

# Internal Dependencies

## References

- [Analyze java package metrics in a graph database](#)
- [Calculate metrics](#)
- [Neo4j Python Driver](#)

## Artifacts

List the artifacts this notebook is based on. Different sorting variations help finding artifacts by their features and support larger code bases where the list of all artifacts gets too long.

Only the top 30 entries are shown. The whole table can be found in the following CSV report:

List\_all\_Java\_artifacts

Table 1a - Top 30 artifacts with the highest package count

|   | artifactName                              | packages | types | incomingDependencies | outgoingDependencies |
|---|---|----------|-------|----------------------|----------------------|
| 0 | axon-messaging-4.11.0.jar                 | 66       | 809   | 8                    | 0                    |
| 1 | axon-server-connector-4.11.0.jar          | 11       | 142   | 1                    | 4                    |
| 2 | axon-modelling-4.11.0.jar                 | 10       | 158   | 6                    | 1                    |
| 3 | axon-eventsourcing-4.11.0.jar             | 9        | 133   | 5                    | 2                    |
| 4 | axon-spring-boot-autoconfigure-4.11.0.jar | 9        | 88    | 0                    | 7                    |
| 5 | axon-test-4.11.0.jar                      | 8        | 87    | 1                    | 3                    |
| 6 | axon-configuration-4.11.0.jar             | 1        | 41    | 2                    | 4                    |
| 7 | axon-disruptor-4.11.0.jar                 | 1        | 22    | 1                    | 3                    |
| 8 | axon-tracing-opentelemetry-4.11.0.jar     | 1        | 5     | 1                    | 1                    |

Table 1b - Top 30 artifacts with the highest type count

|   | artifactName                              | packages | types | incomingDependencies | outgoingDependencies |
|---|---|----------|-------|----------------------|----------------------|
| 0 | axon-messaging-4.11.0.jar                 | 66       | 809   | 8                    | 0                    |
| 1 | axon-modelling-4.11.0.jar                 | 10       | 158   | 6                    | 1                    |
| 2 | axon-server-connector-4.11.0.jar          | 11       | 142   | 1                    | 4                    |
| 3 | axon-eventsourcing-4.11.0.jar             | 9        | 133   | 5                    | 2                    |
| 4 | axon-spring-boot-autoconfigure-4.11.0.jar | 9        | 88    | 0                    | 7                    |
| 5 | axon-test-4.11.0.jar                      | 8        | 87    | 1                    | 3                    |
| 6 | axon-configuration-4.11.0.jar             | 1        | 41    | 2                    | 4                    |
| 7 | axon-disruptor-4.11.0.jar                 | 1        | 22    | 1                    | 3                    |
| 8 | axon-tracing-opentelemetry-4.11.0.jar     | 1        | 5     | 1                    | 1                    |

Table 1c - Top 30 artifacts with the highest number of incoming dependencies

The following table lists the top 30 artifacts that are used the most by other artifacts (highest count of incoming dependencies, highest in-degree).

|   | artifactName                              | packages | types | incomingDependencies | outgoingDependencies |
|---|---|----------|-------|----------------------|----------------------|
| 0 | axon-messaging-4.11.0.jar                 | 66       | 809   | 8                    | 0                    |
| 1 | axon-modelling-4.11.0.jar                 | 10       | 158   | 6                    | 1                    |
| 2 | axon-eventsourcing-4.11.0.jar             | 9        | 133   | 5                    | 2                    |
| 3 | axon-configuration-4.11.0.jar             | 1        | 41    | 2                    | 4                    |
| 4 | axon-disruptor-4.11.0.jar                 | 1        | 22    | 1                    | 3                    |
| 5 | axon-server-connector-4.11.0.jar          | 11       | 142   | 1                    | 4                    |
| 6 | axon-test-4.11.0.jar                      | 8        | 87    | 1                    | 3                    |
| 7 | axon-tracing-opentelemetry-4.11.0.jar     | 1        | 5     | 1                    | 1                    |
| 8 | axon-spring-boot-autoconfigure-4.11.0.jar | 9        | 88    | 0                    | 7                    |

Table 1d - Top 30 artifacts with the highest number of outgoing dependencies

The following table lists the top 30 artifacts that are depending on the highest number of other artifacts (highest count of outgoing dependencies, highest out-degree).

|   | artifactName                              | packages | types | incomingDependencies | outgoingDependencies |
|---|---|----------|-------|----------------------|----------------------|
| 0 | axon-spring-boot-autoconfigure-4.11.0.jar | 9        | 88    | 0                    | 7                    |
| 1 | axon-configuration-4.11.0.jar             | 1        | 41    | 2                    | 4                    |
| 2 | axon-server-connector-4.11.0.jar          | 11       | 142   | 1                    | 4                    |
| 3 | axon-disruptor-4.11.0.jar                 | 1        | 22    | 1                    | 3                    |
| 4 | axon-test-4.11.0.jar                      | 8        | 87    | 1                    | 3                    |
| 5 | axon-eventsourcing-4.11.0.jar             | 9        | 133   | 5                    | 2                    |
| 6 | axon-modelling-4.11.0.jar                 | 10       | 158   | 6                    | 1                    |
| 7 | axon-tracing-opentelemetry-4.11.0.jar     | 1        | 5     | 1                    | 1                    |
| 8 | axon-messaging-4.11.0.jar                 | 66       | 809   | 8                    | 0                    |

Table 1e - Top 30 artifacts with the lowest package count

|   | artifactName                              | packages | types | incomingDependencies | outgoingDependencies |
|---|---|----------|-------|----------------------|----------------------|
| 0 | axon-configuration-4.11.0.jar             | 1        | 41    | 2                    | 4                    |
| 1 | axon-disruptor-4.11.0.jar                 | 1        | 22    | 1                    | 3                    |
| 2 | axon-tracing-opentelemetry-4.11.0.jar     | 1        | 5     | 1                    | 1                    |
| 3 | axon-test-4.11.0.jar                      | 8        | 87    | 1                    | 3                    |
| 4 | axon-eventsourcing-4.11.0.jar             | 9        | 133   | 5                    | 2                    |
| 5 | axon-spring-boot-autoconfigure-4.11.0.jar | 9        | 88    | 0                    | 7                    |
| 6 | axon-modelling-4.11.0.jar                 | 10       | 158   | 6                    | 1                    |
| 7 | axon-server-connector-4.11.0.jar          | 11       | 142   | 1                    | 4                    |
| 8 | axon-messaging-4.11.0.jar                 | 66       | 809   | 8                    | 0                    |

Table 1f - Top 30 artifacts with the lowest type count

|   | artifactName                              | packages | types | incomingDependencies | outgoingDependencies |
|---|---|----------|-------|----------------------|----------------------|
| 0 | axon-tracing-opentelemetry-4.11.0.jar     | 1        | 5     | 1                    | 1                    |
| 1 | axon-disruptor-4.11.0.jar                 | 1        | 22    | 1                    | 3                    |
| 2 | axon-configuration-4.11.0.jar             | 1        | 41    | 2                    | 4                    |
| 3 | axon-test-4.11.0.jar                      | 8        | 87    | 1                    | 3                    |
| 4 | axon-spring-boot-autoconfigure-4.11.0.jar | 9        | 88    | 0                    | 7                    |
| 5 | axon-eventsourcing-4.11.0.jar             | 9        | 133   | 5                    | 2                    |
| 6 | axon-server-connector-4.11.0.jar          | 11       | 142   | 1                    | 4                    |
| 7 | axon-modelling-4.11.0.jar                 | 10       | 158   | 6                    | 1                    |
| 8 | axon-messaging-4.11.0.jar                 | 66       | 809   | 8                    | 0                    |

Table 1g - Top 30 artifacts with the lowest number of incoming dependencies

The following table lists the top 30 artifacts that are used the least by other artifacts (lowest count of incoming dependencies, lowest in-degree).

|   | artifactName                              | packages | types | incomingDependencies | outgoingDependencies |
|---|---|----------|-------|----------------------|----------------------|
| 0 | axon-spring-boot-autoconfigure-4.11.0.jar | 9        | 88    | 0                    | 7                    |
| 1 | axon-disruptor-4.11.0.jar                 | 1        | 22    | 1                    | 3                    |
| 2 | axon-server-connector-4.11.0.jar          | 11       | 142   | 1                    | 4                    |
| 3 | axon-test-4.11.0.jar                      | 8        | 87    | 1                    | 3                    |
| 4 | axon-tracing-opentelemetry-4.11.0.jar     | 1        | 5     | 1                    | 1                    |
| 5 | axon-configuration-4.11.0.jar             | 1        | 41    | 2                    | 4                    |
| 6 | axon-eventsourcing-4.11.0.jar             | 9        | 133   | 5                    | 2                    |
| 7 | axon-modelling-4.11.0.jar                 | 10       | 158   | 6                    | 1                    |
| 8 | axon-messaging-4.11.0.jar                 | 66       | 809   | 8                    | 0                    |

Table 1h - Top 30 artifacts with the lowest number of outgoing dependencies

The following table lists the top 30 artifacts that are depending on the lowest number of other artifacts (lowest count of outgoing dependencies, lowest out-degree).

|   | artifactName                              | packages | types | incomingDependencies | outgoingDependencies |
|---|---|----------|-------|----------------------|----------------------|
| 0 | axon-messaging-4.11.0.jar                 | 66       | 809   | 8                    | 0                    |
| 1 | axon-modelling-4.11.0.jar                 | 10       | 158   | 6                    | 1                    |
| 2 | axon-tracing-opentelemetry-4.11.0.jar     | 1        | 5     | 1                    | 1                    |
| 3 | axon-eventsourcing-4.11.0.jar             | 9        | 133   | 5                    | 2                    |
| 4 | axon-disruptor-4.11.0.jar                 | 1        | 22    | 1                    | 3                    |
| 5 | axon-test-4.11.0.jar                      | 8        | 87    | 1                    | 3                    |
| 6 | axon-configuration-4.11.0.jar             | 1        | 41    | 2                    | 4                    |
| 7 | axon-server-connector-4.11.0.jar          | 11       | 142   | 1                    | 4                    |
| 8 | axon-spring-boot-autoconfigure-4.11.0.jar | 9        | 88    | 0                    | 7                    |

# Cyclic Dependencies

Cyclic dependencies occur when one package uses a class of another package and vice versa. These dependencies can lead to problems when one of these packages needs to be changed.

