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-4.10.0.jar	64	787	5	0
1	axon-modelling-4.10.0.jar	10	156	4	1
2	axon-eventsourcing-4.10.0.jar	9	133	3	2
3	axon-test-4.10.0.jar	8	87	0	3
4	axon-configuration-4.10.0.jar	1	41	0	4
5	axon-disruptor-4.10.0.jar	1	22	1	3

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

	artifactName	packages	types	incomingDependencies	outgoingDependencies
0	axon-messaging-4.10.0.jar	64	787	5	0
1	axon-modelling-4.10.0.jar	10	156	4	1
2	axon-eventsourcing-4.10.0.jar	9	133	3	2
3	axon-test-4.10.0.jar	8	87	0	3
4	axon-configuration-4.10.0.jar	1	41	0	4
5	axon-disruptor-4.10.0.jar	1	22	1	3

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-4.10.0.jar	64	787	5	0
1	axon-modelling-4.10.0.jar	10	156	4	1
2	axon-eventsourcing-4.10.0.jar	9	133	3	2
3	axon-disruptor-4.10.0.jar	1	22	1	3
4	axon-configuration-4.10.0.jar	1	41	0	4
5	axon-test-4.10.0.jar	8	87	0	3

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-configuration-4.10.0.jar	1	41	0	4
1	axon-disruptor-4.10.0.jar	1	22	1	3
2	axon-test-4.10.0.jar	8	87	0	3
3	axon-eventsourcing-4.10.0.jar	9	133	3	2
4	axon-modelling-4.10.0.jar	10	156	4	1
5	axon-messaging-4.10.0.jar	64	787	5	0

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

	artifactName	packages	types	incomingDependencies	outgoingDependencies
0	axon-configuration-4.10.0.jar	1	41	0	4
1	axon-disruptor-4.10.0.jar	1	22	1	3
2	axon-test-4.10.0.jar	8	87	0	3
3	axon-eventsourcing-4.10.0.jar	9	133	3	2
4	axon-modelling-4.10.0.jar	10	156	4	1
5	axon-messaging-4.10.0.jar	64	787	5	0

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

	artifactName	packages	types	incomingDependencies	outgoingDependencies
0	axon-disruptor-4.10.0.jar	1	22	1	3
1	axon-configuration-4.10.0.jar	1	41	0	4
2	axon-test-4.10.0.jar	8	87	0	3
3	axon-eventsourcing-4.10.0.jar	9	133	3	2
4	axon-modelling-4.10.0.jar	10	156	4	1
5	axon-messaging-4.10.0.jar	64	787	5	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-configuration-4.10.0.jar	1	41	0	4
1	axon-test-4.10.0.jar	8	87	0	3
2	axon-disruptor-4.10.0.jar	1	22	1	3
3	axon-eventsourcing-4.10.0.jar	9	133	3	2
4	axon-modelling-4.10.0.jar	10	156	4	1
5	axon-messaging-4.10.0.jar	64	787	5	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-4.10.0.jar	64	787	5	0
1	axon-modelling-4.10.0.jar	10	156	4	1
2	axon-eventsourcing-4.10.0.jar	9	133	3	2
3	axon-disruptor-4.10.0.jar	1	22	1	3
4	axon-test-4.10.0.jar	8	87	0	3
5	axon-configuration-4.10.0.jar	1	41	0	4

