Unimatch

User Guide

Version 3.1

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softbool

Contents

Terminology

Match	Input records that the matching flow could match automatically.
Candidate	Input records that the matching flow could not match automatically but perhaps can be matched manually.
No-match	Input records that the matching flow could not match.
Resolve	Manually select a candidate record as a match.
Flow	Boolware flow
Job profile	Configuration of a match job to be run

Introduction

Welcome

Unimatch is an easy-to-use software for matching and data cleaning. Unimatch depends on the search engine Boolware from Softbool AB and its flexible flow technology for the actual matching process.

Key Features

- Rich, interactive, web-based user interface
- All matching rules are encoded in Boolware xml flows for a powerful and flexible matching process
- Different flows can be used for different inputs
- Different profiles can be defined for different users and/or inputs
- Unicode support, international data in multiple languages can be matched
- Matching jobs can be started automatically (scheduled) or manually
- Candidate handling - supports interactive review through visual inspection of exception files that contain the data that could not be matched automatically
- Supports a wide range of input formats, flat files, tab-, comma and semicolon-delimited files, Excel files as well as databases
- Provide matching statistics so you easy can get a grip of the data quality
- Matching history – all match jobs are stored until they are removed manually
- Billing data – define your counters and receive billing data e-mail
- Multithreaded - all match jobs can run concurrently
- Post step plugins – write your own custom post step plugin
- Runs on all platforms that supports Java version 1.7 or greater and a web server with support for Java servlet API 3.0

System Requirements

Hardware
- RAM: minimum 8 GB, recommended 12 GB or more

Software
- Server JRE (Java SE Runtime Environment) - version 1.7 or later. The server JRE is targeted for server environments with monitoring tools.
- A Servlet container that supports the Java Servlet specification 3.0, preferably Apache Tomcat 7.
- A Boolware server, version 2.8.0.64 or later.
- Web Browser, Internet Explorer 10 or later, Chrome 30 or later and Firefox 30 or later.

Technical support

Our technical support is free during local office time and can be accessed by e-mail or phone.
E-mail: support@softbool.com
Phone: +46 (0)8 519 775 00

Installation

Linux environment requirements

Running Unimatch on Linux requires some environment variables to be set. The locale variables must be set to either "sv_SE.UTF-8" or "en_US.UTF-8" to be able to use national characters with Unimatch application. These settings will be checked upon Unimatch startup and will not let any user log in with incorrect settings.

Setting up a Servlet Container

Before you start to install Unimatch, you need an installation of Java and a servlet container. If you already have these components installed, you may skip this section.

There are many different Servlet containers, for example Apache/Tomcat, BEA Weblogic, IBM Websphere, JBoss, Resin, Jetty, and Orion. If you do not have experience with these containers, we recommend you use Apache Tomcat.

Apache Tomcat is one of the most widely used Java web servers and has been successfully tested with Unimatch. Apache Tomcat is an Open Source Servlet and JSP container that is licensed under the Apache Software License (http://www.apache.org/licenses/) and can be used free of charge.

Setting up Java
Any Java Runtime Environment (JRE) that supports Java Version 1.7 (or later) can be used. For Windows or Linux, these are available from the Sun Java site at http://www.java.com/en/download/manual.jsp. The Sun Java site provides detailed installation instructions for the different platforms. These are all relatively simple; typically, you download and execute an installer.

Setting up Tomcat
Before installing Tomcat, you should first make sure you have set up a Java Runtime Environment (JRE) on your machine; this was described in the previous section.

A convenient way to install Tomcat is to download the self-installing executable. You should launch the installer and follow the instructions it provides. If you choose not to use the self-installing executable, then unpack the binary distribution into a convenient location. Other versions of Tomcat are available from the Apache web site, http://tomcat.apache.org/

Tomcat security and access
Since Unimatch runs under Tomcat, it is the user that *starts* Tomcat that Unimatch runs as. Therefore it is very important that this user has sufficient privileges on the folders that Unimatch is setup to use and that Unimatch can access when browsing files or folders via the GUI. This means that if you want to access folders on another machine, the user that runs Tomcat/Unimatch must have sufficient privileges on the other machine and the folders and that the folders are mapped/mounted on the Unimatch server.

Performance tuning

If Unimatch should handle large input files and/or many concurrent users Tomcat must be tuned to use more memory. Default Tomcat installations usually have a maximum memory size of 256MB which doesn't allow many concurrent users or large input files.

To set the amount of memory that Tomcat can use when you run in the Windows environment you can either use the "Apache Tomcat" tray application and go to the "Java" tab and set the "Maximum memory pool" to a higher value.
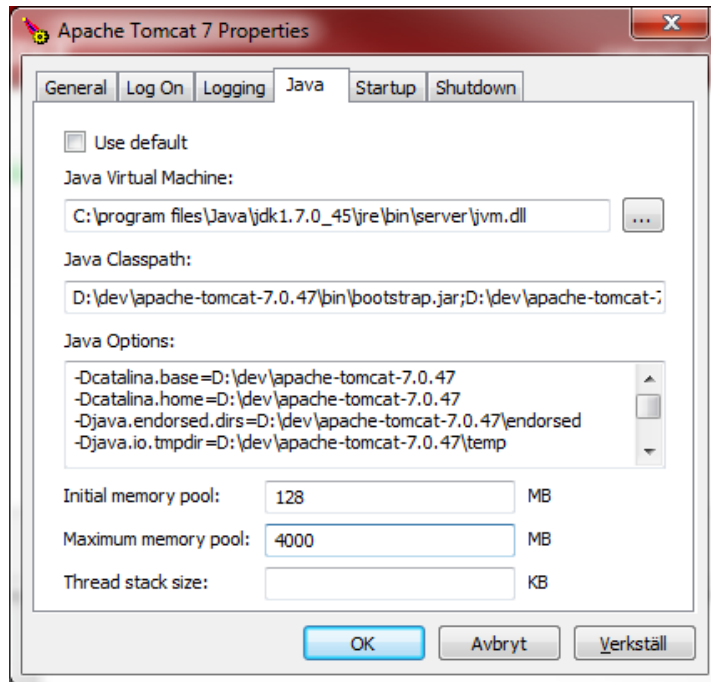
In Linux, you have to enter the following in the "catalina.sh" file located in the "<tomcat-install directory>/bin/":

export CATALINA_OPTS=-Xmx<number of MB to use>m

e.g.
export CATALINA_OPTS=-Xmx1024m

Running Unimatch using HTTPS

To run Unimatch using HTTPS you have to configure the servlet container to use HTTPS. No further configuration is required in Unimatch. The default installation of the Apache Tomcat servlet container will use HTTP and below is a description on how to enable HTTPS:

1) Preparation

    Make sure that Apache Tomcat is stopped.

