

Setup Development Environment for the openMDM(R) Application

Eclipse mdmbl project

Document history:

Author	Date	Affects Version	Description
Angelika Wittek	9.6.2017	0.6	initial version
Angelika Wittek	12.6.2017	0.6	User Preference Service added
Alexander Nehmer	22.6.2017	0.6	Review and additions
Angelika Wittek	30.6.2017	0.6	Mailing Lists and ECA infos added
Angelika Wittek	18.7.2017	0.7	Comments from Ganesh inserted, Glassfish Bugs added
Angelika Wittek	31.07.2017	0.7	Elasticsearch version added, exported to pdf for mdmbl page
Alexander Nehmer	4.8.2017	0.7	Added Eclipse Hot Deploy section
Ganesh Deshvini	14.8.2017	0.7	Parameter to skip npm install
Angelika Wittek	13.9.2017	0.8	additions for new version exported to pdf for download pages

Table of contents

1 Introduction	3
2 Prerequisites	3
3 Installations	4
3.1 Gradle	4
3.1.1 Gradle - via GVM (recommended)	4
3.1.2 Gradle - manually	4
3.1.3 Gdub (Optional, but recommended)	4
3.2 Eclipse IDE	4
3.3 Database for the User Preference Service	5
3.3.1 Apache Derby Database	5
3.3.2 Other Database Products	6
3.4 Glassfish	6
3.5 Database for ODS-Server	7
3.5.1 Embedded Apache Derby Database	7
3.5.2 Oracle 11g XE Release 2	7
3.6 ODS Server	7
3.7 ElasticSearch	8
4 Get and build the code	8
4.1 Source Code Repositories	8
4.2 Building the projects	9
4.3 Configure Gerrit	9
4.3.1 In Eclipse	10
4.3.2 On command line	10
4.4 Known setup bugs and problems	11
4.5 Bugs	11
4.6 Problems and Solutions	11
4.6.1 Glassfish	11

5 Deploy and configure application	11
6 Start application	12
7 Development Rules	13
8 Troubleshooting	13

1 Introduction

This document serves as a guide for developers of the Eclipse mdmbl project. It describes how to setup your environment, where the source code of existing projects can be found and retrieved, how the application can be built, deployed and how to start the application.

Mailinglists:

- For development communication we use the mdmbl mailing list:
<https://dev.eclipse.org/mailman/listinfo/mdmbl-dev>
- The openMDM Working group mailing list:
<https://dev.eclipse.org/mailman/listinfo/open-measured-data-wg>

For contributing to the mdmbl project you need to sign the ECA (Eclipse Contributor Agreement) :

<https://wiki.eclipse.org/ECA>

Helpful Links:

- Eclipse Wiki - openMDM EWG:
<https://wiki.eclipse.org/Open-Measured-Data-Management-WG>
- Eclipse Project openMDM@BL:
<https://projects.eclipse.org/projects/technology.mdmbl>
- Eclipse Bugzilla mdmbl issues:
https://bugs.eclipse.org/bugs/buglist.cgi?quicksearch=openmdm&list_id=16180271
- JIRA REQU Issues:
<https://openmdm.atlassian.net/secure/RapidBoard.jspa?rapidView=57&projectKey=REQU&view=planning&selectedIssue=REQU-48>
- openMDM git repos: <http://git.eclipse.org/c/?q=mdm>

Note: this document is written in Google Docs, location:

https://docs.google.com/document/d/1Cvu5cpm4fhlM_G4E1hdx7bT_XTATrvGRjCiBIAXcfQ8/edit?usp=sharing

2 Prerequisites

Already installed on your machine or install it:

- Java 8: <http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html>
- Maven: <https://maven.apache.org/>
- Git: <https://git-scm.com>

3 Installations

3.1 Gradle

- Download Gradle from <http://gradle.org/downloads>
- Unzip the file into a directory without spaces (recommended).
- Create a GRADLE_HOME environment variable that points to this directory.
- Adjust your PATH environment variable to include \$GRADLE_HOME/bin (%GRADLE_HOME%\bin on Windows).
- Test your setup by invoking `gradle --version`.