## Table 2a - Cyclic Dependencies Overview

Show the top 40 cyclic dependencies sorted by the most promising to resolve first. This is done by calculating the number of forward dependencies (first cycle participant to second cycle participant) in relation to backward dependencies (second cycle participant back to first cycle participant). The higher this rate (approaching 1), the easier it should be to resolve the cycle by focussing on the few backward dependencies.

Only the top 40 entries are shown. The whole table can be found in the following CSV report:

Cyclic\_Dependencies

**Columns:**

- *artifactName* identifies the artifact of the first participant of the cycle
- *packageName* identifies the package of the first participant of the cycle
- *dependentArtifactName* identifies the artifact of the second participant of the cycle
- *dependentPackageName* identifies the package of the second participant of the cycle
- *forwardToBackwardBalance* is between 0 and 1. High for many forward and few backward dependencies.
- *numberForward* contains the number of dependencies from the first participant of the cycle to the second one
- *numberBackward* contains the number of dependencies from the second participant of the cycle back to the first one
- *someForwardDependencies* lists some forward dependencies in the text format "type1 -> type2"
- *backwardDependencies* lists the backward dependencies in the format "type1 <- type2" that are recommended to get resolved

|    | artifactName                 | packageName                                       | dependentArtifactName        | dependentPackageName                                      | forwardToBackwardBalance | numberForward | numberBackward |
|----|------------------------------|---|------------------------------|---|--------------------------|---------------|----------------|
| 0  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.tracing                                 | 0.900000                 | 19            | 1              |
| 1  | axon-messaging-4.11.0        | org.axonframework.queryhandling                   | axon-messaging-4.11.0        | org.axonframework.messaging.responsetypes                 | 0.882353                 | 16            | 1              |
| 2  | axon-messaging-4.11.0        | org.axonframework.queryhandling                   | axon-messaging-4.11.0        | org.axonframework.tracing                                 | 0.875000                 | 15            | 1              |
| 3  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.messaging                               | 0.857143                 | 39            | 3              |
| 4  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.messaging.annotation                    | 0.840000                 | 23            | 2              |
| 5  | axon-messaging-4.11.0        | org.axonframework.deadline                        | axon-messaging-4.11.0        | org.axonframework.tracing                                 | 0.800000                 | 9             | 1              |
| 6  | axon-messaging-4.11.0        | org.axonframework.commandhandling                 | axon-messaging-4.11.0        | org.axonframework.tracing                                 | 0.777778                 | 8             | 1              |
| 7  | axon-eventsourcing-4.11.0    | org.axonframework.eventsourcing                   | axon-eventsourcing-4.11.0    | org.axonframework.eventsourcing.eventstore                | 0.777778                 | 16            | 2              |
| 8  | axon-messaging-4.11.0        | org.axonframework.commandhandling.callbacks       | axon-messaging-4.11.0        | org.axonframework.commandhandling                         | 0.733333                 | 13            | 2              |
| 9  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.serialization                           | 0.647059                 | 14            | 3              |
| 10 | axon-messaging-4.11.0        | org.axonframework.messaging.unitofwork            | axon-messaging-4.11.0        | org.axonframework.messaging                               | 0.647059                 | 14            | 3              |
| 11 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.event.axon | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector                    | 0.615385                 | 21            | 5              |
| 12 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.query      | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector                    | 0.571429                 | 22            | 6              |
| 13 | axon-messaging-4.11.0        | org.axonframework.eventhandling.async             | axon-messaging-4.11.0        | org.axonframework.eventhandling                           | 0.571429                 | 11            | 3              |
| 14 | axon-messaging-4.11.0        | org.axonframework.eventhandling.replay            | axon-messaging-4.11.0        | org.axonframework.eventhandling                           | 0.454545                 | 8             | 3              |
| 15 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.util       | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector                    | 0.428571                 | 5             | 2              |
| 16 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.event.util         | 0.333333                 | 2             | 1              |
| 17 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.query      | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.query.subscription | 0.333333                 | 4             | 2              |

|    | artifactName                 | packageName   | dependentArtifactName        | dependentPackageName                                       | forwardToBackwardBalance | numberForward | numberBackward |
|----|------------------------------|---|------------------------------|--|--------------------------|---------------|----------------|
| 18 | axon-messaging-4.11.0        | org.axonframework.serialization.upcasting.event             | axon-messaging-4.11.0        | org.axonframework.eventhandling                            | 0.333333                 | 6             | 3              |
| 19 | axon-eventsourcing-4.11.0    | org.axonframework.eventsourcing.eventstore.jdbc             | axon-eventsourcing-4.11.0    | org.axonframework.eventsourcing.eventstore.jdbc.statements | 0.317073                 | 27            | 14             |
| 20 | axon-messaging-4.11.0        | org.axonframework.eventhandling                             | axon-messaging-4.11.0        | org.axonframework.eventhandling.tokenstore                 | 0.285714                 | 9             | 5              |
| 21 | axon-modelling-4.11.0        | org.axonframework.modelling.command.inspection              | axon-modelling-4.11.0        | org.axonframework.modelling.command                        | 0.250000                 | 20            | 12             |
| 22 | axon-messaging-4.11.0        | org.axonframework.queryhandling.registration                | axon-messaging-4.11.0        | org.axonframework.queryhandling                            | 0.250000                 | 5             | 3              |
| 23 | axon-messaging-4.11.0        | org.axonframework.messaging                                 | axon-messaging-4.11.0        | org.axonframework.serialization                            | 0.238095                 | 13            | 8              |
| 24 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.command              | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector                     | 0.222222                 | 11            | 7              |
| 25 | axon-messaging-4.11.0        | org.axonframework.messaging.annotation                      | axon-messaging-4.11.0        | org.axonframework.messaging.interceptors                   | 0.200000                 | 3             | 2              |
| 26 | axon-modelling-4.11.0        | org.axonframework.modelling.saga                            | axon-modelling-4.11.0        | org.axonframework.modelling.saga.metamodel                 | 0.142857                 | 4             | 3              |
| 27 | axon-messaging-4.11.0        | org.axonframework.commandhandling.distributed.commandfilter | axon-messaging-4.11.0        | org.axonframework.commandhandling.distributed              | 0.076923                 | 7             | 6              |

### Table 2b - Cyclic Dependencies Break Down

Lists packages with cyclic dependencies with every dependency in a separate row sorted by the most promising dependency first.

Only the top 40 entries are shown. The whole table can be found in the following CSV report:

Cyclic\_Dependencies\_Breakdown

Columns in addition to Table 2a:

- *dependency* shows the cycle dependency in the text format "type1 -> type2" (forward) or "type2<-type1" (backward)