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
0	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	0.900000
1	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	0.882353
2	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.tracing	0.875000
3	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.messaging	0.857143
4	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.messaging.annotation	0.840000
5	axon-messaging-4.10.0	org.axonframework.deadline	axon-messaging-4.10.0	org.axonframework.tracing	0.800000
6	axon-messaging-4.10.0	org.axonframework.commandhandling	axon-messaging-4.10.0	org.axonframework.tracing	0.777778
7	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore	0.777778
8	axon-messaging-4.10.0	org.axonframework.commandhandling.callbacks	axon-messaging-4.10.0	org.axonframework.commandhandling	0.733333
9	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.serialization	0.647059
10	axon-messaging-4.10.0	org.axonframework.messaging.unitofwork	axon-messaging-4.10.0	org.axonframework.messaging	0.647059
11	axon-messaging-4.10.0	org.axonframework.eventhandling.async	axon-messaging-4.10.0	org.axonframework.eventhandling	0.538462
12	axon-messaging-4.10.0	org.axonframework.eventhandling.replay	axon-messaging-4.10.0	org.axonframework.eventhandling	0.454545
13	axon-messaging-4.10.0	org.axonframework.serialization.upcasting.event	axon-messaging-4.10.0	org.axonframework.eventhandling	0.333333
14	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	0.317073
15	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.eventhandling.tokenstore	0.285714
16	axon-modelling-4.10.0	org.axonframework.modelling.command.inspection	axon-modelling-4.10.0	org.axonframework.modelling.command	0.250000
17	axon-messaging-4.10.0	org.axonframework.queryhandling.registration	axon-messaging-4.10.0	org.axonframework.queryhandling	0.250000
18	axon-messaging-4.10.0	org.axonframework.messaging	axon-messaging-4.10.0	org.axonframework.serialization	0.238095
19	axon-messaging-4.10.0	org.axonframework.messaging.annotation	axon-messaging-4.10.0	org.axonframework.messaging.interceptors	0.200000
20	axon-modelling-4.10.0	org.axonframework.modelling.saga	axon-modelling-4.10.0	org.axonframework.modelling.saga.metamodel	0.142857
21	axon-messaging-4.10.0	org.axonframework.commandhandling.distributed....	axon-messaging-4.10.0	org.axonframework.commandhandling.distributed	0.076923

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	forward
0	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	AbstractEventProcessor$Builder->NoOpSpanFactory	
1	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	DefaultEventBusSpanFactory$Builder->SpanFactory	
2	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	DefaultEventProcessorSpanFactory$Builder->Span...	
3	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	DefaultEventProcessorSpanFactory->Span	
4	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	AbstractEventBus->Span	
5	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	SubscribingEventProcessor$Builder->SpanFactory	
6	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	AbstractEventBus->SpanScope	
7	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	DefaultEventBusSpanFactory->SpanFactory	
8	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	EventMessage<-NestingSpanFactory	
9	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	AbstractEventBus$Builder->SpanFactory	
10	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	TrackingEventProcessor$Builder->SpanFactory	
11	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	DefaultEventProcessorSpanFactory->NoOpSpanFact...	
12	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	AbstractEventProcessor$Builder->SpanFactory	
13	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	EventBusSpanFactory->Span	
14	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	EventProcessorSpanFactory->Span	
15	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	DefaultEventProcessorSpanFactory->SpanFactory	
16	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	SimpleEventBus$Builder->SpanFactory	
17	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	DefaultEventBusSpanFactory->Span	
18	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	AbstractEventBus$Builder->NoOpSpanFactory	
19	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	AbstractEventProcessor->Span	
20	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	SimpleQueryUpdateEmitter->MultipleInstancesRes...	
21	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	SimpleQueryUpdateEmitter->OptionalResponseType	
22	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	QueryResponseMessage<-ConvertingResponseMessage	
23	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	QueryGateway->ResponseTypes	
24	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	QueryMessage->ResponseType	
25	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	GenericStreamingQueryMessage->PublisherRespons...	

	artifactName	packageName	dependentArtifactName	dependentPackageName	dependency	forward
26	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	DefaultQueryGateway->ResponseType	
27	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	QueryGateway->ResponseType	
28	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	GenericSubscriptionQueryMessage->ResponseType	
29	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	QuerySubscription->ResponseType	
30	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	SubscriptionQueryMessage->ResponseType	
31	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	SimpleQueryUpdateEmitter->PublisherResponseType	
32	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	SimpleQueryUpdateEmitter->ResponseType	
33	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	StreamingQueryMessage->ResponseType	
34	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	SimpleQueryBus->ResponseType	
35	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	GenericQueryMessage->ResponseType	
36	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	GenericStreamingQueryMessage->ResponseType	
37	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.tracing	QueryBusSpanFactory->Span	
38	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.tracing	SimpleQueryBus->SpanScope	
39	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.tracing	SimpleQueryBus$Builder->NoOpSpanFactory	

