

# 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-4.10.2        | org.axonframework.messaging                     | messaging       | 9924                 | 29258                      | 363                    |   |
| 1  | axon-messaging-4.10.2        | org.axonframework.eventhandling                 | eventhandling   | 5871                 | 25303                      | 329                    |   |
| 2  | axon-messaging-4.10.2        | org.axonframework.commandhandling               | commandhandling | 1903                 | 6289                       | 137                    |   |
| 3  | axon-messaging-4.10.2        | org.axonframework.serialization                 | serialization   | 1655                 | 6740                       | 175                    |   |
| 4  | axon-messaging-4.10.2        | org.axonframework.messaging.annotation          | annotation      | 1079                 | 4066                       | 154                    |   |
| 5  | axon-messaging-4.10.2        | org.axonframework.common                        | common          | 1054                 | 2498                       | 367                    |   |
| 6  | axon-messaging-4.10.2        | org.axonframework.tracing                       | tracing         | 635                  | 2923                       | 109                    |   |
| 7  | axon-messaging-4.10.2        | org.axonframework.queryhandling                 | queryhandling   | 415                  | 1712                       | 80                     |   |
| 8  | axon-configuration-4.10.2    | org.axonframework.config                        | config          | 384                  | 3033                       | 62                     |   |
| 9  | axon-messaging-4.10.2        | org.axonframework.common.transaction            | transaction     | 368                  | 1103                       | 89                     |   |
| 10 | axon-modelling-4.10.2        | org.axonframework.modelling.command             | command         | 277                  | 947                        | 83                     |   |
| 11 | axon-modelling-4.10.2        | org.axonframework.modelling.saga                | saga            | 263                  | 1142                       | 62                     |   |
| 12 | axon-messaging-4.10.2        | org.axonframework.messaging.unitofwork          | unitofwork      | 259                  | 1085                       | 83                     |   |
| 13 | axon-messaging-4.10.2        | org.axonframework.deadline                      | deadline        | 247                  | 1243                       | 45                     |   |
| 14 | axon-eventsourcing-4.10.2    | org.axonframework.eventsourcing.eventstore.jdbc | jdbc            | 235                  | 1288                       | 27                     |   |
| 15 | axon-messaging-4.10.2        | org.axonframework.messaging.deadletter          | deadletter      | 206                  | 1164                       | 39                     |   |
| 16 | axon-eventsourcing-4.10.2    | org.axonframework.eventsourcing.eventstore      | eventstore      | 205                  | 816                        | 70                     |   |
| 17 | axon-messaging-4.10.2        | org.axonframework.monitoring                    | monitoring      | 199                  | 531                        | 41                     |   |
| 18 | axon-eventsourcing-4.10.2    | org.axonframework.eventsourcing                 | eventsourcing   | 148                  | 580                        | 47                     |   |
| 19 | axon-server-connector-4.10.2 | org.axonframework.axonserver.connector          | connector       | 123                  | 581                        | 56                     |   |

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-4.10.2     | org.axonframework.messaging                | messaging       | 8873                 | 28151                      | 372                    |      |
| 1  | axon-messaging-4.10.2     | org.axonframework.eventhandling            | eventhandling   | 3663                 | 13828                      | 173                    |      |
| 2  | axon-messaging-4.10.2     | org.axonframework.serialization            | serialization   | 1500                 | 6100                       | 131                    |      |
| 3  | axon-messaging-4.10.2     | org.axonframework.common                   | common          | 1470                 | 4096                       | 406                    |      |
| 4  | axon-messaging-4.10.2     | org.axonframework.commandhandling          | commandhandling | 1015                 | 3962                       | 70                     |      |
| 5  | axon-messaging-4.10.2     | org.axonframework.messaging.annotation     | annotation      | 960                  | 3719                       | 109                    |      |
| 6  | axon-messaging-4.10.2     | org.axonframework.tracing                  | tracing         | 565                  | 2627                       | 85                     |      |
| 7  | axon-messaging-4.10.2     | org.axonframework.common.transaction       | transaction     | 362                  | 1089                       | 86                     |      |
| 8  | axon-configuration-4.10.2 | org.axonframework.config                   | config          | 265                  | 1808                       | 26                     |      |
| 9  | axon-messaging-4.10.2     | org.axonframework.queryhandling            | queryhandling   | 252                  | 1019                       | 33                     |      |
| 10 | axon-messaging-4.10.2     | org.axonframework.messaging.unitofwork     | unitofwork      | 222                  | 868                        | 72                     |      |
| 11 | axon-messaging-4.10.2     | org.axonframework.monitoring               | monitoring      | 189                  | 501                        | 36                     |      |
| 12 | axon-eventsourcing-4.10.2 | org.axonframework.eventsourcing            | eventsourcing   | 173                  | 645                        | 28                     |      |
| 13 | axon-messaging-4.10.2     | org.axonframework.messaging.deadletter     | deadletter      | 173                  | 1030                       | 24                     |      |
| 14 | axon-modelling-4.10.2     | org.axonframework.modelling.command        | command         | 163                  | 537                        | 39                     |      |
| 15 | axon-eventsourcing-4.10.2 | org.axonframework.eventsourcing.eventstore | eventstore      | 144                  | 464                        | 35                     |      |
| 16 | axon-messaging-4.10.2     | org.axonframework.deadline                 | deadline        | 128                  | 764                        | 22                     |      |
| 17 | axon-modelling-4.10.2     | org.axonframework.modelling.saga           | saga            | 97                   | 277                        | 23                     |      |
| 18 | axon-messaging-4.10.2     | org.axonframework.lifecycle                | lifecycle       | 95                   | 262                        | 27                     |      |
| 19 | axon-messaging-4.10.2     | org.axonframework.messaging.responsetypes  | responsetypes   | 90                   | 372                        | 20                     |      |

