iOpenMPDM 2.0 / Mural 2.0

Creating a Master Person Index Application

iOpenMPDM 2.0/Mural 2.0 Hand-On Tutorial Series

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Date: March 07, 2012

Creating a Master Person Index Application

1. Overview

The goal of a master person index application is to consolidate disparate sources into a centralized master person index database and produce a single version of the truth for master person information. This tutorial is designed to guide you to creating and running a master person index application using iOpen MPDM platform. There are two distinct perspectives that include the design environment and runtime environment as illustrated in Figure 1.

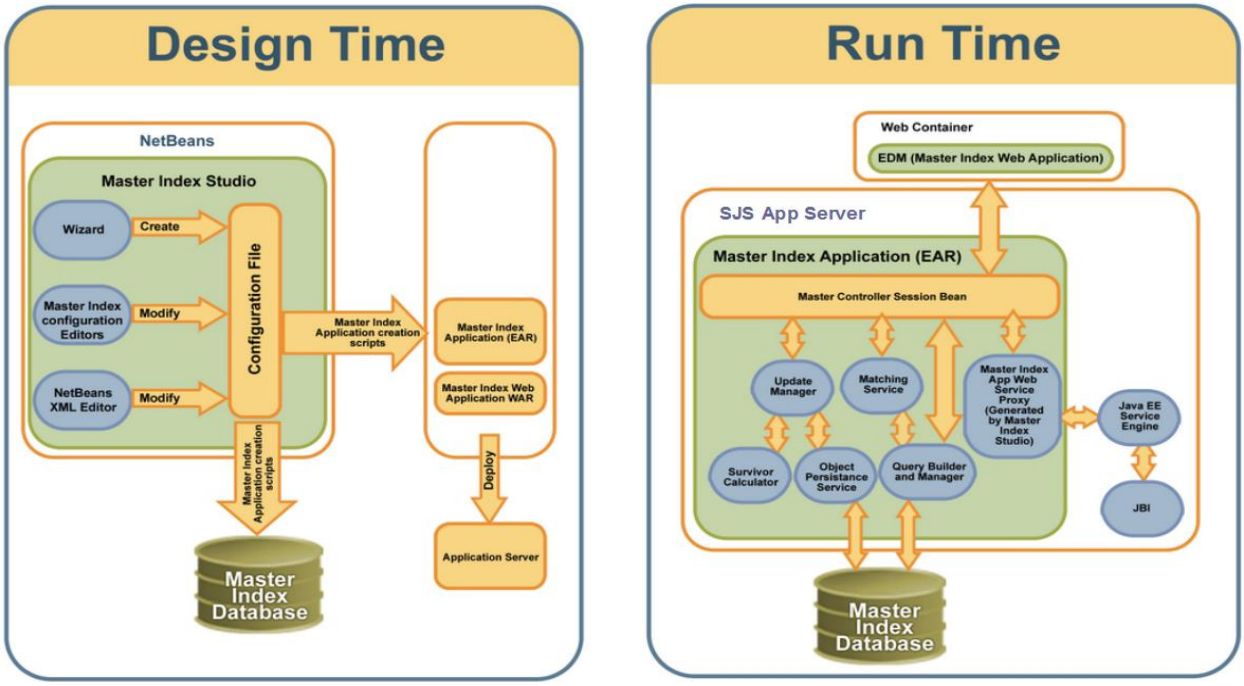


Figure 1 Design and Runtime Environments

The design environment is used for creating and configuring the master person index application. The runtime environment is used for deploying and running the master person index application. The tutorial describes building and testing procedures for a basic master person index application.

1. Install Mural 2.0 MDM NetBeans Plug-in
2. Create Master Person Index Project
3. Configure Matching Engine
4. Configure Standardization Engine
5. Define Search Block
6. Specify Filters

7. Build Master Person Index Application

8. Configure and Create Master Person Index Database
9. Configure Application Server
10. Deploy Master Person Index Application
11. Launch Web-based Master Index Data Manager (MIDM)
12. Test the Master Person Index Application

1.1 Required Components

For a complete set of supported components, please refer to http://java.net/projects/mosaic.

To exercise this tutorial, the following components are required:

1. Windows XP or Windows 7
   Running on the following system environment:
   RAM: 2 GB or above
   FREE DISK: 8 GB or above
   CPU: 1.5 GHZ +
2. NetBeans 7.0.1
   You can download it from http://netbeans.org/downloads
3. GlassFish 3.1.1
   You can download it from http://glassfish.java.net/public/downloadsindex.html
4. JDK 6 Update 29 or above (32 bit or 64bit)
   You can download it from http://www.oracle.com/technetwork/java/javase/downloads
5. MySQL Server 5.1 or above
   You can download it from http://dev.mysql.com/downloads/mysql
6. MySQL Connector/J 5.1.12 and over
   You can download it from http://dev.mysql.com/downloads/connector/j
7. Mozilla Firefox 2.0 or above
   You can download it from http://www.mozilla.org
8. Mural 2.0 MDM NetBeans Plug-in Module
   You can download it from http://java.net/projects/mosaic/downloads

1.2 Prerequisites

You have to successfully install the required components on your computer before you are ready for exercising this tutorial:

1. NetBeans 7.0.1
2. GlassFish 3.0.1
3. JDK 6 Update 29 or above (32 bit or 64bit)

4. MySQL Server 5.1 or above
5. Mozilla Firefox 2.0 or above

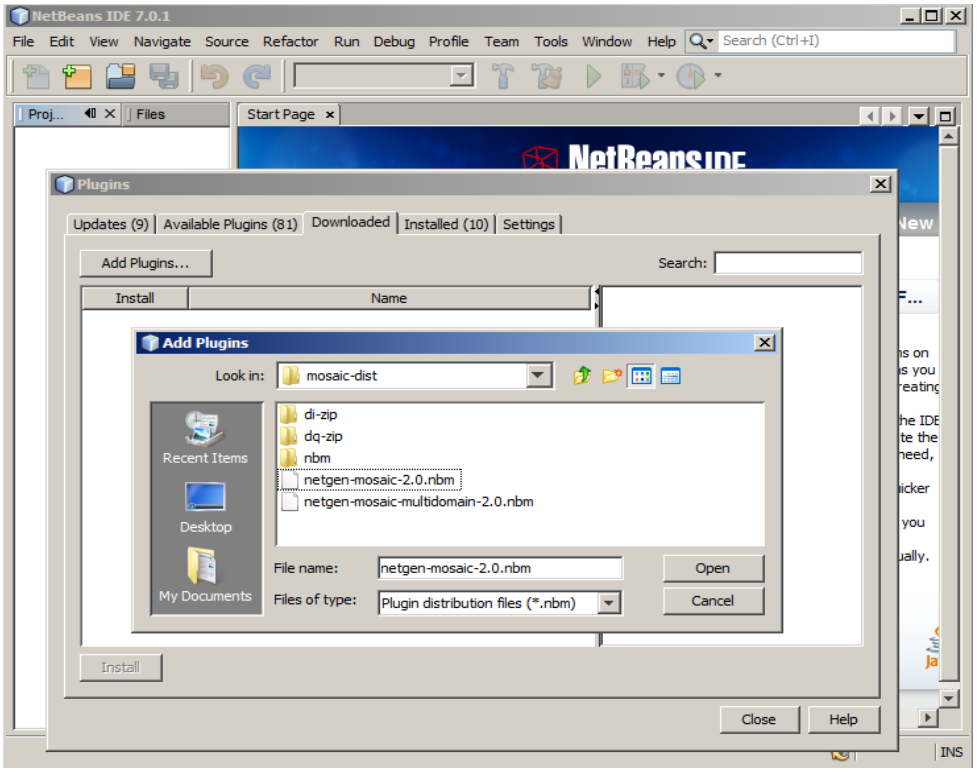
1.3 References

Mural 2.0 MDM Open Source Community
http://java.net/projects/mosaic

2. Install Mural 2.0 MDM NetBeans Plug-in

At this step you already have Mural 2.0 MDM NetBeans Plug-in mural-2.0.nbm file. Next is to install Mural 2.0 MDM NetBeans Plug-in module in the NetBeans 7.0.1 IDE. The following steps show how it is done. If a version of Mural 2.0 MDM NetBeans Plug-in already exists, it must be uninstalled by following the NetBeans instructions.