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	depe
0	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.tracing	EventMessage<-NestingSpan
1	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.messaging.responsetypes	QueryResponseMes ConvertingResponseM
2	axon-messaging-4.10.0	org.axonframework.queryhandling	axon-messaging-4.10.0	org.axonframework.tracing	QueryMessage<-Sp
3	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.messaging	EventMessage<-H
4	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.messaging	DomainEventMessage<-H
5	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.messaging	Tracking StreamableMessage
6	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.messaging.annotation	DomainEventMes AggregateTypeParameter
7	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.messaging.annotation	DomainEventMes SourceIdParameterRes
8	axon-messaging-4.10.0	org.axonframework.deadline	axon-messaging-4.10.0	org.axonframework.tracing	DeadlineMessage<-Sp
9	axon-messaging-4.10.0	org.axonframework.commandhandling	axon-messaging-4.10.0	org.axonframework.tracing	CommandMessage<-Sp
10	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore	EventStreamUtils<-DomainEvent
11	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore	EventStrean AbstractEventStorage
12	axon-messaging-4.10.0	org.axonframework.commandhandling.callbacks	axon-messaging-4.10.0	org.axonframework.commandhandling	NoOpCal SimpleCommandBus$
13	axon-messaging-4.10.0	org.axonframework.commandhandling.callbacks	axon-messaging-4.10.0	org.axonframework.commandhandling	LoggingCal SimpleCommandBus$
14	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.serialization	GenericDomainEventMes AbstractXStrea
15	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.serialization	GenericEventMes AbstractXStreamS
16	axon-messaging-4.10.0	org.axonframework.eventhandling	axon-messaging-4.10.0	org.axonframework.serialization	GapAwareTracking GapAwareTrackingTok
17	axon-messaging-4.10.0	org.axonframework.messaging.unitofwork	axon-messaging-4.10.0	org.axonframework.messaging	CurrentUnitOfWork<-GenericM
18	axon-messaging-4.10.0	org.axonframework.messaging.unitofwork	axon-messaging-4.10.0	org.axonframework.messaging	UnitOfWork<-DefaultIntercept
19	axon-messaging-4.10.0	org.axonframework.messaging.unitofwork	axon-messaging-4.10.0	org.axonframework.messaging	UnitO MessageHandlerInte
20	axon-messaging-4.10.0	org.axonframework.eventhandling.async	axon-messaging-4.10.0	org.axonframework.eventhandling	SequentialPerAggregate SimpleEvent
21	axon-messaging-4.10.0	org.axonframework.eventhandling.async	axon-messaging-4.10.0	org.axonframework.eventhandling	Sequencing SimpleEventHandlerInvok
22	axon-messaging-4.10.0	org.axonframework.eventhandling.async	axon-messaging-4.10.0	org.axonframework.eventhandling	Sequencing SimpleEventHandler
23	axon-messaging-4.10.0	org.axonframework.eventhandling.replay	axon-messaging-4.10.0	org.axonframework.eventhandling	ResetContext<-Reset
24	axon-messaging-4.10.0	org.axonframework.eventhandling.replay	axon-messaging-4.10.0	org.axonframework.eventhandling	GenericResetC AnnotationEventHandl
25	axon-messaging-4.10.0	org.axonframework.eventhandling.replay	axon-messaging-4.10.0	org.axonframework.eventhandling	ResetC AnnotationEventHandler

	artifactName	packageName	dependentArtifactName	dependentPackageName	depe
26	axon-messaging-4.10.0	org.axonframework.serialization.upcasting.event	axon-messaging-4.10.0	org.axonframework.eventhandling	EventUpcaster<-Ev
27	axon-messaging-4.10.0	org.axonframework.serialization.upcasting.event	axon-messaging-4.10.0	org.axonframework.eventhandling	IntermediateEventRepresen Ev
28	axon-messaging-4.10.0	org.axonframework.serialization.upcasting.event	axon-messaging-4.10.0	org.axonframework.eventhandling	InitialEventRepresentation<-Ev
29	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc CleanGapsStatemen
30	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc CreateTokenAtStatemen
31	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc DeleteSnapshotsStatemen
32	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc LastSequenceNumberForStateme
33	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc CreateTailTokenStatemen
34	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc ReadEventDataForAggregateStat
35	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc AppendSnapshotStatemen
36	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc FetchTrackedEventsStatemen
37	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc JdbcEventStorageEngineStat
38	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc ReadEventDataWithGapsStateme
39	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	axon-eventsourcing-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	EventSc AppendEventsStatemen