## 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-4.10.2             | org.axonframework.config                          | config          | 9870                 | 37642                      | 241                    |
| 1  | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot.autoconfigure        | autoconfig      | 5775                 | 20419                      | 239                    |
| 2  | axon-test-4.10.2                      | org.axonframework.test.aggregate                  | aggregate       | 2210                 | 7978                       | 92                     |
| 3  | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.query      | query           | 1569                 | 7173                       | 91                     |
| 4  | axon-messaging-4.10.2                 | org.axonframework.eventhandling                   | eventhandling   | 1563                 | 6457                       | 160                    |
| 5  | axon-disruptor-4.10.2                 | org.axonframework.disruptor.commandhandling       | commandhandling | 1453                 | 5180                       | 84                     |
| 6  | axon-test-4.10.2                      | org.axonframework.test.saga                       | saga            | 1419                 | 4096                       | 81                     |
| 7  | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore.jdbc   | jdbc            | 1340                 | 6712                       | 51                     |
| 8  | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.event.axon | axon            | 1145                 | 4121                       | 97                     |
| 9  | axon-messaging-4.10.2                 | org.axonframework.queryhandling                   | queryhandling   | 1141                 | 5254                       | 86                     |
| 10 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing                   | eventsourcing   | 1009                 | 3348                       | 95                     |
| 11 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.pooled            | pooled          | 962                  | 4431                       | 57                     |
| 12 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.command    | command         | 932                  | 3060                       | 62                     |
| 13 | axon-modelling-4.10.2                 | org.axonframework.modelling.command               | command         | 847                  | 3215                       | 97                     |
| 14 | axon-modelling-4.10.2                 | org.axonframework.modelling.command.inspection    | inspection      | 781                  | 3026                       | 73                     |
| 15 | axon-messaging-4.10.2                 | org.axonframework.commandhandling.distributed     | distributed     | 738                  | 2227                       | 74                     |
| 16 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector            | connector       | 720                  | 3664                       | 81                     |
| 17 | axon-messaging-4.10.2                 | org.axonframework.commandhandling                 | commandhandling | 691                  | 1832                       | 74                     |
| 18 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore        | eventstore      | 613                  | 1981                       | 65                     |
| 19 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.deadletter.jdbc   | jdbc            | 560                  | 3518                       | 49                     |

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-configuration-4.10.2             | org.axonframework.config                          | config          | 595                  | 1831                       | 201                    |
| 1  | axon-messaging-4.10.2                 | org.axonframework.eventhandling                   | eventhandling   | 585                  | 2119                       | 106                    |
| 2  | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector            | connector       | 415                  | 1516                       | 149                    |
| 3  | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing                   | eventsourcing   | 380                  | 1319                       | 95                     |
| 4  | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot.autoconfigure        | autoconfig      | 364                  | 1157                       | 230                    |
| 5  | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot                      | springboot      | 323                  | 983                        | 203                    |
| 6  | axon-test-4.10.2                      | org.axonframework.test                            | test            | 273                  | 791                        | 99                     |
| 7  | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore        | eventstore      | 245                  | 914                        | 58                     |
| 8  | axon-modelling-4.10.2                 | org.axonframework.modelling.command               | command         | 231                  | 766                        | 63                     |
| 9  | axon-messaging-4.10.2                 | org.axonframework.eventhandling.deadletter        | deadletter      | 207                  | 996                        | 57                     |
| 10 | axon-messaging-4.10.2                 | org.axonframework.commandhandling                 | commandhandling | 196                  | 485                        | 67                     |
| 11 | axon-messaging-4.10.2                 | org.axonframework.deadline                        | deadline        | 190                  | 611                        | 48                     |
| 12 | axon-messaging-4.10.2                 | org.axonframework.messaging                       | messaging       | 188                  | 493                        | 27                     |
| 13 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.query      | query           | 180                  | 705                        | 72                     |
| 14 | axon-messaging-4.10.2                 | org.axonframework.queryhandling                   | queryhandling   | 177                  | 614                        | 51                     |
| 15 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.event      | event           | 166                  | 544                        | 73                     |
| 16 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.event.axon | axon            | 166                  | 551                        | 74                     |
| 17 | axon-modelling-4.10.2                 | org.axonframework.modelling.saga                  | saga            | 155                  | 474                        | 58                     |
| 18 | axon-test-4.10.2                      | org.axonframework.test.aggregate                  | aggregate       | 149                  | 548                        | 74                     |
| 19 | axon-disruptor-4.10.2                 | org.axonframework.disruptor.commandhandling       | commandhandling | 130                  | 436                        | 62                     |

