

# Object Oriented Design Quality Metrics

## References

- [Analyze java package metrics in a graph database](#)
- [Calculate metrics](#)
- [jqassistant](#)
- [notebook walks through examples for integrating various packages with Neo4j](#)
- [OO Design Quality Metrics](#)
- [A Validation of Martin's Metric](#)
- [Neo4j Python Driver](#)

## Incoming Dependencies

Incoming dependencies are also denoted as "Fan-in", "Afferent Coupling" or "in-degree". These are the ones that use the listed package.

If these packages get changed, the incoming dependencies might be affected by the change. The more incoming dependencies, the harder it gets to change the code without the need to adapt the dependent code ("rigid code"). Even worse, it might affect the behavior of the dependent code in an unwanted way ("fragile code").

Since Java Packages are organized hierarchically, incoming dependencies can be count for every package in isolation or by including all of its sub-packages. The latter one is done without top level packages like for example "org" or "org.company" by assuring that only packages are considered that have other packages or types in the same hierarchy level ("siblings").

### Table 1a

- Show the top 20 Java Packages with the most incoming dependencies
- Set the "incomingDependencies" properties on Package nodes.

|    | artifactName             | fullQualifiedPackageName                        | packageName     | incomingDependencies | incomingDependenciesWeight | incomingDependentTypes | i   |
|----|--------------------------|-------------------------------------------------|-----------------|----------------------|----------------------------|------------------------|-----|
| 0  | axon-messaging-4.9.3     | org.axonframework.messaging                     | messaging       | 8706                 | 25535                      |                        | 329 |
| 1  | axon-messaging-4.9.3     | org.axonframework.eventhandling                 | eventhandling   | 5363                 | 23731                      |                        | 301 |
| 2  | axon-messaging-4.9.3     | org.axonframework.commandhandling               | commandhandling | 1641                 | 5354                       |                        | 126 |
| 3  | axon-messaging-4.9.3     | org.axonframework.serialization                 | serialization   | 1233                 | 5088                       |                        | 138 |
| 4  | axon-messaging-4.9.3     | org.axonframework.messaging.annotation          | annotation      | 1057                 | 4012                       |                        | 151 |
| 5  | axon-messaging-4.9.3     | org.axonframework.common                        | common          | 926                  | 2126                       |                        | 338 |
| 6  | axon-messaging-4.9.3     | org.axonframework.tracing                       | tracing         | 516                  | 2293                       |                        | 93  |
| 7  | axon-messaging-4.9.3     | org.axonframework.common.transaction            | transaction     | 314                  | 988                        |                        | 76  |
| 8  | axon-modelling-4.9.3     | org.axonframework.modelling.command             | command         | 269                  | 927                        |                        | 79  |
| 9  | axon-modelling-4.9.3     | org.axonframework.modelling.saga                | saga            | 257                  | 1132                       |                        | 60  |
| 10 | axon-messaging-4.9.3     | org.axonframework.messaging.unitofwork          | unitofwork      | 256                  | 1064                       |                        | 82  |
| 11 | axon-messaging-4.9.3     | org.axonframework.deadline                      | deadline        | 238                  | 1229                       |                        | 42  |
| 12 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.jdbc | jdbc            | 218                  | 1205                       |                        | 26  |
| 13 | axon-messaging-4.9.3     | org.axonframework.queryhandling                 | queryhandling   | 214                  | 858                        |                        | 55  |
| 14 | axon-messaging-4.9.3     | org.axonframework.messaging.deadletter          | deadletter      | 197                  | 1140                       |                        | 35  |
| 15 | axon-messaging-4.9.3     | org.axonframework.monitoring                    | monitoring      | 188                  | 500                        |                        | 39  |
| 16 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore      | eventstore      | 169                  | 689                        |                        | 60  |
| 17 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing                 | eventsourcing   | 141                  | 568                        |                        | 44  |
| 18 | axon-configuration-4.9.3 | org.axonframework.config                        | config          | 118                  | 1224                       |                        | 35  |
| 19 | axon-messaging-4.9.3     | org.axonframework.commandhandling.gateway       | gateway         | 97                   | 341                        |                        | 33  |

Table 1b

- Show the top 20 Java Packages including their sub-packages with the most incoming dependencies
- Set the property "incomingDependenciesIncludingSubpackages" on Package nodes.

|    | artifactName             | fullQualifiedPackageName                   | packageName     | incomingDependencies | incomingDependenciesWeight | incomingDependentTypes | incc |
|----|--------------------------|--------------------------------------------|-----------------|----------------------|----------------------------|------------------------|------|
| 0  | axon-messaging-4.9.3     | org.axonframework.messaging                | messaging       | 7690                 | 24528                      | 328                    |      |
| 1  | axon-messaging-4.9.3     | org.axonframework.eventhandling            | eventhandling   | 3109                 | 12117                      | 142                    |      |
| 2  | axon-messaging-4.9.3     | org.axonframework.common                   | common          | 1269                 | 3565                       | 360                    |      |
| 3  | axon-messaging-4.9.3     | org.axonframework.serialization            | serialization   | 1069                 | 4438                       | 92                     |      |
| 4  | axon-messaging-4.9.3     | org.axonframework.messaging.annotation     | annotation      | 938                  | 3665                       | 106                    |      |
| 5  | axon-messaging-4.9.3     | org.axonframework.commandhandling          | commandhandling | 784                  | 3114                       | 57                     |      |
| 6  | axon-messaging-4.9.3     | org.axonframework.tracing                  | tracing         | 466                  | 2085                       | 72                     |      |
| 7  | axon-messaging-4.9.3     | org.axonframework.common.transaction       | transaction     | 308                  | 974                        | 73                     |      |
| 8  | axon-messaging-4.9.3     | org.axonframework.messaging.unitofwork     | unitofwork      | 219                  | 847                        | 71                     |      |
| 9  | axon-messaging-4.9.3     | org.axonframework.monitoring               | monitoring      | 178                  | 470                        | 34                     |      |
| 10 | axon-messaging-4.9.3     | org.axonframework.messaging.deadletter     | deadletter      | 165                  | 1008                       | 20                     |      |
| 11 | axon-modelling-4.9.3     | org.axonframework.modelling.command        | command         | 159                  | 526                        | 37                     |      |
| 12 | axon-messaging-4.9.3     | org.axonframework.deadline                 | deadline        | 114                  | 727                        | 19                     |      |
| 13 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing            | eventsourcing   | 101                  | 385                        | 14                     |      |
| 14 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore | eventstore      | 85                   | 230                        | 23                     |      |
| 15 | axon-modelling-4.9.3     | org.axonframework.modelling.saga           | saga            | 74                   | 225                        | 18                     |      |
| 16 | axon-messaging-4.9.3     | org.axonframework.lifecycle                | lifecycle       | 65                   | 161                        | 19                     |      |
| 17 | axon-messaging-4.9.3     | org.axonframework.messaging.responsetypes  | responsetypes   | 61                   | 280                        | 14                     |      |
| 18 | axon-messaging-4.9.3     | org.axonframework.queryhandling            | queryhandling   | 53                   | 178                        | 8                      |      |
| 19 | axon-messaging-4.9.3     | org.axonframework.eventhandling.tokenstore | tokenstore      | 47                   | 186                        | 21                     |      |

## Outgoing Dependencies

Outgoing dependencies are also denoted as "Fan-out", "Efferent Coupling" or "out-degree". These are the ones that are used by the listed package.