    Use the *keytool* command which comes with Java JDK or Java JRE to create and import Certificates.

Open a command shell and type the following commands:

Windows
For JDK:
```
> set JAVA_HOME=<JAVA INSTALLATION DIRECTORY>
> set PATH=%JAVA_HOME%\bin;%PATH%
```

For JRE:
```
> set JAVA_HOME=<JRE INSTALLATION DIRECTORY>
> set PATH=%JAVA_HOME%\bin;%PATH%
```

Linux
For JDK:
```
$ export JAVA_HOME=<JDK INSTALLATION DIRECTORY>
$ export PATH=$JAVA_HOME/bin:$PATH
```

For JRE:
```
$ export JRE_HOME=<JRE INSTALLATION DIRECTORY>
$ export PATH=$JRE_HOME/bin:$PATH
```

Now you can test it by running:
```
keytool
```

If you can see the keytool command's help text then we can proceed, otherwise please check all paths and re-try.

2) Create a local Certificate Signing Request

In order to obtain a Certificate from the Certificate Authority of your choice you have to create a so called Certificate Signing Request (CSR). That CSR will be used by the Certificate Authority to create a Certificate that will identify your website as "secure". To create a CSR follow these steps:

* Create a new keystore (local Certificate)
```
keytool -genkey -alias tomcat -keyalg RSA \
        -keystore <your_keystore_filename>
```

Windows: If you are specifying a path to the keystore you must use forward-slashes, not backward slashes.
Enter a keystore-password and company information (will be shown when a user views information about the certificate) and when prompted for the key password for <tomcat>, you just press RETURN.

* Create the CSR
```
keytool -certreq -keyalg RSA -alias tomcat -file certreq.csr \
        -keystore <your_keystore_filename>
```

Enter the keystore password. Now there should be a *certreq.csr* file that you can submit to the Certificate Authority and in return you will get a Certificate that you can import into your local keystore.

3) Importing the Certificate

First of all you have to import a Chain Certificate/Root Certificate into the local keystore. Download a Chain/Root Certificate from the Certificate Authority you obtained the Certificate from.

* Import the Chain/Root Certificate into your local keystore
```
keytool -import -alias root -keystore <your_keystore_filename> \
        -trustcacerts -file <filename_of_the_chain_certificate>
```

Enter the keystore password and accept the Chain/Root certificate.

* Import your Certificate
```
keytool -import -alias tomcat -keystore <your_keystore_filename> \
        -file <your_certificate_filename>
```

4) Configuring Tomcat

Open up the "server.xml" file in the "conf" folder in your tomcat installation. Find the "<Connector>"-tag. The default tomcat connector should look like this:
```
<Connector executor="tomcatThreadPool"
           port="8080" protocol="HTTP/1.1"
           connectionTimeout="20000"
           redirectPort="8443" />
```

Change it to:

```
<Connector port="8443"
           protocol="org.apache.coyote.http11.Http11Protocol"
           SSLEnabled="true"
           maxThreads="200" scheme="https" secure="true"
           keystoreFile="<your_keystore_filename>"
           keystorePass="<your_keystore_password>"
           clientAuth="false" sslProtocol="TLS" />
```

Now you can start Apache Tomcat and Unimatch will run under HTTPS.

Installing Unimatch

Before you start the installation program, you should create a home/system directory for Unimatch system and data files. This is the directory where Unimatch will create, read and write system configuration files, archive and billing log files, all input files and also all files generated by the matching process.

When installing on Linux you must start the installer as root. During the install process it will ask for the Linux user that should be running Unimatch (starting Tomcat) and will use this user to change ownership of all Unimatch files, including jobs and profiles, before it is finished.

The installation program will start by asking you to stop Tomcat before you continue with installation. The installation wizard will then ask you to point out the location of your Servlet Container, default Apache Tomcat, which in Windows environment will normally be installed at:

C:/Program Files/Apache Software Foundation/Tomcat 7.0

Apache Tomcat will normally be installed on port 8080, so if you have not changed this, the default setting will be fine.

The installation wizard will now ask you to point out your Boolware JAR file. Normally you will find this file at the following location in Windows environment:

C:/Program/Softbool/Client/JavaClient/boolware.jar

Next, you will be asked to point out the home/system directory for Unimatch data files that you created earlier.

The installation program will then ask you to start the Tomcat service.

Tomcat can be started and stopped via the control panel - administrative tools - services - Apache Tomcat service.

To test the Tomcat/Unimatch installation, enter the following in your web browser:

http://localhost:8080/

If the Apache Tomcat page shows up, the installation was successful.

Uninstalling Unimatch

The installation program will automatically create an "uninstall" shortcut in the Start -> Program Groups menu. To uninstall the Unimatch application, just click on this shortcut.

Note: The Uninstall program will only remove the application files and never your data files.

Migrating from Unimatch version 2.5.x to Unimatch version 3.0.x

When updating to the current Unimatch version from an earlier version the profiles, settings and match jobs will automatically be migrated. To be able to use this feature there are some steps that needs to be achieved:
1) Install Java 1.7 and Tomcat 7.
2) Copy the "unimatch" folder from the Tomcat 6 installation (..\<tomcat 6 folder>\webapps\unimatch) and paste it to the Tomcat 7 installation (..\<tomcat 7 folder>\webapps\).
3) Make sure that all Boolware flows that you used in the previous Unimatch version contains the new <flow_input> section, otherwise they will not be usable in the new Unimatch version.
4) Start the Unimatch v3.0.x installation.