|    | artifactName          | packageName                     | dependentArtifactName | dependentPackageName                      | dependency  | forwardToBackwardBalance | numberForward | numberBackward |
|----|-----------------------|---------------------------------|-----------------------|---|---|--------------------------|---------------|----------------|
| 0  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | TrackingEventProcessor\$Builder->SpanFactory                | 0.900000                 | 19            | 1              |
| 1  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | AbstractEventBus->Span                                      | 0.900000                 | 19            | 1              |
| 2  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | DefaultEventBusSpanFactory->Span                            | 0.900000                 | 19            | 1              |
| 3  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | AbstractEventProcessor->Span                                | 0.900000                 | 19            | 1              |
| 4  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | EventMessage<-NestingSpanFactory                            | 0.900000                 | 19            | 1              |
| 5  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | DefaultEventProcessorSpanFactory\$Builder->SpanFactory      | 0.900000                 | 19            | 1              |
| 6  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | SimpleEventBus\$Builder->SpanFactory                        | 0.900000                 | 19            | 1              |
| 7  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | DefaultEventBusSpanFactory->SpanFactory                     | 0.900000                 | 19            | 1              |
| 8  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | AbstractEventBus->SpanScope                                 | 0.900000                 | 19            | 1              |
| 9  | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | AbstractEventProcessor\$Builder->NoOpSpanFactory            | 0.900000                 | 19            | 1              |
| 10 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | DefaultEventBusSpanFactory\$Builder->SpanFactory            | 0.900000                 | 19            | 1              |
| 11 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | DefaultEventProcessorSpanFactory->NoOpSpanFactory\$NoOpSpan | 0.900000                 | 19            | 1              |
| 12 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | EventBusSpanFactory->Span                                   | 0.900000                 | 19            | 1              |
| 13 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | AbstractEventBus\$Builder->NoOpSpanFactory                  | 0.900000                 | 19            | 1              |
| 14 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | EventProcessorSpanFactory->Span                             | 0.900000                 | 19            | 1              |
| 15 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | SubscribingEventProcessor\$Builder->SpanFactory             | 0.900000                 | 19            | 1              |
| 16 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | AbstractEventProcessor\$Builder->SpanFactory                | 0.900000                 | 19            | 1              |
| 17 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | AbstractEventBus\$Builder->SpanFactory                      | 0.900000                 | 19            | 1              |
| 18 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | DefaultEventProcessorSpanFactory->Span                      | 0.900000                 | 19            | 1              |
| 19 | axon-messaging-4.11.0 | org.axonframework.eventhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | DefaultEventProcessorSpanFactory->SpanFactory               | 0.900000                 | 19            | 1              |
| 20 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | StreamingQueryMessage->ResponseType                         | 0.882353                 | 16            | 1              |
| 21 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | GenericQueryMessage->ResponseType                           | 0.882353                 | 16            | 1              |
| 22 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | GenericStreamingQueryMessage->ResponseType                  | 0.882353                 | 16            | 1              |
| 23 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | DefaultQueryGateway->ResponseType                           | 0.882353                 | 16            | 1              |
| 24 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | SimpleQueryBus->ResponseType                                | 0.882353                 | 16            | 1              |
| 25 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | QueryGateway->ResponseType                                  | 0.882353                 | 16            | 1              |
| 26 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | SimpleQueryUpdateEmitter->OptionalResponseType              | 0.882353                 | 16            | 1              |
| 27 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | QueryMessage->ResponseType                                  | 0.882353                 | 16            | 1              |
| 28 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | GenericStreamingQueryMessage->PublisherResponseType         | 0.882353                 | 16            | 1              |
| 29 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | SubscriptionQueryMessage->ResponseType                      | 0.882353                 | 16            | 1              |
| 30 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | SimpleQueryUpdateEmitter->MultipleInstancesResponseType     | 0.882353                 | 16            | 1              |
| 31 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | SimpleQueryUpdateEmitter->PublisherResponseType             | 0.882353                 | 16            | 1              |
| 32 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | QueryGateway->ResponseTypes                                 | 0.882353                 | 16            | 1              |
| 33 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | QueryResponseMessage<-ConvertingResponseMessage             | 0.882353                 | 16            | 1              |
| 34 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | GenericSubscriptionQueryMessage->ResponseType               | 0.882353                 | 16            | 1              |
| 35 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | QuerySubscription->ResponseType                             | 0.882353                 | 16            | 1              |
| 36 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.messaging.responsetypes | SimpleQueryUpdateEmitter->ResponseType                      | 0.882353                 | 16            | 1              |
| 37 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | QueryMessage<-SpanUtils                                     | 0.875000                 | 15            | 1              |
| 38 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | QueryUpdateEmitterSpanFactory->Span                         | 0.875000                 | 15            | 1              |
| 39 | axon-messaging-4.11.0 | org.axonframework.queryhandling | axon-messaging-4.11.0 | org.axonframework.tracing                 | SimpleQueryUpdateEmitter->Span                              | 0.875000                 | 15            | 1              |

Table 2c - Cyclic Dependencies Break Down - Backward Dependencies Only

Lists packages with cyclic dependencies with every dependency in a separate row sorted by the most promising dependency first. This table only contains the backward dependencies from the second participant of the cycle back to the first one that are the most promising to resolve.

Only the top 40 entries are shown. The whole table can be found in the following CSV report:

Cyclic\_Dependencies\_Breakdown\_BackwardOnly

|    | artifactName                 | packageName                                       | dependentArtifactName        | dependentPackageName                              | dependency  | forwardToBackward |
|----|------------------------------|---|------------------------------|---|---|-------------------|
| 0  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.tracing                         | EventMessage<-NestingSpanFactory  |                   |
| 1  | axon-messaging-4.11.0        | org.axonframework.queryhandling                   | axon-messaging-4.11.0        | org.axonframework.messaging.responsetypes         | QueryResponseMessage<-ConvertingResponseMessage                                 |                   |
| 2  | axon-messaging-4.11.0        | org.axonframework.queryhandling                   | axon-messaging-4.11.0        | org.axonframework.tracing                         | QueryMessage<-SpanUtils   |                   |
| 3  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.messaging                       | EventMessage<-Headers   |                   |
| 4  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.messaging                       | TrackingToken<-StreamableMessageSource  |                   |
| 5  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.messaging                       | DomainEventMessage<-Headers   |                   |
| 6  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.messaging.annotation            | DomainEventMessage<-SourceIdParameterResolverFactory\$SourceIdParameterResolver |                   |
| 7  | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.messaging.annotation            | AggregateTypeParameterResolverFactory\$AggregateTypeParameterResolver           |                   |
| 8  | axon-messaging-4.11.0        | org.axonframework.deadline                        | axon-messaging-4.11.0        | org.axonframework.tracing                         | DeadlineMessage<-SpanUtils  |                   |
| 9  | axon-messaging-4.11.0        | org.axonframework.commandhandling                 | axon-messaging-4.11.0        | org.axonframework.tracing                         | CommandMessage<-SpanUtils   |                   |
| 10 | axon-eventsourcing-4.11.0    | org.axonframework.eventsourcing                   | axon-eventsourcing-4.11.0    | org.axonframework.eventsourcing.eventstore        | EventStreamUtils<-DomainEventStream   |                   |
| 11 | axon-eventsourcing-4.11.0    | org.axonframework.eventsourcing                   | axon-eventsourcing-4.11.0    | org.axonframework.eventsourcing.eventstore        | EventStreamUtils<-AbstractEventStorageEngine                                    |                   |
| 12 | axon-messaging-4.11.0        | org.axonframework.commandhandling.callbacks       | axon-messaging-4.11.0        | org.axonframework.commandhandling                 | NoOpCallback<-SimpleCommandBus\$Builder   |                   |
| 13 | axon-messaging-4.11.0        | org.axonframework.commandhandling.callbacks       | axon-messaging-4.11.0        | org.axonframework.commandhandling                 | LoggingCallback<-SimpleCommandBus\$Builder                                      |                   |
| 14 | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.serialization                   | GenericEventMessage<-AbstractXStreamSerializer                                  |                   |
| 15 | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.serialization                   | GapAwareTrackingToken<-GapAwareTrackingTokenConverter                           |                   |
| 16 | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | axon-messaging-4.11.0        | org.axonframework.serialization                   | GenericDomainEventMessage<-AbstractXStreamSerializer                            |                   |
| 17 | axon-messaging-4.11.0        | org.axonframework.messaging.unitofwork            | axon-messaging-4.11.0        | org.axonframework.messaging                       | UnitOfWork<-DefaultInterceptorChain   |                   |
| 18 | axon-messaging-4.11.0        | org.axonframework.messaging.unitofwork            | axon-messaging-4.11.0        | org.axonframework.messaging                       | UnitOfWork<-MessageHandlerInterceptor   |                   |
| 19 | axon-messaging-4.11.0        | org.axonframework.messaging.unitofwork            | axon-messaging-4.11.0        | org.axonframework.messaging                       | CurrentUnitOfWork<-GenericMessage   |                   |
| 20 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.event.axon | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | EventProcessorInfoConfiguration<-ServerConnectorConfigurerModule                |                   |
| 21 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.event.axon | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | AxonServerEventStoreFactory<-ServerConnectorConfigurerModule                    |                   |
| 22 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.event.axon | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | AxonServerEventStore\$Builder<-ServerConnectorConfigurerModule                  |                   |
| 23 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.event.axon | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | AxonServerEventStore<-ServerConnectorConfigurerModule                           |                   |
| 24 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.event.axon | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | AxonServerEventStoreFactory\$Builder<-ServerConnectorConfigurerModule           |                   |
| 25 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.query      | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | AxonServerNonTransientRemoteQueryHandlingException<-ErrorCode                   |                   |
| 26 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.query      | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | AxonServerQueryDispatchException<-ErrorCode                                     |                   |
| 27 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.query      | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | AxonServerQueryBus\$Builder<-ServerConnectorConfigurerModule                    |                   |
| 28 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.query      | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | QueryPriorityCalculator<-ServerConnectorConfigurerModule                        |                   |
| 29 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.query      | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | AxonServerQueryBus<-ServerConnectorConfigurerModule                             |                   |
| 30 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.query      | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | AxonServerRemoteQueryHandlingException<-ErrorCode                               |                   |
| 31 | axon-messaging-4.11.0        | org.axonframework.eventhandling.async             | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | SequencingPolicy<-SimpleEventHandlerInvoker\$Builder                            |                   |
| 32 | axon-messaging-4.11.0        | org.axonframework.eventhandling.async             | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | SequentialPerAggregatePolicy<-SimpleEventHandlerInvoker\$Builder                |                   |
| 33 | axon-messaging-4.11.0        | org.axonframework.eventhandling.async             | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | SequencingPolicy<-SimpleEventHandlerInvoker                                     |                   |
| 34 | axon-messaging-4.11.0        | org.axonframework.eventhandling.replay            | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | GenericResetContext<-AnnotationEventHandlerAdapter                              |                   |
| 35 | axon-messaging-4.11.0        | org.axonframework.eventhandling.replay            | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | ResetContext<-ResetHandler  |                   |
| 36 | axon-messaging-4.11.0        | org.axonframework.eventhandling.replay            | axon-messaging-4.11.0        | org.axonframework.eventhandling                   | ResetContext<-AnnotationEventHandlerAdapter                                     |                   |
| 37 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.util       | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | GrpcMessageSizeInterceptor<-AxonServerConnectionManager\$Builder                |                   |
| 38 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.util       | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | ExceptionSerializer<-ErrorCode  |                   |
| 39 | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector            | axon-server-connector-4.11.0 | org.axonframework.axonserver.connector.event.util | ErrorCode<-GrpcExceptionParser  |                   |



# Interface Segregation Candidates

Well known from [Design Principles and Design Patterns by Robert C. Martin](#), the *Interface Segregation Principle* suggests that software components should have narrow, focused interfaces rather than large, general-purpose ones. The goal is to minimize the dependencies between components and increase modularity, flexibility, and maintainability.