Code from other packages and libraries you're depending on (outgoing) might change over time. The more outgoing changes, the more likely and frequently code changes are needed. This involves time and effort which can be reduced by automation of tests and version updates. Automated tests are crucial to reveal updates, that change the behavior of the code unexpectedly ("fragile code"). As soon as more

effort is required, keeping up becomes difficult ("rigid code"). Not being able to use a newer version might not only restrict features, it can get problematic if there are security issues. This might force you to take "fast but ugly" solutions into account which further increases technical dept.

Since Java Packages are organized hierarchically, outgoing dependencies can be count for every package in isolation or by including all of its sub-packages. The latter one is done without top level packages like for example "org" or "org.company" by assuring that only packages are considered that have other packages or types in the same hierarchy level ("siblings").

## Table 2a

- Show the top 20 Java Packages with the most outgoing dependencies
- Set the "outgoingDependencies" properties on Package nodes.

|    | artifactName             | fullQualifiedPackageName                        | packageName     | outgoingDependencies | outgoingDependenciesWeight | outgoingDependentTypes |
|----|--------------------------|-------------------------------------------------|-----------------|----------------------|----------------------------|------------------------|
| 0  | axon-configuration-4.9.3 | org.axonframework.config                        | config          | 9863                 | 37635                      | 241                    |
| 1  | axon-test-4.9.3          | org.axonframework.test.aggregate                | aggregate       | 2210                 | 7943                       | 92                     |
| 2  | axon-messaging-4.9.3     | org.axonframework.eventhandling                 | eventhandling   | 1563                 | 6457                       | 160                    |
| 3  | axon-disruptor-4.9.3     | org.axonframework.disruptor.commandhandling     | commandhandling | 1453                 | 5180                       | 84                     |
| 4  | axon-test-4.9.3          | org.axonframework.test.saga                     | saga            | 1419                 | 4096                       | 81                     |
| 5  | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.jdbc | jdbc            | 1340                 | 6712                       | 51                     |
| 6  | axon-messaging-4.9.3     | org.axonframework.queryhandling                 | queryhandling   | 1141                 | 5254                       | 86                     |
| 7  | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing                 | eventsourcing   | 1009                 | 3348                       | 95                     |
| 8  | axon-messaging-4.9.3     | org.axonframework.eventhandling.pooled          | pooled          | 885                  | 4117                       | 56                     |
| 9  | axon-modelling-4.9.3     | org.axonframework.modelling.command             | command         | 842                  | 3161                       | 94                     |
| 10 | axon-modelling-4.9.3     | org.axonframework.modelling.command.inspection  | inspection      | 781                  | 3026                       | 73                     |
| 11 | axon-messaging-4.9.3     | org.axonframework.commandhandling.distributed   | distributed     | 738                  | 2227                       | 74                     |
| 12 | axon-messaging-4.9.3     | org.axonframework.commandhandling               | commandhandling | 691                  | 1832                       | 74                     |
| 13 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore      | eventstore      | 613                  | 1981                       | 65                     |
| 14 | axon-messaging-4.9.3     | org.axonframework.eventhandling.deadletter.jdbc | jdbc            | 560                  | 3512                       | 49                     |
| 15 | axon-messaging-4.9.3     | org.axonframework.deadline.dbscheduler          | dbscheduler     | 488                  | 1845                       | 40                     |
| 16 | axon-messaging-4.9.3     | org.axonframework.deadline.quartz               | quartz          | 453                  | 1492                       | 40                     |
| 17 | axon-messaging-4.9.3     | org.axonframework.commandhandling.gateway       | gateway         | 443                  | 1199                       | 56                     |
| 18 | axon-modelling-4.9.3     | org.axonframework.modelling.saga                | saga            | 432                  | 1464                       | 62                     |
| 19 | axon-messaging-4.9.3     | org.axonframework.deadline.jobrunr              | jobrunr         | 419                  | 1315                       | 37                     |

Table 2b

- Show the top 20 Java Packages including their sub-packages with the most outgoing dependencies
- Set the property "outgoingDependenciesIncludingSubpackages" on Package nodes.

|    | artifactName             | fullQualifiedPackageName                       | packageName     | outgoingDependencies | outgoingDependenciesWeight | outgoingDependentTypes |
|----|--------------------------|------------------------------------------------|-----------------|----------------------|----------------------------|------------------------|
| 0  | axon-messaging-4.9.3     | org.axonframework.eventhandling                | eventhandling   | 585                  | 2115                       | 106                    |
| 1  | axon-configuration-4.9.3 | org.axonframework.config                       | config          | 539                  | 1689                       | 201                    |
| 2  | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing                | eventsourcing   | 380                  | 1319                       | 95                     |
| 3  | axon-test-4.9.3          | org.axonframework.test                         | test            | 273                  | 791                        | 99                     |
| 4  | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore     | eventstore      | 245                  | 914                        | 58                     |
| 5  | axon-modelling-4.9.3     | org.axonframework.modelling.command            | command         | 230                  | 759                        | 63                     |
| 6  | axon-messaging-4.9.3     | org.axonframework.eventhandling.deadletter     | deadletter      | 207                  | 993                        | 57                     |
| 7  | axon-messaging-4.9.3     | org.axonframework.commandhandling              | commandhandling | 195                  | 482                        | 67                     |
| 8  | axon-messaging-4.9.3     | org.axonframework.deadline                     | deadline        | 190                  | 608                        | 48                     |
| 9  | axon-messaging-4.9.3     | org.axonframework.messaging                    | messaging       | 183                  | 480                        | 27                     |
| 10 | axon-messaging-4.9.3     | org.axonframework.queryhandling                | queryhandling   | 175                  | 607                        | 51                     |
| 11 | axon-modelling-4.9.3     | org.axonframework.modelling.saga               | saga            | 155                  | 474                        | 58                     |
| 12 | axon-test-4.9.3          | org.axonframework.test.aggregate               | aggregate       | 149                  | 548                        | 74                     |
| 13 | axon-disruptor-4.9.3     | org.axonframework.disruptor.commandhandling    | commandhandling | 130                  | 436                        | 62                     |
| 14 | axon-modelling-4.9.3     | org.axonframework.modelling.command.inspection | inspection      | 119                  | 416                        | 51                     |
| 15 | axon-test-4.9.3          | org.axonframework.test.saga                    | saga            | 111                  | 387                        | 60                     |
| 16 | axon-messaging-4.9.3     | org.axonframework.eventhandling.pooled         | pooled          | 105                  | 453                        | 35                     |
| 17 | axon-modelling-4.9.3     | org.axonframework.modelling.saga.repository    | repository      | 103                  | 441                        | 34                     |
| 18 | axon-messaging-4.9.3     | org.axonframework.commandhandling.distributed  | distributed     | 93                   | 248                        | 48                     |
| 19 | axon-messaging-4.9.3     | org.axonframework.eventhandling.scheduling     | scheduling      | 88                   | 291                        | 22                     |