When the installation is done and you are starting Tomcat, the startup process may take some extra time due to the migration.

JDBC-drivers for Unimatch

In order to be able to use a JDBC database as the input format for Unimatch you must manually install the necessary JDBC drivers (.jar files), no drivers are included in Unimatch setup. The supported JDBC drivers are:

MySQL   (tested with mysql-connector-java-5.1.30.jar)
PostgreSQL   (tested with postgresql-9.1-901.jdbc4.jar)
Oracle   (tested with ojdbc6-11.2.0.jar)
SQL Server   (tested with sqljdbc4-4.0.jar)
Sybase   (tested with sybase-connector-java-7.0.7)
DB2   (tested with db2jcc4.jar)

The .jar files for the data sources that you want to use should be placed in the "jdbc" folder where the Unimatch application is installed, e.g. "C:/Program Files/Apache Software Foundation/Tomcat 7.0/webapps/unimatch/jdbc". Note that Unimatch must be restarted after you have added JDBC drivers.

Boolware Flows

Unimatch makes a few demands on the design of Boolware flows. The requirements that Unimatch puts on a Boolware flow that should be used from Unimatch are:

- A flow must describe all input variables that the flow can handle. These "flow input variables" will appear in the boolware tree in Unimatch and allow the user to map input file columns to a particular flow input variable.
  Unimatch uses the "type" attribute in the "<parameter>" element in a flow to know how the edit box should look like. Specifying "qlstring" in the "type" attribute will tell Unimatch to use a multiline edit box for editing the flow variable value. Unimatch will also use the "description" attribute as a tooltip when hovering over a flow variable.

  E.g. `<flow_input>`

  ```
      <parameter name="myparam" type="" defaultvalue="" description=""/>
  </flow_input>
  ```

- Flow exit codes must *begin* with one of the following:

  - match
  - nomatch
  - candidates
  - multi_match
  - error
  - warn

  E.g. `<exit type="match.OK"/>`

  The exit codes from the Boolware flow determine how Unimatch will handle the response records. Responses which returns e.g. "match.best" will be stored in the match file, responses which returns e.g. "nomatch.name" will be stored in the no-match file, response which returns "candidates" will be stored in the candidate file and later handled when resolving candidates and finally responses which returns e.g. "multi_match.best" works the same way as "match" but tells Unimatch that more than one record is returned and should be written to the match file. The "error" exit code stops the matching process and sets the error message to the string following the "error" code, e.g. "error.no result found" will stop matching process and set error message to "no result found". The "warn" exit code will treat the boolware response records as no-match but will log the warning message following the "warn" code to the Unimatch log file, e.g. "warn.no result found" will treat the boolware response as no-match and write the message "no result found" to the Unimatch log file.

- The flow must return response records for match and candidates. If the flow returns more than one record for a match, Unimatch will only handle the first record unless it returns "multi_match". Unimatch will also handle the candidate records in the order that the Boolware flow returns them.

For more information about designing Boolware flows, see Boolware Programmers Guide.

When Unimatch creates a boolware flow request it appends a <bwTable> </bwTable>-element in the flow query that the flow can read which contains the boolware table that were chosen in the Unimatch profile, as pure information.

Activation

Unimatch contains product activation technology designed to eliminate unauthorized use of Unimatch, without imposing a burden on legitimate users.

After you install Unimatch you have to activate the software. Until you do, Unimatch will run as a trial. All features are available during the trial period but Unimatch will only match the first 100 records from the input file.
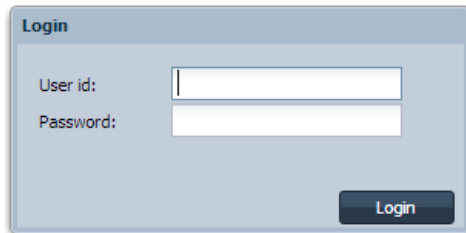
To activate your software, do the following:

1. Click on the question mark () down in the right corner.

2. Select the Activation tab

3. Click on the button "Create license activation mail". You will be prompted to download the activation file and if you have a mail client configured, you will also get a predefined email where you should attach the activation file and mail it to Softbool support.

4. When you receive your licence file from Softbool, save it on your desktop

5. Start a browser and go to the Unimatch application.

6. Click on the green question mark () down in the right corner.

7. Select the Activation tab

8. Click on the button "Activate" and select your licence file that you stored on the desktop.

Unimatch is now activated and you can remove the copy of the licence file from your desktop.