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 constuct 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	18
1	org.axonframework.messaging.ResultMessage	9	[isExceptional, exceptionResult]	2	12
2	org.axonframework.eventhandling.DomainEventMes...	10	[getSequenceNumber]	1	9
3	org.axonframework.eventhandling.EventMessage	9	[getTimestamp, getIdentifier]	2	9
4	org.axonframework.eventhandling.TrackedEventMe...	10	[trackingToken]	1	8
5	org.axonframework.eventhandling.EventMessage	9	[getIdentifier]	1	7
6	org.axonframework.eventhandling.DomainEventMes...	10	[getAggregateIdentifier, getType, getSequenceN...	3	6
7	org.axonframework.commandhandling.GenericComma...	14	[asCommandResultMessage]	1	5
8	org.axonframework.deadline.GenericDeadlineMessage	11	[asDeadlineMessage]	1	5
9	org.axonframework.eventhandling.ReplayToken	13	[createReplayToken]	1	4
10	org.axonframework.eventhandling.TrackedEventMe...	12	[trackingToken]	1	4
11	org.axonframework.deadline.DeadlineMessage	10	[getDeadlineName]	1	4
12	org.axonframework.eventhandling.DomainEventMes...	10	[getType]	1	4
13	org.axonframework.eventhandling.DomainEventMes...	10	[getAggregateIdentifier]	1	4
14	org.axonframework.eventhandling.GenericEventMe...	10	[asEventMessage]	1	4
15	org.axonframework.deadline.DefaultDeadlineMana...	8	[builder]	1	4
16	org.axonframework.common.transaction.NoTransac...	4	[instance]	1	4
17	org.axonframework.commandhandling.GenericComma...	15	[asCommandResultMessage]	1	3
18	org.axonframework.messaging.annotation.Wrapped...	14	[handle]	1	3
19	org.axonframework.eventhandling.ReplayToken	13	[isReplay]	1	3
20	org.axonframework.modelling.command.inspection...	13	[type]	1	3
21	org.axonframework.eventhandling.DomainEventMes...	11	[getAggregateIdentifier, getType, getSequenceN...	3	3
22	org.axonframework.eventhandling.GenericEventMe...	11	[asEventMessage]	1	3
23	org.axonframework.eventhandling.DomainEventMes...	10	[getAggregateIdentifier, getSequenceNumber]	2	3
24	org.axonframework.eventhandling.GapAwareTracki...	10	[getGaps, withGapsTruncatedAt, newInstance, ge...	5	3
25	org.axonframework.eventhandling.EventMessage	9	[getTimestamp]	1	3
26	org.axonframework.messaging.MessageDecorator	9	[describeTo]	1	3
27	org.axonframework.eventhandling.TrackedEventData	5	[trackingToken]	1	3
28	org.axonframework.eventhandling.tokenstore.Con...	5	[get]	1	3
29	org.axonframework.modelling.command.inspection...	17	[initialize, getAggregateRoot, initSequence]	4	2
30	org.axonframework.queryhandling.SimpleQueryUpd...	17	[builder]	1	2
31	org.axonframework.messaging.annotation.Wrapped...	15	[canHandle, handle]	2	2
32	org.axonframework.commandhandling.CommandMessa...	14	[commandName, isFactoryHandler]	2	2
33	org.axonframework.commandhandling.GenericComma...	14	[asCommandResultMessage]	2	2
34	org.axonframework.deadline.DeadlineMessage	14	[getDeadlineName]	1	2
35	org.axonframework.messaging.GenericResultMessage	14	[asResultMessage]	1	2
36	org.axonframework.messaging.annotation.Wrapped...	14	[canHandle]	1	2
37	org.axonframework.eventhandling.DomainEventMes...	13	[getAggregateIdentifier, getSequenceNumber]	2	2
38	org.axonframework.modelling.command.inspection...	13	[types]	1	2
39	org.axonframework.queryhandling.SubscriptionQu...	12	[getUpdateResponseType]	1	2

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`.

