Installation Guide for the openMDM5(R) web application
Eclipse mdmbl project

Document history:

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1 Introduction

This document serves as an installation guide for the openMDM5 web application. The application is build and the artefacts to ready to deploy.
Please note: this guide describes the deployment only, for installing the application in a company infrastructure, please contact your administrators to support you with firewalls and proxy configurations, grant permissions, etc..

Interesting links:
- openMDM website: https://www.openmdm.org/
- Eclipse project page: https://projects.eclipse.org/projects/technology.mdmbl
- The openMDM Working group mailing list: https://dev.eclipse.org/mailman/listinfo/open-measured-data-wg
- JIRA: https://openmdm.atlassian.net/secure/BrowseProjects.jspa?selectedCategory=all&selectedProjectType=software
- JIRA REQU Issues: https://openmdm.atlassian.net/secure/RapidBoard.jspa?rapidView=57&projectKey=REQU&view=planning&selectedIssue=REQU-48

For any questions please contact us via the mailinglist:
https://dev.eclipse.org/mailman/listinfo/mdmbl-dev

Report a bug via:
https://bugs.eclipse.org/bugs/buglist.cgi?quicksearch=mdmbl

To build the application from the code base, please follow this documentation:
https://wiki.eclipse.org/images/e/e0/GettingStarted_mdmbl.pdf

1.1 ODS Server used for Developer Tests

All released versions are tested with the following ODS Server:

- HiQSoft GmbH, Avalon Version 4.6: https://www.highqsoft.com/de/avalon-asam-ods-server/
- Peak Solution GmbH, ODS Server Version 2.5.8 http://www.peak-solution.de/de/produkte-leistungen/versuchs-messdatenmanagement/softwareloesungen/peak-ods-server/

NOTE: There is an issue with the an older Avalon Server version 4.3b (from 2013): if multiple catalog sensors are deleted, the server application throws an error and and leaves the application model in a broken state.

2 Prerequisites

In your infrastructure you need to have installed:
- Java 8 (JDK1.8.0_45 or higher): http://www.oracle.com/technetwork/java/javase/downloads/
- Glassfish 4.1.2 - Full Paltform : https://javaee.github.io/glassfish/download some Glassfish libraries have to be patched, refer to:
  - 6.2 Glassfish - java.lang.ClassNotFoundException
  - 6.3 Glassfish - org.osgi.framework.BundleException

You need a running ASAM ODS Server with a compliant database configured with an ASAM Application Mode. E.g.
- Peak Solution: http://www.peak-solution.de/de/produkte-leistungen/versuchs-messdatenmanagement/softwareloesungen/peak-ods-server/ Note: you also need the notification service plugin for Peak ODS Server
- HiQSoft: https://www.highqsoft.com/de/avalon-asam-ods-server/

Or another compliant data source (e.g. PAK adapter).

3 Download Application Artefacts

Download zip file with artefacts from
http://git.eclipse.org/c/mdmbl/org.eclipse.mdmbl.git/plain/Releases/V0.x/

File: openMDM_application-<version>.zip

4 Installation

Unpack the zip file "openMDM_application-version>.zip", you will find the following structure:
- org.eclipse.mdm.nucleus.war
- configuration/
- schema/

4.1 Setup User Preference Service Database

The Preference service stores its data to a relational database.

4.1.1 Setup default schema / user (openMDM)

The Preference service stores its data to a relational database. The default name for the schema / user is "openMDM". For changing the default name please see section 4.1.3 Setup with another schema name.

At the moment there are two database products supported and tested:
- Apache Derby DB: Use the integrated Derby DB from Glassfish or download it from https://db.apache.org/derby/releases/release-10.13.1.1.cgi
- Postgres DB: https://www.postgresql.org/

Create a schema / user "openMDM" on your database and use the scripts provided in the zip file to create the table:
`schema/org.eclipse.mdm.preferences/*.sql`

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

4.1.2 Apache Derby Database integrated in Glassfish Platform

The Glassfish Application Server has included the Derby libraries, so first get the Glassfish, as described this chapter.

