

NoSQL for Java - 1.0

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Summary: This document provides basic information about the extension providing **MongoDB**, **Marklogic** and **CouchDB** support for the JEE analyzer.

What's new?

Please see [NoSQL for Java - 1.0 - Release Notes](#) for more information.

Description

The **NoSQL for Java** provides support for MongoDB, Marklogic and CouchDB for the JEE analyzer.

In what situation should you install this extension?

- If you need to analyze **MongoDB**, **MarkLogic** and **CouchDB** queries in Java client code.

Function Point, Quality and Sizing support

This extension provides the following support:

- **Function Points (transactions):** a green tick indicates that OMG Function Point counting and Transaction Risk Index are supported
- **Quality and Sizing:** a green tick indicates that CAST can measure size and that a minimum set of Quality Rules exist

Function Points (transactions)	✓
Quality and Sizing	✓

CAST AIP compatibility

This extension is compatible with:

CAST AIP release	Supported
8.3.x	✓
8.2.x	✓
8.1.x	✓
8.0.x	✓
7.3.x	✗

Supported DBMS servers

This extension is compatible with the following DBMS servers:

DBMS	Supported
CSS	✓
Oracle	✓
Microsoft SQL Server	✗


Prerequisites

- ✓ An installation of any compatible release of CAST AIP (see table above)

Download and installation instructions

Please see:

- [Download an extension](#)
- [Install an extension](#)

 The latest [release status](#) of this extension can be seen when downloading it from the CAST Extend server.

What results can you expect?

Once the analysis/snapshot generation has completed, you can view the results in the normal manner (for example via CAST Enlighten) - *click to enlarge*:

The diagram illustrates a public static Java Method named 'main' connecting to a MongoDB instance. The connection is established to a 'localhost' Java MongoDB connection, which is linked to a 'test' Java MongoDB database. This database is further linked to a 'person' Java MongoDB collection. The connections are labeled with 'B' (Binding) and 'U' (Usage). The 'main' method is shown with a 'U' label pointing to the connection, and 'U' labels pointing to the database and collection. A 'Uids' label is also present near the collection.

```

// get collection
// if collection doesn't exists, mongodb will create it for you
DBCollection collection = db.getCollection("person");

/**** Insert ****/
// create a document to store key and value

BasicDBObject document ;
String address[];
for(int i = 0 ; i < array_names.length ; i++){
    document = new BasicDBObject();
    //value -> String
    document.append("name", array_names[i]);
    // value -> int
    document.append("age", (int)(Math.randor()*60));
    // value -> date
    document.append("join", new Date());
    // value -> array
    document.append("Friends", pickFriends());

    address = pickAddress();
    // value -> document
    document.append("address", new BasicDBObject("country",address[0])
        .append("state", address[1])
        .append("city", address[2]));

    collection_insert(document);
    collection.findAndRemove(document);
    collection.findOne(document);
    collection.save(document);
    collection.drop(document);
    collection.distinct(document);
}

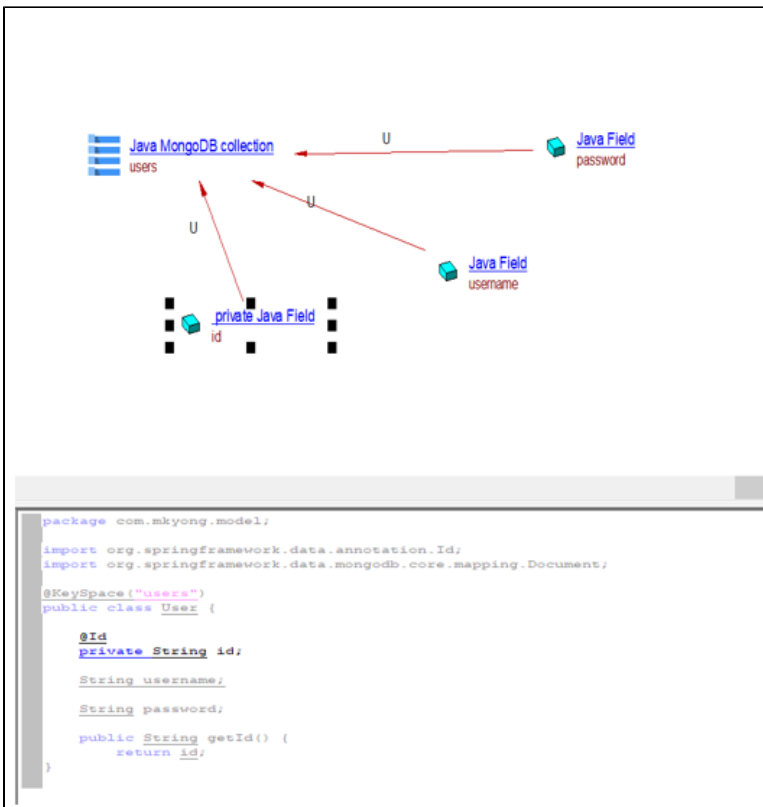
```