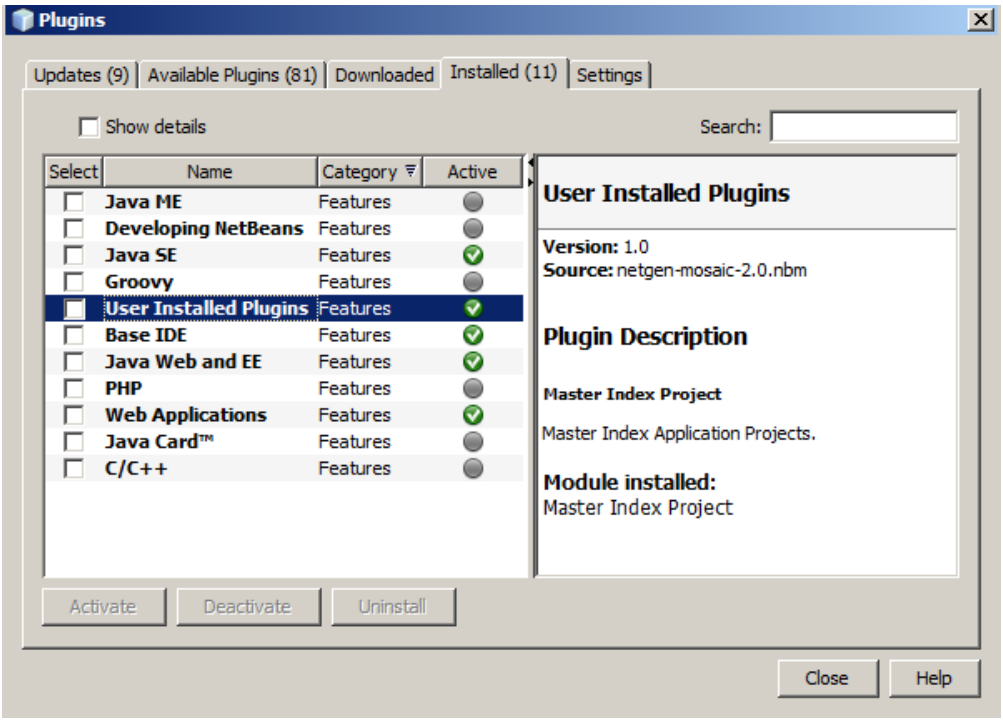
1. Start NetBeans 7.0.1.
2. Choose **Tools** on the menu bar, then choose **Plugins** menu option.
3. Choose **Downloaded** on the **Plugins** menu bar, then choose "**Add Plugins …**" button.
4. Navigate to the directory where you downloaded mural-2.0.nbm file, then click **OK** button.



5. Click **Install** button, then click **Next** button on the pop-up window.

6. Accept the license agreement, then click **Install** button to install the Plug-in.
7. Click **Finish** button once the installation is completed.
8. Close **Plugins** window.

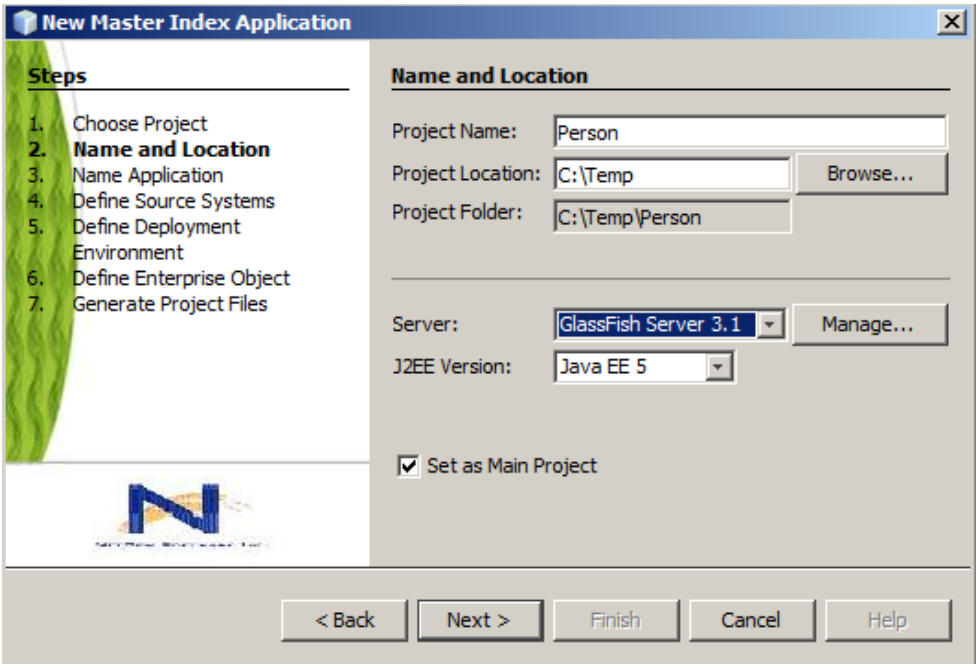
Now Mural 2.0 MDM NetBeans Plug-in shall be visible in Plugins dialog window. You are ready to start building a master person index application.



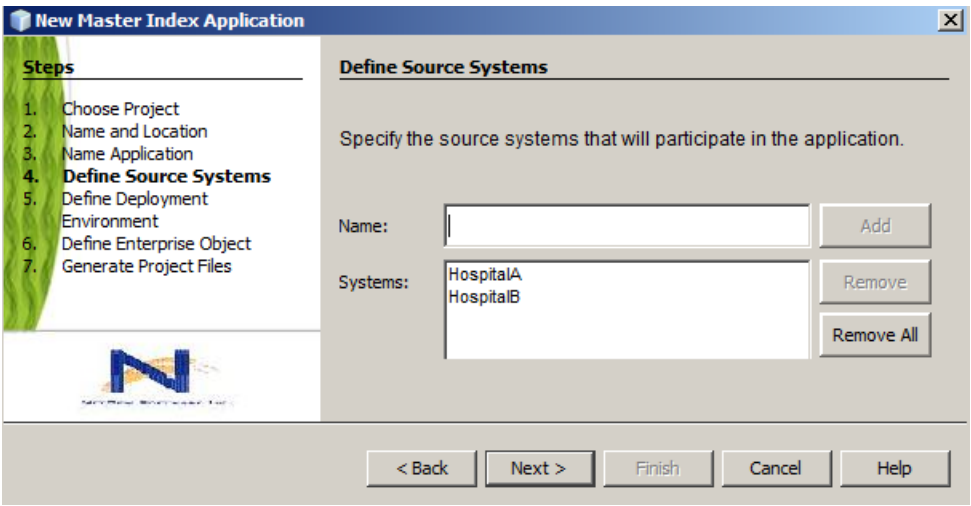
3. Create Master Person Index Project

The following steps will create a new generic-purpose Person master person index application.

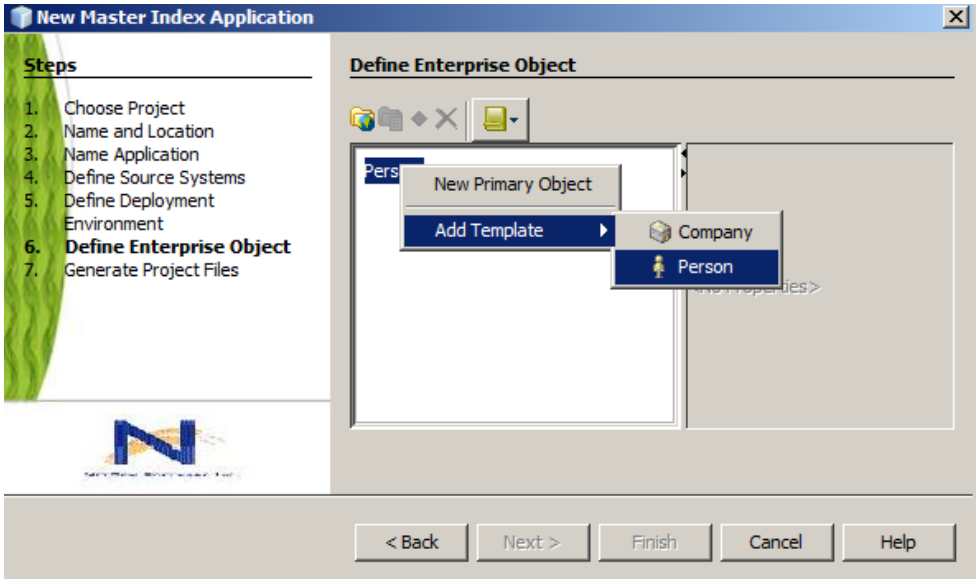
1. Start NetBeans 7.0.1 with Mural 2.0 MDM NetBeans Plug-in installed.
2. On the menu bar choose **File > New Project > MDM > Master Index Application,** click **Next** button.
3. Create a new project with the name of Person, choose **Server** type to GlassFish 3.1, and **J2EE Version** to Java EE 5. If GlassFish Server 3.1 is not listed in the pull-down menu, click **Manage..** button to add in GlassFish Server 3.1 following NetBeans instructions.