## 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 | instabilityArt |
|----|---------------------------------------|---|-----------------|-------------|------------------|-----------------------|---------------------|----------------|
| 0  | axon-messaging-4.10.2                 | org.axonframework.messaging                       | messaging       | 0.013225    | 0.087940         | 0.180723              | 0.089552            |                |
| 1  | axon-messaging-4.10.2                 | org.axonframework.common.transaction              | transaction     | 0.016043    | 0.043011         | 0.000000              | 0.030303            |                |
| 2  | axon-messaging-4.10.2                 | org.axonframework.common                          | common          | 0.021356    | 0.039267         | 0.000000              | 0.011494            |                |
| 3  | axon-messaging-4.10.2                 | org.axonframework.eventhandling.scheduling        | scheduling      | 0.074074    | 0.111111         | 0.000000              | 0.181818            |                |
| 4  | axon-messaging-4.10.2                 | org.axonframework.lifecycle                       | lifecycle       | 0.090090    | 0.184211         | 0.000000              | 0.125000            |                |
| 5  | axon-messaging-4.10.2                 | org.axonframework.monitoring                      | monitoring      | 0.095455    | 0.145833         | 0.333333              | 0.214286            |                |
| 6  | axon-messaging-4.10.2                 | org.axonframework.serialization                   | serialization   | 0.096122    | 0.208145         | 0.304348              | 0.183673            |                |
| 7  | axon-messaging-4.10.2                 | org.axonframework.common.annotation               | annotation      | 0.120000    | 0.120000         | 0.000000              | 0.166667            |                |
| 8  | axon-messaging-4.10.2                 | org.axonframework.common.stream                   | stream          | 0.131579    | 0.150000         | 0.000000              | 0.111111            |                |
| 9  | axon-messaging-4.10.2                 | org.axonframework.tracing                         | tracing         | 0.161162    | 0.198529         | 0.480000              | 0.272727            |                |
| 10 | axon-messaging-4.10.2                 | org.axonframework.eventhandling                   | eventhandling   | 0.210250    | 0.327198         | 0.500000              | 0.235294            |                |
| 11 | axon-messaging-4.10.2                 | org.axonframework.messaging.annotation            | annotation      | 0.218116    | 0.303167         | 0.406250              | 0.212121            |                |
| 12 | axon-messaging-4.10.2                 | org.axonframework.common.jpa                      | jpa             | 0.240000    | 0.217391         | 1.000000              | 0.250000            |                |
| 13 | axon-messaging-4.10.2                 | org.axonframework.common.legacyjpa                | legacyjpa       | 0.260870    | 0.238095         | 1.000000              | 0.272727            |                |
| 14 | axon-messaging-4.10.2                 | org.axonframework.commandhandling                 | commandhandling | 0.266384    | 0.350711         | 0.600000              | 0.300000            |                |
| 15 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot                      | springboot      | 0.273810    | 0.441860         | 0.000000              | 0.333333            |                |
| 16 | axon-messaging-4.10.2                 | org.axonframework.messaging.correlation           | correlation     | 0.304348    | 0.200000         | 0.400000              | 0.285714            |                |
| 17 | axon-messaging-4.10.2                 | org.axonframework.serialization.upcasting         | upcasting       | 0.312500    | 0.083333         | 0.000000              | 0.333333            |                |
| 18 | axon-messaging-4.10.2                 | org.axonframework.messaging.unitofwork            | unitofwork      | 0.321990    | 0.194175         | 0.583333              | 0.119048            |                |
| 19 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.event.util | util            | 0.333333    | 0.250000         | 0.000000              | 0.333333            |                |

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 | instabilityArt |
|----|------------------------------|---|-----------------|-------------|------------------|-----------------------|---------------------|----------------|
| 0  | axon-messaging-4.10.2        | org.axonframework.common                          | common          | 0.003390    | 0.012165         | 0.000000              | 0.023810            |                |
| 1  | axon-messaging-4.10.2        | org.axonframework.messaging                       | messaging       | 0.020748    | 0.067669         | 0.402878              | 0.114286            |                |
| 2  | axon-messaging-4.10.2        | org.axonframework.serialization                   | serialization   | 0.032258    | 0.154839         | 0.190476              | 0.186047            |                |
| 3  | axon-messaging-4.10.2        | org.axonframework.lifecycle                       | lifecycle       | 0.040404    | 0.068966         | 0.000000              | 0.090909            |                |
| 4  | axon-messaging-4.10.2        | org.axonframework.monitoring                      | monitoring      | 0.040609    | 0.052632         | 0.454545              | 0.166667            |                |
| 5  | axon-messaging-4.10.2        | org.axonframework.tracing                         | tracing         | 0.055184    | 0.141414         | 0.187500              | 0.275862            |                |
| 6  | axon-messaging-4.10.2        | org.axonframework.messaging.annotation            | annotation      | 0.073359    | 0.155039         | 0.424242              | 0.193548            |                |
| 7  | axon-messaging-4.10.2        | org.axonframework.common.annotation               | annotation      | 0.086957    | 0.086957         | 0.000000              | 0.100000            |                |
| 8  | axon-messaging-4.10.2        | org.axonframework.common.lock                     | lock            | 0.107143    | 0.142857         | 0.000000              | 0.142857            |                |
| 9  | axon-messaging-4.10.2        | org.axonframework.messaging.unitofwork            | unitofwork      | 0.112000    | 0.100000         | 0.375000              | 0.100000            |                |
| 10 | axon-messaging-4.10.2        | org.axonframework.messaging.responsetypes         | responsetypes   | 0.126214    | 0.333333         | 0.000000              | 0.500000            |                |
| 11 | axon-messaging-4.10.2        | org.axonframework.eventhandling                   | eventhandling   | 0.137712    | 0.379928         | 0.451327              | 0.377358            |                |
| 12 | axon-messaging-4.10.2        | org.axonframework.common.jdbc                     | jdbc            | 0.150943    | 0.212121         | 0.000000              | 0.266667            |                |
| 13 | axon-messaging-4.10.2        | org.axonframework.common.property                 | property        | 0.153846    | 0.222222         | 0.000000              | 0.200000            |                |
| 14 | axon-messaging-4.10.2        | org.axonframework.common.jpa                      | jpa             | 0.157895    | 0.117647         | 0.000000              | 0.200000            |                |
| 15 | axon-messaging-4.10.2        | org.axonframework.commandhandling                 | commandhandling | 0.161850    | 0.489051         | 0.512195              | 0.448276            |                |
| 16 | axon-messaging-4.10.2        | org.axonframework.common.legacyjpa                | legacyjpa       | 0.176471    | 0.133333         | 0.000000              | 0.222222            |                |
| 17 | axon-messaging-4.10.2        | org.axonframework.messaging.deadletter            | deadletter      | 0.183962    | 0.272727         | 0.466667              | 0.333333            |                |
| 18 | axon-eventsourcing-4.10.2    | org.axonframework.eventsourcing.snapshotting      | snapshotting    | 0.187500    | 0.250000         | 0.500000              | 0.333333            |                |
| 19 | axon-server-connector-4.10.2 | org.axonframework.axonserver.connector.event.util | util            | 0.200000    | 0.200000         | 0.000000              | 0.250000            |                |