Smaller, focused and purpose-driven interfaces

- make it easier to modify individual components without affecting the rest of the system.
- make it clearer which client is affected by which change.
- don't force their clients to depend on methods they don't need.
- reduce the scope of changes since a change to one component doesn't affect others.
- lead to a more loosely coupled architecture that is easier to understand and maintain.

Reference: [Analyze java package metrics in a graph database](#)

## How to apply the results

If just one method of a type is used, especially in many places, then the result of this method can be used to call e.g. a method or construct an object instead of using the whole object and then just calling that single method.

If there are a couple of methods that are used for a distinct purpose, those could be factored out into a separate interface. The original type can extended/implement the new interface so that there are no breaking changes. Then all the callers, that use only this group of methods, can be changed to the new interface.

## Table 4 - Top 40 most used combinations of methods

The following table shows the top 40 most used combinations of methods of larger types that might benefit from applying the *Interface Segregation Principle*. The whole table can be found in the CSV report `Candidates_for_Interface_Segregation`.

|    | fullDependentTypeName  | declaredMethods | calledMethodNames  | calledMethods | callerTypes |
|----|--|-----------------|--|---------------|-------------|
| 0  | org.axonframework.commandhandling.CommandMessage                     | 9               | [getCommandName]   | 1             | 20          |
| 1  | org.axonframework.eventhandling.EventMessage                         | 9               | [getIdentifier, getTimestamp]                                    | 2             | 10          |
| 2  | org.axonframework.eventhandling.EventMessage                         | 9               | [getIdentifier]  | 1             | 10          |
| 3  | org.axonframework.eventhandling.DomainEventMessage                   | 10              | [getSequenceNumber]  | 1             | 9           |
| 4  | org.axonframework.eventhandling.TrackedEventMessage                  | 10              | [trackingToken]  | 1             | 8           |
| 5  | org.axonframework.commandhandling.GenericCommandResultMessage        | 14              | [asCommandResultMessage]   | 1             | 6           |
| 6  | org.axonframework.eventhandling.DomainEventMessage                   | 10              | [getSequenceNumber, getType, getAggregateIdentifier]             | 3             | 6           |
| 7  | org.axonframework.messaging.ResultMessage                            | 9               | [exceptionResult, isExceptional]                                 | 2             | 6           |
| 8  | org.axonframework.eventhandling.ReplayToken                          | 13              | [createReplayToken]  | 1             | 5           |
| 9  | org.axonframework.deadline.GenericDeadlineMessage                    | 11              | [asDeadlineMessage]  | 1             | 5           |
| 10 | org.axonframework.eventhandling.DomainEventMessage                   | 10              | [getAggregateIdentifier]   | 1             | 5           |
| 11 | org.axonframework.eventhandling.TrackedEventMessage                  | 12              | [trackingToken]  | 1             | 4           |
| 12 | org.axonframework.eventhandling.GenericEventMessage                  | 11              | [asEventMessage]   | 1             | 4           |
| 13 | org.axonframework.deadline.DeadlineMessage                           | 10              | [getDeadlineName]  | 1             | 4           |
| 14 | org.axonframework.eventhandling.DomainEventMessage                   | 10              | [getType]  | 1             | 4           |
| 15 | org.axonframework.deadline.DefaultDeadlineManagerSpanFactory         | 8               | [builder]  | 1             | 4           |
| 16 | org.axonframework.common.transaction.NoTransactionManager            | 4               | [instance]   | 1             | 4           |
| 17 | org.axonframework.queryhandling.SimpleQueryUpdateEmitter             | 17              | [builder]  | 1             | 3           |
| 18 | org.axonframework.commandhandling.GenericCommandResultMessage        | 15              | [asCommandResultMessage]   | 1             | 3           |
| 19 | org.axonframework.messaging.annotation.WrappedMessageHandlingMember  | 14              | [handle]   | 1             | 3           |
| 20 | org.axonframework.eventhandling.ReplayToken                          | 13              | [isReplay]   | 1             | 3           |
| 21 | org.axonframework.modelling.command.inspection.AggregateModel        | 13              | [type]   | 1             | 3           |
| 22 | org.axonframework.queryhandling.SubscriptionQueryMessage             | 12              | [getUpdateResponseType]  | 1             | 3           |
| 23 | org.axonframework.eventhandling.DomainEventMessage                   | 11              | [getSequenceNumber, getType, getAggregateIdentifier]             | 3             | 3           |
| 24 | org.axonframework.queryhandling.SimpleQueryBus                       | 11              | [builder]  | 1             | 3           |
| 25 | org.axonframework.eventhandling.DomainEventMessage                   | 10              | [getSequenceNumber, getAggregateIdentifier]                      | 2             | 3           |
| 26 | org.axonframework.eventhandling.GapAwareTrackingToken                | 10              | [getGaps, advanceTo, withGapsTruncatedAt, getIndex, newInstance] | 5             | 3           |
| 27 | org.axonframework.eventhandling.GenericEventMessage                  | 10              | [asEventMessage]   | 1             | 3           |
| 28 | org.axonframework.queryhandling.DefaultQueryBusSpanFactory           | 10              | [builder]  | 1             | 3           |
| 29 | org.axonframework.commandhandling.gateway.DefaultCommandGateway      | 9               | [builder]  | 1             | 3           |
| 30 | org.axonframework.config.Configuration                               | 9               | [getComponent]   | 1             | 3           |
| 31 | org.axonframework.config.Configuration                               | 9               | [snapshotFilter, upcasterChain]                                  | 2             | 3           |
| 32 | org.axonframework.eventhandling.EventMessage                         | 9               | [getTimestamp]   | 1             | 3           |
| 33 | org.axonframework.messaging.MessageDecorator                         | 9               | [describeTo]   | 1             | 3           |
| 34 | org.axonframework.queryhandling.QueryMessage                         | 9               | [getQueryName, getResponseType]                                  | 2             | 3           |
| 35 | org.axonframework.commandhandling.DefaultCommandBusSpanFactory       | 5               | [builder]  | 1             | 3           |
| 36 | org.axonframework.eventhandling.TrackedEventData                     | 5               | [trackingToken]  | 1             | 3           |
| 37 | org.axonframework.eventhandling.tokenstore.ConfigToken               | 5               | [get]  | 1             | 3           |
| 38 | org.axonframework.eventhandling.DefaultEventBusSpanFactory           | 4               | [builder]  | 1             | 3           |
| 39 | org.axonframework.queryhandling.DefaultQueryUpdateEmitterSpanFactory | 4               | [builder]  | 1             | 3           |

## Package Usage

Table 5 - Types that are used by multiple packages

This table shows the top 40 packages that are used by the highest number of different packages. The whole table can be found in the CSV report `List_types_that_are_used_by_many_different_packages` .