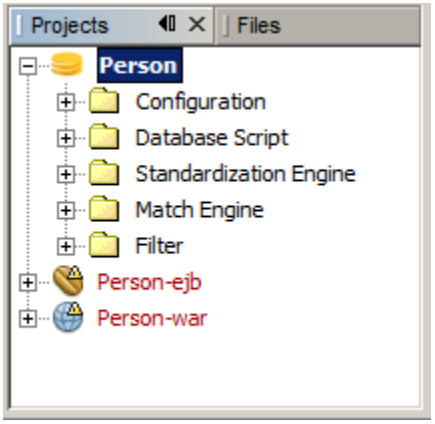
4. Click Next Button; Name Application as Person; Click Next button.
5. Specify HospitalA and HospitalB source systems that participate in the application; Click Next button.



6. Choose MySQL **Database** type; and keep the rest by default; then click **Next** Button.
7. Next step to create data object model using enterprise object definition wizard. Right click on Person; expand **Add Template** menu; chose **Person template**. You can expand Person object hierarchy to review the attributes and child objects of the Person template object model.



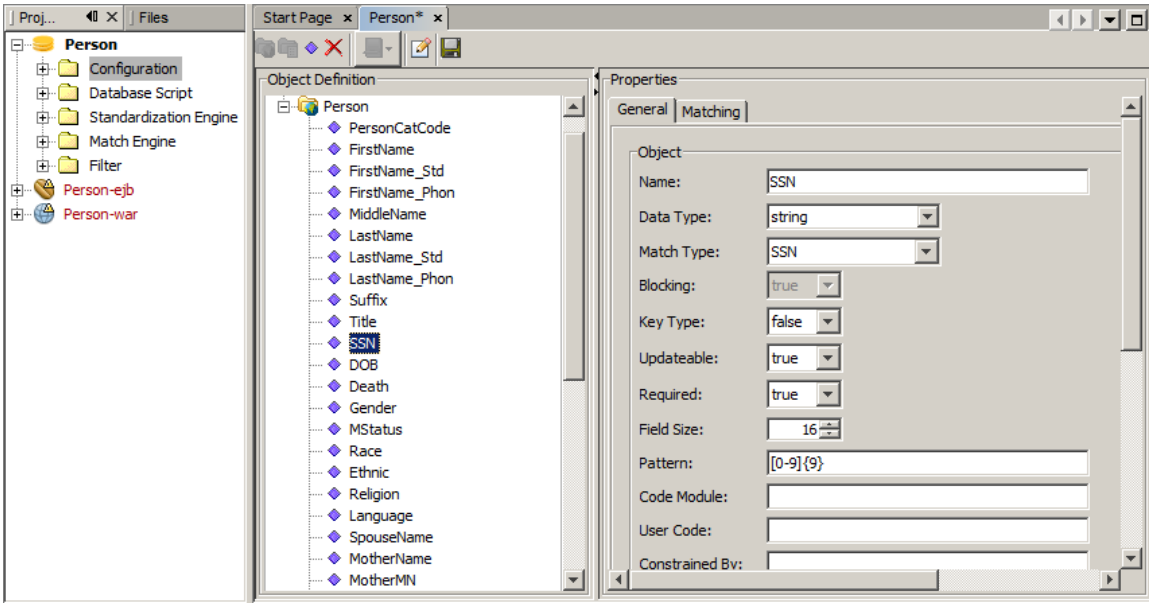
8. Click **Next** button and check "**Generate the remaining Master Index application files now**"; then click **Finish** button. The project wizard automatically generates all the project artifacts.
9. Now in the Projects panel Person Java EE enterprise application is generated, it contains lots of configuration files in different folders, an EJB module and a web module.



4. Configure Matching Engine

The Mural 2.0 match engine is highly configurable. You need to determine what Person attributes be used for matching records. In this tutorial, we use First Name, Last Name, SSN, DOB and Gender for Person record match.

1. In the Projects panel, right click on **Configuration** and select **Edit** to have Person object model detail.
2. Click on **SSN** in the **Person** object definition tree and set its **Match Type** property to **SSN**.

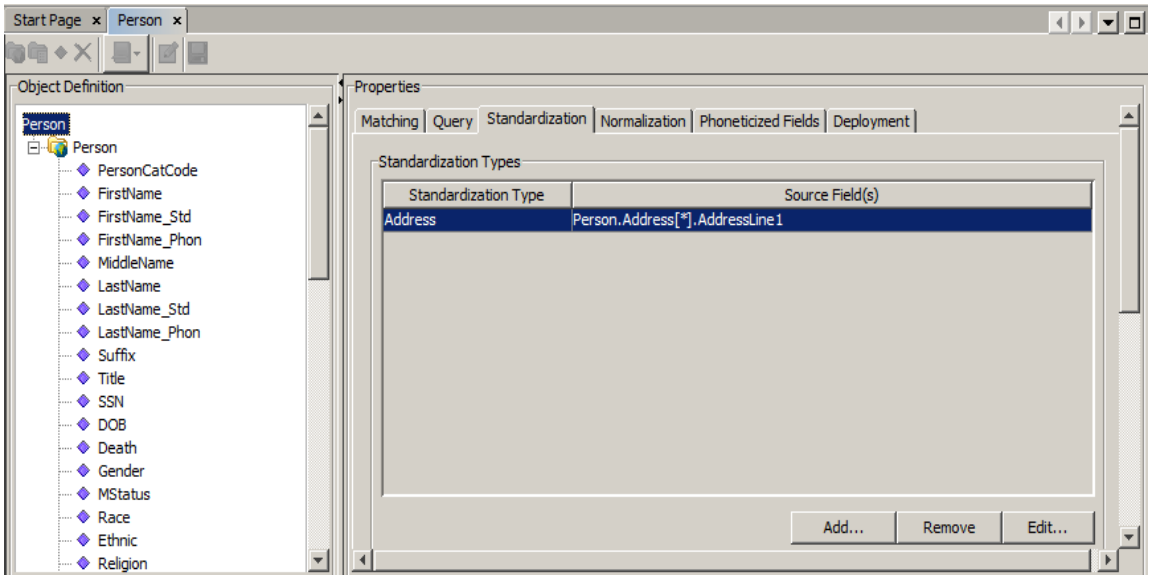


3. Select **DOB** and set its **Match Type** property to **DOB**.
4. Select **Gender** and set its **Match Type** property to **Gender**.
5. Expand **Address** child object and select **AddressLine1_StDir**; then set its **Match Type** property to **None**.
6. Expand **Address** child object and select **AddressLine1_StName**; then set its **Match Type** property to **None**.
7. Expand **Address** child object and select **AddressLine1_HouseNo**; then set its **Match Type** property to **None**.
8. Expand **Address** child object and select **AddressLine1_StType**; then set its **Match Type** property to **None**.
9. Save your changes.