Getting Started
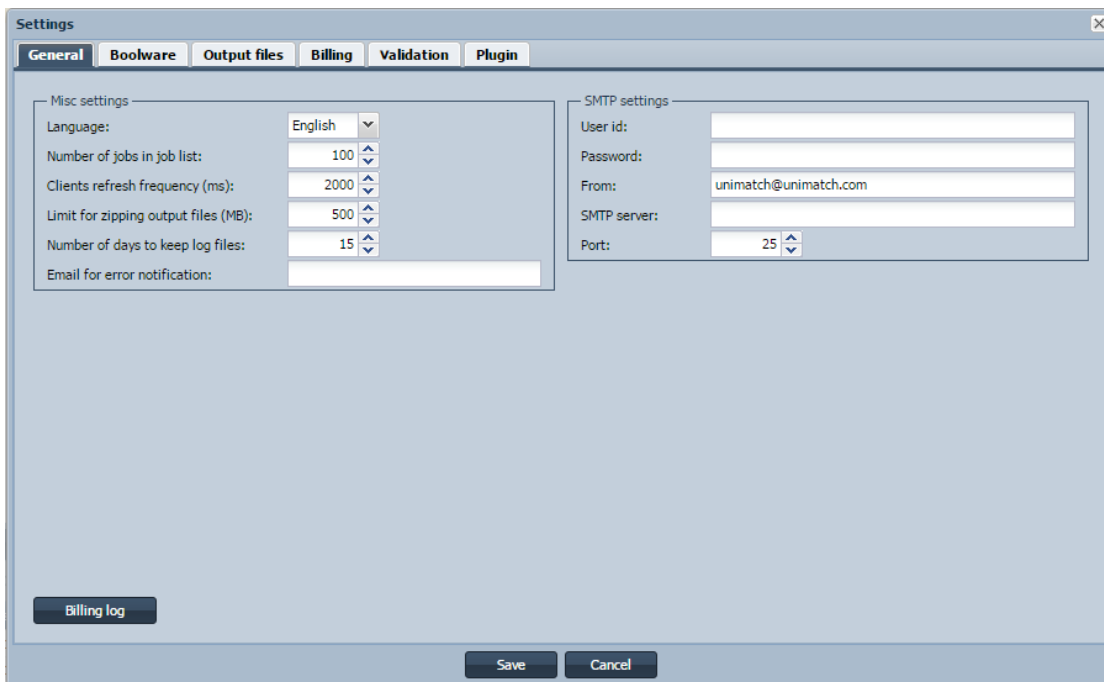
Login

When starting Unimatch you will be prompted for a user id and a password. If it is the first time you start Unimatch there is a default user named "**admin**" with **no password** set. Enter user id and password and press Login button to get access to the Unimatch application. The user id of the logged in user will be displayed in the caption of the browser window.

System settings

By clicking on the settings button (🔧) down in the right corner you bring up the Unimatch settings window (referred later as system settings). Some settings can be overridden on a user or profile level.

On the general tab you can change the following misc. settings:

- Language
  Unimatch application language - will be activated the next time anyone login
- Number of jobs in job list
  how many jobs that should be saved in the match job list for each user (default 100)
- Client refresh frequency
  set the clients refresh interval (default 2 sec.) – new value will be used next time

anyone login. This value specifies how often each client (browser) calls the Unimatch server to obtain changes in the profile tree, the user list and the match job list.

- **Limit for zipping output files**
  set a limit when Unimatch should zip the output files before sending them to the browser or copying them to an output folder (default 500MB)
- **Number of days to keep log files**
  each day the application log file, the job log file and the billing log file will roll over and create new files and here you specify how many days (generations) of log files that you want to keep before the oldest gets deleted
- **Email for error notification**
  enter an email address to receive an email when running a scheduled job and an error occurs

In order to be able to send emails from the Unimatch application you have to fill in the SMTP fields. Here you specify the user name, the password, the "from" address, the SMTP server and the SMTP server port that your mail server uses. Please contact your mail/network administrator to obtain the correct settings.

The button "Billing log" in the bottom-left corner of the "General" tab brings up all billing log files (one for each day and the number of files depends on how many log file generations you have configured) available to choose from and then you can double-click to view a daily log.
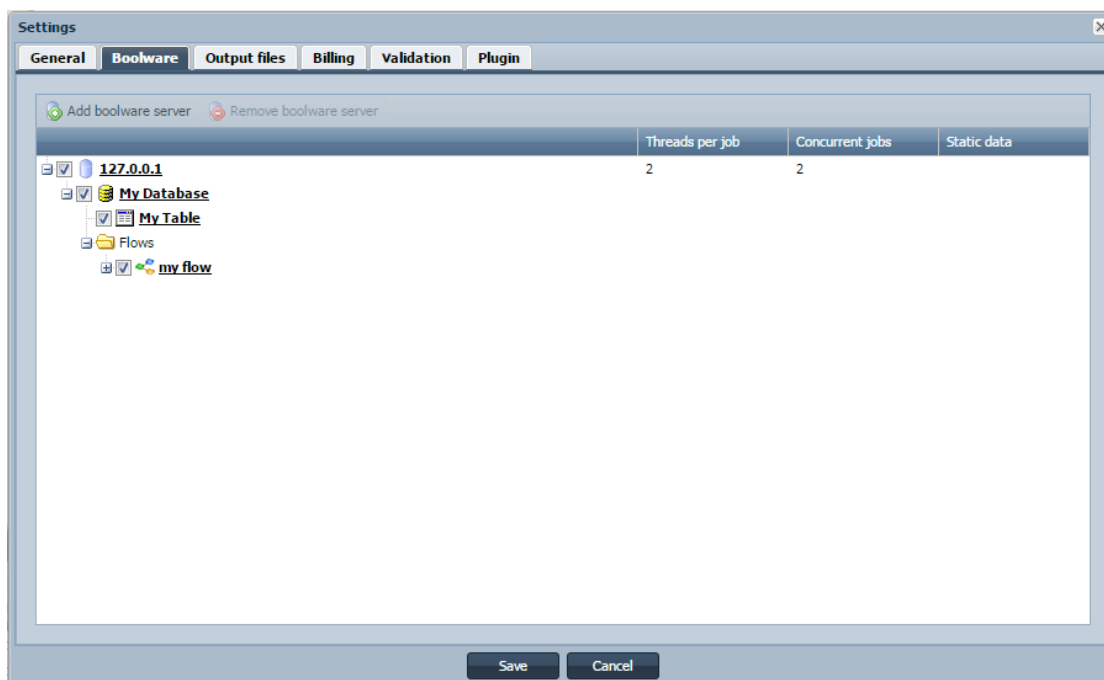
On the Boolware tab you can configure which Boolware servers that should be available. These Boolware settings may be overridden for a particular user allowing different Boolware settings for different users. Read more about Boolware flows on page 13.

To add a new Boolware server, click "Add boolware server" ( ) and enter the IP-address or the DNS name for the Boolware server. To remove a Boolware server, select the server and click on "Remove boolware server" ( ).