## Instability

$$Instability = \frac{Outgoing\ Dependencies}{Outgoing\ Dependencies + Incoming\ Dependencies}$$

*Instability* is expressed as the ratio of the number of outgoing dependencies of a module (i.e., the number of packages that depend on it) to the total number of dependencies (i.e., the sum of incoming and outgoing dependencies).

Small values near zero indicate low *Instability*. With no outgoing but some incoming dependencies the Instability is zero which is denoted as maximally stable. Such code units are more rigid and difficult to

change without impacting other parts of the system. If they are changed less because of that, they are considered stable.

Conversely, high values approaching one indicate high *Instability*. With some outgoing dependencies but no incoming ones the *Instability* is denoted as maximally unstable. Such code units are easier to change without affecting other modules, making them more flexible and less prone to cascading changes throughout the system. If they are changed more often because of that, they are considered unstable.

Since Java Packages are organized hierarchically, *Instability* can be calculated for every package in isolation or by including all of its sub-packages.

### Table 3a

- Show the top 20 Java Packages with the lowest *Instability*
- Set the property "instability" on Package nodes.

|    | artifactName         | fullQualifiedPackageName                   | packageName     | instability | instabilityTypes | instabilityInterfaces | instabilityPackages | instabilityArtifacts |
|----|----------------------|--------------------------------------------|-----------------|-------------|------------------|-----------------------|---------------------|----------------------|
| 0  | axon-messaging-4.9.3 | org.axonframework.messaging                | messaging       | 0.015047    | 0.096154         | 0.185185              | 0.101695            | 0.0                  |
| 1  | axon-messaging-4.9.3 | org.axonframework.common.transaction       | transaction     | 0.018750    | 0.050000         | 0.000000              | 0.034483            | 0.0                  |
| 2  | axon-messaging-4.9.3 | org.axonframework.common                   | common          | 0.024236    | 0.042493         | 0.000000              | 0.012658            | 0.0                  |
| 3  | axon-messaging-4.9.3 | org.axonframework.eventhandling.scheduling | scheduling      | 0.090909    | 0.142857         | 0.000000              | 0.222222            | 0.0                  |
| 4  | axon-messaging-4.9.3 | org.axonframework.monitoring               | monitoring      | 0.100478    | 0.152174         | 0.333333              | 0.230769            | 0.0                  |
| 5  | axon-messaging-4.9.3 | org.axonframework.common.annotation        | annotation      | 0.120000    | 0.120000         | 0.000000              | 0.166667            | 0.0                  |
| 6  | axon-messaging-4.9.3 | org.axonframework.lifecycle                | lifecycle       | 0.123457    | 0.233333         | 0.000000              | 0.176471            | 0.0                  |
| 7  | axon-messaging-4.9.3 | org.axonframework.serialization            | serialization   | 0.124911    | 0.250000         | 0.318182              | 0.214286            | 0.0                  |
| 8  | axon-messaging-4.9.3 | org.axonframework.common.stream            | stream          | 0.147059    | 0.166667         | 0.000000              | 0.125000            | 0.0                  |
| 9  | axon-messaging-4.9.3 | org.axonframework.tracing                  | tracing         | 0.191223    | 0.225000         | 0.480000              | 0.333333            | 0.0                  |
| 10 | axon-messaging-4.9.3 | org.axonframework.messaging.annotation     | annotation      | 0.221649    | 0.307339         | 0.406250              | 0.218750            | 0.0                  |
| 11 | axon-messaging-4.9.3 | org.axonframework.eventhandling            | eventhandling   | 0.225671    | 0.347072         | 0.500000              | 0.258065            | 0.0                  |
| 12 | axon-messaging-4.9.3 | org.axonframework.common.jpa               | jpa             | 0.272727    | 0.250000         | 1.000000              | 0.300000            | 0.0                  |
| 13 | axon-messaging-4.9.3 | org.axonframework.commandhandling          | commandhandling | 0.296312    | 0.370000         | 0.612245              | 0.333333            | 0.0                  |
| 14 | axon-messaging-4.9.3 | org.axonframework.common.legacyjpa         | legacyjpa       | 0.300000    | 0.277778         | 1.000000              | 0.333333            | 0.0                  |
| 15 | axon-messaging-4.9.3 | org.axonframework.serialization.upcasting  | upcasting       | 0.312500    | 0.083333         | 0.000000              | 0.333333            | 0.0                  |
| 16 | axon-messaging-4.9.3 | org.axonframework.messaging.unitofwork     | unitofwork      | 0.324538    | 0.196078         | 0.583333              | 0.121951            | 0.0                  |
| 17 | axon-messaging-4.9.3 | org.axonframework.common.digest            | digest          | 0.333333    | 0.333333         | 0.000000              | 0.333333            | 0.0                  |
| 18 | axon-messaging-4.9.3 | org.axonframework.messaging.deadletter     | deadletter      | 0.341137    | 0.396552         | 0.500000              | 0.454545            | 0.0                  |
| 19 | axon-messaging-4.9.3 | org.axonframework.common.lock              | lock            | 0.352113    | 0.363636         | 0.500000              | 0.222222            | 0.0                  |

Table 3b

- Show the top 20 Java Packages including their sub-packages with the lowest *Instability*
- Set the property "instabilityIncludingSubpackages" on Package nodes.