|    | fulQualifiedDependentTypeName                                   | dependentTypeName            | dependentTypeLabels  | numberOfUsingPackages |
|----|---|------------------------------|--|-----------------------|
| 0  | org.axonframework.common.BuilderUtils                           | BuilderUtils                 | [Type, File, Java, Class, ByteCode, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Ma...  | 50                    |
| 1  | org.axonframework.common.AxonConfigurationException             | AxonConfigurationException   | [Type, File, Java, Class, ByteCode, Throwable, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedCom...  | 43                    |
| 2  | org.axonframework.messaging.Message                             | Message                      | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInduce...   | 42                    |
| 3  | org.axonframework.messaging.MetaData                            | MetaData                     | [Type, File, Java, Class, ByteCode, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityBetweenness, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4Ty...  | 40                    |
| 4  | org.axonframework.serialization.Serializer                      | Serializer                   | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityBetweenness, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mar...  | 37                    |
| 5  | org.axonframework.eventhandling.EventMessage                    | EventMessage                 | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeakl...  | 36                    |
| 6  | org.axonframework.messaging.unitofwork.UnitOfWork               | UnitOfWork                   | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityArticleRank, Mark4TopCentralityBetweenness, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWe...  | 33                    |
| 7  | org.axonframework.common.transaction.TransactionManager         | TransactionManager           | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation1...  | 31                    |
| 8  | org.axonframework.common.Assert                                 | Assert                       | [Type, File, Java, Class, ByteCode, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Ma...   | 29                    |
| 9  | org.axonframework.serialization.SerializedObject                | SerializedObject             | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityBetweenness, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInduce...  | 28                    |
| 10 | org.axonframework.serialization.SerializedType                  | SerializedType               | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0]...   | 28                    |
| 11 | org.axonframework.messaging.unitofwork.CurrentUnitOfWork        | CurrentUnitOfWork            | [Type, File, Java, Class, ByteCode, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityBetweenness, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TypeLabelPropagation19, Mark4TypeLouvainCommunity3, Mark4TypeLeidenCommunity5, Mark4TypeKCoreDecomposition10]                                | 22                    |
| 12 | org.axonframework.common.Registration                           | Registration                 | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation10, Mark4TypeLouvainCommunity8, Mark4TypeLeidenCommunity8, Mark4TypeKCoreDecomposition10]                                | 22                    |
| 13 | org.axonframework.tracing.SpanFactory                           | SpanFactory                  | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation10, Mark4TypeLouvainCommunity8, Mark4TypeLeidenCommunity8, Mark4TypeKCoreDecomposition10] | 22                    |
| 14 | org.axonframework.lifecycle.Lifecycle                           | Lifecycle                    | [Type, File, Java, ByteCode, Interface, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation12, Mark4TypeLouvainCommunity12, Mark4TypeLeidenCommunity3, Mark4TypeKCoreDecomposition10]  | 20                    |
| 15 | org.axonframework.lifecycle.Lifecycle\$LifecycleRegistry        | Lifecycle\$LifecycleRegistry | [Type, File, Java, ByteCode, Interface, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation12, Mark4TypeLouvainCommunity12, Mark4TypeLeidenCommunity3, Mark4TypeKCoreDecomposition10]  | 20                    |
| 16 | org.axonframework.messaging.MessageHandlerInterceptor           | MessageHandlerInterceptor    | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityBetweenness, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation2, Mark4TypeLouvainCommunity1, Mark4Ty...                             | 20                    |
| 17 | org.axonframework.common.ObjectUtils                            | ObjectUtils                  | [Type, File, Java, Class, ByteCode, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation10, Mark4TypeLouvainCommunity1, Mark4TypeLeidenCommunity10, Mark4TypeKCoreDecomposition10]  | 20                    |
| 18 | org.axonframework.eventhandling.TrackingToken                   | TrackingToken                | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0]...   | 20                    |
| 19 | org.axonframework.eventhandling.DomainEventMessage              | DomainEventMessage           | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation40, Mark4T...  | 19                    |
| 20 | org.axonframework.messaging.MessageDispatchInterceptor          | MessageDispatchInterceptor   | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation10, Mark4TypeLouvainCommunity0, Mark4TypeLeidenCommunity0, Mark4TypeKCoreDecomposition10]   | 19                    |
| 21 | org.axonframework.messaging.annotation.ParameterResolverFactory | ParameterResolverFactory     | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation7, Mark4TypeLouvainCommunity5, Mark4TypeLeidenCommunity7, Mark4TypeKCoreDecomposition10]  | 19                    |
| 22 | org.axonframework.serialization.SimpleSerializedObject          | SimpleSerializedObject       | [Type, File, Java, Class, ByteCode, GenericDeclaration, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation50, Mark4TypeLouvainCommunity12, Mark4TypeLeidenCommunity2, Mark4TypeKCoreDecomposition10, Mark4TypeMaximumKCuto.125]  | 19                    |
| 23 | org.axonframework.common.AxonNonTransientException              | AxonNonTransientException    | [Type, File, Java, Class, ByteCode, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation36, Mark4TypeLouvainCommunity6, Mark4TypeLeidenCommunity6, Mark4TypeKCoreDecompositi...   | 18                    |
| 24 | org.axonframework.eventhandling.GenericEventMessage             | GenericEventMessage          | [Type, File, Java, Class, ByteCode, GenericDeclaration, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation9, Mark4TypeLouvainCommunity3, Mark4TypeLeidenCommunity2, Mark4TypeKCoreDecompositi...  | 18                    |
| 25 | org.axonframework.commandhandling.CommandMessage                | CommandMessage               | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeakl...  | 17                    |
| 26 | org.axonframework.tracing.NoOpSpanFactory                       | NoOpSpanFactory              | [Type, File, Java, Class, ByteCode, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation10, Mark4TypeLouvainCommunity8, Mark4TypeLeidenCommunity8, Mark4TypeKCoreDecomposition10]   | 17                    |
| 27 | org.axonframework.eventhandling.EventBus                        | EventBus                     | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation6, Mark4TypeLouvainCommunity4, Mark4TypeLeidenCommunity6, Mark4TypeKCoreDecomposition10]  | 15                    |
| 28 | org.axonframework.messaging.annotation.HandlerDefinition        | HandlerDefinition            | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation7, Mark4TypeLouvainCommunity5, Mark4TypeLeidenCommunity7, Mark4TypeKCoreDecomposition10]  | 15                    |
| 29 | org.axonframework.common.transaction.NoTransactionManager       | NoTransactionManager         | [Type, File, Java, ByteCode, Enum, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation12, Mark4TypeLouvainCommunity9, Mark4TypeLeidenCommunity3, Mark4TypeKCoreDecomposition10, Mark4TypeMaximumKCuto.14285714285714285]   | 15                    |
| 30 | org.axonframework.messaging.ResultMessage                       | ResultMessage                | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityBetweenness, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation9, Mark4TypeLouvainCommunity...  | 15                    |
| 31 | org.axonframework.tracing.Span                                  | Span                         | [Type, File, Java, ByteCode, Interface, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation10, Mark4TypeLouvainCommunity8]...   | 15                    |
| 32 | org.axonframework.messaging.unitofwork.DefaultUnitOfWork        | DefaultUnitOfWork            | [Type, File, Java, Class, ByteCode, GenericDeclaration, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation9, Mark4TypeLouvainCommunity3, Mark4TypeLeidenCommunity5, Mark4TypeKCoreDecomposition10]  | 14                    |
| 33 | org.axonframework.common.ReflectionUtils                        | ReflectionUtils              | [Type, File, Java, Class, ByteCode, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation26, Mark4TypeLouvainCommunity5, Mark4TypeLeidenCommunity7, Mark4TypeKCoreDecomposition7]  | 14                    |
| 34 | org.axonframework.messaging.InterceptorChain                    | InterceptorChain             | [Type, File, Java, ByteCode, Interface, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation5, Mark4TypeLouvainCommunity3, Mark4TypeLeidenCommunity5, Mark4TypeKCoreDecomposition10, Mark4TypeMaximumKCuto.10389610389610389]   | 13                    |

|    | fullQualifiedDependentTypeName                            | dependentTypeName         | dependentTypeLabels   | numberOfUsingPackages |
|----|---|---------------------------|---|-----------------------|
| 35 | org.axonframework.eventhandling.TrackedEventMessage       | TrackedEventMessage       | [Type, File, Java, ByteCode, GenericDeclaration, Interface, Mark4TopCentralityArticleRank, Mark4TopCentralityHyperlinkInducedTopicSearchAuthority, Mark4TopCentralityHyperlinkInducedTopicSearchHub, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation57, Mark4TypeLouvainCommunity10, Mark4... | 13                    |
| 36 | org.axonframework.common.AxonException                    | AxonException             | [Type, File, Java, Class, ByteCode, Mark4TopCentralityPageRank, Mark4TopCentralityArticleRank, Mark4TopCentralityHarmonic, Mark4TopCentralityCloseness, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation35, Mark4TypeLouvainCommunity13, Mark4TypeLeidenCommunity12, Mark4TypeKCoreDecompos... | 12                    |
| 37 | org.axonframework.common.DateTimeUtils                    | DateTimeUtils             | [Type, File, Java, Class, ByteCode, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation71, Mark4TypeLouvainCommunity1, Mark4TypeLeidenCommunity10, Mark4TypeKCoreDecomposition8]  | 12                    |
| 38 | org.axonframework.messaging.DefaultInterceptorChain       | DefaultInterceptorChain   | [Type, File, Java, Class, ByteCode, GenericDeclaration, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation2, Mark4TypeLouvainCommunity1, Mark4TypeLeidenCommunity2, Mark4TypeKCoreDecomposition10]   | 12                    |
| 39 | org.axonframework.eventhandling.GenericDomainEventMessage | GenericDomainEventMessage | [Type, File, Java, Class, ByteCode, GenericDeclaration, Mark4TypeWeaklyConnectedComponent0, Mark4TypeLabelPropagation9, Mark4TypeLouvainCommunity3, Mark4TypeLeidenCommunity2, Mark4TypeKCoreDecomposition10, Mark4TypeMaximumKCut0.2727272727272727]   | 12                    |

Table 6 - Packages that are used by multiple artifacts

This table shows the top 30 artifacts that only use a few (compared to all existing) packages of another artifact. The whole table can be found in the CSV report `ArtifactPackageUsage` .