Unimatch will list all servers that you have added including databases, tables and flows in those servers but only flow parameters for flows that contain a "flow_input" XML section (see more in Boolware API documentation). All flow input variables from this section in the flow will be listed. You can also add constant/static data for a flow variable by double-clicking in the "Static data" column for a flow variable and enter/change a value. If a flow in the tree cannot be expanded and has a red stop sign in the flow image (🛑) then that flow does not contain any flow_input section.

Each server, database, table and flow has a checkbox and you must check/select a server, database, table and flow which should be the default when a user is creating new job profiles. Selecting a server automatically selects the first database, table and flow if they are not already selected.

For each Boolware server you can set number of threads per job and max number of concurrent jobs by double-clicking in the appropriate column on a Boolware server row.
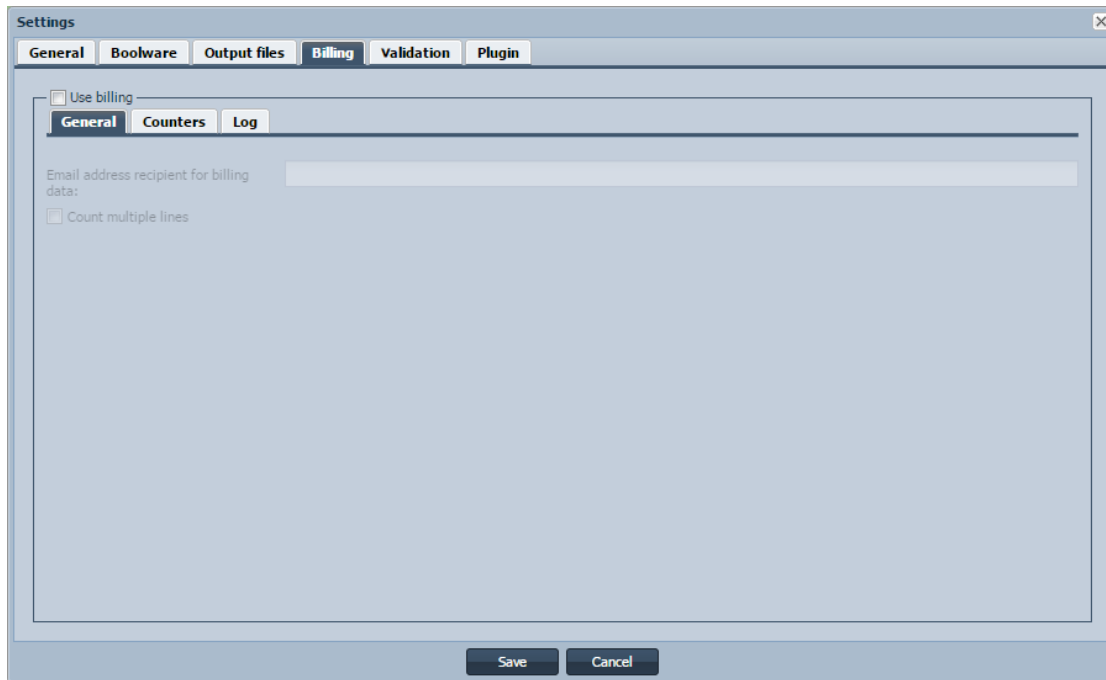
- Number of threads per job
  controls how many threads each match job should use (default 2). Do not set a too high value as the server may be overloaded and every match job will run slower.
- Max number of concurrent jobs
  set the maximum number of jobs (default 2) that can run simultaneously. By changing this value you can save system resources during heavy load. If you start more than the specified number of concurrent jobs, the new jobs will be in an idle state until a match job is finished and then the new job will start