## 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-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot.autoconfig           | autoconfig       | 0.0          | 0                   | 29          |
| 1  | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot                      | springboot       | 0.0          | 0                   | 25          |
| 2  | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore.leg... | legacyjpa        | 0.0          | 0                   | 10          |
| 3  | axon-messaging-4.10.2                 | org.axonframework.commandhandling.distributed.... | commandfilter    | 0.0          | 0                   | 7           |
| 4  | axon-messaging-4.10.2                 | org.axonframework.deadline.dbscheduler            | dbscheduler      | 0.0          | 0                   | 7           |
| 5  | axon-messaging-4.10.2                 | org.axonframework.eventhandling.scheduling.dbs... | dbscheduler      | 0.0          | 0                   | 7           |
| 6  | axon-messaging-4.10.2                 | org.axonframework.serialization.json              | json             | 0.0          | 0                   | 7           |
| 7  | axon-messaging-4.10.2                 | org.axonframework.serialization.xml               | xml              | 0.0          | 0                   | 7           |
| 8  | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.query.s... | subscription     | 0.0          | 0                   | 6           |
| 9  | axon-messaging-4.10.2                 | org.axonframework.tracing.attributes              | attributes       | 0.0          | 0                   | 6           |
| 10 | axon-tracing-opentelemetry-4.10.2     | org.axonframework.tracing.opentelemetry           | opentelemetry    | 0.0          | 0                   | 5           |
| 11 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.deadletter        | deadletter       | 0.0          | 0                   | 5           |
| 12 | axon-messaging-4.10.2                 | org.axonframework.serialization.converters        | converters       | 0.0          | 0                   | 5           |
| 13 | axon-test-4.10.2                      | org.axonframework.test.server                     | server           | 0.0          | 0                   | 4           |
| 14 | axon-messaging-4.10.2                 | org.axonframework.commandhandling.callbacks       | callbacks        | 0.0          | 0                   | 4           |
| 15 | axon-messaging-4.10.2                 | org.axonframework.deadline.quartz                 | quartz           | 0.0          | 0                   | 4           |
| 16 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.scheduling.java   | java             | 0.0          | 0                   | 4           |
| 17 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.tokenstore.jpa    | jpa              | 0.0          | 0                   | 4           |
| 18 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.processor  | processor        | 0.0          | 0                   | 3           |
| 19 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.event.util | util             | 0.0          | 0                   | 3           |
| 20 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.scheduling.job... | jobrunr          | 0.0          | 0                   | 3           |
| 21 | axon-messaging-4.10.2                 | org.axonframework.util                            | util             | 0.0          | 0                   | 3           |
| 22 | axon-modelling-4.10.2                 | org.axonframework.modelling.saga.repository.le... | legacyjpa        | 0.0          | 0                   | 3           |
| 23 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.heartbe... | checker          | 0.0          | 0                   | 2           |
| 24 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore.inm... | inmemory         | 0.0          | 0                   | 2           |
| 25 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.tokenstore.inm... | inmemory         | 0.0          | 0                   | 2           |
| 26 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.tokenstore.leg... | legacyjpa        | 0.0          | 0                   | 2           |
| 27 | axon-messaging-4.10.2                 | org.axonframework.messaging.interceptors.legac... | legacyvalidation | 0.0          | 0                   | 2           |
| 28 | axon-modelling-4.10.2                 | org.axonframework.modelling.command.legacyjpa     | legacyjpa        | 0.0          | 0                   | 2           |
| 29 | axon-modelling-4.10.2                 | org.axonframework.modelling.saga.repository.in... | inmemory         | 0.0          | 0                   | 2           |