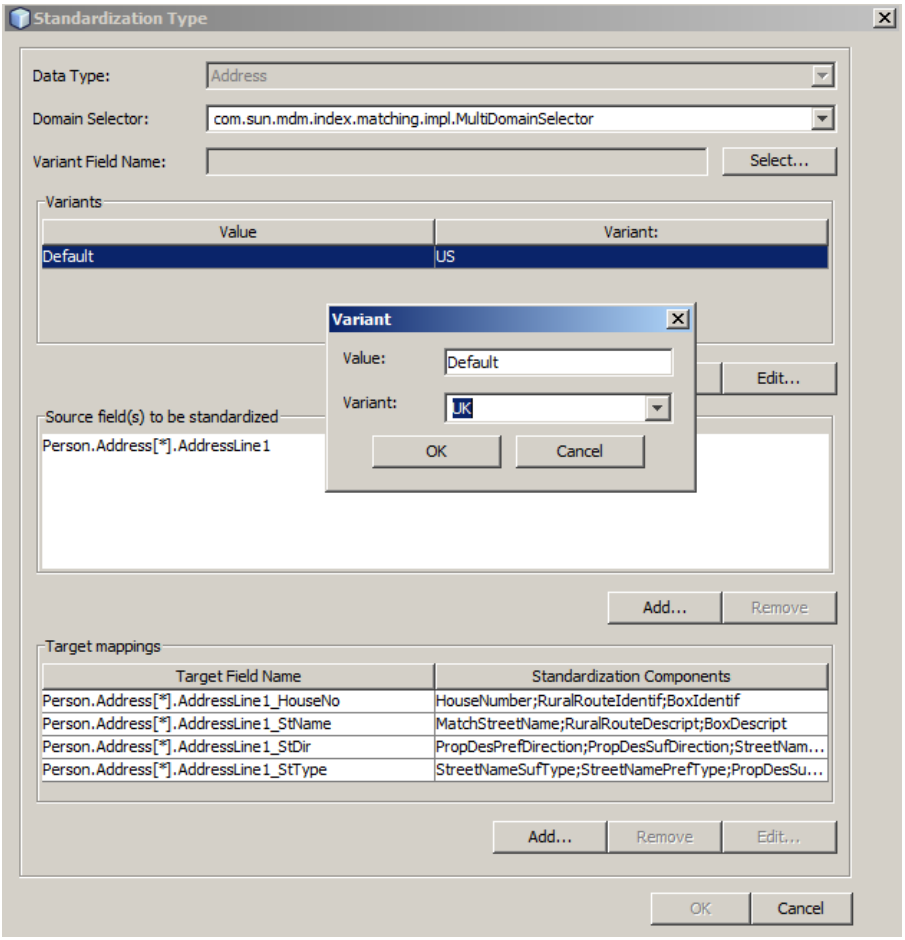
5. Configure Standardization Engine

The Mural 2.0 standardization engine is highly configurable to parse, normalize and phonetically encode attributes for improving matching accuracy and efficiency. The engine supports different languages and variants. The next step is to specify UK address variant to standardize Person addresses.

1. In the Projects panel, right click on **Configuration** and select **Edit** to have Person object model detail if the Person object model detail view is not displayed.
2. Click on the top **Person** node in the Object Definition tree and find the **Standardization** tab on the right panel.
3. Click on **Address** in Standardization Type panel and select **Edit** button to configure Address standardization parameters.



4. In the Standardization Type window, click on Default on Variants panel, then click on Edit button, choose UK variant.

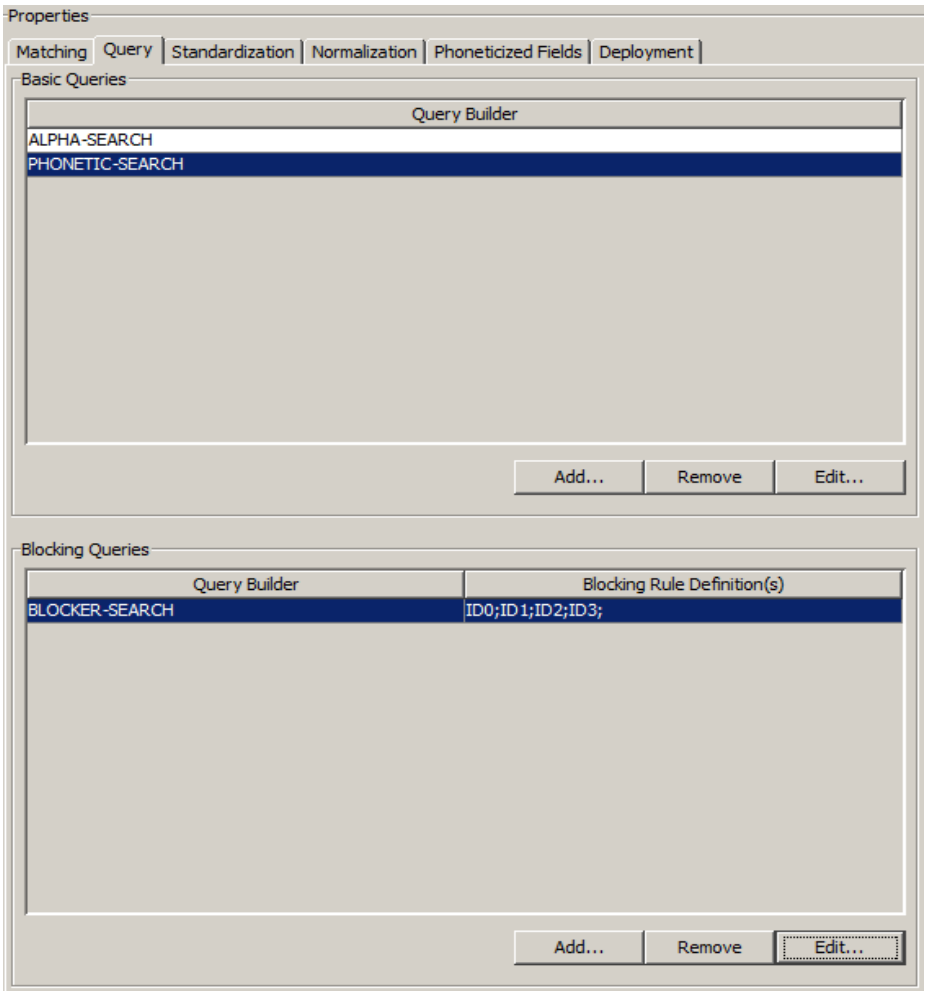


5. Click OK button and save your changes.

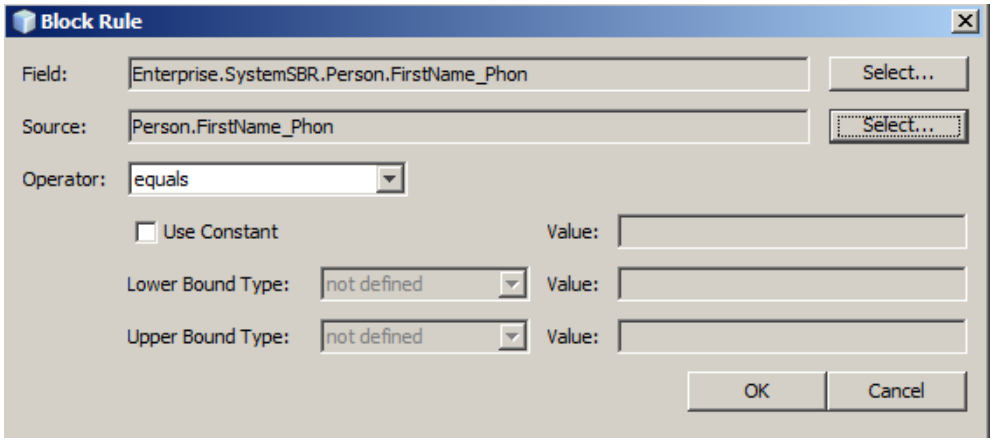
6. Define Search Block

Blocking procedure defines query criteria that retrieve a small set of possible candidates for matching an incoming record. In this tutorial, we define a new block combing with first name, DOB and gender.

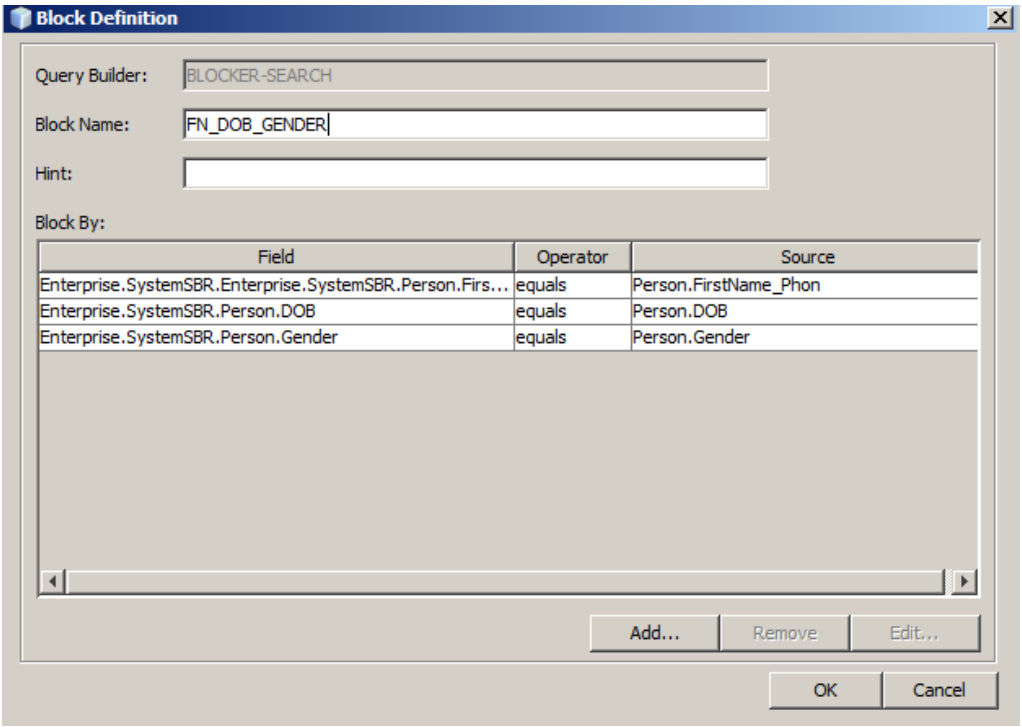
1. In the Projects panel, right click on **Configuration** and select **Edit** to have Person object model detail.
2. Click on the top **Person** node in the Object Definition tree and find the **Query** tab on the right panel.
3. In the **Query** tab, scroll down to find the **Blocking Queries** panel. Click on the **BLOCKER-SEARCH** row and then click on **Edit** button.