If you right click you bring up a popup menu and the menu has the following choices:
- Change name/IP-address
  You can rename the server which will affect all profiles that uses the old server name or IP address. This could be useful if you want to move the Unimatch installation to another environment which uses new IP addresses/DNS names and you have many profiles which are using the "old" IP-address or DNS name.
  If you have IP addresses/DNS names that you don't want to use anymore and have profiles that use these addresses/names you can rename that server to the IP address/DNS name that you want the profiles to use instead. You will get a warning message that the address/name already exist and if you accept the rename, the server row in the list will be removed and a rename will take place for all profiles using the old address/name when you save system settings.
- Revert to default flow parameter values
  Resets the values in the "Static data" column to the values last read from the boolware server. Only active when right-clicking on a flow or flow variable row
- Copy all flow variables static data
  Copies all static data values from a flow to be able to paste them into another flow. Only active when right-clicking on a flow or flow variable row
- Paste flow variables static data
  replaces all flow variables static data to the ones you last copied. The flow variables with the same name will pasted into, others will be ignored. Only active when right-clicking on a flow or flow variable row and you have copied flow variable static data
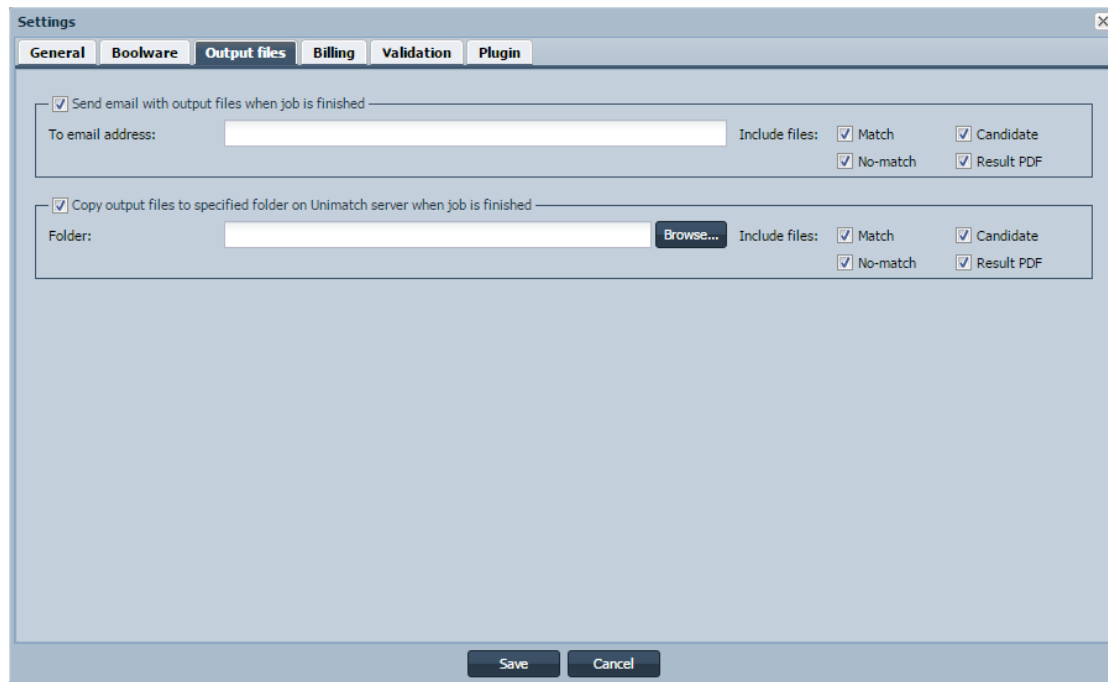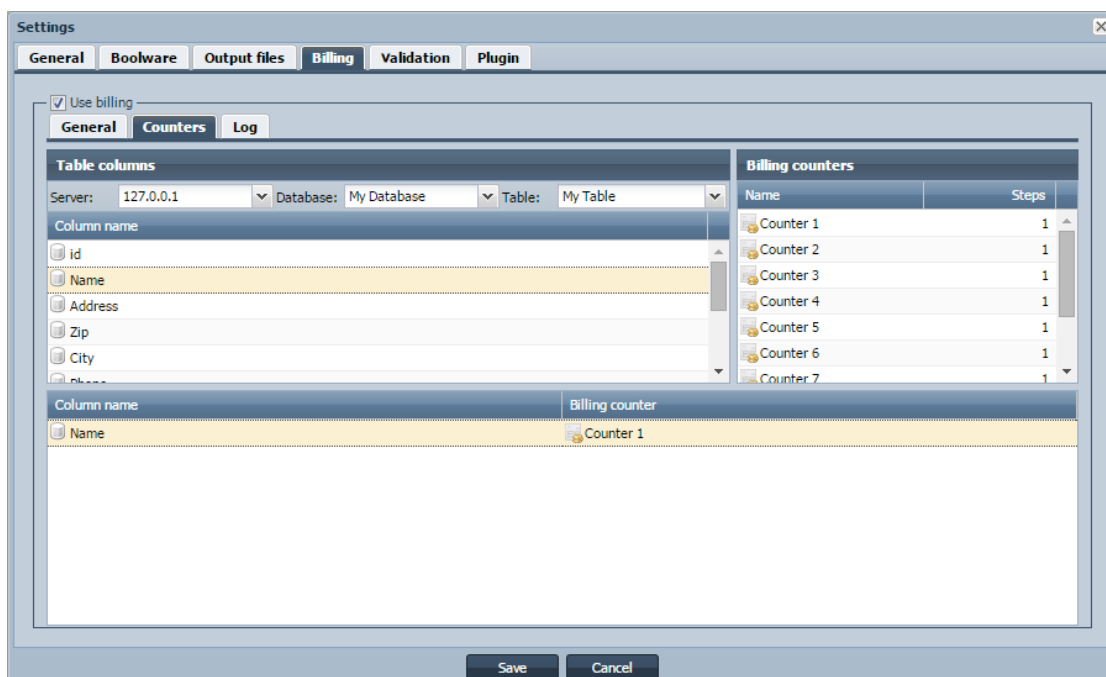
On the "Output files" tab you can specify what will happen with the output files when a job has finished successfully. If you tick the "Send email with output files when job is finished" you will receive the chosen include files (match, no-match, candidate and result PDF) attached in a mail. If you tick the "Copy output files to specified folder on Unimatch server when job is finished" and then clicking on the "Browse…" button, you will get a directory/file browser window displaying the contents on the Unimatch server (the directories/disks that the Unimatch server can access) and you can choose a directory that the output files will be copied to when the job finish successfully. All copied output files will get a timestamp in front of the file name, e.g. "20131205114620.match.my input file.txt". You can also control which files that should be copied to the folder specified, by ticking the appropriate checkbox for the file.

On the "Billing" tab you can activate and define billing information. Tick the "Use billing" checkbox to activate billing system wide.

When the Boolware flow returns a match for an input record, Unimatch scans this match record and tries to find the boolware columns that are mapped to a billing counter and when it is found the counter will be increased by the amount (steps) specified for the counter.

On the "General" tab inside the Billing tab you can enter the email address where the billing information should be sent when the job finish. When ticking the "Count multiple lines" checkbox, all the multiple records returned when the result string from the flow begins with "multi_match" will be scanned for any boolware columns mapped to a counter and when found they will be increased.