Table 4b

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

|     | artifactName                          | fullQualifiedPackageName                           | packageName        | abstractness | numberAbstractTypes | numberTypes |
|-----|---------------------------------------|--|--------------------|--------------|---------------------|-------------|
| 137 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore.jdbc... | statements         | 1.000000     | 15                  | 15          |
| 138 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.actuator                         | actuator           | 1.000000     | 1                   | 1           |
| 136 | axon-messaging-4.10.2                 | org.axonframework.serialization.upcasting          | upcasting          | 0.833333     | 5                   | 6           |
| 133 | axon-messaging-4.10.2                 | org.axonframework.common.annotation                | annotation         | 0.666667     | 2                   | 3           |
| 134 | axon-messaging-4.10.2                 | org.axonframework.common.stream                    | stream             | 0.666667     | 2                   | 3           |
| 135 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.scheduling         | scheduling         | 0.666667     | 2                   | 3           |
| 132 | axon-messaging-4.10.2                 | org.axonframework.common                           | common             | 0.642857     | 18                  | 28          |
| 129 | axon-messaging-4.10.2                 | org.axonframework.messaging                        | messaging          | 0.600000     | 21                  | 35          |
| 130 | axon-messaging-4.10.2                 | org.axonframework.lifecycle                        | lifecycle          | 0.600000     | 6                   | 10          |
| 131 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.gateway            | gateway            | 0.600000     | 3                   | 5           |
| 128 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot.util                  | util               | 0.555556     | 5                   | 9           |
| 125 | axon-messaging-4.10.2                 | org.axonframework.serialization.upcasting.event    | event              | 0.500000     | 6                   | 12          |
| 126 | axon-messaging-4.10.2                 | org.axonframework.common.transaction               | transaction        | 0.500000     | 2                   | 4           |
| 127 | axon-modelling-4.10.2                 | org.axonframework.modelling.saga.metamodel         | metamodel          | 0.500000     | 2                   | 4           |
| 123 | axon-messaging-4.10.2                 | org.axonframework.common.jdbc                      | jdbc               | 0.444444     | 8                   | 18          |
| 124 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.conflictresolu...  | conflictresolution | 0.444444     | 4                   | 9           |
| 122 | axon-configuration-4.10.2             | org.axonframework.config                           | config             | 0.439024     | 18                  | 41          |
| 121 | axon-modelling-4.10.2                 | org.axonframework.modelling.command                | command            | 0.410714     | 23                  | 56          |
| 120 | axon-messaging-4.10.2                 | org.axonframework.eventhandling                    | eventhandling      | 0.410000     | 41                  | 100         |
| 115 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.heartbeat   | heartbeat          | 0.400000     | 2                   | 5           |
| 116 | axon-test-4.10.2                      | org.axonframework.test.utils                       | utils              | 0.400000     | 2                   | 5           |
| 117 | axon-test-4.10.2                      | org.axonframework.test.eventscheduler              | eventscheduler     | 0.400000     | 2                   | 5           |
| 118 | axon-messaging-4.10.2                 | org.axonframework.deadline.annotation              | annotation         | 0.400000     | 2                   | 5           |
| 119 | axon-messaging-4.10.2                 | org.axonframework.queryhandling.registration       | registration       | 0.400000     | 2                   | 5           |
| 114 | axon-modelling-4.10.2                 | org.axonframework.modelling.saga                   | saga               | 0.393939     | 13                  | 33          |
| 111 | axon-messaging-4.10.2                 | org.axonframework.commandhandling                  | commandhandling    | 0.375000     | 12                  | 32          |
| 112 | axon-messaging-4.10.2                 | org.axonframework.messaging.interceptors           | interceptors       | 0.375000     | 3                   | 8           |
| 113 | axon-messaging-4.10.2                 | org.axonframework.messaging.responsetypes          | responsetypes      | 0.375000     | 3                   | 8           |
| 110 | axon-messaging-4.10.2                 | org.axonframework.messaging.deadletter             | deadletter         | 0.368421     | 7                   | 19          |
| 109 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore         | eventstore         | 0.354839     | 11                  | 31          |

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-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot.autoconfig           | autoconfig       | 0.0          | 0                   | 31          | 1                  |
| 1  | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.heartbe... | connection       | 0.0          | 0                   | 2           | 1                  |
| 2  | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore.leg... | legacyjpa        | 0.0          | 0                   | 10          | 0                  |
| 3  | axon-messaging-4.10.2                 | org.axonframework.commandhandling.distributed.... | commandfilter    | 0.0          | 0                   | 7           | 0                  |
| 4  | axon-messaging-4.10.2                 | org.axonframework.deadline.dbscheduler            | dbscheduler      | 0.0          | 0                   | 7           | 0                  |
| 5  | axon-messaging-4.10.2                 | org.axonframework.eventhandling.scheduling.dbs... | dbscheduler      | 0.0          | 0                   | 7           | 0                  |
| 6  | axon-messaging-4.10.2                 | org.axonframework.serialization.json              | json             | 0.0          | 0                   | 7           | 0                  |
| 7  | axon-messaging-4.10.2                 | org.axonframework.serialization.xml               | xml              | 0.0          | 0                   | 7           | 0                  |
| 8  | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.query.s... | subscription     | 0.0          | 0                   | 6           | 0                  |
| 9  | axon-messaging-4.10.2                 | org.axonframework.tracing.attributes              | attributes       | 0.0          | 0                   | 6           | 0                  |
| 10 | axon-tracing-opentelemetry-4.10.2     | org.axonframework.tracing.opentelemetry           | opentelemetry    | 0.0          | 0                   | 5           | 0                  |
| 11 | axon-messaging-4.10.2                 | org.axonframework.serialization.converters        | converters       | 0.0          | 0                   | 5           | 0                  |
| 12 | axon-test-4.10.2                      | org.axonframework.test.server                     | server           | 0.0          | 0                   | 4           | 0                  |
| 13 | axon-messaging-4.10.2                 | org.axonframework.commandhandling.callbacks       | callbacks        | 0.0          | 0                   | 4           | 0                  |
| 14 | axon-messaging-4.10.2                 | org.axonframework.deadline.quartz                 | quartz           | 0.0          | 0                   | 4           | 0                  |
| 15 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.scheduling.java   | java             | 0.0          | 0                   | 4           | 0                  |
| 16 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.tokenstore.jpa    | jpa              | 0.0          | 0                   | 4           | 0                  |
| 17 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.processor  | processor        | 0.0          | 0                   | 3           | 0                  |
| 18 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.event.util | util             | 0.0          | 0                   | 3           | 0                  |
| 19 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.scheduling.job... | jobrunr          | 0.0          | 0                   | 3           | 0                  |
| 20 | axon-messaging-4.10.2                 | org.axonframework.util                            | util             | 0.0          | 0                   | 3           | 0                  |
| 21 | axon-modelling-4.10.2                 | org.axonframework.modelling.saga.repository.le... | legacyjpa        | 0.0          | 0                   | 3           | 0                  |
| 22 | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.heartbe... | checker          | 0.0          | 0                   | 2           | 0                  |
| 23 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore.inm... | inmemory         | 0.0          | 0                   | 2           | 0                  |
| 24 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.tokenstore.inm... | inmemory         | 0.0          | 0                   | 2           | 0                  |
| 25 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.tokenstore.leg... | legacyjpa        | 0.0          | 0                   | 2           | 0                  |
| 26 | axon-messaging-4.10.2                 | org.axonframework.messaging.interceptors.legac... | legacyvalidation | 0.0          | 0                   | 2           | 0                  |
| 27 | axon-modelling-4.10.2                 | org.axonframework.modelling.command.legacyjpa     | legacyjpa        | 0.0          | 0                   | 2           | 0                  |
| 28 | axon-modelling-4.10.2                 | org.axonframework.modelling.saga.repository.in... | inmemory         | 0.0          | 0                   | 2           | 0                  |
| 29 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.actuator.axonserver             | axonserver       | 0.0          | 0                   | 2           | 0                  |