|    | artifactName             | fullQualifiedPackageName                     | packageName     | instability | instabilityTypes | instabilityInterfaces | instabilityPackages | instabilityArtifacts |
|----|--------------------------|----------------------------------------------|-----------------|-------------|------------------|-----------------------|---------------------|----------------------|
| 0  | axon-messaging-4.9.3     | org.axonframework.common                     | common          | 0.003925    | 0.013699         | 0.000000              | 0.027778            | 0.000000             |
| 1  | axon-messaging-4.9.3     | org.axonframework.messaging                  | messaging       | 0.023244    | 0.076056         | 0.400000              | 0.133333            | 0.000000             |
| 2  | axon-messaging-4.9.3     | org.axonframework.monitoring                 | monitoring      | 0.043011    | 0.055556         | 0.454545              | 0.181818            | 0.000000             |
| 3  | axon-messaging-4.9.3     | org.axonframework.serialization              | serialization   | 0.044683    | 0.206897         | 0.200000              | 0.222222            | 0.000000             |
| 4  | axon-messaging-4.9.3     | org.axonframework.lifecycle                  | lifecycle       | 0.057971    | 0.095238         | 0.000000              | 0.133333            | 0.000000             |
| 5  | axon-messaging-4.9.3     | org.axonframework.tracing                    | tracing         | 0.066132    | 0.162791         | 0.187500              | 0.333333            | 0.000000             |
| 6  | axon-messaging-4.9.3     | org.axonframework.messaging.annotation       | annotation      | 0.074951    | 0.158730         | 0.424242              | 0.200000            | 0.000000             |
| 7  | axon-messaging-4.9.3     | org.axonframework.common.annotation          | annotation      | 0.086957    | 0.086957         | 0.000000              | 0.100000            | 0.000000             |
| 8  | axon-messaging-4.9.3     | org.axonframework.common.lock                | lock            | 0.107143    | 0.142857         | 0.000000              | 0.142857            | 0.000000             |
| 9  | axon-messaging-4.9.3     | org.axonframework.messaging.unitofwork       | unitofwork      | 0.113360    | 0.101266         | 0.375000              | 0.102564            | 0.000000             |
| 10 | axon-messaging-4.9.3     | org.axonframework.eventhandling              | eventhandling   | 0.158365    | 0.427419         | 0.463636              | 0.425532            | 0.000000             |
| 11 | axon-messaging-4.9.3     | org.axonframework.common.property            | property        | 0.166667    | 0.250000         | 0.000000              | 0.200000            | 0.000000             |
| 12 | axon-messaging-4.9.3     | org.axonframework.messaging.responsetypes    | responsetypes   | 0.175676    | 0.416667         | 0.000000              | 0.625000            | 0.000000             |
| 13 | axon-messaging-4.9.3     | org.axonframework.common.jdbc                | jdbc            | 0.177778    | 0.259259         | 0.000000              | 0.333333            | 0.000000             |
| 14 | axon-messaging-4.9.3     | org.axonframework.common.jpa                 | jpa             | 0.187500    | 0.142857         | 0.000000              | 0.250000            | 0.000000             |
| 15 | axon-messaging-4.9.3     | org.axonframework.messaging.deadletter       | deadletter      | 0.191176    | 0.310345         | 0.466667              | 0.444444            | 0.000000             |
| 16 | axon-messaging-4.9.3     | org.axonframework.commandhandling            | commandhandling | 0.199183    | 0.540323         | 0.512821              | 0.500000            | 0.000000             |
| 17 | axon-messaging-4.9.3     | org.axonframework.common.legacyjpa           | legacyjpa       | 0.214286    | 0.166667         | 0.000000              | 0.285714            | 0.000000             |
| 18 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.snapshotting | snapshotting    | 0.230769    | 0.307692         | 0.500000              | 0.375000            | 0.000000             |
| 19 | axon-messaging-4.9.3     | org.axonframework.messaging.correlation      | correlation     | 0.266667    | 0.222222         | 0.500000              | 0.250000            | 0.000000             |

## Abstractness

$$Abstractness = \frac{\text{abstract classes in category}}{\text{total number of classes in category}}$$

Package *Abstractness* is expressed as the ratio of the number of abstract classes and interfaces to the total number of classes of a package.

Zero *Abstractness* means that there are no abstract types or interfaces in the package. On the other hand, a value of one means that there are only abstract types.

Since Java Packages are organized hierarchically, *Abstractness* can be calculated for every package in isolation or by including all of its sub-packages.

Table 4a

- Show the top 30 packages with the lowest *Abstractness*
- Set the property "abstractness" on Package nodes.

|    | artifactName             | fullQualifiedPackageName                          | packageName      | abstractness | numberAbstractTypes | numberTypes |
|----|--------------------------|---------------------------------------------------|------------------|--------------|---------------------|-------------|
| 0  | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.leg... | legacyjpa        | 0.0          | 0                   | 10          |
| 1  | axon-messaging-4.9.3     | org.axonframework.commandhandling.distributed.... | commandfilter    | 0.0          | 0                   | 7           |
| 2  | axon-messaging-4.9.3     | org.axonframework.deadline.dbscheduler            | dbscheduler      | 0.0          | 0                   | 7           |
| 3  | axon-messaging-4.9.3     | org.axonframework.eventhandling.scheduling.dbs... | dbscheduler      | 0.0          | 0                   | 7           |
| 4  | axon-messaging-4.9.3     | org.axonframework.serialization.json              | json             | 0.0          | 0                   | 7           |
| 5  | axon-messaging-4.9.3     | org.axonframework.serialization.xml               | xml              | 0.0          | 0                   | 7           |
| 6  | axon-messaging-4.9.3     | org.axonframework.tracing.attributes              | attributes       | 0.0          | 0                   | 6           |
| 7  | axon-messaging-4.9.3     | org.axonframework.eventhandling.deadletter        | deadletter       | 0.0          | 0                   | 5           |
| 8  | axon-messaging-4.9.3     | org.axonframework.serialization.converters        | converters       | 0.0          | 0                   | 5           |
| 9  | axon-test-4.9.3          | org.axonframework.test.server                     | server           | 0.0          | 0                   | 4           |
| 10 | axon-messaging-4.9.3     | org.axonframework.commandhandling.callbacks       | callbacks        | 0.0          | 0                   | 4           |
| 11 | axon-messaging-4.9.3     | org.axonframework.deadline.quartz                 | quartz           | 0.0          | 0                   | 4           |
| 12 | axon-messaging-4.9.3     | org.axonframework.eventhandling.scheduling.java   | java             | 0.0          | 0                   | 4           |
| 13 | axon-messaging-4.9.3     | org.axonframework.eventhandling.tokenstore.jpa    | jpa              | 0.0          | 0                   | 4           |
| 14 | axon-modelling-4.9.3     | org.axonframework.modelling.saga.repository.le... | legacyjpa        | 0.0          | 0                   | 3           |
| 15 | axon-messaging-4.9.3     | org.axonframework.eventhandling.scheduling.job... | jobrunr          | 0.0          | 0                   | 3           |
| 16 | axon-messaging-4.9.3     | org.axonframework.util                            | util             | 0.0          | 0                   | 3           |
| 17 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.inm... | inmemory         | 0.0          | 0                   | 2           |
| 18 | axon-modelling-4.9.3     | org.axonframework.modelling.command.legacyjpa     | legacyjpa        | 0.0          | 0                   | 2           |
| 19 | axon-modelling-4.9.3     | org.axonframework.modelling.saga.repository.in... | inmemory         | 0.0          | 0                   | 2           |
| 20 | axon-messaging-4.9.3     | org.axonframework.eventhandling.tokenstore.inm... | inmemory         | 0.0          | 0                   | 2           |
| 21 | axon-messaging-4.9.3     | org.axonframework.eventhandling.tokenstore.leg... | legacyjpa        | 0.0          | 0                   | 2           |
| 22 | axon-messaging-4.9.3     | org.axonframework.messaging.interceptors.legac... | legacyvalidation | 0.0          | 0                   | 2           |
| 23 | axon-messaging-4.9.3     | org.axonframework.common.digest                   | digest           | 0.0          | 0                   | 1           |
| 24 | axon-messaging-4.9.3     | org.axonframework.common.io                       | io               | 0.0          | 0                   | 1           |
| 25 | axon-messaging-4.9.3     | org.axonframework.eventhandling.interceptors      | interceptors     | 0.0          | 0                   | 1           |
| 26 | axon-eventsourcing-4.9.3 | org                                               | org              | 0.0          | 0                   | 0           |
| 27 | axon-eventsourcing-4.9.3 | org.axonframework                                 | axonframework    | 0.0          | 0                   | 0           |
| 28 | axon-test-4.9.3          | org                                               | org              | 0.0          | 0                   | 0           |
| 29 | axon-test-4.9.3          | org.axonframework                                 | axonframework    | 0.0          | 0                   | 0           |