On the "Counters" tab you can choose from which server, database and table that you want to show table columns from and to map a counter to a table column you just drag the counter row and drop it on a table column row (or the other way around; drag a table column and drop it on a billing counter row). You can map the same counter to different table columns. If you double-click in the "Name" column in the Billing counters list you can rename the counter at your choice. The name of the counter will be used in the billing information e-mail and/or in the billing log. If you double-click in the "Steps" column you can change how much the counter should be increased each time.
There are a total of ten different counters that can be used and mapped to table columns. To delete a mapping, just select it and press the backspace key or delete key on the keyboard or right-click with the mouse to get a popup-menu with menu item for delete.
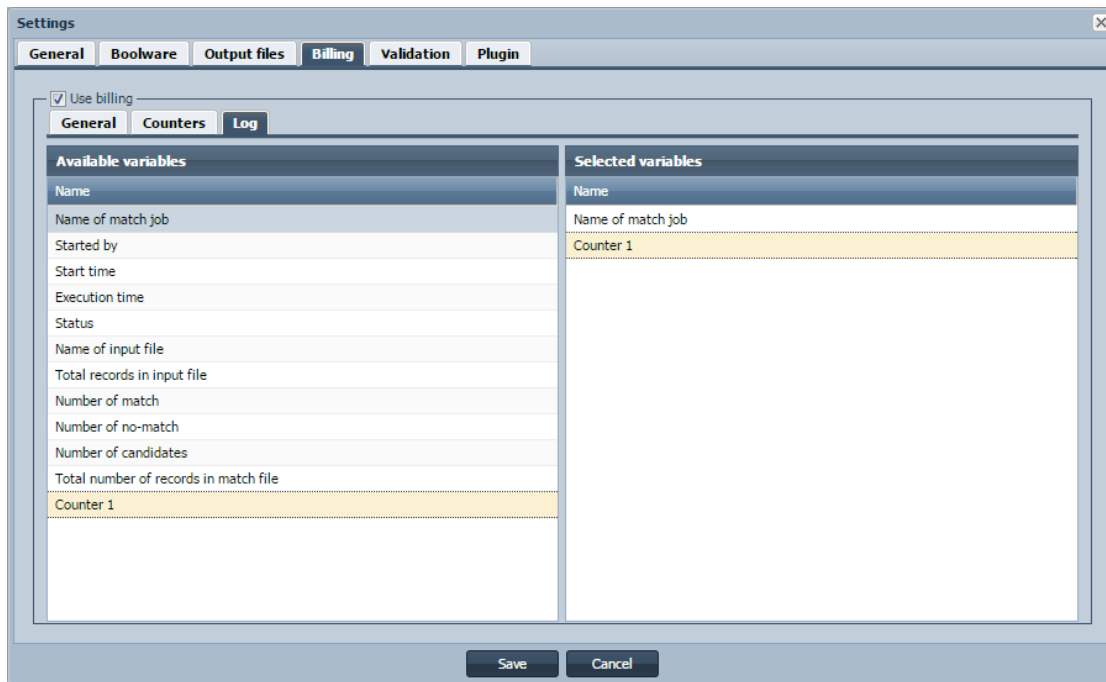

On the "Log" tab you can define which variables you want to use. The billing counters that have been mapped to a table column will be listed along with other pre-defined variables in the "Available variables" list. To select a variable, just drag it to the "Selected variables" list or double-click on the variable. To delete a variable, just select it and press the backspace key or the delete key on the keyboard or right-click with the mouse to get a popup-menu with menu items for delete.

The variables you can choose among are:

Name of match job	- The complete name of the match job
Started by	- User who started the job
Start time	- Start date and time
Execution time	- The time it took to run the match job
Status	- The status of the match job, "done", "warn", "error"
Name of input file	- Input file name
Total records in input file	- Number of records in input file

Number of match	- Number of input records that gave a match
Number of no-match	- Number of input records that did not give a match
Number of candidates	- Number of input records that gave candidates
Total number of records in match file	- Number of rows in match file normally this value is equal to "Number of match" but if "multi_match" are used and "multi_match"-records are found then this value will be greater.
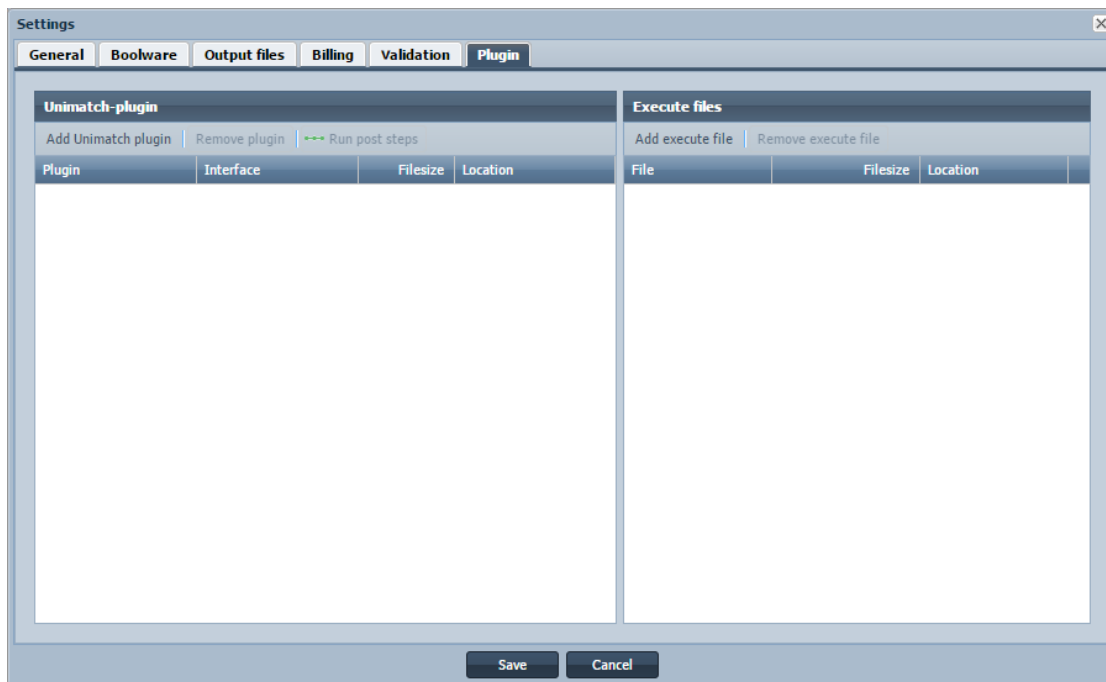
On the "plugin" tab you can manage all plugins and all executable files that a user can choose from as a post step.

The left list "Unimatch Plugins" contains all plugins that have been uploaded or is about to be uploaded. To add a new plugin, click on the button "Add Unimatch plugin". You can choose a file either locally on your machine or choose a file on the Unimatch server.
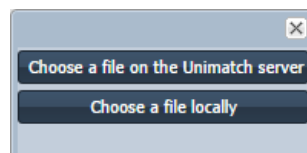
If you choose a local file it will be uploaded to the Unimatch server when you click "OK" or "Apply". If you choose a file on the Unimatch server it will be copied to a folder that Unimatch handles.