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 |
|-----|---------------------------------------|--|--------------------|--------------|---------------------|-------------|--------------------|
| 116 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore.jdbc... | statements         | 1.000000     | 15                  | 15          | 0                  |
| 114 | axon-messaging-4.10.2                 | org.axonframework.common.annotation                | annotation         | 0.666667     | 2                   | 3           | 0                  |
| 115 | axon-messaging-4.10.2                 | org.axonframework.common.stream                    | stream             | 0.666667     | 2                   | 3           | 0                  |
| 113 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore.jdbc    | jdbc               | 0.620690     | 18                  | 29          | 1                  |
| 112 | axon-messaging-4.10.2                 | org.axonframework.serialization.upcasting          | upcasting          | 0.611111     | 11                  | 18          | 1                  |
| 110 | axon-messaging-4.10.2                 | org.axonframework.lifecycle                        | lifecycle          | 0.600000     | 6                   | 10          | 0                  |
| 111 | axon-messaging-4.10.2                 | org.axonframework.eventhandling.gateway            | gateway            | 0.600000     | 3                   | 5           | 0                  |
| 107 | axon-messaging-4.10.2                 | org.axonframework.serialization.upcasting.event    | event              | 0.500000     | 6                   | 12          | 0                  |
| 108 | axon-messaging-4.10.2                 | org.axonframework.common.transaction               | transaction        | 0.500000     | 2                   | 4           | 0                  |
| 109 | axon-modelling-4.10.2                 | org.axonframework.modelling.saga.metamodel         | metamodel          | 0.500000     | 2                   | 4           | 0                  |
| 106 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot.util                  | util               | 0.454545     | 5                   | 11          | 1                  |
| 104 | axon-messaging-4.10.2                 | org.axonframework.common.jdbc                      | jdbc               | 0.444444     | 8                   | 18          | 0                  |
| 105 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.conflictresolu...  | conflictresolution | 0.444444     | 4                   | 9           | 0                  |
| 103 | axon-configuration-4.10.2             | org.axonframework.config                           | config             | 0.439024     | 18                  | 41          | 0                  |
| 102 | axon-messaging-4.10.2                 | org.axonframework.common                           | common             | 0.425743     | 43                  | 101         | 1                  |
| 98  | axon-test-4.10.2                      | org.axonframework.test.utils                       | utils              | 0.400000     | 2                   | 5           | 0                  |
| 99  | axon-test-4.10.2                      | org.axonframework.test.eventscheduler              | eventscheduler     | 0.400000     | 2                   | 5           | 0                  |
| 100 | axon-messaging-4.10.2                 | org.axonframework.deadline.annotation              | annotation         | 0.400000     | 2                   | 5           | 0                  |
| 101 | axon-messaging-4.10.2                 | org.axonframework.queryhandling.registration       | registration       | 0.400000     | 2                   | 5           | 0                  |
| 97  | axon-modelling-4.10.2                 | org.axonframework.modelling.command                | command            | 0.380952     | 32                  | 84          | 1                  |
| 96  | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore         | eventstore         | 0.379747     | 30                  | 79          | 2                  |
| 94  | axon-messaging-4.10.2                 | org.axonframework.messaging                        | messaging          | 0.375000     | 54                  | 144         | 2                  |
| 95  | axon-messaging-4.10.2                 | org.axonframework.messaging.responsetypes          | responsetypes      | 0.375000     | 3                   | 8           | 0                  |
| 93  | axon-messaging-4.10.2                 | org.axonframework.messaging.deadletter             | deadletter         | 0.368421     | 7                   | 19          | 0                  |
| 92  | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing                    | eventsourcing      | 0.353383     | 47                  | 133         | 3                  |
| 91  | axon-modelling-4.10.2                 | org.axonframework.modelling.command.inspection     | inspection         | 0.346154     | 9                   | 26          | 0                  |
| 86  | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.actuator                         | actuator           | 0.333333     | 1                   | 3           | 1                  |
| 87  | axon-test-4.10.2                      | org.axonframework.test.saga                        | saga               | 0.333333     | 7                   | 21          | 0                  |
| 88  | axon-messaging-4.10.2                 | org.axonframework.common.property                  | property           | 0.333333     | 3                   | 9           | 0                  |
| 89  | axon-messaging-4.10.2                 | org.axonframework.monitoring                       | monitoring         | 0.333333     | 2                   | 6           | 0                  |