	fullQualifiedDependentTypeName	dependentTypeName	dependentTypeLabels	numberOfUsingPackages
0	org.axonframework.common.BuilderUtils	BuilderUtils	[Type, File, Java, ByteCode, Class, Mark4TopCe...	44
1	org.axonframework.common.AxonConfigurationExce...	AxonConfigurationException	[Type, File, Java, ByteCode, Class, Mark4TopCe...	37
2	org.axonframework.messaging.Message	Message	[Type, File, Java, ByteCode, GenericDeclaratio...	34
3	org.axonframework.messaging.MetaData	MetaData	[Type, File, Java, ByteCode, Class, Mark4TopCe...	33
4	org.axonframework.eventhandling.EventMessage	EventMessage	[Type, File, Java, ByteCode, GenericDeclaratio...	32
5	org.axonframework.messaging.unitofwork.UnitOfWork	UnitOfWork	[Type, File, Java, ByteCode, GenericDeclaratio...	31
6	org.axonframework.serialization.Serializer	Serializer	[Type, File, Java, ByteCode, Interface, Mark4T...	29
7	org.axonframework.common.Assert	Assert	[Type, File, Java, ByteCode, Class, Mark4TopCe...	27
8	org.axonframework.common.transaction.Transacti...	TransactionManager	[Type, File, Java, ByteCode, Interface, Mark4T...	27
9	org.axonframework.serialization.SerializedObject	SerializedObject	[Type, File, Java, ByteCode, GenericDeclaratio...	25
10	org.axonframework.serialization.SerializedType	SerializedType	[Type, File, Java, ByteCode, Interface, Mark4T...	24
11	org.axonframework.messaging.unitofwork.Current...	CurrentUnitOfWork	[Type, File, Java, ByteCode, Class, Mark4TopCe...	21
12	org.axonframework.common.AxonNonTransientExcep...	AxonNonTransientException	[Type, File, Java, ByteCode, Class, Mark4TopCe...	18
13	org.axonframework.eventhandling.DomainEventMes...	DomainEventMessage	[Type, File, Java, ByteCode, GenericDeclaratio...	18
14	org.axonframework.eventhandling.GenericEventMe...	GenericEventMessage	[Type, File, Java, ByteCode, Class, GenericDec...	18
15	org.axonframework.messaging.annotation.Paramet...	ParameterResolverFactory	[Type, File, Java, ByteCode, Interface, Mark4T...	18
16	org.axonframework.eventhandling.TrackingToken	TrackingToken	[Type, File, Java, ByteCode, Interface, Mark4T...	18
17	org.axonframework.common.Registration	Registration	[Type, File, Java, ByteCode, Interface, Mark4T...	17
18	org.axonframework.serialization.SimpleSerializ...	SimpleSerializedObject	[Type, File, Java, ByteCode, Class, GenericDec...	17
19	org.axonframework.messaging.MessageHandlerInte...	MessageHandlerInterceptor	[Type, File, Java, ByteCode, GenericDeclaratio...	16
20	org.axonframework.common.ObjectUtils	ObjectUtils	[Type, File, Java, ByteCode, Class, Mark4TypeW...	16
21	org.axonframework.tracing.SpanFactory	SpanFactory	[Type, File, Java, ByteCode, Interface, Mark4T...	16
22	org.axonframework.messaging.MessageDispatchInt...	MessageDispatchInterceptor	[Type, File, Java, ByteCode, GenericDeclaratio...	15
23	org.axonframework.commandhandling.CommandMessage	CommandMessage	[Type, File, Java, ByteCode, GenericDeclaratio...	14
24	org.axonframework.messaging.unitofwork.Default...	DefaultUnitOfWork	[Type, File, Java, ByteCode, Class, GenericDec...	14
25	org.axonframework.messaging.annotation.Handler...	HandlerDefinition	[Type, File, Java, ByteCode, Interface, Mark4T...	14
26	org.axonframework.common.ReflectionUtils	ReflectionUtils	[Type, File, Java, ByteCode, Class, Mark4TypeW...	14
27	org.axonframework.eventhandling.EventBus	EventBus	[Type, File, Java, ByteCode, Interface, Mark4T...	13
28	org.axonframework.lifecycle.Lifecycle	Lifecycle	[Type, File, Java, ByteCode, Interface, Mark4T...	13
29	org.axonframework.lifecycle.Lifecycle$Lifecycl...	Lifecycle$LifecycleRegistry	[Type, File, Java, ByteCode, Interface, Mark4T...	13
30	org.axonframework.common.transaction.NoTransac...	NoTransactionManager	[Type, File, Java, ByteCode, Enum, Mark4TypeWe...	13
31	org.axonframework.messaging.ResultMessage	ResultMessage	[Type, File, Java, ByteCode, GenericDeclaratio...	13
32	org.axonframework.common.DateTimeUtils	DateTimeUtils	[Type, File, Java, ByteCode, Class, Mark4TypeW...	12
33	org.axonframework.messaging.DefaultInterceptor...	DefaultInterceptorChain	[Type, File, Java, ByteCode, Class, GenericDec...	12
34	org.axonframework.messaging.InterceptorChain	InterceptorChain	[Type, File, Java, ByteCode, Interface, Mark4T...	12