|    | artifactName                          | dependentArtifactName        | dependentPackages | dependentArtifactPackages | packageUsagePercentage | dependentFullQualifiedPackageNames   | dependentPackageNames   |
|----|---------------------------------------|------------------------------|-------------------|---------------------------|------------------------|--|---|
| 0  | axon-tracing-opentelemetry-4.11.0     | axon-messaging-4.11.0        | 3                 | 66                        | 0.045455               | [org.axonframework.messaging, org.axonframework.common, org.axonframework.tracing]   | [messaging, common, tracing]  |
| 1  | axon-server-connector-4.11.0          | axon-modelling-4.11.0        | 1                 | 10                        | 0.100000               | [org.axonframework.modelling.command]  | [command]   |
| 2  | axon-spring-boot-autoconfigure-4.11.0 | axon-test-4.11.0             | 1                 | 8                         | 0.125000               | [org.axonframework.test.server]  | [server]  |
| 3  | axon-disruptor-4.11.0                 | axon-messaging-4.11.0        | 9                 | 66                        | 0.136364               | [org.axonframework.messaging.unitofwork, org.axonframework.common.caching, org.axonframework.commandhandling, org.axonframework.common, org.axonframework.messaging, org.axonframework.commandhandling.callbacks, org.axonframework.messaging.annotation, org.axonframework.monitoring, org.axonframework... | [unitofwork, caching, commandhandling, common, messaging, callbacks, annotation, monitoring, transaction]   |
| 4  | axon-test-4.11.0                      | axon-messaging-4.11.0        | 10                | 66                        | 0.151515               | [org.axonframework.common, org.axonframework.eventhandling, org.axonframework.messaging, org.axonframework.commandhandling, org.axonframework.messaging.annotation, org.axonframework.common.stream, org.axonframework.deadline, org.axonframework.messaging...  | [common, eventhandling, scheduling, messaging, commandhandling, annotation, stream, deadline, unitofwork, gateway]  |
| 5  | axon-disruptor-4.11.0                 | axon-modelling-4.11.0        | 2                 | 10                        | 0.200000               | [org.axonframework.modelling.command.inspection, org.axonframework.modelling.command]  | [inspection, command]   |
| 6  | axon-event sourcing-4.11.0            | axon-modelling-4.11.0        | 2                 | 10                        | 0.200000               | [org.axonframework.modelling.command.inspection, org.axonframework.modelling.command]  | [inspection, command]   |
| 7  | axon-test-4.11.0                      | axon-event sourcing-4.11.0   | 2                 | 9                         | 0.222222               | [org.axonframework.event sourcing, org.axonframework.event sourcing.eventstore]  | [event sourcing, eventstore]  |
| 8  | axon-disruptor-4.11.0                 | axon-event sourcing-4.11.0   | 2                 | 9                         | 0.222222               | [org.axonframework.event sourcing, org.axonframework.event sourcing.eventstore]  | [event sourcing, eventstore]  |
| 9  | axon-modelling-4.11.0                 | axon-messaging-4.11.0        | 18                | 66                        | 0.272727               | [org.axonframework.messaging.unitofwork, org.axonframework.eventhandling, org.axonframework.common.property, org.axonframework.common, org.axonframework.commandhandling, org.axonframework.messaging, org.axonframework.messaging.annotation, org.axonframework.common.annotation, org.axonframework.tr...  | [unitofwork, eventhandling, property, common, commandhandling, messaging, annotation, tracing, jpa, xml, serialization, lock, caching, legacyjpa, interceptors, deadline, jdbc]   |
| 10 | axon-event sourcing-4.11.0            | axon-messaging-4.11.0        | 20                | 66                        | 0.303030               | [org.axonframework.common.lock, org.axonframework.messaging.unitofwork, org.axonframework.serialization, org.axonframework.serialization.upcasting.event, org.axonframework.messaging.annotation, org.axonframework.common.caching, org.axonframework.messaging, org.axonframework.tracing, org.axonfram...  | [lock, unitofwork, serialization, event, annotation, caching, messaging, tracing, transaction, eventhandling, common, io, jpa, jdbc, xml, stream, monitoring, lifecycle, legacyjpa, commandhandling]  |
| 11 | axon-server-connector-4.11.0          | axon-event sourcing-4.11.0   | 3                 | 9                         | 0.333333               | [org.axonframework.event sourcing.eventstore, org.axonframework.event sourcing.snapshotting, org.axonframework.event sourcing]   | [eventstore, snapshotting, event sourcing]  |
| 12 | axon-spring-boot-autoconfigure-4.11.0 | axon-server-connector-4.11.0 | 4                 | 11                        | 0.363636               | [org.axonframework.axonserver.connector.command, org.axonframework.axonserver.connector.query, org.axonframework.axonserver.connector.event.axon]  | [command, connector, query, axon]   |
| 13 | axon-server-connector-4.11.0          | axon-messaging-4.11.0        | 25                | 66                        | 0.378788               | [org.axonframework.common.transaction, org.axonframework.eventhandling, org.axonframework.eventhandling.tokenstore, org.axonframework.eventhandling.pooled, org.axonframework.lifecycle, org.axonframework.common, org.axonframework.messaging, org.axonframework.serialization, org.axonf...                | [transaction, eventhandling, tokenstore, pooled, lifecycle, common, responsetypes, serialization, messaging, queryhandling, tracing, distributed, callbacks, commandhandling, java, jdbc, event, unitofwork, async, stream, scheduling, monitoring, xml, util, innmemory]                                   |
| 14 | axon-configuration-4.11.0             | axon-event sourcing-4.11.0   | 4                 | 9                         | 0.444444               | [org.axonframework.event sourcing.eventstore.jpa, org.axonframework.event sourcing.snapshotting, org.axonframework.event sourcing, org.axonframework.event sourcing.eventstore]  | [jpa, snapshotting, event sourcing, eventstore]   |
| 15 | axon-test-4.11.0                      | axon-modelling-4.11.0        | 5                 | 10                        | 0.500000               | [org.axonframework.modelling.saga, org.axonframework.modelling.command.inspection, org.axonframework.modelling.command, org.axonframework.modelling.saga.repository.inmemory, org.axonframework.modelling.saga.repository]   | [saga, inspection, command, inmemory, repository]   |
| 16 | axon-configuration-4.11.0             | axon-messaging-4.11.0        | 34                | 66                        | 0.515152               | [org.axonframework.eventhandling.tokenstore.jpa, org.axonframework.common.annotation, org.axonframework.messaging.unitofwork, org.axonframework.lifecycle, org.axonframework.eventhandling.scheduling, org.axonframework.queryhandling.annotation, org.axonframework.monitoring, org.axonframework.commo...  | [jpa, annotation, unitofwork, lifecycle, scheduling, monitoring, jdbc, async, util, caching, transaction, commandhandling, tracing, deadline, gateway, lock, event, deadletter, tokenstore, messaging, xml, correlation, inmemory, pooled, common, interceptors, queryhandling, serialization, eventhand... |
| 17 | axon-spring-boot-autoconfigure-4.11.0 | axon-event sourcing-4.11.0   | 5                 | 9                         | 0.555556               | [org.axonframework.event sourcing.eventstore.legacyjpa, org.axonframework.event sourcing.eventstore, org.axonframework.event sourcing.eventstore.jdbc, org.axonframework.event sourcing.eventstore.jpa]  | [legacyjpa, eventstore, event sourcing, jdbc, jpa]  |
| 18 | axon-spring-boot-autoconfigure-4.11.0 | axon-modelling-4.11.0        | 6                 | 10                        | 0.600000               | [org.axonframework.modelling.saga.repository.legacyjpa, org.axonframework.modelling.saga.repository, org.axonframework.modelling.saga, org.axonframework.modelling.saga, org.axonframework.modelling.saga.repository.jdbc, org.axonframework.modelling.command]  | [legacyjpa, repository, jpa, saga, jdbc, command]   |
| 19 | axon-modelling-4.11.0                 | axon-modelling-4.11.0        | 6                 | 10                        | 0.600000               | [org.axonframework.modelling.saga, org.axonframework.modelling.saga.repository, org.axonframework.modelling.command, org.axonframework.modelling.saga.metamodel, org.axonframework.modelling.command.inspection, org.axonframework.modelling.saga.repository.jpa]  | [saga, repository, command, metamodel, inspection, jpa]   |
| 20 | axon-configuration-4.11.0             | axon-modelling-4.11.0        | 6                 | 10                        | 0.600000               | [org.axonframework.modelling.command, org.axonframework.modelling.saga, org.axonframework.modelling.saga.repository.jpa, org.axonframework.modelling.saga.repository, org.axonframework.modelling.saga.repository.inmemory, org.axonframework.modelling.command.inspection]                                  | [command, saga, jpa, repository, inmemory, inspection]  |
| 21 | axon-messaging-4.11.0                 | axon-messaging-4.11.0        | 41                | 66                        | 0.621212               | [org.axonframework.commandhandling, org.axonframework.commandhandling.distributed, org.axonframework.eventhandling, org.axonframework.common.annotation, org.axonframework.messaging, org.axonframework.messaging.unitofwork, org.axonframework.messaging.interceptors, org.axonframework.common, org.ax...  | [commandhandling, distributed, eventhandling, annotation, messaging, unitofwork, interceptors, common, async, serialization, transaction, event, monitoring, io, stream, lifecycle, replay, tokenstore, tracing, deadline, queryhandling, deadletter, jpa, legacyjpa, responsetypes, upcasting, correlat... |
| 22 | axon-spring-boot-autoconfigure-4.11.0 | axon-messaging-4.11.0        | 41                | 66                        | 0.621212               | [org.axonframework.messaging.deadletter, org.axonframework.eventhandling, org.axonframework.messaging.timeout, org.axonframework.common.legacyjpa, org.axonframework.eventhandling.tokenstore, org.axonframework.common.serialization, org.axonframework.common.transaction, org...                          | [deadletter, eventhandling, timeout, legacyjpa, tokenstore, jdbc, serialization, transaction, commandhandling, scheduling, gateway, jobrunr, common, pooled, xml, distributed, tracing, deadline, event, attributes, lifecycle, interceptors, annotation, dbscheduler, queryhandling, jpa, avro, message... |
| 23 | axon-test-4.11.0                      | axon-test-4.11.0             | 5                 | 8                         | 0.625000               | [org.axonframework.test, org.axonframework.test.matchers, org.axonframework.test.deadline, org.axonframework.test.util, org.axonframework.test.event scheduler]  | [test, matchers, deadline, util, event scheduler]   |
| 24 | axon-event sourcing-4.11.0            | axon-event sourcing-4.11.0   | 7                 | 9                         | 0.777778               | [org.axonframework.event sourcing.conflict resolution, org.axonframework.event sourcing.eventstore, org.axonframework.event sourcing.eventstore.jdbc, org.axonframework.event sourcing.snapshotting, org.axonframework.event sourcing, org.axonframework.eventstore.jpa, org.axonframework.event...          | [conflict resolution, eventstore, jdbc, snapshotting, event sourcing, jpa, statements]  |

|    | artifactName                          | dependentArtifactName                 | dependentPackages | dependentArtifactPackages | packageUsagePercentage | dependentFullQualifiedPackageNames   | dependentPackageNames  |
|----|---------------------------------------|---------------------------------------|-------------------|---------------------------|------------------------|--|--|
| 25 | axon-server-connector-4.11.0          | axon-server-connector-4.11.0          | 9                 | 11                        | 0.818182               | [org.axonframework.axonserver.connector, org.axonframework.axonserver.connector.heartbeat, org.axonframework.axonserver.connector.event.util, org.axonframework.axonserver.connector.query, org.axonframework.axonserver.connector.util, org.axonframework.axonserver.connector.processor, org.axonframe...    | [connector, heartbeat, util, query, processor, subscription, command, axon]      |
| 26 | axon-spring-boot-autoconfigure-4.11.0 | axon-spring-boot-autoconfigure-4.11.0 | 8                 | 9                         | 0.888889               | [org.axonframework.springboot, org.axonframework.springboot.util, org.axonframework.springboot.autoconfigure, org.axonframework.springboot.util.legacyjpa, org.axonframework.springboot.service.connection, org.axonframework.springboot.util.jpa, org.axonframework.actuator.axonserver, org.axonframework... | [springboot, util, autoconfig, legacyjpa, connection, jpa, axonserver, actuator] |
| 27 | axon-spring-boot-autoconfigure-4.11.0 | axon-configuration-4.11.0             | 1                 | 1                         | 1.000000               | [org.axonframework.config]   | [config]   |
| 28 | axon-server-connector-4.11.0          | axon-configuration-4.11.0             | 1                 | 1                         | 1.000000               | [org.axonframework.config]   | [config]   |
| 29 | axon-spring-boot-autoconfigure-4.11.0 | axon-tracing-opentelemetry-4.11.0     | 1                 | 1                         | 1.000000               | [org.axonframework.tracing.opentelemetry]  | [opentelemetry]  |