Table 4b

- Show the top 30 packages with the highest *Abstractness* and number of Java Types

|     | artifactName             | fullQualifiedPackageName                           | packageName        | abstractness | numberAbstractTypes | numberTypes |
|-----|--------------------------|----------------------------------------------------|--------------------|--------------|---------------------|-------------|
| 106 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.jdbc... | statements         | 1.000000     | 15                  | 15          |
| 105 | axon-messaging-4.9.3     | org.axonframework.serialization.upcasting          | upcasting          | 0.833333     | 5                   | 6           |
| 102 | axon-messaging-4.9.3     | org.axonframework.common.annotation                | annotation         | 0.666667     | 2                   | 3           |
| 103 | axon-messaging-4.9.3     | org.axonframework.common.stream                    | stream             | 0.666667     | 2                   | 3           |
| 104 | axon-messaging-4.9.3     | org.axonframework.eventhandling.scheduling         | scheduling         | 0.666667     | 2                   | 3           |
| 101 | axon-messaging-4.9.3     | org.axonframework.common                           | common             | 0.642857     | 18                  | 28          |
| 98  | axon-messaging-4.9.3     | org.axonframework.messaging                        | messaging          | 0.600000     | 21                  | 35          |
| 99  | axon-messaging-4.9.3     | org.axonframework.lifecycle                        | lifecycle          | 0.600000     | 6                   | 10          |
| 100 | axon-messaging-4.9.3     | org.axonframework.eventhandling.gateway            | gateway            | 0.600000     | 3                   | 5           |
| 95  | axon-messaging-4.9.3     | org.axonframework.serialization.upcasting.event    | event              | 0.500000     | 6                   | 12          |
| 96  | axon-modelling-4.9.3     | org.axonframework.modelling.saga.metamodel         | metamodel          | 0.500000     | 2                   | 4           |
| 97  | axon-messaging-4.9.3     | org.axonframework.common.transaction               | transaction        | 0.500000     | 2                   | 4           |
| 93  | axon-messaging-4.9.3     | org.axonframework.common.jdbc                      | jdbc               | 0.444444     | 8                   | 18          |
| 94  | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.conflictresolu...  | conflictresolution | 0.444444     | 4                   | 9           |
| 92  | axon-modelling-4.9.3     | org.axonframework.modelling.command                | command            | 0.425926     | 23                  | 54          |
| 91  | axon-configuration-4.9.3 | org.axonframework.config                           | config             | 0.425000     | 17                  | 40          |
| 90  | axon-messaging-4.9.3     | org.axonframework.eventhandling                    | eventhandling      | 0.410000     | 41                  | 100         |
| 86  | axon-test-4.9.3          | org.axonframework.test.utils                       | utils              | 0.400000     | 2                   | 5           |
| 87  | axon-test-4.9.3          | org.axonframework.test.eventscheduler              | eventscheduler     | 0.400000     | 2                   | 5           |
| 88  | axon-messaging-4.9.3     | org.axonframework.deadline.annotation              | annotation         | 0.400000     | 2                   | 5           |
| 89  | axon-messaging-4.9.3     | org.axonframework.queryhandling.registration       | registration       | 0.400000     | 2                   | 5           |
| 85  | axon-modelling-4.9.3     | org.axonframework.modelling.saga                   | saga               | 0.393939     | 13                  | 33          |
| 82  | axon-messaging-4.9.3     | org.axonframework.commandhandling                  | commandhandling    | 0.375000     | 12                  | 32          |
| 83  | axon-messaging-4.9.3     | org.axonframework.messaging.interceptors           | interceptors       | 0.375000     | 3                   | 8           |
| 84  | axon-messaging-4.9.3     | org.axonframework.messaging.responsetypes          | responsetypes      | 0.375000     | 3                   | 8           |
| 81  | axon-messaging-4.9.3     | org.axonframework.messaging.deadletter             | deadletter         | 0.368421     | 7                   | 19          |
| 80  | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore         | eventstore         | 0.354839     | 11                  | 31          |
| 78  | axon-modelling-4.9.3     | org.axonframework.modelling.command.inspection     | inspection         | 0.346154     | 9                   | 26          |
| 79  | axon-messaging-4.9.3     | org.axonframework.commandhandling.distributed      | distributed        | 0.346154     | 9                   | 26          |
| 74  | axon-test-4.9.3          | org.axonframework.test.saga                        | saga               | 0.333333     | 7                   | 21          |

Table 4c

- Show the top 30 packages including their sub-packages with the highest package depth and lowest *Abstractness*
- Set the property "abstractnessIncludingSubpackages" on Package nodes.