Create database and tables:
- Change to your <glassfish_root> directory
- Start the database:.

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

- Start the ij Tool (http://db.apache.org/derby/papers/DerbyTut/ij_intro.html):

```
<glassfish_root>$ java -jar ./javadb/lib/derbyrun.jar ij
```

- Create database with default name "openMDM"

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

- Create the table "preference"

```
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));
```

- Add constraints

```
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

```
ij> exit;
```

- Stop database.

```
<glassfish_root>$ ./bin/asadmin stop-database
```

4.1.3 Configure the JDBC resource and its dependent JDBC Connection in your Glassfish

The database connection is looked up by JNDI. The default JNDI name for the JDBC resource is set to jdbc/openMDM.
The JDBC resource and its dependent JDBC Connection Pool have be created and configured within the Glassfish web administration console or through asadmin command line tool.

Configuration:
- start your database: (if derby DB is used: `> asadmin start-database`)
- start Glassfish: `> asadmin start-domain`
- go to your Glassfish web administration console:
  if your Glassfish installation is on your machine the URL is normally:
  http://localhost:4848/
- Menu Item: JDBC-> JDBC Connection Pools -> new
    - poolname: <mypool_name>
    - Resource Type: javax.sql.DataSource
    - Database Driver Vendor: Derby or Postgressql
    - -> next

- ○ set properties: User, DatabaseName to openMDM, set password
- ○ -> 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

4.1.4 Setup with another schema name

"openMDM" is the default schema name, if you have to change it you have to change it in the configuration and rebuild the code. Please look at the following documentation:
https://wiki.eclipse.org/images/e/e0/GettingStarted_mdmbl.pdf

Note: this will be changed in one of the following releases

4.2 Install 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

For Peak ODS Server add the following line to
`$odsserver_root/cfg/server.properties`:
`JMS_FORWARDER.PORT=8089`

For disabling the ElasticSearch feature, see section 4.4 Configure property files

4.3 Configure property files

- ● start your Glassfish server
- ● copy the content of the extracted /configuration folder to
  `$GLASSFISH_ROOT/domains/domain1/config`

- ● Configuration file: `org.eclipse.mdm.property/`**`global.properties`**
  To enable globally the freetext search set the parameter: `freetext.active=true`
- ● 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)
    - the freetext parameters are set in the service.xml
    - freetext search is active for at least one service
- Configuration file: **`org.eclipse.mdm.connector/service.xml`**
    - configure the data sources, for ODS Servers look into your ODS Server log file to determine the corba URL
    - To use the freetext search configure for each datasource separately:
        - specific parameters for the NotificationService and the freetext search
        - set the freetext.active parameter to true (Example2)
    - If you do not want to use the freetext search for a datasource:
        - set the freetext.active parameter to false (Example3)
        - **or** leave away the freetext.* parameters, as they are optional (Example1)

```xml
<services>
<!-- Example1: ODS Server without freetext.* parameters -> freetext search is not active -->
<service entityManagerFactoryClass="org.eclipse.mdm.api.odsadapter.ODSContextFactory">
        <param name="nameservice">corbaloc::1.2@YOUR_HOST1:2809/NameService</param>
        <param name="servicename">YOUR_SERVICE1.ASAM-ODS</param>
</service>
<!-- Example2: Peak ODS-Sever with active freetext search -->
<service entityManagerFactoryClass="org.eclipse.mdm.api.odsadapter.ODSContextFactory">
        <param name="nameservice">corbaloc::1.2@YOUR_HOST2:2809/NameService</param>
        <param name="servicename">YOUR_SERVICE2.ASAM-ODS</param>
        <!--The indexing requires a user to get the DataItems from the ODS Server. Those are the
credentials for the user -->
        <param name="freetext.active">true</param>
        <param name="freetext.user">sa</param>
        <param name="freetext.password">sa</param>
        <param name="freetext.notificationType">peak</param>
        <param name="freetext.notificationUrl">http://YOUR_HOST2:8089/api</param>
</service>