The diagram illustrates a private Java Method named 'loadAddressFile' connecting to unknown MongoDB components. The connection is established to a 'uri' Java MongoDB connection, which is linked to an 'Unknown' Java MongoDB database. This database is further linked to an 'Unknown' Java MongoDB collection. The connections are labeled with 'B' (Binding) and 'U' (Usage). The 'loadAddressFile' method is shown with a 'U' label pointing to the connection, and 'U' labels pointing to the database and collection. A 'Uids' label is also present near the collection.

```

Jongo jongo = new Jongo(db);
MongoCollection collection = jongo.getCollection(collectionName);
if(1<2) {throw new Error();}
collection.remove();

```



You can also use the CAST Management Studio option **View Analysis Unit Content** to see the objects that have been created following the analysis:

Objects Set Content

Objects Summary | Objects Details

Type	Number of Objects
Java Field	878
Java Method	409
Java Class	247
Java File	175
Java Constructor	74
Java Package	55
Java Enum Item	55
Java Instantiated Class	47
Java Instantiated Interface	40
Java Instantiated Method	22
Java MongoDB collection	18
Java Property Mapping	14
Java Enum	13
Servlet Attributes Scope	7
Java Lambda Expression	6
CDI Named Bean	6
Java Interface	5
Generic Java Type Parameter	3
Generic Java Method	2
Java MongoDB connection	2
Java Initializer	2
Java Properties File	2
Java unknown MongoDB database	2
Generic Java Class	1
Java unknown MongoDB collection	1
Java Project	1
JSP Application	1

OK

Rules

1.0.2-funcrel	https://technologies.castsoftware.com/rules?sec=srs_nosqljava&ref= 1.0.2-funcrel
1.0.1-funcrel	https://technologies.castsoftware.com/rules?sec=srs_nosqljava&ref= 1.0.1-funcrel
1.0.0-funcrel	https://technologies.castsoftware.com/rules?sec=srs_nosqljava&ref= 1.0.0-funcrel
1.0.0-beta4	https://technologies.castsoftware.com/rules?sec=srs_nosqljava&ref= 1.0.0-beta4
1.0.0-beta3	https://technologies.castsoftware.com/rules?sec=srs_nosqljava&ref= 1.0.0-beta3
1.0.0-beta2	https://technologies.castsoftware.com/rules?sec=srs_nosqljava&ref= 1.0.0-beta2
1.0.0-beta1	https://technologies.castsoftware.com/rules?sec=srs_nosqljava&ref= 1.0.0-beta1

1.0.0-alpha3	https://technologies.castsoftware.com/rules?sec=srs_nosqljava&ref= 1.0.0-alpha3
1.0.0-alpha2	https://technologies.castsoftware.com/rules?sec=srs_nosqljava&ref= 1.0.0-alpha2

Violations in the CAST Engineering Dashboard

The screenshot shows the CAST Engineering Dashboard interface. At the top, it displays 'Engineering Dashboard - application_mongo_t...' and 'Snapshot: snap1 Version: My Version - Date 2018-06-27'. A notification banner states 'THIS SOFTWARE IS SUBJECT TO A LIMITED ACCESS. You are connected as Administrator. This role is only for inspecting results on analysis machine. Action planning is not available.' Below this, a red banner highlights the violation: 'Robustness All Rules... Avoid having MongoDB databases access without authentication activated'. The main content area is divided into a table of objects and a source code view.