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-4.10.2                 | org.axonframework.serialization.converters        | converters    | NaN      | 0.0          | NaN         | 5             |
| 1  | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.heartbe... | source        | NaN      | 0.0          | NaN         | 1             |
| 2  | axon-messaging-4.10.2                 | org.axonframework.common.io                       | io            | NaN      | 0.0          | NaN         | 1             |
| 3  | axon-messaging-4.10.2                 | org.axonframework.eventhandling.interceptors      | interceptors  | NaN      | 0.0          | NaN         | 1             |
| 4  | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.actuator                        | actuator      | NaN      | 1.0          | NaN         | 1             |
| 5  | axon-server-connector-4.10.2          | org   | org           | NaN      | 0.0          | NaN         | 0             |
| 6  | axon-server-connector-4.10.2          | org.axonframework                                 | axonframework | NaN      | 0.0          | NaN         | 0             |
| 7  | axon-server-connector-4.10.2          | org.axonframework.axonserver                      | axonserver    | NaN      | 0.0          | NaN         | 0             |
| 8  | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.heartbe... | connection    | NaN      | 0.0          | NaN         | 0             |
| 9  | axon-server-connector-4.10.2          | org.axonframework.axonserver.connector.event      | event         | NaN      | 0.0          | NaN         | 0             |
| 10 | axon-tracing-opentelemetry-4.10.2     | org   | org           | NaN      | 0.0          | NaN         | 0             |
| 11 | axon-tracing-opentelemetry-4.10.2     | org.axonframework                                 | axonframework | NaN      | 0.0          | NaN         | 0             |
| 12 | axon-tracing-opentelemetry-4.10.2     | org.axonframework.tracing                         | tracing       | NaN      | 0.0          | NaN         | 0             |
| 13 | axon-eventsourcing-4.10.2             | org   | org           | NaN      | 0.0          | NaN         | 0             |
| 14 | axon-eventsourcing-4.10.2             | org.axonframework                                 | axonframework | NaN      | 0.0          | NaN         | 0             |
| 15 | axon-test-4.10.2                      | org   | org           | NaN      | 0.0          | NaN         | 0             |
| 16 | axon-test-4.10.2                      | org.axonframework                                 | axonframework | NaN      | 0.0          | NaN         | 0             |
| 17 | axon-configuration-4.10.2             | org   | org           | NaN      | 0.0          | NaN         | 0             |
| 18 | axon-configuration-4.10.2             | org.axonframework                                 | axonframework | NaN      | 0.0          | NaN         | 0             |
| 19 | axon-messaging-4.10.2                 | org   | org           | NaN      | 0.0          | NaN         | 0             |
| 20 | axon-messaging-4.10.2                 | org.axonframework                                 | axonframework | NaN      | 0.0          | NaN         | 0             |
| 21 | axon-modelling-4.10.2                 | org   | org           | NaN      | 0.0          | NaN         | 0             |
| 22 | axon-modelling-4.10.2                 | org.axonframework                                 | axonframework | NaN      | 0.0          | NaN         | 0             |
| 23 | axon-modelling-4.10.2                 | org.axonframework.modelling                       | modelling     | NaN      | 0.0          | NaN         | 0             |
| 24 | axon-spring-boot-autoconfigure-4.10.2 | org   | org           | NaN      | 0.0          | NaN         | 0             |
| 25 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework                                 | axonframework | NaN      | 0.0          | NaN         | 0             |
| 26 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot.service              | service       | NaN      | 0.0          | NaN         | 0             |
| 27 | axon-disruptor-4.10.2                 | org   | org           | NaN      | 0.0          | NaN         | 0             |
| 28 | axon-disruptor-4.10.2                 | org.axonframework                                 | axonframework | NaN      | 0.0          | NaN         | 0             |
| 29 | axon-disruptor-4.10.2                 | org.axonframework.disruptor                       | disruptor     | NaN      | 0.0          | NaN         | 0             |

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-server-connector-4.10.2          | org.axonframework.axonserver.connector.event.util  | util            | 0.800000 | 0.000000     | 0.200000    | 3             |
| 1  | axon-messaging-4.10.2                 | org.axonframework.tracing                          | tracing         | 0.744816 | 0.200000     | 0.055184    | 25            |
| 2  | axon-messaging-4.10.2                 | org.axonframework.common.lock                      | lock            | 0.711039 | 0.181818     | 0.107143    | 11            |
| 3  | axon-messaging-4.10.2                 | org.axonframework.serialization                    | serialization   | 0.671967 | 0.295775     | 0.032258    | 71            |
| 4  | axon-test-4.10.2                      | org.axonframework.test.server                      | server          | 0.666667 | 0.000000     | 0.333333    | 4             |
| 5  | axon-messaging-4.10.2                 | org.axonframework.common.digest                    | digest          | 0.666667 | 0.000000     | 0.333333    | 1             |
| 6  | axon-messaging-4.10.2                 | org.axonframework.messaging.annotation             | annotation      | 0.648863 | 0.277778     | 0.073359    | 54            |
| 7  | axon-messaging-4.10.2                 | org.axonframework.monitoring                       | monitoring      | 0.626058 | 0.333333     | 0.040609    | 6             |
| 8  | axon-test-4.10.2                      | org.axonframework.test.matchers                    | matchers        | 0.606707 | 0.125000     | 0.268293    | 24            |
| 9  | axon-messaging-4.10.2                 | org.axonframework.messaging                        | messaging       | 0.604252 | 0.375000     | 0.020748    | 144           |
| 10 | axon-messaging-4.10.2                 | org.axonframework.messaging.unitofwork             | unitofwork      | 0.602286 | 0.285714     | 0.112000    | 14            |
| 11 | axon-messaging-4.10.2                 | org.axonframework.common.jpa                       | jpa             | 0.592105 | 0.250000     | 0.157895    | 4             |
| 12 | axon-messaging-4.10.2                 | org.axonframework.eventhandling                    | eventhandling   | 0.584510 | 0.277778     | 0.137712    | 234           |
| 13 | axon-messaging-4.10.2                 | org.axonframework.common.legacyjpa                 | legacyjpa       | 0.573529 | 0.250000     | 0.176471    | 4             |
| 14 | axon-messaging-4.10.2                 | org.axonframework.common                           | common          | 0.570868 | 0.425743     | 0.003390    | 101           |
| 15 | axon-messaging-4.10.2                 | org.axonframework.commandhandling                  | commandhandling | 0.556597 | 0.281553     | 0.161850    | 103           |
| 16 | axon-messaging-4.10.2                 | org.axonframework.messaging.correlation            | correlation     | 0.533784 | 0.250000     | 0.216216    | 4             |
| 17 | axon-messaging-4.10.2                 | org.axonframework.common.property                  | property        | 0.512821 | 0.333333     | 0.153846    | 9             |
| 18 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot.util.legacyjpa        | legacyjpa       | 0.500000 | 0.000000     | 0.500000    | 1             |
| 19 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.springboot.util.jpa              | jpa             | 0.500000 | 0.000000     | 0.500000    | 1             |
| 20 | axon-messaging-4.10.2                 | org.axonframework.messaging.responsetypes          | responsetypes   | 0.498786 | 0.375000     | 0.126214    | 8             |
| 21 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.eventstore.jdbc... | statements      | 0.480769 | 1.000000     | 0.480769    | 15            |
| 22 | axon-eventsourcing-4.10.2             | org.axonframework.eventsourcing.snapshotting       | snapshotting    | 0.479167 | 0.333333     | 0.187500    | 3             |
| 23 | axon-messaging-4.10.2                 | org.axonframework.serialization.xml                | xml             | 0.466667 | 0.000000     | 0.533333    | 7             |
| 24 | axon-messaging-4.10.2                 | org.axonframework.util                             | util            | 0.454545 | 0.000000     | 0.545455    | 3             |
| 25 | axon-messaging-4.10.2                 | org.axonframework.messaging.deadletter             | deadletter      | 0.447617 | 0.368421     | 0.183962    | 19            |
| 26 | axon-messaging-4.10.2                 | org.axonframework.commandhandling.callbacks        | callbacks       | 0.409091 | 0.000000     | 0.590909    | 4             |
| 27 | axon-messaging-4.10.2                 | org.axonframework.common.jdbc                      | jdbc            | 0.404612 | 0.444444     | 0.150943    | 18            |
| 28 | axon-modelling-4.10.2                 | org.axonframework.modelling.saga.repository.in...  | inmemory        | 0.400000 | 0.000000     | 0.600000    | 2             |
| 29 | axon-spring-boot-autoconfigure-4.10.2 | org.axonframework.actuator.axonserver              | axonserver      | 0.400000 | 0.000000     | 0.600000    | 2             |