<!-- Example3:  Avalon ODS-Sever -> freetext search is not active-->
<service entityManagerFactoryClass="org.eclipse.mdm.api.odsadapter.ODSContextFactory">
        <param name="nameservice">corbaloc::1.2@YOUR_HOST3:2809/NameService</param>
        <param name="servicename">YOUR_SERVICE3.ASAM-ODS</param>
        <!--The indexing requires a user to get the DataItems from the ODS Server. Those are the
credentials for the user -->
        <param name="freetext.active">true</param>
        <param name="freetext.user">sa</param>
        <param name="freetext.password">sa</param>
        <param name="freetext.notificationType">avalon</param>
        <param name="freetext.pollingInterval">5000</param>
</service>
</services>
```

- restart the application server (Glassfish)

4.4 Configure system properties

- use system property "org.eclipse.mdm.api.odsadapter.filetransfer.interfaceName" to set a specific network interface name to be used

4.5 Deploy web application to glassfish

Deploy the application (org.eclipse.mdm.nucleus-<version>.war, included in the zip file) on your running Glassfish server
=> do it e.g. via the admin console at http://localhost:4848/ and adapt the Context Root and the Application Name to "org.eclipse.mdm.nucleus".

4.6 Install and configure Glassfish Login Realm

The realm is configured in a standardized way. Configure your LDAP, AD or other systems according to the glassfish documentation:
https://javaee.github.io/glassfish/doc/4.0/security-guide.pdf

For local installations you can setup and configure a file realm, described in the readme.md file of the org.eclipse.mdm.nucleus project:
http://git.eclipse.org/c/mdmbl/org.eclipse.mdm.nucleus.git/tree/README.md

Note: The component "org.eclipse.mdm.realms" is not used any longer, since 5.0.0M4

4.7 Headless Deployment

The default configuration for the authentication method is set to "FORMULAR". If you want to do a headless deployment change it to "BASIC".

Change this file:
org.eclipse.mdm.nuclues/org.eclipse.mdm.application/src/main/webconfig/web.xml

from
```
<auth-method>FORMULAR</auth-method>
```
to
```
<auth-method>BASIC</auth-method>
```

4.8 Configure icons for the web frontend

All icons for the web frontend are taken from the FAMFAMFAM Silk Icons library, version 1.3 (http://www.famfamfam.com/lab/icons/silk/) This library is licenced under the Creative Commons Attribution 3.0 License (https://creativecommons.org/licenses/by/3.0/). This library was approved by the Eclipse Foundation, see CQ 17759.

Note:
A lot of users of other mdm applications are used to the icons from this document https://www.highqsoft.com/download/ao_base.htm
These icons are not open source, so we do not use them in our application.

The mapping from the ao elements to FAMFAMFAM icons:

ASAM ODS 5.3.0 Base Element Definitions		FamFamFam Silk Icons, V1.3
https://www.highqsoft.com/download/ao_base.htm#AoFile		page_white_stack
https://www.highqsoft.com/download/ao_base.htm#AoEnvironment		database
folder		folder
https://www.highqsoft.com/download/ao_base.htm#AoMeasurementQuantity		chart_curve_go
https://www.highqsoft.com/download/ao_base.htm#AoMeasurement		chart_curve
https://www.highqsoft.com/download/ao_base.htm#AoParameter		shape_square
https://www.highqsoft.com/download/ao_base.htm#AoParameterSet		shape_move_forwards
project		house
structure level		paste_plain
https://www.highqsoft.com/download/ao_base.htm#AoSubmatrix		calendar
https://www.highqsoft.com/download/ao_base.htm#AoTestEquipmentPart		monitor
https://www.highqsoft.com/download/ao_base.htm#AoTestEquipment		computer
https://www.highqsoft.com/download/ao_base.htm#AoTest		brick_add
https://www.highqsoft.com/download/ao_base.htm#AoTestSequencePart		shape_move_front
https://www.highqsoft.com/download/ao_base.htm#AoTestSequence		page_white_stack
test step		brick
https://www.highqsoft.com/download/ao_base.htm#AoUnitUnderTestPart		cog
https://www.highqsoft.com/download/ao_base.htm#AoUnitUnderTest		cog_go

The mapping is defined in:
org.eclipse.mdm.nucleus/org.eclipse.mdm.application/src/main/webapp/src/styles.css

5 Start application

- start ORB ($JAVA_HOME/bin/orbd -ORBInitialPort 2809) (skip this if your ODS Server is starting this implicitly, e.g. you are using Peak ODS Server with no NAMESERVICE specified in the server.properties or another)
- start the database for the ODS Server (if necessary)
- start the ODS server
- start Elasticsearch
- start database for the User Preference Service
  (e.g. derby DB: > asadmin start-database)
- start Glassfish: > asadmin start-domain)

Change to your browser URL is e.g. 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 and login.

6 Problems and Solutions

6.1 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

6.2 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

6.3 Glassfish - org.osgi.framework.BundleException

If you run into "org.osgi.framework.BundleException: Unresolved constraint in bundle
com.fasterxml.jackson.module.jackson-module-jaxb-annotations": this is a compatibility
problem with the installed jackson libraries.
The solution is to replace
GLASSFISH_HOME/glassfish/modules/jackson-*.jar with these files:
  ● http://central.maven.org/maven2/com/fasterxml/jackson/core/jackson-annotations/2.8
    .1/jackson-annotations-2.8.1.jar
  ● http://central.maven.org/maven2/com/fasterxml/jackson/core/jackson-core/2.8.1/jacks
    on-core-2.8.1.jar
  ● http://central.maven.org/maven2/com/fasterxml/jackson/core/jackson-databind/2.8.1/j
    ackson-databind-2.8.1.jar
  ● http://central.maven.org/maven2/com/fasterxml/jackson/jaxrs/jackson-jaxrs-base/2.8.
    1/jackson-jaxrs-base-2.8.1.jar
  ● http://central.maven.org/maven2/com/fasterxml/jackson/jaxrs/jackson-jaxrs-json-provi
    der/2.8.1/jackson-jaxrs-json-provider-2.8.1.jar

6.4 Glassfish - java.lang.NoSuchMethodError

If you are using the REST-API to access the MDM entities (CREATE und UPDATE) and
encounter the following error:

```
java.lang.NoSuchMethodError:
com.fasterxml.jackson.databind.deser.std.UntypedObjectDeserializer
.<init>
```

replace the jackson libraries as mentioned in 7.2.3.

6.5 Glassfish - WEB9102: Login failed: Lookup failed

If you cannot login to the webclient and the glassfish log shows the following error:

```
WEB9102: Web Login Failed:
com.sun.enterprise.security.auth.login.common.LoginException:
Login failed: Lookup failed for
```

```
'java:global/org.eclipse.mdm.nucleus/ConnectorService!org.eclipse.
mdm.connector.boundary.ConnectorService' in
SerialContext[myEnv={java.naming.factory.initial=com.sun.enterpris
e.naming.impl.SerialInitContextFactory,
java.naming.factory.state=com.sun.corba.ee.impl.presentation.rmi.J
NDIStateFactoryImpl,
java.naming.factory.url.pkgs=com.sun.enterprise.naming}|#]
```

check that the war file was deployed with the Application Name "org.eclipse.mdm.nucleus"

7 Troubleshooting

Look into the Logfiles:

- Glassfish:
  `$glassfish_root/domains/domain1/logs/server.log`
- Derby DB for User Preference Service:
  `$glassfish_root/databases/derby.log`
- Postgres DB Logfiles (if used)
- The Logfiles of your ODS compatible datasource