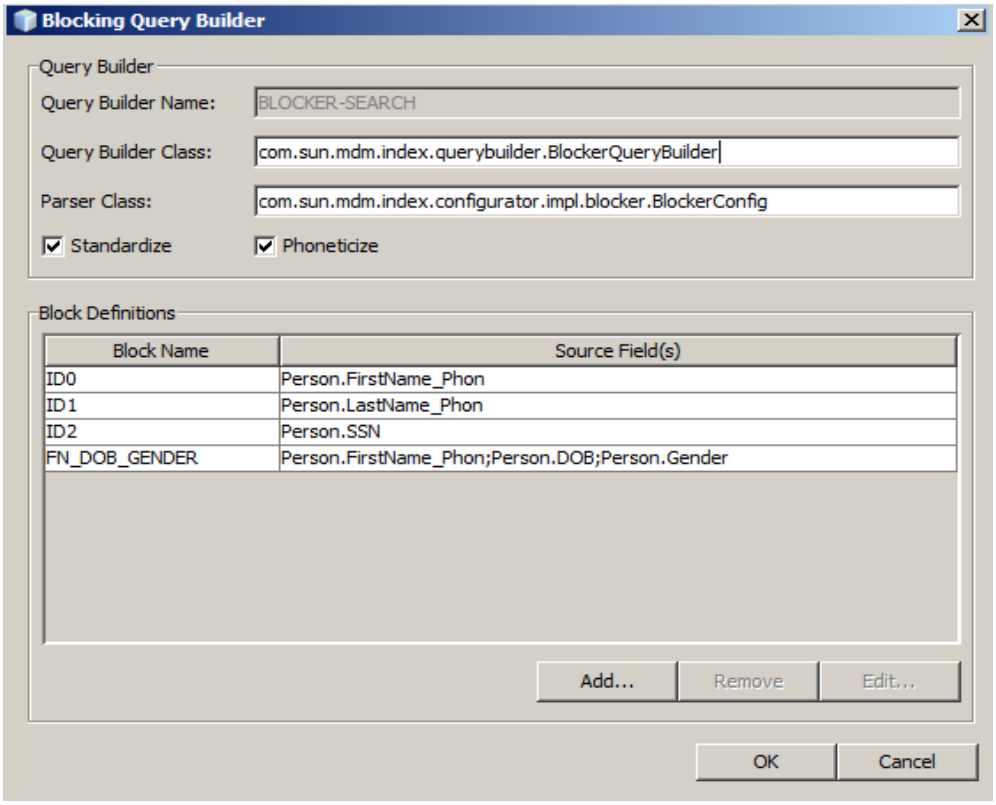
4. In the **Blocking Query Builder** window, choose ID3 row, click **Remove** button to Address block.
5. In the **Blocking Query Builder** window, click **Add** button to add a new block definition.
6. In the Block Definition window, enter FN_DOB_GENDER for **Block Name** and select **Add** to define block rules for FN_DOB_GENDER block.
7. In the Block Rule pop-up window, click the **Select** button for Field to choose the FirstName_Phon field in the Person object model; click the **Select** button for Source select FirstName_Phon field in the Person object model.



8. In the **Block Definition** window, click **Add button** to repeat step 7 to add DOB and Gender for FN_DOB_GENDER block. Then click **OK** button to complete FN_DOB_GENDER block definition.



9. Click **OK** button on the **Block definition** window to complete BLOCKER-SEARCH definition. You have 4 blocks: ID0, ID1, ID2 and FN_DOB_GENDER.



10. Click **OK** button to finish Query Builder definition.

7. Specify Filters

The filter is used for excluding unwanted values during processing. The incoming records often contain default values when the actual values are unknown. For an example, “999-99-9999” or “000-00-000” is used for a social security number. “Baby” or “Girl” is used for the name of a newborn. In this tutorial, we specify a filter that ignores records with SSN value of 999999999.

1. In the Projects panel, expand Filter folder under Person project tree.
2. Double click on filter.xml to open the filter configuration file in the right side XML editor.
3. Edit the highlighted below to exclude Person.SSN value 999999999.

```
filter.xml
1  <?xml version="1.0" encoding="UTF-8"?>
2  <filter  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3           xsi:noNamespaceSchemaLocation="schema/filter.xsd">
4
5      <exclusion-List  module-name="ExclusionFilter"
6                       parser-class="com.sun.mdm.index.filter.ExclusionFilterCofig">
7
8          <!-- Default list of value for all  sbr ,matching & blockings -->
9          <field  sbr="true" matching="true" blocking="true" >
10             <!-- Field for exclusion -->
11             <name>Person.SSN</name>
12             <value>
13                 <!-- Value to be excluded -->
14                 <field-value>999999999</field-value>
15             </value>
16         </field>
17
18         <!-- Sample if using a file to define filter values -->
19         <field sbr="true" matching="true" blocking="false">
20             <!-- Field for exclusion -->
21             <name></name>
22             <value>
23                 <file delimiter="|">
24                     <!-- File name containing list of excluded values -->
25                     <file-name></file-name>
26                 </file>
27             </value>
28         </field>
29
30     </exclusion-List>
31 </filter>
```

4. Save your changes. And close filter.xml.

8. Build Master Person Index Application

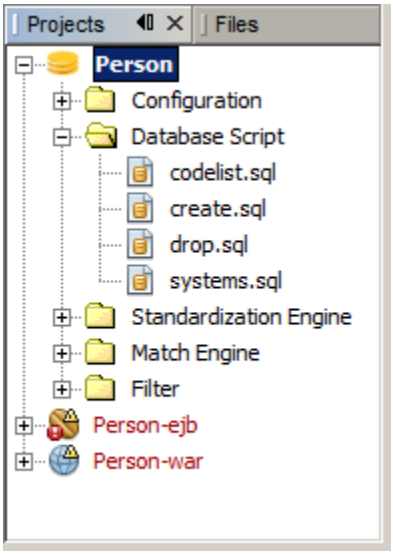
At this step we completed configuring master person index application. Now we are ready to generate the Person Java EE enterprise application archive file (EAR file) that can be deployed to the application server.

1. Save all your changes.
2. Right click on **Person** node under Person project tree; Choose **Build** in the pop-down menu.
3. Person.ear will be automatically created under the **dist** folder of Person project directory. If build is successful, you shall see a message like BUILD SUCCESSFUL (total time: 1 minute 45 seconds) in the Output window.

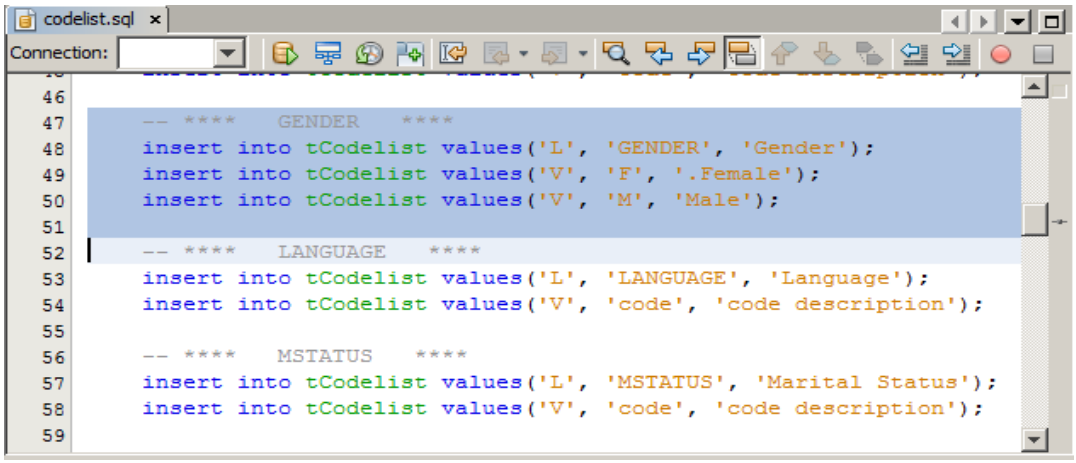
9. Configure and Create Master Person Index Database

The Mural 2.0 project wizard automatically creates a collection of database scripts when the Person master index application is built. In this tutorial, we will edit the database scripts before running these scripts.