	fullQualifiedDependentTypeName	dependentTypeName	dependentTypeLabels	numberOfUsingPackages
35	org.axonframework.tracing.NoOpSpanFactory	NoOpSpanFactory	[Type, File, Java, ByteCode, Class, Mark4TypeW...	12
36	org.axonframework.messaging.ScopeDescriptor	ScopeDescriptor	[Type, File, Java, ByteCode, Interface, Mark4T...	12
37	org.axonframework.common.AxonTransientException	AxonTransientException	[Type, File, Java, ByteCode, Class, Mark4TypeW...	11
38	org.axonframework.messaging.annotation.Classpa...	ClasspathHandlerDefinition	[Type, File, Java, ByteCode, Class, Mark4TypeW...	11
39	org.axonframework.messaging.annotation.Classpa...	ClasspathParameterResolverFactory	[Type, File, Java, ByteCode, Class, Mark4TypeW...	11

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	d
0	axon-modelling-4.10.0	axon-modelling-4.10.0	6	10	0.600000	[org.axonframework.modelling.saga.repository.j...	
1	axon-test-4.10.0	axon-test-4.10.0	5	8	0.625000	[org.axonframework.test, org.axonframework.tes...	
2	axon-messaging-4.10.0	axon-messaging-4.10.0	41	64	0.640625	[org.axonframework.serialization.upcasting, or...	s
3	axon-eventsourcing-4.10.0	axon-eventsourcing-4.10.0	7	9	0.777778	[org.axonframework.eventsourcing.eventstore, o...	

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	dependentPackageT
0	axon-modelling-4.10.0	axon-messaging-4.10.0	org.axonframework.modelling.saga.metamodel	org.axonframework.eventhandling	1	
1	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.snapshotting	org.axonframework.eventhandling	1	
2	axon-test-4.10.0	axon-messaging-4.10.0	org.axonframework.test.matchers	org.axonframework.eventhandling	1	
3	axon-eventsourcing-4.10.0	axon-modelling-4.10.0	org.axonframework.eventsourcing.conflictresolu...	org.axonframework.modelling.command	1	
4	axon-eventsourcing-4.10.0	axon-modelling-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	org.axonframework.modelling.command	1	
5	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.conflictresolu...	org.axonframework.eventhandling	2	
6	axon-modelling-4.10.0	axon-messaging-4.10.0	org.axonframework.modelling.command	org.axonframework.eventhandling	2	
7	axon-test-4.10.0	axon-messaging-4.10.0	org.axonframework.test.eventscheduler	org.axonframework.eventhandling	2	
8	axon-modelling-4.10.0	axon-messaging-4.10.0	org.axonframework.modelling.command.legacyjpa	org.axonframework.eventhandling	2	
9	axon-test-4.10.0	axon-messaging-4.10.0	org.axonframework.test.matchers	org.axonframework.messaging	1	
10	axon-test-4.10.0	axon-messaging-4.10.0	org.axonframework.test	org.axonframework.messaging	1	
11	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.conflictresolu...	org.axonframework.messaging	1	
12	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.eventstore	org.axonframework.messaging	1	
13	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.eventstore.jdbc	org.axonframework.serialization	1	
14	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.eventstore.jpa	org.axonframework.serialization	1	
15	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.eventstore.leg...	org.axonframework.serialization	1	
16	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	org.axonframework.eventhandling	3	
17	axon-test-4.10.0	axon-modelling-4.10.0	org.axonframework.test.utils	org.axonframework.modelling.saga	1	
18	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.conflictresolu...	org.axonframework.commandhandling	1	
19	axon-test-4.10.0	axon-messaging-4.10.0	org.axonframework.test.matchers	org.axonframework.commandhandling	1	
20	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.snapshotting	org.axonframework.common	1	
21	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.eventstore.jdb...	org.axonframework.common	1	
22	axon-eventsourcing-4.10.0	axon-messaging-4.10.0	org.axonframework.eventsourcing.conflictresolu...	org.axonframework.common	1	
23	axon-modelling-4.10.0	axon-messaging-4.10.0	org.axonframework.modelling.command.legacyjpa	org.axonframework.common	1	
24	axon-test-4.10.0	axon-messaging-4.10.0	org.axonframework.test.eventscheduler	org.axonframework.common	1	
25	axon-test-4.10.0	axon-messaging-4.10.0	org.axonframework.test.utils	org.axonframework.common	1	
26	axon-test-4.10.0	axon-messaging-4.10.0	org.axonframework.test.server	org.axonframework.common	1	
27	axon-modelling-4.10.0	axon-messaging-4.10.0	org.axonframework.modelling.command.legacyjpa	org.axonframework.messaging.annotation	2	