3.2 Eclipse IDE

Get the current JEE Distribution from <https://www.eclipse.org/downloads>

It is recommended to use the Eclipse Installer.

Install Plugins:

- Gradle: follow this tutorial <http://www.vogella.com/tutorials/EclipseGradle/article.html>.
- SonarLint via Eclipse Marketplace
- EclEmma Code Coverage Tool (optional)

Create a new workspace for the mdmbl projects and configure it:

- set encoding to UTF-8
- set formatting rules to the Eclipse default rules

3.3 Database for the User Preference Service

The Preference service stores its data to a relational database. The database connection is looked up by JNDI and the JNDI name and other database relevant parameters are

specified in `src/main/resources/META-INF/persistence.xml`. The default JNDI name for the JDBC resource is set to `jdbc/openMDM`.

For the User Preference Service you need a database with a schema “openMDM”.

Note: “openMDM” is the default schema name, it can be changed in the file:

```
/org.eclipse.mdm.nucleus/org.eclipse.mdm.preferences/src/main/resources/META-INF/persistence.xml
```

3.3.1 Apache Derby Database

There is an Quickstart Guide from Deby:

<https://builds.apache.org/job/Derby-docs/lastSuccessfulBuild/artifact/trunk/out/getstart/index.html>

- Download it from <https://db.apache.org/derby/releases/release-10.13.1.1.cgi>
- Installation Guide: http://db.apache.org/derby/papers/DerbyTut/install_software.html
 - set `$DERBY_INSTALL` to your installation dir
 - CLASSPATH must include `$DERBY_INSTALL/lib/`
 - `derby.jar`
 - `derbyclient.jar`
 - `derbynet.jar`
 - `derbytools.jar`
- Start database: `$DERBY_INSTALL/bin/startNetworkServer.bat`
- Create a directory for the database data and change to it
- Start the ij tool as described here:
http://db.apache.org/derby/papers/DerbyTut/ij_intro.html
- Create database with default name “openMDM”

```
ij> CONNECT  
'jdbc:derby://localhost:1527/openMDM;create=true';
```
- Create preference table:

```
ij> CREATE TABLE OPENMDM.PREFERENCE (ID BIGINT GENERATED BY  
DEFAULT AS IDENTITY NOT NULL, keyCol VARCHAR(255), SOURCE  
VARCHAR(255), username VARCHAR(255), valueCol  
CLOB(2147483647) NOT NULL, PRIMARY KEY (ID));  
ij> ALTER TABLE OPENMDM.PREFERENCE ADD CONSTRAINT  
UNQ_PREFERENCE_0 UNIQUE (source, username, keyCol);
```
- Check table:

```
ij> SELECT * FROM OPENMDM.PREFERENCE;
```
- close ij;
- Stop database.

3.3.2 Other Database Products

There is also the possibility to use other database products. For Postgres DB you will find the according sql scripts after the nucleus build in the following directory:

```
$workspace/org.eclipse.mdm.nucleus/build/distributions/schema/org.eclipse.mdm.preferences
```

Other database products supported by EclipseLink may also work, but are neither tested nor supported by the mdmbl project.

3.4 Glassfish

- Version 4.1.2 required
- Download Glassfish from <http://download.oracle.com/glassfish/>
- Unzip the file into a directory without spaces (recommended).
- Test it:
 - change to the glassfish-root directory
 - invoke `./bin/asadmin start-domain``
 - change to your browser
 - URL localhost:8080 should show you a welcome page
 - URL localhost:4848 should show you the admin page
 - Note: if you need to change the default ports 8080 or 4848 please see the glassfish documentation

For the User Preference Service configure JDBC resource and its dependent JDBC Connection Pool. It has to be created and configured within the glassfish web administration console or through asadmin command line tool.

