Installation Guide

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Server configuration

Requirements

In order to install BioNetDB, the following packages are required:

- Java 1.8.0_65+
- Neo4j graph database
- Apache Maven (when building BioNetDB from sources)
- Apache Tomcat Web server

Installing Neo4j

In order to install Neo4j, follow the instructions from the Neo4j Operation Manual powered by the Neo4j Team. This describes how to install Neo4j in different deployment contexts, such as Linux, Mac OS, Windows, Debian, Docker.

Installing Tomcat

In order to install Tomcat Web server, follow the instruction from the Apache Software Foundation.

Configuration

BioNetDB installation requires the configuration file *configuration.yml* written in **YAML** format and located in the *$BIONETDB_HOME* folder. The configuration file contains mainly Neo4j database configuration, e. g.:

Configuration file

```
---
logLevel: null
logFile: null

## More than one database can be defined, you can pass the database id to
BioNetDbManager.
## If not passed the default database will always be the first one.
databases:
- id: "hsapiens"
  species: "hsapiens"    ## examples: hsapiens, mmusculus, ...
  host: "localhost"
  port: "7687"
  user: "neo4j"
  password: "neo4j;"
  options: null          ## map containing specific database options
```

Installing BioNetDB

In order to build BioNetDB from source code you must first get the source code of BioNetDB from GitHub, most of the dependencies - including OpenCB dependencies - will be fetched from Maven Central Repository, however in some scenarios OpenCB dependencies will need to be built from GitHub source code. Compiling and building processes are carried out by **Apache Maven**.

As mentioned, you get the BioNetDB source code from GitHub. You can download the tar ball or clone the Git repository. Next sections describe both methods to get the source code.

Downloading the tar ball

1. Download the latest release from GitHub (*tar.gz* or *zip* file).
2. Extract the contents of the archive using *tar -xfz <filename>* for the *tar.gz* file, or *gunzip <filename>* for the *zip* file.

Cloning the BioNetDB Git repository

1. Execute one of the following Git commands:

Shell

```
## Latest stable version
git clone -b master https://github.com/opencb/bionetdb.git

## Develop branch, for this to work remember to clone and build
BioNetDB dependencies (see below)
git clone -b develop https://github.com/opencb/bionetdb.g
```

Compiling BioNetDB source code

BioNetDB has dependencies from other OpenCB projects such as *CellBase* while others are third-party dependencies such as MongoDB. All BioNetDB ***stable*** releases are always merged and tagged at ***master*** branch (users are encouraged to use latest stable release for production), you can find all releases at Bio NetDB Releases. We guarantee that all the dependencies needed for building stable releases are deployed at Maven Central Repository, this is true for both OpenCB and third-party dependencies. Theref ore for building a stable release you only need to clone BioNetDB repository itself since all the dependencies will be fetched form Maven Central repository.

This is different for development branches. Active BioNetDB development is carried out at ***develop*** branc h, in this branch third-party dependencies will be still fetched from Maven Central Repository **but** this is not true for OpenCB dependencies since it is very likely they are still in development and therefore they are not deployed. Keep in mind that we only guarantee that *develop* compiles and that bugs are expected, use this branch for development or for testing new functionalities. So, for building ***develop*** bran ch you may require to download and install the following OpenCB repositories in this order:

- *java-common-libs*:https://github.com/opencb/java-common-libs (branch 'develop')
- *biodata*: https://github.com/opencb/biodata (branch 'develop')
- *cellbase*: https://github.com/opencb/cellbase (branch 'develop')

As you can see one of our rules is that *develop* branch of all major applications such as BioNetDB and CellBase always depend on *develop* branches. So, if you really want to build *develop* the you can clone and build dependencies by executing:

Clone Dependencies

```
## Clone develop branc
git clone -b develop https://github.com/opencb/java-common-libs.git
git clone -b develop https://github.com/opencb/biodata.git
git clone -b develop https://github.com/opencb/cellbase.git

## Now you can execute the following command in each of the folders the
specified order above
mvn clean install -DskipTests
```

Now you can compile the BioNetDB source code by executing the following command from your BioNetDB folder (i.e., the root of the cloned repository):

```
$ mvn clean install -DskipTests
```

After compiling successfully, you should see the following messages:

```
...
...
[INFO] Executed tasks
[INFO]
------------------------------------------------------------------------
[INFO] Reactor Summary:
[INFO]
[INFO] BioNetDB project ................................... SUCCESS [
1.423 s]
[INFO] bionetdb-core ...................................... SUCCESS [
12.854 s]
[INFO] bionetdb-server .................................... SUCCESS [
3.576 s]
[INFO] bionetdb-app ....................................... SUCCESS [
1.200 s]
[INFO]
------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO]
------------------------------------------------------------------------
[INFO] Total time: 19.213 s
[INFO] Finished at: 2018-06-26T10:24:12+01:00
[INFO] Final Memory: 38M/716M
[INFO]
------------------------------------------------------------------------
```

Deploy WAR file

Once BioNetDB compiled, the WAR file (*bionetdb.war*) is located at the *$BIONETDB_HOME* folder. The WAR file consists of a set of RESTful webservices acting as an interface to BioNetDB. In order to start the web services follow the next steps:

1. Install and start the Apache Tomcat Web server. Be sure you set the environment variable *$BIONETDB_HOME* pointing to your BioNetDB folder before starting Tomcat server.

2. Deploy *bionetdb.war* by just copying it from the BioNetDB folder (i.e., *$BIONETDB_HOME*) into the Tomcat *`webapps`* folder (check the folder where you downloaded Tomcat, or probably */var/lib/tomcat8* if you installed via apt-get):

   ```
   $ cp $BIONETDB_HOME/bionetdb.war $(path_to_tomcat)/webapps
   ```

3. Then, you should be able to see the swagger page at `http://localhost:8080/bionetdb/webservices/`. See Using RESTful web services for a tutorial.

