

# Installation Guide for the openMDM5(R) web application

## Eclipse mdmbl project

### Document history:

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

<https://docs.google.com/document/d/13QfiZh7rQBkslrWW2GR7Kd6Ylp2mnnoRSmFr8AFABsg/edit?usp=sharing>

# 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.mdmb1>
- The openMDM Working group mailing list:  
<https://dev.eclipse.org/mailman/listinfo/open-measured-data-wg>
- JIRA:  
<https://openmdm.atlassian.net/secure/BrowseProjects.jspx?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/mdmb1-dev>

Report a bug via:

<https://bugs.eclipse.org/bugs/buglist.cgi?quicksearch=mdmb1>

To build the application from the code base, please follow this documentation:

[https://wiki.eclipse.org/images/e/e0/GettingStarted\\_mdmb1.pdf](https://wiki.eclipse.org/images/e/e0/GettingStarted_mdmb1.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 leaves the application model in a broken state.

## 2 Prerequisites

In your infrastructure you need to have installed:

- Java 8:
  - Oracle Java SE 8u201 and higher  
<http://www.oracle.com/technetwork/java/javase/downloads/>
  - AdoptJDK: openJDK 8 with HotSpot  
<https://adoptopenjdk.net/>
- Glassfish Application Server
  - Glassfish 5.1.0 - Full Platform:  
<https://projects.eclipse.org/projects/ee4j.glassfish/downloads>
  - Glassfish 4.1.2 - Full Platform : <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](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 been 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 Postgresql
- -> 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\\_mdmb1.pdf](https://wiki.eclipse.org/images/e/e0/GettingStarted_mdmb1.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](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)

```

<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 Property lookups for parameters values in service.xml

The service.xml contains all information necessary for the Connector-Service to connect to the available datasources/adapters instances. Since this information includes secret information like passwords, it is possible to provide lookups, which gives you the possibility to specify tokens as references to properties defined elsewhere.

There are different lookups available:

- \* sys: Looks up variables defined as system properties
- \* env: Looks up variables defined as environment variables

Example:

```
<param name="password">${env:odsPassword}</param>
```

## 4.5 Configure system properties

- use system property "org.eclipse.mdm.api.odsadapter.filetransfer.interfaceName" to set a specific network interface name to be used
- use system property "org.eclipse.mdm.configPath" to redefine the location of the Glassfish config folder, e.g. "GLASSFISH\_ROOT/glassfish/domains/domain1/config"

## 4.6 I18N configuration of the web frontend

I18N support for web frontend, languages available: English, German.

**For adding a new language see:**

org.eclipse.mdm.nucleus/org.eclipse.mdm.application/src/main/webapp/README\_I18N.md

**Files with translations:**

org.eclipse.mdm.nucleus/org.eclipse.mdm.application/src/main/webapp/src/assets/i18n/\*.json

## 4.7 Deployment of org.eclipse.mdm.nucleus

Deploy the backend ( org.eclipse.mdm.nucleus-VERSION.war) on your Glassfish server  
For Glassfish 5.1 use the command line (see [6.6 Glassfish 5 - Archive Path is NULL](#)).

### 4.7.1 Deployment in GlassFish Server Administration Console

- Open admin console at <http://localhost:4848/>
- Select “Deploy an Application”
- Select “Choose file” under “Packaged File to Be Uploaded to the Server” und select the war file
- Adapt the “Context Root” and the “Application Name” to “org.eclipse.mdm.nucleus”
- Click “OK”
- Afterwards, goto <http://localhost:8080/org.eclipse.mdm.nucleus> and Login with sa/sa

### 4.7.2 Deployment through command line

The command line utility `asadmin` is available under `GLASSFISH_HOME/glassfish/bin/asadmin`.

To deploy the war file through command line execute the following command (replacing `PATH-TO-WAR` and `VERSION`)

```
asadmin deploy --force=true --name org.eclipse.mdm.nucleus  
PATH-TO-WAR/org.eclipse.mdm.nucleus-VERSION.war
```

## 4.8 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

## 4.9 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>

## 4.10 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](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
<a href="https://www.highqsoft.com/download/ao_base.htm#AoFile">https://www.highqsoft.com/download/ao_base.htm#AoFile</a>	 page_white_stack
<a href="https://www.highqsoft.com/download/ao_base.htm#AoEnvironment">https://www.highqsoft.com/download/ao_base.htm#AoEnvironment</a>	 database
folder	 folder
<a href="https://www.highqsoft.com/download/ao_base.htm#AoMeasurementQuantity">https://www.highqsoft.com/download/ao_base.htm#AoMeasurementQuantity</a>	 chart_curve_go
<a href="https://www.highqsoft.com/download/ao_base.htm#AoMeasurement">https://www.highqsoft.com/download/ao_base.htm#AoMeasurement</a>	 chart_curve
<a href="https://www.highqsoft.com/download/ao_base.htm#AoParameter">https://www.highqsoft.com/download/ao_base.htm#AoParameter</a>	 shape_square
<a href="https://www.highqsoft.com/download/ao_base.htm#AoParameterSet">https://www.highqsoft.com/download/ao_base.htm#AoParameterSet</a>	 shape_move_forwards
project	 house
structure level	 paste_plain
<a href="https://www.highqsoft.com/download/ao_base.htm#AoSubmatrix">https://www.highqsoft.com/download/ao_base.htm#AoSubmatrix</a>	 calendar
<a href="https://www.highqsoft.com/download/ao_base.htm#AoTestEquipmentPart">https://www.highqsoft.com/download/ao_base.htm#AoTestEquipmentPart</a>	 monitor
<a href="https://www.highqsoft.com/download/ao_base.htm#AoTestEquipment">https://www.highqsoft.com/download/ao_base.htm#AoTestEquipment</a>	 computer
<a href="https://www.highqsoft.com/download/ao_base.htm#AoTest">https://www.highqsoft.com/download/ao_base.htm#AoTest</a>	 brick_add
<a href="https://www.highqsoft.com/download/ao_base.htm#AoTestSequencePart">https://www.highqsoft.com/download/ao_base.htm#AoTestSequencePart</a>	 shape_move_front
<a href="https://www.highqsoft.com/download/ao_base.htm#AoTestSequence">https://www.highqsoft.com/download/ao_base.htm#AoTestSequence</a>	 page_white_stack
test step	 brick
<a href="https://www.highqsoft.com/download/ao_base.htm#AoUnitUnderTestPart">https://www.highqsoft.com/download/ao_base.htm#AoUnitUnderTestPart</a>	 cog
<a href="https://www.highqsoft.com/download/ao_base.htm#AoUnitUnderTest">https://www.highqsoft.com/download/ao_base.htm#AoUnitUnderTest</a>	 cog_go

t		
---	--	--

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 4 - `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](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 4 - 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/jackson-core-2.8.1.jar>
- <http://central.maven.org/maven2/com/fasterxml/jackson/core/jackson-databind/2.8.1/jackson-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-provider/2.8.1/jackson-jaxrs-json-provider-2.8.1.jar>

## 6.4 Glassfish 4 - 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”

## 6.6 Glassfish 5 - Archive Path is NULL

If deploying the war file with the Glassfish Administration Console in Glassfish 5, an exception occurs: "Archive Path is NULL". This is a known [issue](#). Until it is fix in Glassfish, the war file can be deployed by [command line](#).

## 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