Description for the Derby Database with defaultname "openMDM":

- Start Derby DB
- start: <http://localhost:4848/>
- Menu Item: JDBC-> JDBC Connection Pools -> new
 - poolname: <mypool_name>
 - Resource Type: javax.sql.DataSource
 - Database Driver Vendor: Derby
 - -> next
 - set properties: User, Password, DatabaseName to openMDM
 - -> finish
 - check it: open Connection Pool, try the ping button
- Menu item JDBC -> JDBC Resources -> new
 - JNDI NAME: jdbc/openMDM
 - Pool Name: <mypool_name>
- stop glassfish `./bin/asadmin stop-domain domain1``
- stop Derby DB

Now you can start the Derby DB via:

```
$glassfish_root> ./bin/asadmin start-database
```

3.5 Database for ODS-Server

The database product is dependent of the ODS Server you use. To start an ODS Server you need a loaded ASAM ODS Application Model in the DB.

3.5.1 Embedded Apache Derby Database

If you use a Peak ODS Server from Peak Solutions GmbH: they provide an embedded Derby Database with an Application Model and Data. Follow their instructions.

3.5.2 Oracle 11g XE Release 2

- Download it from <http://www.oracle.com/technetwork/database/database-technologies/express-edition/downloads/index.html>
- Install it.
- Note for Ubuntu Users: see this article <http://tuhrig.de/3-ways-of-installing-oracle-xe-11g-on-ubuntu/>
- Note for Linux Users: Installing the Docker Container from <https://hub.docker.com/r/alexexiled/docker-oracle-xe-11g/> works fine (proofed by Angelika Wittek, 25.4.2017)

Load an empty Application Model to the DB: please refer to Jira-Ticket ORGA-178
TODO: check into git the dump and the descriptions and update link

3.6 ODS Server

ASAM ODS-Server e.g. from

- Peak Solutions: <http://www.peak-solution.de/de/produkte-leistungen/versuchs-messdatenmanagement/softwareloesungen/peak-ods-server/>
 - HiQSoft: <https://www.highqsoft.com/de/avalon-asam-ods-server/>
 - or another compliant data source (e.g. PAK adapter)
-
- Get a test license from the vendors and follow the installation instructions.
 - If you already imported an Application Model to your database and database is running, then the ODS Server should start.

Notes for running a Peak ODS Server:

- You need the notification service. Check if there is the `notification-plugin-1.1.0.jar` in the `$odsserver_root/lib` directory or copy it there.
- And add the following line to `$odsserver_root/cfg/server.properties`:
`JMS_FORWARDER.PORT=8089`
- The Peak ODS Server can run its own ORB daemon. Just leave `NAMESERVICE=` in `$odsserver_root/cfg/server.properties`
- If using Derby DB with demo data from Peak
 - The provided MDMNVH-DerbyDB Backup must be copied into the Derby database folder (besides openMDM DB folder; see 3.3.1)
 - `$odsserver_root/cfg/server.properties` (username must be the name of the schema and password must be any non zero length string)
 - `DB_URL = jdbc:derby://localhost:1527/MDMNVH`
 - `DB_USER = MDMNVH`
 - `DB_PASSWORD = dummpw`
 - `DB_DRIVER = DERBY`

3.7 ElasticSearch

ElasticSearch can be downloaded at <https://www.elastic.co/products/elasticsearch>. use a version 2.x., e.g.

<https://www.elastic.co/de/downloads/past-releases/elasticsearch-2-4-2>

Upgrade to version 5.x is planned, see:

https://bugs.eclipse.org/bugs/show_bug.cgi?id=520297

For testing purpose, it can be simply started by executing `bin/run.bat`

4 Get and build the code

4.1 Source Code Repositories

The application is split into several modules, each one dedicated to a certain scope of functions. All source code has been made available in git repositories hosted by the Eclipse Foundation <https://eclipse.org/org/foundation/>

The version control system used to track all changes is Git: <https://git-scm.com/>

We strongly recommend to use a separate workspace for the openMDM projects.