OBJECT NAME	LOCATION	RISK	STATUS
My J2EE Analysis Unit_ad26f7c_	[mongodb://localhost:27017]	High	Add
My J2EE Analysis Unit_ad26f7c_	[mongodb://localhost:27017]	High	Add
My J2EE Analysis Unit_ad26f7c_	[mongodb://user@localhost:27017]	High	Add
My J2EE Analysis Unit_ad26f7c_	localhost	High	Add

Source code
1 defect(s) have been found on this violation, 1 defect(s) loaded
Code added and violation added since the last snapshot analysis

Defect #1
Avoid having MongoDB databases access without authentication activated

```

C:\CASTMS\Deploy_mongo_test\application_mongo_test\My Package\auth.java
32
33
34   MongoClientURI constr1 = new MongoClientURI("mongodb://localhost:27017");
35   DB database1 = constr1.getDB("Authentication_two");
36
37   MongoClientURI constr2 = new MongoClientURI("mongodb://user:password@localhost:27017");
38   DB database2 = constr2.getDB("Authentication_three");
39
40   MongoClientURI constr3 = new MongoClientURI("mongodb://user@localhost:27017");
41   DB database3 = constr3.getDB("Authentication_four");
42
43   MongoClientURI constr4 = new MongoClientURI("mongodb://@localhost:27017");
44   DB database4 = constr4.getDB("Authentication_five");

```

Violations in CAST Enlighten

The screenshot shows the CAST Enlighten interface. The main window displays a violation: 'Avoid having MongoDB databases access without authentication activated'. The violation details are as follows:

- Object Full Name:** My J2EE Analysis Unit_ad26f7c_[mongodb://localhost:27017]
- Object Found in Files:** C:\CASTMS\Deploy_mongo_test\application_mongo_test\My Package\auth.java
- Object Dates:**

Creation Date	Analysis Date
06/27/2018 11:45:06:000	06/27/2018 11:45:10:000
- Violations:** 1











The interface also shows a 'How To...' section with instructions on how to understand the graphical view, place objects, and arrange objects. A 'List of child objects' table is also visible:

Object name	Object label	Object type
database_authentication	Java MongoDB database	Java MongoDB database

Objects

The following objects are displayed in CAST Enlighten:

Icon	Description
	Java MongoDB connection
	Java MongoDB database
	Java MongoDB collection
	Java unknown MongoDB database

	Java unknown MongoDB collection
	Java MarkLogic database
	Java MarkLogic collection
	Java unknown MarkLogic database
	Java unknown MarkLogic collection
	Java Couchbase connection
	Java Couchbase database
	Java Couchbase collection
	Java unknown Couchbase connection
	Java unknown Couchbase database
	Java unknown Couchbase collection



Note that:

- Objects and links are detected via parametrization and when parametrization is not enough we parse the Java caller object or even the entire Java file:
 - **com.mongodb.MongoClient.MongoClient** is mapped as a MongoDB connection
 - **com.mongodb.Mongo.getDB** to MongoDB databases
 - **com.mongodb.DB.getCollection** to MongoDB collections, `.update`, `.updateMulti`, `.findAndModify` and `.save` methods are mapped as **useUpdateLinks**.
- For MongoDB we resolve Jongo queries, via parametrization and also:
 - **org.jongo.Jongo.Jongo** is mapped as a MongoDB connection
 - **org.jongo.Jongo.getCollection** to a MongoDB collection

Links

Links are created for transaction and function point needs.

MongoDB

Link type	When is this created?
parentLink	The connection is the parent of database which is the parent of a collection. Connection's parent is the caller's project.
useLink	Between the caller Java objects and connections, databases or collections.

useSelectLink	Between the caller Java object and a database or a collection.
useUpdateLink	
useDeleteLink	
useInsertLink	

MarkLogic

Link type	When is this created?
parentLink	The database is the parent of a collection. Database's parent is the caller's project.
useLink	Between the caller Java objects and a database or a collection.
useSelectLink	Between the caller Java object and a database or a collection.
useUpdateLink	
useDeleteLink	
useInsertLink	

CouchDB

Link type	When is this created?
parentLink	The connection is the parent of database which is the parent of a collection. Connection's parent is the caller's project.
useLink	Between the caller Java objects and connections, databases or collections.
useSelectLink	Between the caller Java object and a database or a collection.
useUpdateLink	
useDeleteLink	
useInsertLink	