## 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

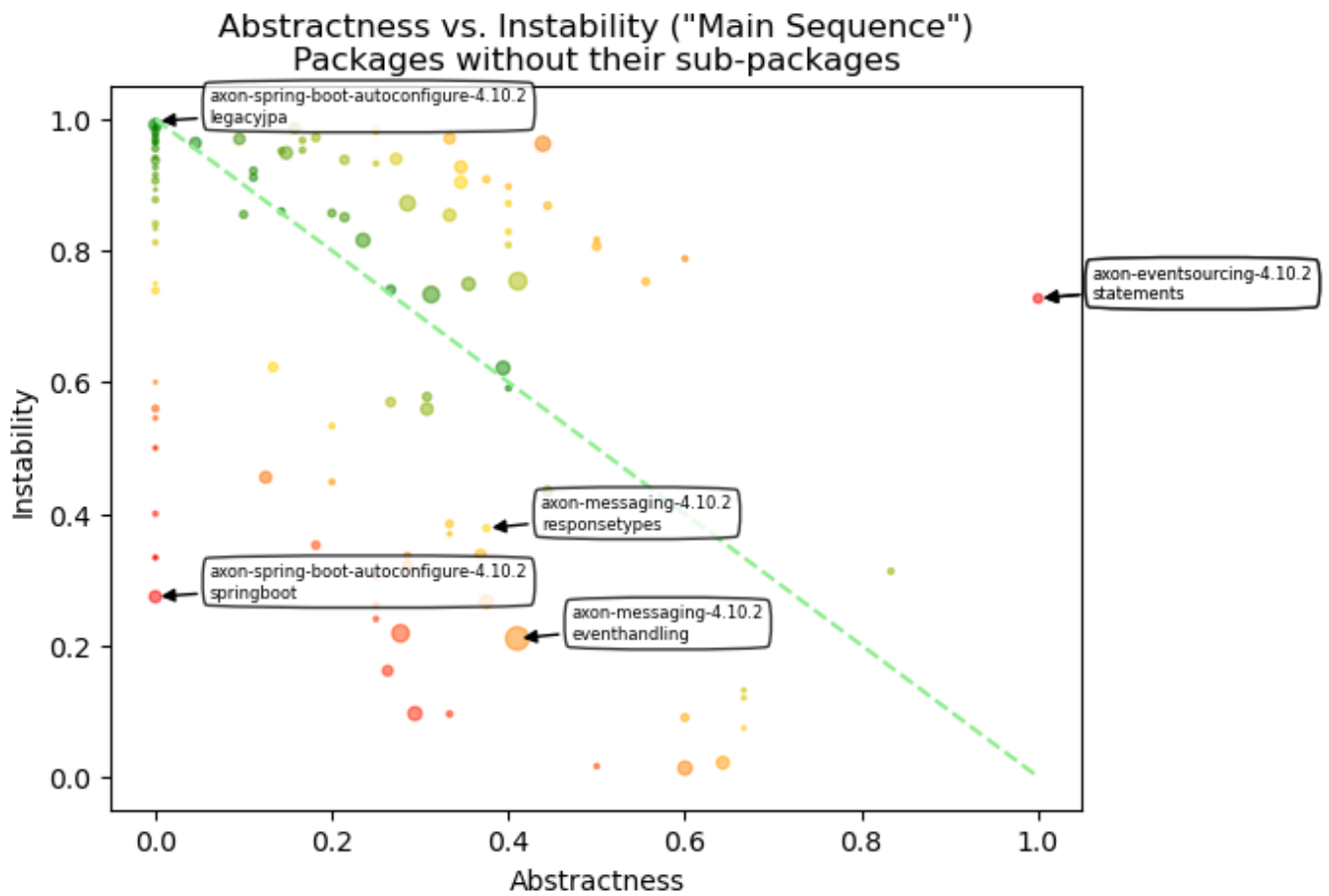


Figure 5b - Packages including their sub-packages



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