- Create a new workspace directory
- Change to this directory

- Run the following command to checkout the source code. You have to adapt the URL for each project: ``git clone <repository URL>``

Checkout the following projects

```
git clone http://git.eclipse.org/gitroot/mdmbl/org.eclipse.mdm.api.base.git
git clone http://git.eclipse.org/gitroot/mdmbl/org.eclipse.mdm.api.default.git
git clone http://git.eclipse.org/gitroot/mdmbl/org.eclipse.mdm.api.odsadapter.git
git clone http://git.eclipse.org/gitroot/mdmbl/org.eclipse.mdm.nucleus.git
git clone http://git.eclipse.org/gitroot/mdmbl/org.eclipse.mdm.realms.git
git clone http://git.eclipse.org/gitroot/mdmbl/org.eclipse.mdm.openatfx.mdf.git
git clone http://git.eclipse.org/gitroot/mdmbl/org.eclipse.mdm.mdfsorter.git
```

Alternatively configure eGit in your Eclipse IDE and checkout there:

4.2 Building the projects

Please see the README.md files in the root directory of the projects for exact information about how the projects are build.

Generally you may run `./gradlew clean build`` in the root directory of each project to build it. Execute `./gradlew clean build install`` to also generate a JAR to be placed in your local cache. From there it can be retrieved when subsequent projects are build. To skip npm install, pass an argument **skipNode** while doing the nucleus project build.

eg:- `./gradlew clean build -PskipNode`

Running the gradlew script from nucleus will build the following projects:

1. org.eclipse.mdm.api.base.git
2. org.eclipse.mdm.api.default.git
3. org.eclipse.mdm.api.odsadapter.git
4. org.eclipse.mdm.nucleus.git

Import the project to your Eclipse IDE via File -> Import -> Import as existing gradle project. If importing all projects at once via the parent directory fails, import each project separately. Build the projects in the order they are listed above, because of the dependencies between them.

Refer to the documentation and follow it:

- <http://git.eclipse.org/c/gerrit/mdmbl/org.eclipse.mdm.nucleus.git/tree/README.md>
- <http://git.eclipse.org/c/gerrit/mdmbl/org.eclipse.mdm.realms.git/tree/README.md>

If there are still java errors after importing and building, right click on the project -> Gradle -> Refresh Gradle Project

For other build problems. see the section [4.4 Known setup bugs](#). If your problem is not listed there, create a Bugzilla Bug for it:

https://bugs.eclipse.org/bugs/enter_bug.cgi?product=MDMBL

After importing the projects to the IDE, you have all repository connections in the Git perspective.

4.3 Configure Eclipse for Hot Deploy

- On the command line run "gradlew clean install" in org.eclipse.mdm.nucleus
- Eclipse setup:
- Import all projects into Eclipse (tested with Buildship 2.2.x)
- Import -> Gradle Project
 - org.eclipse.mdm.nucleus
- In project "org.eclipse.mdm.nucleus"
 - Project Properties
 - Project Facets (if project is not faceted yet)
 - Convert to faceted form ...
 - Select "Dynamic Web Module"
 - Builders (optional)
 - Disable "Validation" (speeds up redeployment)
 - Deployment Assembly
 - Remove all entries
 - Add following sources
 - To Deploy Path WEB-INF/lib
 - Java Build Path Entries
 - Add Project and External Dependencies
 - Project
 - org.eclipse.mdm.api.base
 - org.eclipse.mdm.api.default
 - org.eclipse.mdm.api.odsadapter
 - org.eclipse.mdm.businessobjects
 - org.eclipse.mdm.connector
 - org.eclipse.mdm.filerelease
 - org.eclipse.mdm.freetextindexer
 - org.eclipse.mdm.preferences
 - org.eclipse.mdm.property
 - To Deploy Path WEB-INF/classes
 - Folder
 - org.eclipse.mdm.application/bin
 - To Deploy Path /
 - Folder
 - org.eclipse.mdm.application/build/node/dist
 - To Deploy Path /WEB-INF
 - Folder
 - org.eclipse.mdm.application/src/main/webconfig
 - In projects
 - org.eclipse.mdm.api.base
 - org.eclipse.mdm.api.default

- org.eclipse.mdm.api.odsadapter
- org.eclipse.mdm.businessobjects
- org.eclipse.mdm.connector
- org.eclipse.mdm.filerelease
- org.eclipse.mdm.preferences
- org.eclipse.mdm.property

- Project Properties
 - Project Facets
 - Set Java Version to 1.8
- In project "org.eclipse.mdm.connector"
 - Gradle -> Refresh Gradle Project

- Check that in project org.eclipse.mdm.nucleus the Deployment Assembly settings were not reset. Otherwise redo.