Table 7 - Types that are used by multiple artifacts

This table shows the top 30 types that only use a few (compared to all existing) types of another artifact. The whole table can be found in the CSV report `ClassesPerPackageUsageAcrossArtifacts`.

| artifactName | dependentArtifactName                 | packageName               | dependentPackage.fqn  | dependentTypes                              | dependentPackageTypes | typeUsagePercentage |          |
|--------------|---------------------------------------|---------------------------|---|---|-----------------------|---------------------|----------|
| 0            | axon-spring-boot-autoconfigure-4.11.0 | axon-messaging-4.11.0     | org.axonframework.springboot.autoconfigure.legacy.jpa       | org.axonframework.eventhandling             | 1                     | 100                 | 0.010000 |
| 1            | axon-server-connector-4.11.0          | axon-messaging-4.11.0     | org.axonframework.axonserver.connector                      | org.axonframework.eventhandling             | 1                     | 100                 | 0.010000 |
| 2            | axon-spring-boot-autoconfigure-4.11.0 | axon-messaging-4.11.0     | org.axonframework.springboot.util                           | org.axonframework.eventhandling             | 1                     | 100                 | 0.010000 |
| 3            | axon-modelling-4.11.0                 | axon-messaging-4.11.0     | org.axonframework.modelling.saga.metamodel                  | org.axonframework.eventhandling             | 1                     | 100                 | 0.010000 |
| 4            | axonsourcing-4.11.0                   | axon-messaging-4.11.0     | org.axonframework.event sourcing.snapshotting               | org.axonframework.eventhandling             | 1                     | 100                 | 0.010000 |
| 5            | axon-test-4.11.0                      | axon-messaging-4.11.0     | org.axonframework.test.matchers                             | org.axonframework.eventhandling             | 1                     | 100                 | 0.010000 |
| 6            | axonsourcing-4.11.0                   | axon-modelling-4.11.0     | org.axonframework.event sourcing.eventstore.jdbc            | org.axonframework.modelling.command         | 1                     | 56                  | 0.017857 |
| 7            | axon-server-connector-4.11.0          | axon-modelling-4.11.0     | org.axonframework.axonserver.connector                      | org.axonframework.modelling.command         | 1                     | 56                  | 0.017857 |
| 8            | axonsourcing-4.11.0                   | axon-modelling-4.11.0     | org.axonframework.event sourcing.conflictresolution         | org.axonframework.modelling.command         | 1                     | 56                  | 0.017857 |
| 9            | axon-modelling-4.11.0                 | axon-messaging-4.11.0     | org.axonframework.modelling.command                         | org.axonframework.eventhandling             | 2                     | 100                 | 0.020000 |
| 10           | axon-test-4.11.0                      | axon-messaging-4.11.0     | org.axonframework.test.event scheduler                      | org.axonframework.eventhandling             | 2                     | 100                 | 0.020000 |
| 11           | axonsourcing-4.11.0                   | axon-messaging-4.11.0     | org.axonframework.event sourcing.conflictresolution         | org.axonframework.eventhandling             | 2                     | 100                 | 0.020000 |
| 12           | axon-modelling-4.11.0                 | axon-messaging-4.11.0     | org.axonframework.modelling.command.legacy.jpa              | org.axonframework.eventhandling             | 2                     | 100                 | 0.020000 |
| 13           | axon-server-connector-4.11.0          | axon-eventsourcing-4.11.0 | org.axonframework.axonserver.connector.event.axon           | org.axonframework.event sourcing            | 1                     | 42                  | 0.023810 |
| 14           | axon-server-connector-4.11.0          | axon-configuration-4.11.0 | org.axonframework.axonserver.connector.processor            | org.axonframework.config                    | 1                     | 41                  | 0.024390 |
| 15           | axon-spring-boot-autoconfigure-4.11.0 | axon-configuration-4.11.0 | org.axonframework.springboot                                | org.axonframework.config                    | 1                     | 41                  | 0.024390 |
| 16           | axon-spring-boot-autoconfigure-4.11.0 | axon-configuration-4.11.0 | org.axonframework.springboot.autoconfigure.legacy.jpa       | org.axonframework.config                    | 1                     | 41                  | 0.024390 |
| 17           | axonsourcing-4.11.0                   | axon-messaging-4.11.0     | org.axonframework.event sourcing.eventstore                 | org.axonframework.messaging                 | 1                     | 35                  | 0.028571 |
| 18           | axon-test-4.11.0                      | axon-messaging-4.11.0     | org.axonframework.test.matchers                             | org.axonframework.messaging                 | 1                     | 35                  | 0.028571 |
| 19           | axon-test-4.11.0                      | axon-messaging-4.11.0     | org.axonframework.test                                      | org.axonframework.messaging                 | 1                     | 35                  | 0.028571 |
| 20           | axonsourcing-4.11.0                   | axon-messaging-4.11.0     | org.axonframework.event sourcing.conflictresolution         | org.axonframework.messaging                 | 1                     | 35                  | 0.028571 |
| 21           | axonsourcing-4.11.0                   | axon-messaging-4.11.0     | org.axonframework.event sourcing.eventstore.legacy.jpa      | org.axonframework.serialization             | 1                     | 34                  | 0.029412 |
| 22           | axonsourcing-4.11.0                   | axon-messaging-4.11.0     | org.axonframework.event sourcing.eventstore.jpa             | org.axonframework.serialization             | 1                     | 34                  | 0.029412 |
| 23           | axon-spring-boot-autoconfigure-4.11.0 | axon-messaging-4.11.0     | org.axonframework.springboot.autoconfigure.legacy.jpa       | org.axonframework.serialization             | 1                     | 34                  | 0.029412 |
| 24           | axonsourcing-4.11.0                   | axon-messaging-4.11.0     | org.axonframework.event sourcing.eventstore.jdbc            | org.axonframework.serialization             | 1                     | 34                  | 0.029412 |
| 25           | axonsourcing-4.11.0                   | axon-messaging-4.11.0     | org.axonframework.event sourcing.eventstore.jdbc.statements | org.axonframework.eventhandling             | 3                     | 100                 | 0.030000 |
| 26           | axon-test-4.11.0                      | axon-modelling-4.11.0     | org.axonframework.test.utils                                | org.axonframework.modelling.saga            | 1                     | 33                  | 0.030303 |
| 27           | axon-test-4.11.0                      | axon-messaging-4.11.0     | org.axonframework.test.matchers                             | org.axonframework.commandhandling           | 1                     | 32                  | 0.031250 |
| 28           | axonsourcing-4.11.0                   | axon-messaging-4.11.0     | org.axonframework.event sourcing.conflictresolution         | org.axonframework.commandhandling           | 1                     | 32                  | 0.031250 |
| 29           | axon-server-connector-4.11.0          | axon-eventsourcing-4.11.0 | org.axonframework.axonserver.connector                      | org.axonframework.event sourcing.eventstore | 1                     | 31                  | 0.032258 |

Table 8 - Duplicate package names across artifacts

This table shows the top 30 duplicate package names across artifacts. They are ordered by the number of duplicates descending.

This might lead to confusion, makes importing more error prone and might even lead to duplicate classes where only one of them will be loaded by the class loader. If a package is named the same way in two or more artifacts this even allows another artifact to access package protected classes, methods or members which might not be intended.

The whole table can be found in the CSV report `DuplicatePackageNamesAcrossArtifacts`.

packageName duplicates artifactNames

Table 9 - Annotated elements

This table shows 30 most used Java Annotations including some examples where they are used.