1. In the Project panel, expand Person project and Database script folder. It shows a list of database scripts.



2. Double click on codelist.sql to open it in the text editor on the right panel.
3. Edit the GENDER section, add "F" and "M" entries for GENDER.



4. Edit the ADDRTYPE section, add “BIZ” and “HOME” entries for ADDRTYPE.

```
33          descr varchar(50) not null);
34
35      -- ****   ADDRTYPE   ****
36      insert into tCodelist values('L', 'ADDRTYPE', 'Address Type');
37      insert into tCodelist values('V', 'BIZ', 'Business Address');
38      insert into tCodelist values('V', 'HOME', 'Home Address');
39
40      -- ****   CITIZEN   ****
41      insert into tCodelist values('L', 'CITIZEN', 'Citizenship');
42      insert into tCodelist values('V', 'code', 'code description');
43
44      -- ****   ETHNIC   ****
45      insert into tCodelist values('L', 'ETHNIC', 'Ethnic');
```

5. Save all your changes and close codelist.sql window.
6. Ensure that your MySQL server installed and runs as a service.
7. Start a Command windows, change the current directory to the DatabaseScript folder of the Person project; then run mysql command as root user.

```
C:\Temp\Person\src\DatabaseScript>mysql -h localhost -u root -p
Enter password: ************
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 5.1.31-community MySQL Community Server (GPL)

Type 'help;' or '\h' for help. Type '\c' to clear the buffer.

mysql>
```

8. Create a new database user person with password person by typing the command:
   mysql>create user ‘person’ identified by ‘person’;
9. Grant all the privileges to the new user person by typing the command:
   mysql>grant all privileges on *.* to person;
10. Create a new database person by typing the command:
    mysql>create database person;
11. Quit and restart mysql command as person user; then switch to person database by typing the command:
    mysql>use person;

```
Command Prompt - mysql -h localhost -u person -p

C:\Temp\Person\src\DatabaseScript>mysql -h localhost -u person -p
Enter password: ******
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 13
Server version: 5.1.31-community MySQL Community Server (GPL)

Type 'help;' or '\h' for help. Type '\c' to clear the buffer.

mysql> use person;
Database changed
mysql> _
```

12. Run database scripts by typing the command:
    mysql>source create.sql;
    mysql>source systems.sql;
    mysql>source codelist.sql;
13. You can use any SQL console to connect to MySQL person database to review the master person index tables. We suggest you to choose Oracle SQL Developer or MySQL Administrator. The following picture lists all tables of the person schema by MySQL Administrator:

Schema Tables | Schema Indices | Views | Stored procedures

person
All tables of the person schema

Table Name	Engine	R...	Data length	Index length	Update time
sbyn_address	InnoDB	0	16 kB	16 kB	
sbyn_addresssbr	InnoDB	0	16 kB	16 kB	
sbyn_alias	InnoDB	0	16 kB	16 kB	
sbyn_aliassbr	InnoDB	0	16 kB	16 kB	
sbyn_appl	InnoDB	1	16 kB	16 kB	
sbyn_assumedmatch	InnoDB	0	16 kB	32 kB	
sbyn_audit	InnoDB	0	16 kB	32 kB	
sbyn_common_detail	InnoDB	14	16 kB	16 kB	
sbyn_common_header	InnoDB	12	16 kB	32 kB	
sbyn_enterprise	InnoDB	0	16 kB	16 kB	
sbyn_merge	InnoDB	0	16 kB	48 kB	
sbyn_overwrite	InnoDB	0	16 kB	0 B	
sbyn_person	InnoDB	0	16 kB	16 kB	
sbyn_personsbr	InnoDB	0	16 kB	16 kB	
sbyn_phone	InnoDB	0	16 kB	16 kB	
sbyn_phonesbr	InnoDB	0	16 kB	16 kB	
sbyn_potentialduplicates	InnoDB	0	16 kB	48 kB	
sbyn_seq_table	InnoDB	17	16 kB	16 kB	
sbyn_systemobject	InnoDB	0	16 kB	0 B	
sbyn_systems	InnoDB	2	16 kB	0 B	
sbyn_systemsbr	InnoDB	0	16 kB	0 B	
sbyn_transaction	InnoDB	0	16 kB	80 kB	
sbyn_user_code	InnoDB	0	16 kB	0 B	

Num. of Tables: 23 | Rows: 46 | Data Len: 368 kB | Index Len: 464 kB

Details >> | Create Table | Edit Table | Maintenance | Refresh

Now the master person index database is ready to be used by the master person index application.

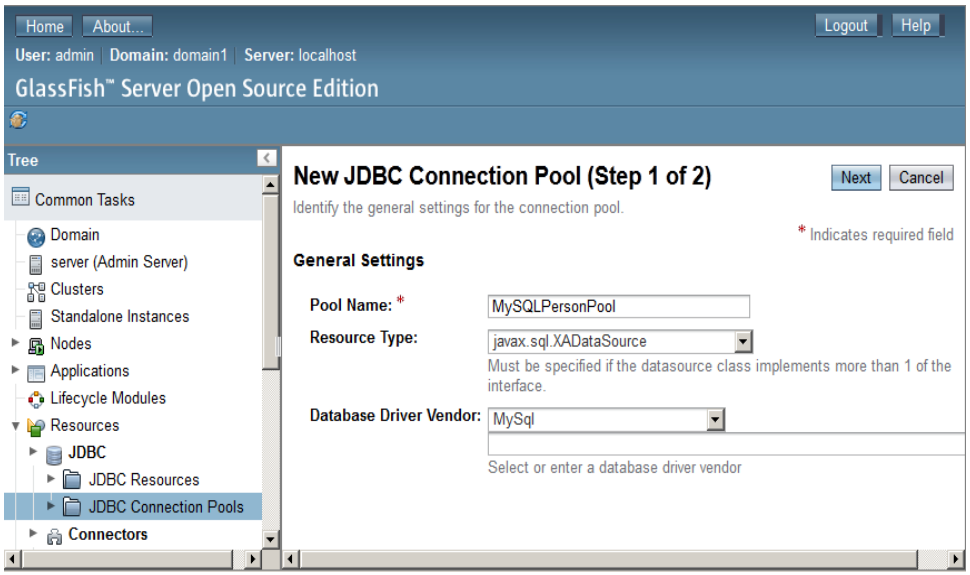
10. Configure Application Server

The application server needs to be configured before the master person index application is deployed. The configurations include:

- Install database driver
- Create connection pool
- Create JDBS resources
- Create JMS resource
- Setup user

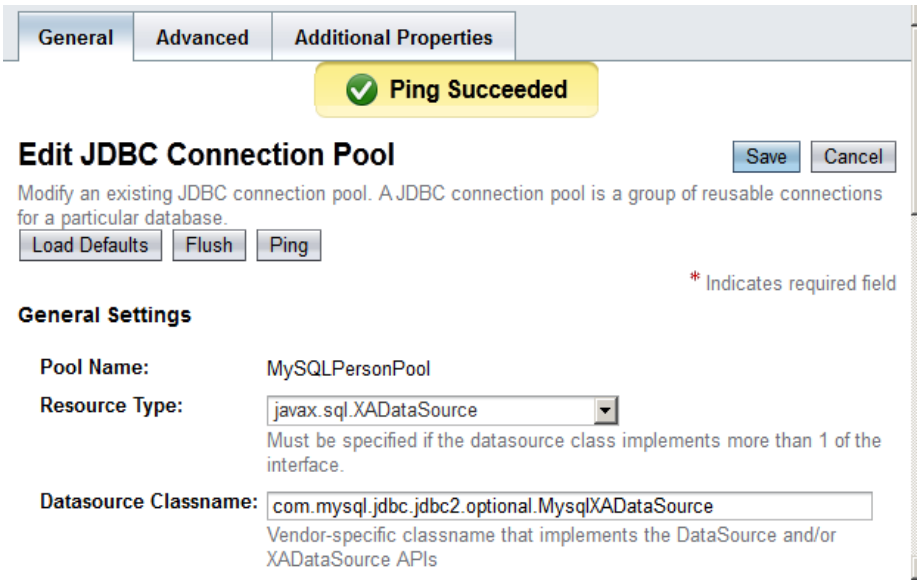
In this tutorial, we use GlassFish 3.0.1 and MySQL 5.1.