- Setup Glassfish (Servers View)
 - Servers -> Create new
 - Complete setup for local Glassfish instance
 - Install Glassfish tools if needed
 - Double-click on Glassfish server
 - Publishing
 - "Automatically publish when resources change"
 - Context Menu -> Add and Remove ...
 - Add org.eclipse.mdm.nucleus to Glassfish

- Configure Glassfish
 - Open Management Console (localhost:4848)
 - Configurations
 - server-config
 - System Properties
 - Add property
org.jboss.weld.serialization.beanIdentifierIndex
Optimization to false

- Start Glassfish in "Debug"-Mode to have your changed sources published

4.4 Configure Gerrit

Gerrit can be found at <https://git.eclipse.org/r/>

For checking in code to a repository you need to configure Gerrit in the Git perspective.

There is a tutorial, it also explains how to use Gerrit with Eclipse:

<http://www.vogella.com/tutorials/Gerrit/article.html>

See documentation from Eclipse:

<https://wiki.eclipse.org/Gerrit>

Get your Gerrit Password via:

<https://git.eclipse.org/r/#/settings/http-password>

Configure your Gerrit settings:

<https://git.eclipse.org/r/#/settings/>

-> Watch the mdmbl projects.

4.4.1 In Eclipse

Go to your Eclipse IDE -> Git Perspective

For all project do:

- Expand the project
- Remotes -> Create Remote
- Remote Name -> e.g. CodeReview; Select "Configure Push" -> OK
- URI -> click change button
- Configure URI Window:
 - URI:
https://<eclipse_username>@git.eclipse.org/r/a/mdmbl/<projectname>
e.g.
https://<eclipse_username>@git.eclipse.org/r/a/mdmbl/org.eclipse.mdm.api.base
 - Protocol: choose HTTPS
 - Fill in username and password (the Gerrit one from the settings above)
 - Check the option "Store in secure store"
- Back to the "Configure Push" Window, section "Ref mapping" -> add
 - Local Branch: HEAD
 - Remote branch: refs/for/dev
 - OK
- Try the "Dry-Run" Button to test your configuration
- Save
- "Gerrit Configuration" (right click on new remote)
 - URI: same as above
 - Username: same as above
 - Destination branch: dev
- Finish

For every commit to Gerrit

- Add Signed-Off-By when you commit to sign off the commit
- In Eclipse: open the git staging perspective, there is a window called "Commit message" and next to the label "Commit Message" there are 3 buttons. the middle button is the "Add signed-off-by" button. Click it.

4.5 Push code

4.5.1 Eclipse

To push code to gerrit you can

- 1) As a committer
 - a) Push code directly to Gerrit without any review (in Git repositories view: Push to upstream)
 - b) Push code to Gerrit for reviewing (in Git repositories view: Push to Gerrit)
- 2) As a non-committer
 - a) Push code to Gerrit for reviewing (in Git repositories view: Push to Gerrit)

4.5.2 Working with feature branches

- Develop on your feature branch. Make code reviews as usual via Gerrit on your branch.
- When integrating your branch into the dev branch
 - Checkout the dev branch
 - Merge your feature branch into the dev branch, but with having Git a merge commit created although it was a fast-forward merge

```
git merge --no-ff your_feature_branch
```
 - Push the dev branch to Gerrit

Without the no-ff option Gerrit refuses to accept the push due to “no new changes”.