|    | artifactName             | fullQualifiedPackageName                          | packageName      | abstractness | numberAbstractTypes | numberTypes | maxSubpackageDepth |
|----|--------------------------|---------------------------------------------------|------------------|--------------|---------------------|-------------|--------------------|
| 0  | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.leg... | legacyjpa        | 0.000000     | 0                   | 10          | 0                  |
| 1  | axon-messaging-4.9.3     | org.axonframework.commandhandling.distributed.... | commandfilter    | 0.000000     | 0                   | 7           | 0                  |
| 2  | axon-messaging-4.9.3     | org.axonframework.deadline.dbscheduler            | dbscheduler      | 0.000000     | 0                   | 7           | 0                  |
| 3  | axon-messaging-4.9.3     | org.axonframework.eventhandling.scheduling.dbs... | dbscheduler      | 0.000000     | 0                   | 7           | 0                  |
| 4  | axon-messaging-4.9.3     | org.axonframework.serialization.json              | json             | 0.000000     | 0                   | 7           | 0                  |
| 5  | axon-messaging-4.9.3     | org.axonframework.serialization.xml               | xml              | 0.000000     | 0                   | 7           | 0                  |
| 6  | axon-messaging-4.9.3     | org.axonframework.tracing.attributes              | attributes       | 0.000000     | 0                   | 6           | 0                  |
| 7  | axon-messaging-4.9.3     | org.axonframework.serialization.converters        | converters       | 0.000000     | 0                   | 5           | 0                  |
| 8  | axon-test-4.9.3          | org.axonframework.test.server                     | server           | 0.000000     | 0                   | 4           | 0                  |
| 9  | axon-messaging-4.9.3     | org.axonframework.commandhandling.callbacks       | callbacks        | 0.000000     | 0                   | 4           | 0                  |
| 10 | axon-messaging-4.9.3     | org.axonframework.deadline.quartz                 | quartz           | 0.000000     | 0                   | 4           | 0                  |
| 11 | axon-messaging-4.9.3     | org.axonframework.eventhandling.scheduling.java   | java             | 0.000000     | 0                   | 4           | 0                  |
| 12 | axon-messaging-4.9.3     | org.axonframework.eventhandling.tokenstore.jpa    | jpa              | 0.000000     | 0                   | 4           | 0                  |
| 13 | axon-modelling-4.9.3     | org.axonframework.modelling.saga.repository.le... | legacyjpa        | 0.000000     | 0                   | 3           | 0                  |
| 14 | axon-messaging-4.9.3     | org.axonframework.eventhandling.scheduling.job... | jobrunr          | 0.000000     | 0                   | 3           | 0                  |
| 15 | axon-messaging-4.9.3     | org.axonframework.util                            | util             | 0.000000     | 0                   | 3           | 0                  |
| 16 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.inm... | inmemory         | 0.000000     | 0                   | 2           | 0                  |
| 17 | axon-modelling-4.9.3     | org.axonframework.modelling.command.legacyjpa     | legacyjpa        | 0.000000     | 0                   | 2           | 0                  |
| 18 | axon-modelling-4.9.3     | org.axonframework.modelling.saga.repository.in... | inmemory         | 0.000000     | 0                   | 2           | 0                  |
| 19 | axon-messaging-4.9.3     | org.axonframework.eventhandling.tokenstore.inm... | inmemory         | 0.000000     | 0                   | 2           | 0                  |
| 20 | axon-messaging-4.9.3     | org.axonframework.eventhandling.tokenstore.leg... | legacyjpa        | 0.000000     | 0                   | 2           | 0                  |
| 21 | axon-messaging-4.9.3     | org.axonframework.messaging.interceptors.legac... | legacyvalidation | 0.000000     | 0                   | 2           | 0                  |
| 22 | axon-messaging-4.9.3     | org.axonframework.common.digest                   | digest           | 0.000000     | 0                   | 1           | 0                  |
| 23 | axon-messaging-4.9.3     | org.axonframework.common.io                       | io               | 0.000000     | 0                   | 1           | 0                  |
| 24 | axon-messaging-4.9.3     | org.axonframework.eventhandling.interceptors      | interceptors     | 0.000000     | 0                   | 1           | 0                  |
| 25 | axon-disruptor-4.9.3     | org.axonframework.disruptor.commandhandling       | commandhandling  | 0.045455     | 1                   | 22          | 0                  |
| 26 | axon-modelling-4.9.3     | org.axonframework.modelling.saga.repository.jdbc  | jdbc             | 0.100000     | 1                   | 10          | 0                  |
| 27 | axon-messaging-4.9.3     | org.axonframework.eventhandling.deadletter.jpa    | jpa              | 0.111111     | 1                   | 9           | 0                  |

|    | artifactName         | fullQualifiedPackageName                        | packageName | abstractness | numberAbstractTypes | numberTypes | maxSubpackageDepth |
|----|----------------------|-------------------------------------------------|-------------|--------------|---------------------|-------------|--------------------|
| 28 | axon-messaging-4.9.3 | org.axonframework.eventhandling.tokenstore.jdbc | jdbc        | 0.111111     | 1                   | 9           | 0                  |
| 29 | axon-messaging-4.9.3 | org.axonframework.eventhandling.tokenstore      | tokenstore  | 0.125000     | 3                   | 24          | 1                  |

Table 4d

- Show the top 30 packages including their sub-packages with the highest package depth and highest *Abstractness*

