Visibility Metrics for Java with Neo4j

References

- [Visibility Metrics and the Importance of Hiding Things](#)
- [Calculate metrics](#)
- [Controlling Access to Members of a Class](#)
- [py2neo](#)

Artifacts

Table 1

- List all the artifacts this notebook is based on

	artifactName	packages	types
0	axon-disruptor-4.7.5.jar	1	22
1	axon-eventsourcing-4.7.5.jar	9	130
2	axon-test-4.7.5.jar	8	85
3	axon-messaging-4.7.5.jar	61	729
4	axon-modelling-4.7.5.jar	10	149
5	axon-configuration-4.7.5.jar	1	39

Relative Visibility Of Types

A Java class or interface may be declared with the modifier public, in which case it is visible to all classes everywhere. If a class or interface has no modifier (the default, also known as package-private), it is visible only within its own package.

The relative visibility is the number of inner components that are visible outside (public) divided by the number of all types:

$$relative visibility = \frac{public\ types}{all\ types}$$

Using package protected types is one of many ways to improve encapsulation and implementation detail hiding.

How to apply the results

The relative visibility is between zero (all types are package protected) and one (all types are public). A value lower than one means that there are types that are declared package protected. The lower the value is, the better implementation details are hidden.

Non public classes can't be accessed from another package so they can be changed without affecting code in other packages. They clearly indicate functionality that only belongs to one package. This also motivates to use more classes and to split up code into smaller pieces with a single responsibility and reason to change.

Table 1

- Show relative visibility statistics aggregated for all packages per artifact

	artifact	all	public	min	max	average	percentile25	percentile50	percentile75	percentile90
0	axon-configuration-4.7.5	39	26	0.666667	0.666667	0.666667	0.666667	0.666667	0.666667	0.666667
1	axon-disruptor-4.7.5	22	9	0.409091	0.409091	0.409091	0.409091	0.409091	0.409091	0.409091
2	axon-eventsourcing-4.7.5	130	95	0.500000	1.000000	0.769159	0.612903	0.785714	1.000000	1.000000
3	axon-messaging-4.7.5	729	592	0.100000	1.000000	0.861211	0.750000	0.947368	1.000000	1.000000
4	axon-modelling-4.7.5	149	128	0.500000	1.000000	0.804762	0.737500	0.813187	0.887255	1.000000
5	axon-test-4.7.5	85	64	0.473684	1.000000	0.812336	0.650000	0.879167	1.000000	1.000000

Table 2

- List the top 40 packages and their artifact with the highest relative visibility