	artifactName	dependentArtifactName	packageName	dependentPackage.fqn	dependentTypes	dependentPackageT
28	axon-eventsourcing-4.10.0	axon-modelling-4.10.0	org.axonframework.eventsourcing.eventstore	org.axonframework.modelling.command	2	
29	axon-test-4.10.0	axon-messaging-4.10.0	org.axonframework.test	org.axonframework.messaging.annotation	2	

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	examples
0	javax.annotation.Nonnull	Parameter	1501	[org.axonframework.test.aggregate.ResultValida...
1	java.lang.Deprecated	Method	96	[org.axonframework.test.aggregate.ResultValida...
2	javax.annotation.Nullable	Parameter	61	[org.axonframework.modelling.command.CreationP...
3	java.lang.FunctionalInterface	Interface	54	[org.axonframework.test.matchers.FieldFilter, ...
4	java.lang.annotation.Retention	Annotation	40	[org.axonframework.modelling.command.Aggregate...
5	java.lang.annotation.Target	Annotation	40	[org.axonframework.modelling.command.Aggregate...
6	javax.persistence.Basic	Field	39	[org.axonframework.modelling.saga.repository.j...
7	javax.annotation.Nonnull	Method	37	[org.axonframework.test.aggregate.AggregateTes...
8	jakarta.persistence.Basic	Field	33	[org.axonframework.modelling.saga.repository.j...
9	com.fasterxml.jackson.annotation.JsonProperty	Parameter	32	[org.axonframework.modelling.command.Aggregate...
10	java.lang.Deprecated	Class	25	[org.axonframework.test.aggregate.StubAggregat...
11	java.beans.ConstructorProperties	Constructor	21	[org.axonframework.modelling.command.Aggregate...
12	java.lang.annotation.Documented	Annotation	21	[org.axonframework.modelling.command.Aggregate...
13	java.lang.Deprecated	Constructor	17	[org.axonframework.modelling.command.Annotatio...
14	com.fasterxml.jackson.annotation.JsonCreator	Constructor	16	[org.axonframework.modelling.command.Aggregate...
15	javax.persistence.Column	Field	12	[org.axonframework.modelling.saga.repository.j...
16	jakarta.persistence.Column	Field	11	[org.axonframework.modelling.saga.repository.j...
17	org.axonframework.common.Priority	Class	11	[org.axonframework.test.FixtureResourceParamet...
18	javax.persistence.Lob	Field	10	[org.axonframework.modelling.saga.repository.j...
19	javax.persistence.Id	Field	10	[org.axonframework.modelling.saga.repository.j...
20	java.lang.SafeVarargs	Constructor	9	[org.axonframework.test.matchers.ListMatcher.<...
21	com.fasterxml.jackson.annotation.JsonGetter	Method	9	[org.axonframework.commandhandling.distributed...
22	jakarta.persistence.Id	Field	9	[org.axonframework.modelling.saga.repository.j...
23	org.axonframework.messaging.annotation.HasHand...	Annotation	8	[org.axonframework.modelling.command.CreationP...
24	jakarta.persistence.Lob	Field	8	[org.axonframework.modelling.saga.repository.j...
25	javax.persistence.Entity	Class	6	[org.axonframework.modelling.saga.repository.j...
26	jakarta.persistence.Entity	Class	6	[org.axonframework.modelling.saga.repository.j...
27	org.axonframework.messaging.annotation.Message...	Annotation	6	[org.axonframework.commandhandling.CommandHand...
28	javax.persistence.MappedSuperclass	Class	6	[org.axonframework.modelling.saga.repository.j...
29	java.lang.SafeVarargs	Method	6	[org.axonframework.test.aggregate.AggregateTes...

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	2337	896	1002	[/org/axonframe
1	1	75	70	29	[/org/axonframe
2	2	2266	685	371	[/org/axonframe
3	4	1483	293	329	[/org/axonframew