|    | artifactName             | fullQualifiedPackageName                           | packageName        | abstractness | numberAbstractTypes | numberTypes | maxSubpackageDepth |
|----|--------------------------|----------------------------------------------------|--------------------|--------------|---------------------|-------------|--------------------|
| 92 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.jdbc... | statements         | 1.000000     | 15                  | 15          | 0                  |
| 90 | axon-messaging-4.9.3     | org.axonframework.common.annotation                | annotation         | 0.666667     | 2                   | 3           | 0                  |
| 91 | axon-messaging-4.9.3     | org.axonframework.common.stream                    | stream             | 0.666667     | 2                   | 3           | 0                  |
| 89 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.jdbc    | jdbc               | 0.620690     | 18                  | 29          | 1                  |
| 88 | axon-messaging-4.9.3     | org.axonframework.serialization.upcasting          | upcasting          | 0.611111     | 11                  | 18          | 1                  |
| 86 | axon-messaging-4.9.3     | org.axonframework.lifecycle                        | lifecycle          | 0.600000     | 6                   | 10          | 0                  |
| 87 | axon-messaging-4.9.3     | org.axonframework.eventhandling.gateway            | gateway            | 0.600000     | 3                   | 5           | 0                  |
| 83 | axon-messaging-4.9.3     | org.axonframework.serialization.upcasting.event    | event              | 0.500000     | 6                   | 12          | 0                  |
| 84 | axon-modelling-4.9.3     | org.axonframework.modelling.saga.metamodel         | metamodel          | 0.500000     | 2                   | 4           | 0                  |
| 85 | axon-messaging-4.9.3     | org.axonframework.common.transaction               | transaction        | 0.500000     | 2                   | 4           | 0                  |
| 81 | axon-messaging-4.9.3     | org.axonframework.common.jdbc                      | jdbc               | 0.444444     | 8                   | 18          | 0                  |
| 82 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.conflictresolu...  | conflictresolution | 0.444444     | 4                   | 9           | 0                  |
| 80 | axon-messaging-4.9.3     | org.axonframework.common                           | common             | 0.425743     | 43                  | 101         | 1                  |
| 79 | axon-configuration-4.9.3 | org.axonframework.config                           | config             | 0.425000     | 17                  | 40          | 0                  |
| 75 | axon-test-4.9.3          | org.axonframework.test.utils                       | utils              | 0.400000     | 2                   | 5           | 0                  |
| 76 | axon-test-4.9.3          | org.axonframework.test.eventscheduler              | eventscheduler     | 0.400000     | 2                   | 5           | 0                  |
| 77 | axon-messaging-4.9.3     | org.axonframework.deadline.annotation              | annotation         | 0.400000     | 2                   | 5           | 0                  |
| 78 | axon-messaging-4.9.3     | org.axonframework.queryhandling.registration       | registration       | 0.400000     | 2                   | 5           | 0                  |
| 74 | axon-modelling-4.9.3     | org.axonframework.modelling.command                | command            | 0.390244     | 32                  | 82          | 1                  |
| 73 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore         | eventstore         | 0.379747     | 30                  | 79          | 2                  |
| 71 | axon-messaging-4.9.3     | org.axonframework.messaging                        | messaging          | 0.375000     | 54                  | 144         | 2                  |
| 72 | axon-messaging-4.9.3     | org.axonframework.messaging.responsetypes          | responsetypes      | 0.375000     | 3                   | 8           | 0                  |
| 70 | axon-messaging-4.9.3     | org.axonframework.messaging.deadletter             | deadletter         | 0.368421     | 7                   | 19          | 0                  |
| 69 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing                    | eventsourcing      | 0.353383     | 47                  | 133         | 3                  |
| 68 | axon-modelling-4.9.3     | org.axonframework.modelling.command.inspection     | inspection         | 0.346154     | 9                   | 26          | 0                  |
| 64 | axon-test-4.9.3          | org.axonframework.test.saga                        | saga               | 0.333333     | 7                   | 21          | 0                  |
| 65 | axon-messaging-4.9.3     | org.axonframework.common.property                  | property           | 0.333333     | 3                   | 9           | 0                  |
| 66 | axon-messaging-4.9.3     | org.axonframework.monitoring                       | monitoring         | 0.333333     | 2                   | 6           | 0                  |
| 67 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.snapshotting       | snapshotting       | 0.333333     | 1                   | 3           | 0                  |
| 63 | axon-messaging-4.9.3     | org.axonframework.queryhandling                    | queryhandling      | 0.315789     | 18                  | 57          | 1                  |

## Distance from the main sequence

The *main sequence* is a imaginary line that represents a good compromise between *Abstractness* and *Instability*. A high distance to this line may indicate problems. For example is very *stable* (rigid) code with

low abstractness hard to change.

Read more details on that in [OO Design Quality Metrics](#) and [Calculate metrics](#).

Table 5a

- Show the top 30 packages with the highest distance from the "main sequence"

|    | artifactName             | fullQualifiedName                                 | name          | distance | abstractness | instability | elementsCount |
|----|--------------------------|---------------------------------------------------|---------------|----------|--------------|-------------|---------------|
| 0  | axon-messaging-4.9.3     | org.axonframework.tracing.attributes              | attributes    | NaN      | 0.000000     | NaN         | 6             |
| 1  | axon-messaging-4.9.3     | org.axonframework.serialization.converters        | converters    | NaN      | 0.000000     | NaN         | 5             |
| 2  | axon-messaging-4.9.3     | org.axonframework.common.io                       | io            | NaN      | 0.000000     | NaN         | 1             |
| 3  | axon-messaging-4.9.3     | org.axonframework.eventhandling.interceptors      | interceptors  | NaN      | 0.000000     | NaN         | 1             |
| 4  | axon-eventsourcing-4.9.3 | org                                               | org           | NaN      | 0.000000     | NaN         | 0             |
| 5  | axon-eventsourcing-4.9.3 | org.axonframework                                 | axonframework | NaN      | 0.000000     | NaN         | 0             |
| 6  | axon-test-4.9.3          | org                                               | org           | NaN      | 0.000000     | NaN         | 0             |
| 7  | axon-test-4.9.3          | org.axonframework                                 | axonframework | NaN      | 0.000000     | NaN         | 0             |
| 8  | axon-modelling-4.9.3     | org                                               | org           | NaN      | 0.000000     | NaN         | 0             |
| 9  | axon-modelling-4.9.3     | org.axonframework                                 | axonframework | NaN      | 0.000000     | NaN         | 0             |
| 10 | axon-modelling-4.9.3     | org.axonframework.modelling                       | modelling     | NaN      | 0.000000     | NaN         | 0             |
| 11 | axon-disruptor-4.9.3     | org                                               | org           | NaN      | 0.000000     | NaN         | 0             |
| 12 | axon-disruptor-4.9.3     | org.axonframework                                 | axonframework | NaN      | 0.000000     | NaN         | 0             |
| 13 | axon-disruptor-4.9.3     | org.axonframework.disruptor                       | disruptor     | NaN      | 0.000000     | NaN         | 0             |
| 14 | axon-configuration-4.9.3 | org                                               | org           | NaN      | 0.000000     | NaN         | 0             |
| 15 | axon-configuration-4.9.3 | org.axonframework                                 | axonframework | NaN      | 0.000000     | NaN         | 0             |
| 16 | axon-messaging-4.9.3     | org                                               | org           | NaN      | 0.000000     | NaN         | 0             |
| 17 | axon-messaging-4.9.3     | org.axonframework                                 | axonframework | NaN      | 0.000000     | NaN         | 0             |
| 18 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.jdb... | statements    | 0.727273 | 1.000000     | 0.727273    | 15            |
| 19 | axon-messaging-4.9.3     | org.axonframework.common.digest                   | digest        | 0.666667 | 0.000000     | 0.333333    | 1             |
| 20 | axon-messaging-4.9.3     | org.axonframework.serialization                   | serialization | 0.580971 | 0.294118     | 0.124911    | 34            |
| 21 | axon-messaging-4.9.3     | org.axonframework.monitoring                      | monitoring    | 0.566188 | 0.333333     | 0.100478    | 6             |
| 22 | axon-messaging-4.9.3     | org.axonframework.tracing                         | tracing       | 0.545620 | 0.263158     | 0.191223    | 19            |
| 23 | axon-messaging-4.9.3     | org.axonframework.messaging.annotation            | annotation    | 0.500573 | 0.277778     | 0.221649    | 54            |
| 24 | axon-messaging-4.9.3     | org.axonframework.common.transaction              | transaction   | 0.481250 | 0.500000     | 0.018750    | 4             |
| 25 | axon-messaging-4.9.3     | org.axonframework.common.jpa                      | jpa           | 0.477273 | 0.250000     | 0.272727    | 4             |
| 26 | axon-messaging-4.9.3     | org.axonframework.common.lock                     | lock          | 0.466069 | 0.181818     | 0.352113    | 11            |
| 27 | axon-messaging-4.9.3     | org.axonframework.common.legacyjpa                | legacyjpa     | 0.450000 | 0.250000     | 0.300000    | 4             |
| 28 | axon-messaging-4.9.3     | org.axonframework.eventhandling.gateway           | gateway       | 0.425397 | 0.600000     | 0.825397    | 5             |
| 29 | axon-test-4.9.3          | org.axonframework.test.matchers                   | matchers      | 0.419643 | 0.125000     | 0.455357    | 24            |