	artifactName	fullQualifiedPackageName	packageName	publicTypes	allTypes	relativeVisibility
0	axon-modelling-4.7.5	org.axonframework.modelling.saga	saga	30	30	1.000000
1	axon-eventsourcing-4.7.5	org.axonframework.eventsourcing.eventstore.jdb...	statements	15	15	1.000000
2	axon-messaging-4.7.5	org.axonframework.serialization.upcasting.event	event	12	12	1.000000
3	axon-messaging-4.7.5	org.axonframework.lifecycle	lifecycle	10	10	1.000000
4	axon-eventsourcing-4.7.5	org.axonframework.eventsourcing.conflictresolu...	conflictresolution	9	9	1.000000
5	axon-messaging-4.7.5	org.axonframework.common.property	property	9	9	1.000000
6	axon-messaging-4.7.5	org.axonframework.messaging.interceptors	interceptors	8	8	1.000000
7	axon-messaging-4.7.5	org.axonframework.messaging.responsetypes	responsetypes	8	8	1.000000
8	axon-messaging-4.7.5	org.axonframework.commandhandling.distributed....	commandfilter	7	7	1.000000
9	axon-messaging-4.7.5	org.axonframework.serialization.json	json	7	7	1.000000
10	axon-messaging-4.7.5	org.axonframework.eventhandling.tokenstore	tokenstore	7	7	1.000000
11	axon-messaging-4.7.5	org.axonframework.serialization.xml	xml	7	7	1.000000
12	axon-messaging-4.7.5	org.axonframework.tracing.attributes	attributes	6	6	1.000000
13	axon-messaging-4.7.5	org.axonframework.eventhandling.scheduling.quartz	quartz	6	6	1.000000
14	axon-messaging-4.7.5	org.axonframework.serialization.upcasting	upcasting	6	6	1.000000
15	axon-messaging-4.7.5	org.axonframework.serialization.converters	converters	5	5	1.000000
16	axon-messaging-4.7.5	org.axonframework.eventhandling.gateway	gateway	5	5	1.000000
17	axon-messaging-4.7.5	org.axonframework.queryhandling.registration	registration	5	5	1.000000
18	axon-test-4.7.5	org.axonframework.test.eventscheduler	eventscheduler	5	5	1.000000
19	axon-messaging-4.7.5	org.axonframework.commandhandling.callbacks	callbacks	4	4	1.000000
20	axon-messaging-4.7.5	org.axonframework.messaging.correlation	correlation	4	4	1.000000
21	axon-messaging-4.7.5	org.axonframework.common.jpa	jpa	4	4	1.000000
22	axon-messaging-4.7.5	org.axonframework.eventhandling.tokenstore.jpa	jpa	4	4	1.000000
23	axon-messaging-4.7.5	org.axonframework.common.legacyjpa	legacyjpa	4	4	1.000000
24	axon-messaging-4.7.5	org.axonframework.deadline.quartz	quartz	4	4	1.000000
25	axon-test-4.7.5	org.axonframework.test.deadline	deadline	4	4	1.000000
26	axon-eventsourcing-4.7.5	org.axonframework.eventsourcing.snapshotting	snapshotting	3	3	1.000000
27	axon-messaging-4.7.5	org.axonframework.deadline.jobrunr	jobrunr	3	3	1.000000
28	axon-messaging-4.7.5	org.axonframework.eventhandling.scheduling.job...	jobrunr	3	3	1.000000
29	axon-messaging-4.7.5	org.axonframework.eventhandling.scheduling	scheduling	3	3	1.000000
30	axon-messaging-4.7.5	org.axonframework.util	util	3	3	1.000000
31	axon-messaging-4.7.5	org.axonframework.eventhandling.tokenstore.leg...	legacyjpa	2	2	1.000000
32	axon-messaging-4.7.5	org.axonframework.messaging.interceptors.legac...	legacyvalidation	2	2	1.000000
33	axon-modelling-4.7.5	org.axonframework.modelling.command.legacyjpa	legacyjpa	2	2	1.000000
34	axon-test-4.7.5	org.axonframework.test.server	server	2	2	1.000000
35	axon-messaging-4.7.5	org.axonframework.common.digest	digest	1	1	1.000000
36	axon-messaging-4.7.5	org.axonframework.eventhandling.interceptors	interceptors	1	1	1.000000
37	axon-messaging-4.7.5	org.axonframework.common.io	io	1	1	1.000000
38	axon-test-4.7.5	org.axonframework.test.matchers	matchers	23	24	0.958333
39	axon-messaging-4.7.5	org.axonframework.messaging.deadletter	deadletter	18	19	0.947368
40	axon-messaging-4.7.5	org.axonframework.commandhandling.distributed	distributed	24	26	0.923077
41	axon-messaging-4.7.5	org.axonframework.messaging	messaging	32	35	0.914286
42	axon-messaging-4.7.5	org.axonframework.commandhandling	commandhandling	26	29	0.896552
43	axon-messaging-4.7.5	org.axonframework.eventhandling.tokenstore.jdbc	jdbc	8	9	0.888889
44	axon-messaging-4.7.5	org.axonframework.eventhandling.deadletter.jpa	jpa	8	9	0.888889
45	axon-modelling-4.7.5	org.axonframework.modelling.saga.repository.jdbc	jdbc	8	9	0.888889
46	axon-modelling-4.7.5	org.axonframework.modelling.command	command	45	51	0.882353
47	axon-messaging-4.7.5	org.axonframework.common	common	24	28	0.857143
48	axon-eventsourcing-4.7.5	org.axonframework.eventsourcing.eventstore.jpa	jpa	6	7	0.857143
49	axon-modelling-4.7.5	org.axonframework.modelling.saga.repository.jpa	jpa	6	7	0.857143