4.6 Known setup bugs and problems

- The build of the org.eclipse.mdm.api.odsadapter project does need a “gradle clean install” as a “gradle install” breaks with build errors that package “com.google.protobuf” does not exist

4.7 Problems and Solutions

4.7.1 Glassfish - Inconsistent Module State

- org.glassfish.deployment.common.DeploymentException: Error in linking security policy for org.eclipse.mdm.nucleus -- Inconsistent Module State
 - Deployment went wrong
 - delete

```
$glassfish_root/glassfish/domains/domain1/applications/org.eclipsemdm.nucleus
```
 - delete \$glassfish_root/glassfish/domains/domain1/generated

- restart Glassfish

4.7.2 Glassfish - java.lang.ClassNotFoundException

If you run into "java.lang.ClassNotFoundException: javax.xml.parsers.ParserConfigurationException not found by org.eclipse.persistence.moxy" this is a bug described in https://bugs.eclipse.org/bugs/show_bug.cgi?id=463169 and <https://java.net/jira/browse/GLASSFISH-21440>.

This solution is to replace

GLASSFISH_HOME/glassfish/modules/org.eclipse.persistence.moxy.jar with this:

<http://central.maven.org/maven2/org/eclipse/persistence/org.eclipse.persistence.moxy/2.6.1/org.eclipse.persistence.moxy-2.6.1.jar>

5 Deploy and configure application

before deploying the application:

- start ORB (`$JAVA_HOME/bin/orbd -ORBInitialPort 2809`) (skip this if you are using Peak ODS Server with no NAMESERVICE specified in the server.properties)
- start ODS Server with corresponding database
- start Elasticsearch
- start Glassfish
 - `> asadmin start-domain`
 - `> asadmin start-database`

The build of the nucleus module creates:

`/org.eclipse.mdm.nucleus/build/distributions/mdm_web.zip`

The ZIP archive contains:

- the backend `org.eclipse.mdm.nucleus.war`
- the configurations in `/configuration`
- sql scripts for the User Preference Service in `/schema`.

Deploy the backend (`org.eclipse.mdm.nucleus.war`) on your Glassfish server

=> do it via the admin console at <http://localhost:4848/>

Configuration:

- copy the content of the extracted `/configuration` folder to `$GLASSFISH_ROOT/domains/domain1/config`
- edit the `org.eclipse.mdm.connector/service.xml` file to configure the data sources, look into your ODS Server log file to determine the corba URL.
e.g. for the Peak ODS Server with embedded Derby Database use:

```

<service
entityManagerFactoryClass="org.eclipse.mdm.api.odsadapter.ODSEntityManagerFactory">
  <param name="nameservice">corbaloc:iiop:127.0.0.1:2809/NameService</param>
  <param name="servicename">MDMNVH.ASAM-ODS</param>
</service>

```

- There is a config parameter to enable / disable the elasticsearch in
`$GLASSFISH_ROOT/domains/domain1/config/org.eclipse.mdm.property/global.properties`
Parameter: `freetext.active=[true|false]`
- if you enable the `freetext.active` parameter (=true), make sure that ElasticSearch is started and that the port in the property `elasticsearch.url` is set correct (check it in the ElasticSearch log and via your browser with the url and port, the result should be a json response)
- install and configure the LoginModule (see `org.eclipse.mdm.realms - README.md`)
- restart the application server
- goto <http://localhost:8080/org.eclipse.mdm.nucleus> and Login with sa/sa

6 Start application

- start ORB (`$JAVA_HOME/bin/orbd -ORBInitialPort 2809`) (skip this if you are using Peak ODS Server with no NAMESERVICE specified in the `server.properties`)
- start the database for the ODS Server (if necessary)
- start the ODS server
- start Elasticsearch
- start Glassfish (including database for UPS)

Change to your browser URL is `http://localhost:8080/org.eclipse.mdm.nucleus`.

You should see the openMDM LoginPage. Look for user/ password in the database in the `userXX` table, e.g. sa/sa.

7 Build backend and frontend separately

- To skip npm install, pass an argument **skipNode** while doing the nucleus project build. eg:- `./gradlew clean build -PskipNode`

8 Development Rules

- prefix every commit with the Bugzilla ID if there is one, e.g. your commit message would be "518433: made some changes"

9 Troubleshooting

Look into the Logfiles:

- **Glassfish:**
`$glassfish_root/domains/domain1/logs/server.log`
- **Derby DB for User Preference Service:**
`$glassfish_root/databases/derby.log`
- **Peak ODS Server:**
`$peakodsserver_root/logs/`