Table 5b

- Show the top 30 packages including their sub-packages with the highest distance from the "main sequence"

|    | artifactName             | fullQualifiedName                                  | name               | distance | abstractness | instability | elementsCount |
|----|--------------------------|----------------------------------------------------|--------------------|----------|--------------|-------------|---------------|
| 0  | axon-messaging-4.9.3     | org.axonframework.tracing                          | tracing            | 0.733868 | 0.200000     | 0.066132    | 25            |
| 1  | axon-messaging-4.9.3     | org.axonframework.common.lock                      | lock               | 0.711039 | 0.181818     | 0.107143    | 11            |
| 2  | axon-messaging-4.9.3     | org.axonframework.common.digest                    | digest             | 0.666667 | 0.000000     | 0.333333    | 1             |
| 3  | axon-messaging-4.9.3     | org.axonframework.serialization                    | serialization      | 0.659543 | 0.295775     | 0.044683    | 71            |
| 4  | axon-messaging-4.9.3     | org.axonframework.messaging.annotation             | annotation         | 0.647272 | 0.277778     | 0.074951    | 54            |
| 5  | axon-messaging-4.9.3     | org.axonframework.monitoring                       | monitoring         | 0.623656 | 0.333333     | 0.043011    | 6             |
| 6  | axon-test-4.9.3          | org.axonframework.test.matchers                    | matchers           | 0.606707 | 0.125000     | 0.268293    | 24            |
| 7  | axon-messaging-4.9.3     | org.axonframework.messaging                        | messaging          | 0.601756 | 0.375000     | 0.023244    | 144           |
| 8  | axon-messaging-4.9.3     | org.axonframework.messaging.unitofwork             | unitofwork         | 0.600925 | 0.285714     | 0.113360    | 14            |
| 9  | axon-messaging-4.9.3     | org.axonframework.common                           | common             | 0.570333 | 0.425743     | 0.003925    | 101           |
| 10 | axon-messaging-4.9.3     | org.axonframework.eventhandling                    | eventhandling      | 0.566957 | 0.274678     | 0.158365    | 233           |
| 11 | axon-messaging-4.9.3     | org.axonframework.common.jpa                       | jpa                | 0.562500 | 0.250000     | 0.187500    | 4             |
| 12 | axon-messaging-4.9.3     | org.axonframework.common.legacyjpa                 | legacyjpa          | 0.535714 | 0.250000     | 0.214286    | 4             |
| 13 | axon-messaging-4.9.3     | org.axonframework.commandhandling                  | commandhandling    | 0.519264 | 0.281553     | 0.199183    | 103           |
| 14 | axon-messaging-4.9.3     | org.axonframework.common.property                  | property           | 0.500000 | 0.333333     | 0.166667    | 9             |
| 15 | axon-messaging-4.9.3     | org.axonframework.messaging.correlation            | correlation        | 0.483333 | 0.250000     | 0.266667    | 4             |
| 16 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.eventstore.jdbc... | statements         | 0.480769 | 1.000000     | 0.480769    | 15            |
| 17 | axon-messaging-4.9.3     | org.axonframework.messaging.responsetypes          | responsetypes      | 0.449324 | 0.375000     | 0.175676    | 8             |
| 18 | axon-messaging-4.9.3     | org.axonframework.messaging.deadletter             | deadletter         | 0.440402 | 0.368421     | 0.191176    | 19            |
| 19 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.snapshotting       | snapshotting       | 0.435897 | 0.333333     | 0.230769    | 3             |
| 20 | axon-messaging-4.9.3     | org.axonframework.util                             | util               | 0.400000 | 0.000000     | 0.600000    | 3             |
| 21 | axon-modelling-4.9.3     | org.axonframework.modelling.saga.repository.in...  | inmemory           | 0.400000 | 0.000000     | 0.600000    | 2             |
| 22 | axon-messaging-4.9.3     | org.axonframework.commandhandling.callbacks        | callbacks          | 0.380952 | 0.000000     | 0.619048    | 4             |
| 23 | axon-messaging-4.9.3     | org.axonframework.common.jdbc                      | jdbc               | 0.377778 | 0.444444     | 0.177778    | 18            |
| 24 | axon-messaging-4.9.3     | org.axonframework.eventhandling.gateway            | gateway            | 0.377778 | 0.600000     | 0.777778    | 5             |
| 25 | axon-messaging-4.9.3     | org.axonframework.serialization.xml                | xml                | 0.360000 | 0.000000     | 0.640000    | 7             |
| 26 | axon-eventsourcing-4.9.3 | org.axonframework.eventsourcing.conflictresolu...  | conflictresolution | 0.353535 | 0.444444     | 0.909091    | 9             |
| 27 | axon-messaging-4.9.3     | org.axonframework.lifecycle                        | lifecycle          | 0.342029 | 0.600000     | 0.057971    | 10            |
| 28 | axon-messaging-4.9.3     | org.axonframework.eventhandling.async              | async              | 0.311111 | 0.133333     | 0.555556    | 15            |
| 29 | axon-messaging-4.9.3     | org.axonframework.commandhandling.distributed....  | commandfilter      | 0.300000 | 0.000000     | 0.700000    | 7             |

## Abstractness vs. Instability Plot with "Main Sequence" line as reference

- Plot *Abstractness* vs. *Instability* of all packages
- Draw the "main sequence" as dashed green diagonal line
- Scale the packages by the number of types they contain
- Color the packages by their distance to the "main sequence" (blue=near, red=far)

Figure 5a - Packages without their sub-packages





Figure 5b - Packages including their sub-packages

Abstractness vs. Instability ("Main Sequence")  
Packages including their sub-packages