|    | annotationName  | languageElement | numberOfAnnotatedElements |   |
|----|---|-----------------|---------------------------|---|
| 0  | javax.annotation.Nonnull  | Parameter       | 1668                      | [org.axonframework.disruptor.commandhandling.Black<br>org.axonframework.disruptor.commandhandling.Black<br>org.axonframework.disruptor.commandhandling.CommandHandlerInvoker\$DisruptorRepository.load(0), org  |
| 1  | java.lang.Deprecated  | Method          | 133                       | [org.axonframework.mde<br>Builder, spanFactory, org.axonframework.modelling.command.AggregateIdentifier.routing<br>.modelling.command.GenericJpaRepository<br>Builder, spanFactory, org.axonframework.modelling.command.Lockin  |
| 2  | org.springframework.context.annotation.Bean                               | Method          | 122                       | [org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxEventStoreAutoC<br>org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxAutoCor<br>org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxAutoCor   |
| 3  | org.springframework.boot.autoconfigure.condition.ConditionalOnMissingBean | Method          | 78                        | [org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxAutoCor<br>org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxAutoCor<br>org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxAutoConfiguration.sa  |
| 4  | java.lang.FunctionalInterface   | Interface       | 65                        | [org.axonframework.modelling.command.CreationPolicyAggregateFactory, org.axonframework.model<br>org.axonframework.modelling.command.NoArgumentConstructorCreator<br>org.axonframework.eventsourcing.conflictresolution.ConflictExceptionSup                                 |
| 5  | javax.annotation.Nullable   | Parameter       | 62                        | [org.axonframework.modelling.command.Creator<br>org.axonframework.modelling.command.NoArgumentConstructorCreator<br>org.axonframework.modelling.command.Repository.load(1), org.axonframework.modelling.com   |
| 6  | javax.annotation.Nonnull  | Method          | 60                        | [org.axonframework.disruptor.commandhandling.DisruptorCommarr<br>org.axonframework.modelling.command.NoArgumentConstructorCreator<br>org.axonframework.modelling.command.NoArgumentConstructorCreator.create, or  |
| 7  | java.lang.annotation.Target   | Annotation      | 44                        | [org.axonframework.modelling.command.AggregateIdentifier, org.axonframes<br>org.axonframework.modelling.command.AggregateMember, org.axonframework.m<br>org.axonframework.modelling.command.AggregateVersion, org.axc   |
| 8  | java.lang.annotation.Retention  | Annotation      | 44                        | [org.axonframework.modelling.command.AggregateIdentifier, org.axonframes<br>org.axonframework.modelling.command.AggregateMember, org.axonframework.m<br>org.axonframework.modelling.command.AggregateVersion, org.axc   |
| 9  | java.lang.Deprecated  | Class           | 43                        | [org.axonframework.modelling.command.legacyjpa.GenericJpaRepository, org.axonframework.modelling.saga<br>org.axonframework.modelling.saga.repository.legacyjpa.JpaSagaStore, org.axonframework.eventsourcing.MultiSt  |
| 10 | javax.persistence.Basic   | Field           | 39                        | [org.axonframework.modelling.saga.repository<br>org.axonframework.modelling.saga.reposit<br>org.axonframework.modelling.saga.repository<br>org.axonframework.modelling.saga.  |
| 11 | jakarta.persistence.Basic   | Field           | 33                        | [org.axonframework.modelling.saga.repository<br>org.axonframework.modelling.saga.repository.jpa.Ass<br>org.axonframework.modelling.saga.repository.jpa.AssociationValueEntry.associationValue, org.axonfram   |
| 12 | com.fasterxml.jackson.annotation.JsonProperty                             | Parameter       | 32                        | [org.axonframework.modelling.command.AggregateScopeDescriptor.<init>(0), org.axonframework.modelling.com<br><init>(1), org.axonframework.modelling.saga.SagaScopeDescriptor.<init>(0), org.axonframework.modelling.sag  |
| 13 | org.springframework.boot.autoconfigure.AutoConfiguration                  | Class           | 26                        | [org.axonframework.springboot.autoconfigure.legacyjpa.jpaji<br>org.axonframework.springboot.autoconfigure.legacyjpa.jpaji<br>org.axonframework.springboot.autoconfigure.jpaEventStoreAutoConfiguration, org.axonframework.springboot  |
| 14 | java.lang.annotation.Documented   | Annotation      | 24                        | [org.axonframework.modelling.command.EntityId, org.axonframework.model<br>org.axonframework.modelling.command.AggregateRoot, org.axonframework.modelling.com<br>org.axonframework.modelling.command.AggregateVersion, org.axonframework.modelling.command.CreationPolicy, c |
| 15 | java.beans.ConstructorProperties  | Constructor     | 21                        | [org.axonframework.modelling.command.AggregateScopeDescriptor.<init>, org.axonframework.modelling.<br>org.axonframework.commandhandling.distributed.commandfilter.A<br>org.axonframework.commandhandling.distributed.c  |
| 16 | java.lang.Deprecated  | Constructor     | 20                        | [org.axonframework.modelling.command.VersionedAggregateIdentifier.<init>, org.axonframework.modelling.<br><init>, org.axonframework.eventsourcing.MultiStreamableh  |
| 17 | org.springframework.beans.factory.annotation.Qualifier                    | Parameter       | 20                        | [org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxEventStoreAutoCon<br>org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxAutoConfiguration.deadLetterQ<br>org.axonframework.springboot.autoconfigure   |
| 18 | org.springframework.boot.autoconfigure.AutoConfigureAfter                 | Class           | 17                        | [org.axonframework.springboot.autoconfigure.legacyjpa.jpaji<br>org.axonframework.springboot.autoconfigure.legacyjpa.jpaji<br>org.axonframework.springboot.autoconfigure.jpaEventStoreAutoConfiguration, org.axonframework.springboot  |
| 19 | com.fasterxml.jackson.annotation.JsonCreator                              | Constructor     | 16                        | [org.axonframework.modelling.command.AggregateScopeDescriptor.<init>, org.axonframework.modelling.<br>org.axonframework.eventhandling.GapAwareTrackingToken.<init>, org.axonframework.eventhandling.Glo<br>org.ax   |
| 20 | org.springframework.boot.autoconfigure.condition.ConditionalOnBean        | Method          | 15                        | [org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxAutoConfigurat<br>org.axonframework.springboot.autoconfigure.InterceptorAutoConfiguration.commi<br>org.axonframework.springboot.autoconfigure.Interceptor#  |
| 21 | org.springframework.boot.autoconfigure.condition.ConditionalOnClass       | Class           | 15                        | [org.axonframework.springboot.autoconfigure.AvroSerializerAutoConfiguration, org.axonframework.springboot.autoco<br>org.axonframework.springboot.autoconfigure.MetricsAutoConfiguration, org.axonframework.springboot.autoconfigure   |
| 22 | org.springframework.boot.autoconfigure.condition.ConditionalOnProperty    | Method          | 15                        | [org.axonframework.springboot.autoconfigure.MetricsAutoConfig<br>org.axonframework.springboot.autoconfigure.AxonServerAutoConfiguration, org.axonframework.springboot.persistentStreamSchedi  |
| 23 | org.springframework.boot.autoconfigure.AutoConfigureBefore                | Class           | 15                        | [org.axonframework.springboot.autoconfigure.legacyjpa.jpaji<br>org.axonframework.springboot.autoconfigure.legacyjpa.jpaji<br>org.axonframework.springboot.autoconfigure.jpaEventStoreAutoConfiguration, org.axonframework.springboot  |
| 24 | javax.persistence.Column  | Field           | 12                        | [org.axonframework.modelling.saga.repository.jpa.SagaEntry.serializedSaga, org.axonframework.eventhandling.f<br>org.axonframework.eventhandling.Abstract  |
| 25 | org.springframework.boot.context.properties.EnableConfigurationProperties | Class           | 12                        | [org.axonframework.springboot.autoconfigure.legacyjpa.jpajavaxAutoConfiguration, org.axonframework.springboot.z<br>org.axonframework.springboot.autoconfigure.jpaAutoConfiguration, org.axonframework.springboot.autoconfigure  |
| 26 | jakarta.persistence.Column  | Field           | 11                        | [org.axonframework.modelling.saga.repository.jpa.SagaEntry.serializedSaga, org.axonframework.eventhandling.f<br>org.axonframework.eventhandling.AbstractEventEntry.payload, org.axonframework.eventhandl<br>org   |
| 27 | org.axonframework.common.Priority   | Class           | 11                        | [org.axonframework.commandhandling.CurrentUnit<br>org.axonframework.eventhandling.Sequence<br>org.axonframework.eventhandling.Tim<br>org.axonframework.messaging.annotation.AggregateT  |
| 28 | org.springframework.boot.autoconfigure.condition.ConditionalOnProperty    | Class           | 10                        | [org.axonframework.springboot.autoconfigure.AxonTimeoutAutoConfiguration, org.axonframework.springboot.aut<br>XStreamConfiguredConditionEventsXStreamCondition, org.axonframework.springboot.aut<br>XStreamConfigured   |
| 29 | javax.persistence.Lob   | Field           | 10                        | [org.axonframework.modelling.saga.repository.jpa.<br>org.axonframework.modelling.saga.SagaEntry.serializedSaga, org.axonframework.eventhan<br>org.axonframework.eventhandling.AbstractEventEntry  |

Table 10 - Distance distribution between dependent files

This table shows the file directory distance distribution between dependent files. Intuitively, the distance is given by the fewest number of change directory commands needed to navigate between a file and a dependency it uses. Those are aggregate to see how many dependent files are in the same directory, how many are just one change directory command apart, and so on.



| dependency.fileDistanceAsFewestChangeDirectoryCommands | numberOfDependencies | numberOfDependencyUsers | numberOfDependencyProviders |   |
|--|----------------------|-------------------------|-----------------------------|---|
| 0  | 0                    | 2685                    | 1062                        | 1195 <div>             [/axon-configuration-4.<br/>             /org/axonframework/disruptor/comr<br/>             /org/axonframework/disruptor/commandhandlir<br/>             /org/axonframework/disruptor/commandhandlir           </div>  |
| 1  | 1                    | 92                      | 84                          | 38 <div>             [/org/axonframework/modelling/command/inspection uses /o<br/>             /org/axonframework/modelling/command/legacyjpa uses /o<br/>             /org/axonframework/modelling/command uses /org/axonfran           </div>                                       |
| 2  | 2                    | 2559                    | 778                         | 477 <div>             [/org/axonframework/mc<br/>             Builder.class uses /org/axonframework/modelling/command/ins<br/>             /org/axonframework/modelling/command/legacyjpa/GenericJl<br/>             Builder.class uses /org/axonframework/modelling           </div> |
| 3  | 4                    | 2629                    | 456                         | 550 <div>             [/org/axonframework/config uses /org/axonit<br/>             /org/axonframework<br/>             /org/axonframework/disruptor/comman<br/>             /org/axonframework/springboot/autoconfig uses /org/axo           </div>                                   |