1. Copy mysql-connector-java-5.1.12-bin.jar under glassfish/lib/endorsed folder.
2. Start GlasssFish 3.1.1 application server by the command:
3. glassfish\bin\asadmin start-domain
4. Launch GlassFish Administration console using the URL: http://localhost:4848
5. Login with User Name admin and Password adminadmin
6. In the left-side panel, expand **Resources > JDBC > JDBC Connection Pools** and click **New** to create a new connection pool. Enter MySQLPersonPool for Pool Name; for Resource Type, choose javax.sql.XADataSource and for Database Vendor, select MySQL; click **Next** to continue the wizard.

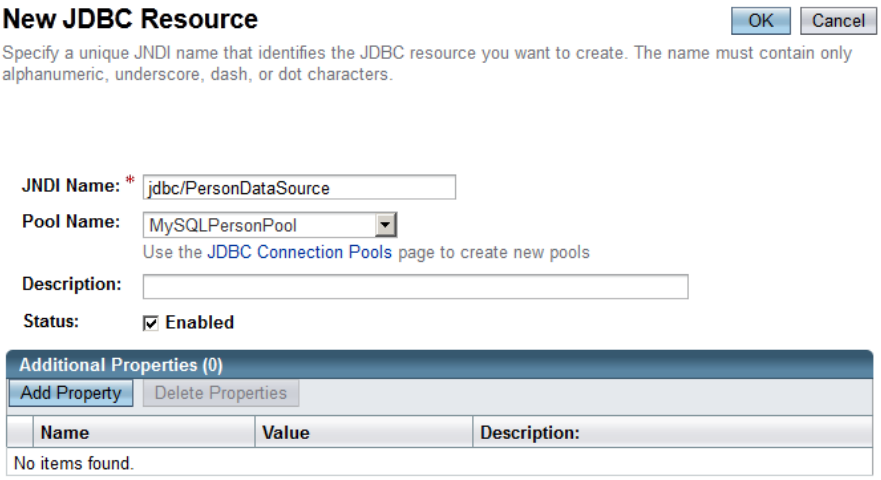


7. In Additional Properties section, configure the following MySQLPersonPool properties
    - User: person
    - Password: person
    - URL: jdbc:mysql://localhost:3306/person

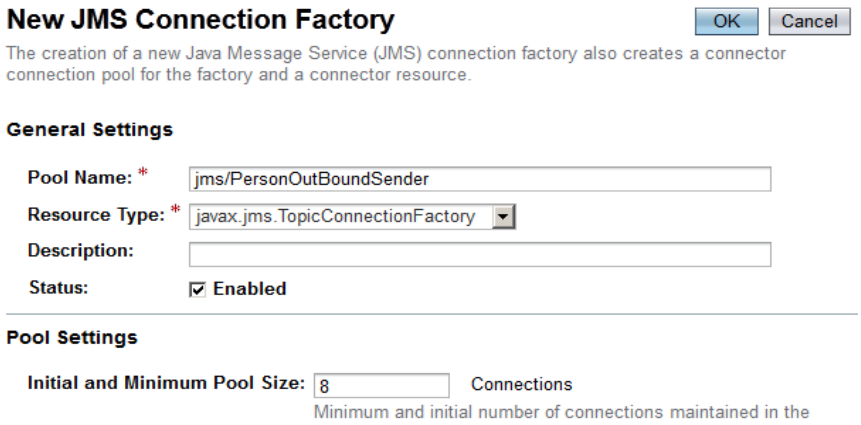
8. Leave the rest of properties default values. Click Finish button. Now MySQLPeronPool is created and listed in the Pools.
9. Click Ping button in MySQLPersonPool page, test the connection between your GlassFish and your MySQL database.



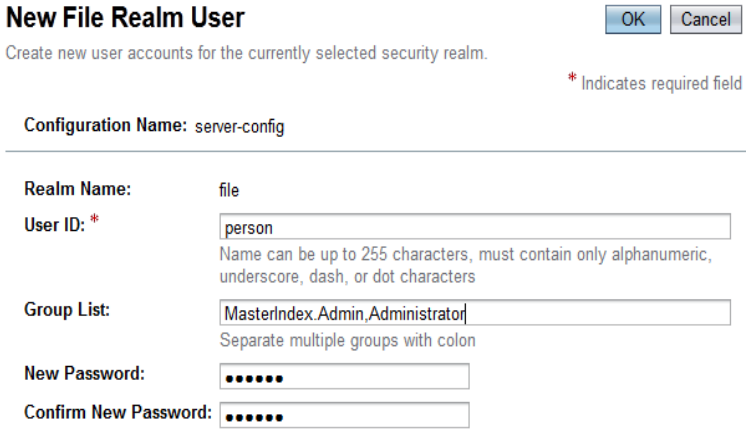
10. Now you need to create three JDBC resources. In the left-side panel, expand **Resources > JDBC > JDBC Resources** and click **New** to create a new JDBC resource. Specify jdbc/PersonDataSource for JNDI Name; Select MySQLPersonPool for Pool Name; Click OK button to complete. Repeat step 10 to create jdbc/PersonSequenceDataSource and jdbc/PersonReportDataSource.



11. In the left-side panel, expand **Resources > JMS Resources > Connection Factories** and click **New** to create a new JMS resource. Specify jms/PersonOutBoundSender for Pool Name; Select javax.jms.TopicConnectionFactory for Resource Type; Click OK button to complete.



12. Now we need to setup security user. In the left-side panel, expand **Configurations > server-config > Security > Realms > file** and click New to add a new security user. Enter person for User ID; enter MasterIndex.Admin,Administrator for Group List; enter person for New Password; then click OK button for completion.

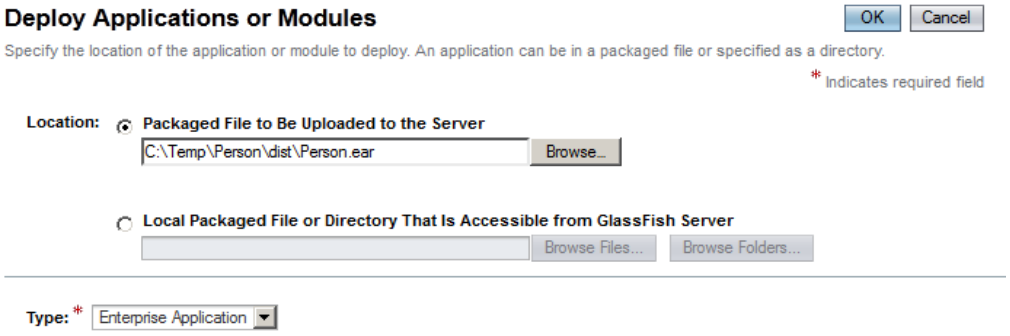


Now the GlassFish is ready for the deployment of the master person index application.

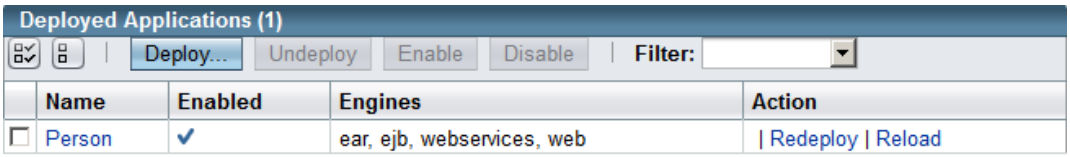
11. Deploy Master Person Index Application

In section 8, you already generated the master person index application enterprise archive file Person.ear. Now you can deploy it to the GlassFish application server.

1. In the left-side panel, Select **Applications**; click **Deploy** button to deploy the application. Click **Browse** button to locate Person.ear; click **OK** button.



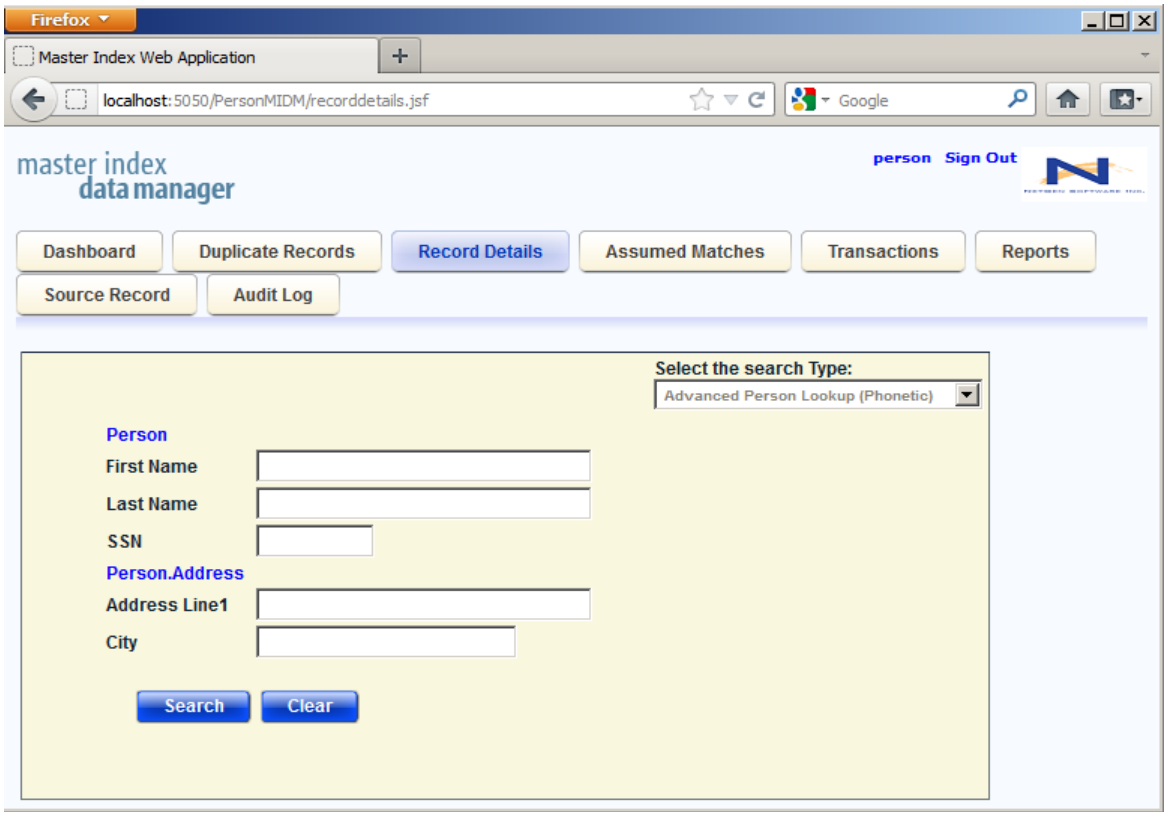
2. If deployed successfully, you will see the Person application listed.



12. Launch the Master Index Data Manager (MIDM)

The master index data manager is web-based console for managing master index information. To access it,

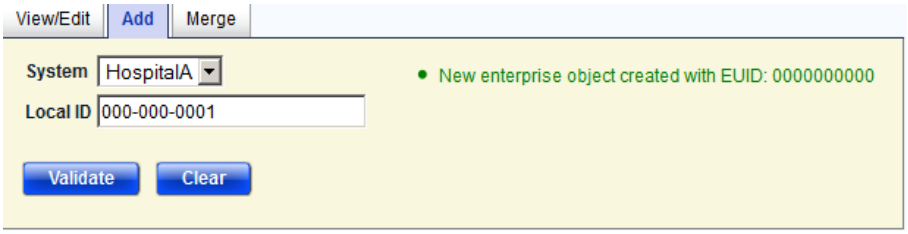
1. Start Mozilla Firefox, enter the URL http://localhost:8080/PersonMIDM
2. Login with User Name person and Password person. The Person MIDM landing page is like:



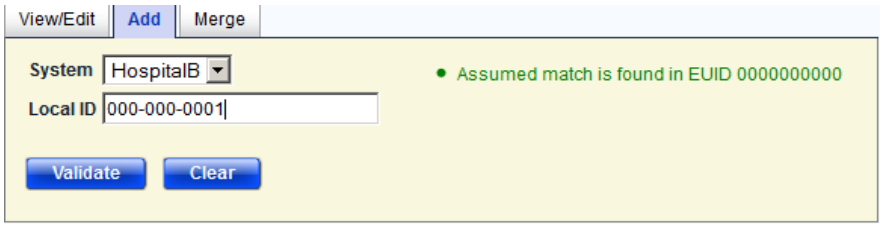
13. Test the Master Person Index Application

For testing, we enter three test records using Person MIDM web console.

1. Click **Source Record** tab; select Add tab to enter record.
2. Select HospitalA for **System**; Enter 000-000-0001 for **Local ID**; Click **Validate** button.
3. In the record entry form, enter
   First Name: John
   Last Name: Green
   SSN: 111223333
   DOB: 01/01/1960
   Gender: Male
4. Scroll to the bottom of the page and click **Submit** button. You will see the following message like

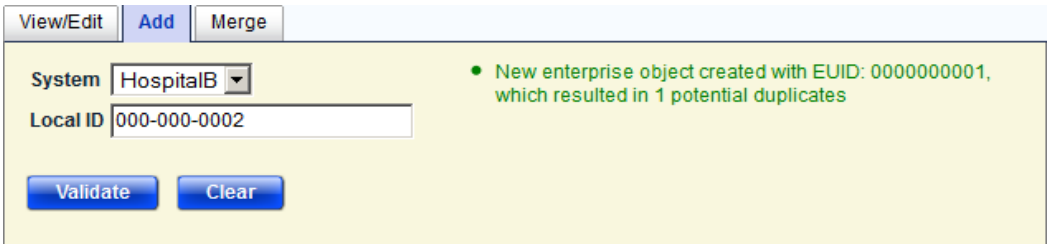


5. Enter another record. Select HospitalB for **System**; Enter 000-000-0001 for **Local ID**; Click **Validate** button.
6. In the record entry form, enter
   First Name: Johnny (use nickname rather than John)
   Last Name: Grene (different spelling)
   SSN: 111232333 (transposition of two digits)
   DOB: 01/10/1960 (transposition of two digits)
   Gender: Male
7. Scroll to the bottom of the page and click **Submit** button. You will see the following message like



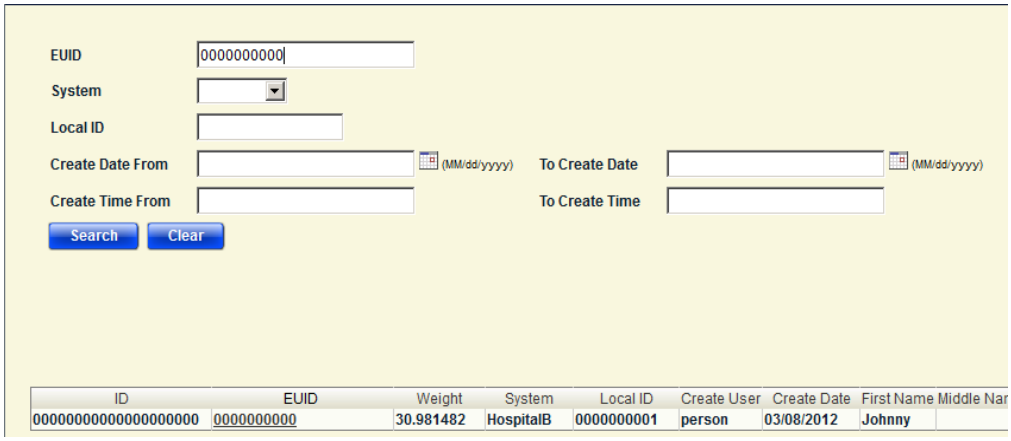
Based on matching configuration, the system determined that these two records are matched for the same person.

8. Enter another record. Select HospitalB for **System**; Enter 000-000-0002 for **Local ID**; Click **Validate** button.
9. In the record entry form, enter
   First Name: Johnny (use nickname rather than John)
   Last Name: Greene (different spelling)
   SSN: 1112233555 (different from previous ones)
   DOB: 01/12/1960 (different from previous ones)
   Gender: Male
10. Scroll to the bottom of the page and click **Submit** button. You will see the following message like



The system determines that this is a potential duplicate from previous two records you entered.

11. Click **Assumed Matches** tab and enter 000000000 for EUID to display the matches.



12. Click on EUID 0000000000 to show detail of the matches.

Assumed Matches Details Back

Person Details	Main EUID	HospitalB	Add 03/08/2012	Update 03/08/2012
EUID	0000000000	0000000001	0000000000	0000000000
Status	Active	Active	Active	Active
Person Cat Code				
First Name	Johnny	Johnny	John	Johnny
Middle Name				
Last Name	Grene	Grene	Green	Grene
Suffix				
Title				
SSN	111-23-2333	111-23-2333	111-22-3333	111-23-2333
Date of Birth	01/10/1960	01/10/1960	01/01/1960	01/10/1960
Death				
Gender	Male	Male	Male	Male