Only .jar files are allowed as plugins. When adding a .jar file Unimatch will check if any profiles are already using this plugin as a post step, via its class name in the .jar file and update the profile accordingly. Match jobs that was run using a .jar that have been updated will be automatically updated when the job is restarted.

The columns in the plugin list are:

Plugin   Name of the .jar file
Interface   Which interfaces that the .jar file support
File size   Size of the file
Location   Location of the .jar file. If the .jar file exists on the Unimatch server it will display "Unimatch-server". If it is to be uploaded it will display "Local (to be uploaded).

The button "Remove plugin" removes selected .jar files. If you remove a plugin, all jobs using a post step in that plugin will fail when running.

The right list "Executable Files" contains all executable files that have been uploaded or is about to be uploaded. These files can be selected in a profile and executed as a post step. Commonly these files will are batch files for Windows or shell scripts for Linux.

These files must return one of the following exit codes:

0   Successful
4   Warning, output from command line will be written to the Unimatch log with the type "WARN"
8   Error, output from command line will be written to the Unimatch log with the type "ERROR" and the match job will stop with an error

Any other unknown exit code will be handled as 0, success.

To add a new executable file, click on the button "Add Executable File". You can choose a file either locally on your machine or choose a file on the Unimatch server.
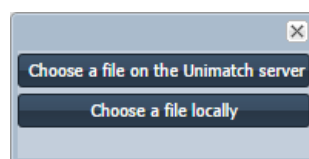
If you choose a local file it will be uploaded to the Unimatch server when you click "OK" or "Apply". If you choose a file on the Unimatch server it will be copied to a folder that Unimatch handles.

The columns in the execute step list are:

Step   Name of the file
File size   Size of the file

Location   Location of the .jar file. If the .jar file exists on the Unimatch server it will
            display "Unimatch-server". If it is to be uploaded it will display "Local (to be
            uploaded).

The button "Remove Executable File" removes selected executable files.

Pressing "Save" will upload all changes that you have made to the plugins and/or
executable file list and an upload dialog will show with progress on each file to be
uploaded.

If you have uploaded a post step plugin or an executable file and you have a match job
selected in the match job list you can manually run post steps directly on a match job.
Clicking on the "Run post steps" button will bring up a dialog where you can add all post
steps that you want to run and in what order. Click on "Run" in the dialog to start the
post steps.

Using post steps

To use a post step plugin or an executable file in a profile, open the profile for editing
and select the tab "Post steps". Click on the button "Add Step" and select a post step that
should be executed when a match job successfully ends.

If the selected post step belongs to a plugin, default arguments will be shown in the left
column.

See section "Step 8: Post step" for more info.

Introduction to the User Interface

In the Unimatch application the main window consists of three areas: Top-left is the area where all job profiles are shown, bottom is the area where all match jobs is listed and to the top-right there is a tab control where user administration and candidate resolving exists (appears when a job is finished and double-clicking on the match job).
The top-left and bottom areas can be hidden to give more space for candidate resolving by clicking on the ⧏ button in the Job profiles caption or the ⩒ button in the Match jobs caption. You can also drag the edges of the areas to increase/decrease the size of them.

Job profiles

This area shows all profiles that has been created for a user in a tree-hierarchy way. The profiles area behaves like a file system where you can create job groups (like directories in a file system) to group your profiles. You can also drag-and-drop groups and profiles, rename and remove them.
If you are logged in as an admin user you will see all users as well as all profiles/match jobs for all users. The admin user can also move profiles/groups to another user (by drag-and-drop or copy-and-paste) and also manage profiles and even start another users match jobs. Non-admin users will only be able to manage their own profiles/groups. Admin users are displayed in the profile tree by an 👤 icon and non-admin users by an 👤 icon.
You can rename a group/profile by either selecting it and press F2 or right-click in the profile area and choose rename from the popup menu. Please note that renaming a profile also affects all match jobs connected to the profile and they will also be renamed.
If you want to edit a profile, just double-click on the profile or choose edit from the popup menu.
You can also copy and paste an existing profile as a starting point for creating a similar profile by selecting "Copy job profile" and then "Paste job profile" from the popup menu.
If a profile is being edited, the profile icon will change from 📄 to 🔒. Trying to edit a locked profile will result in an error window with information which user and IP that currently has the profile lock.

The 4 buttons on top of the profile area are:

"Run job" (➡)   starts a match job using the selected profile.
"Schedule job" (🔵)   prepares a match job using the selected profile to start at a
                          certain time and date.
"+ job profile" (🟢)   creates a new profile.
"- job profile" (🔴)   removes the selected profile.

Match jobs

This area shows running, finished or scheduled match jobs. The jobs are listed in a paged list which means that if there are more than 25 jobs, you can navigate between pages of jobs each by pressing the next (▶) or previous (◀) button. The "last" button (▶|) navigates to the last page of jobs and the "first" button (|◀) navigates to the first page. The refresh (♺) button reload the current page of jobs again. Furthest to the right there is information about which match jobs that are in the list and the total of match jobs available. You can also enter in the edit box a page to display and load it by pressing Enter on the keyboard.

The match jobs will always be stored in this list until you manually remove them by pressing on the "Remove match jobs" (🔴) button or choosing "Remove job" from the popup menu or when the limit is reached about how many jobs that are allowed in job list.
The "Job log" (🖼) button lets the user download a CSV file with previously run match jobs of the current day together with information about the jobs. When a match job has finished, a row in the job log file is created. Clicking on this button brings up all available job log files (one for each day and the number of files depends on how many log file generations you have configured) that you can choose amongst. The "Restart match job" (➡) button lets you start the match job again, using the same settings as last run, even if the original profile has changed. When clicking on this button you will be asked to enter a row in the input file to start from, default is the row it started from in previous run. The "Continue match job" (➡) button lets you continue a match job which have been cancelled.

The match job list shows 8 columns for each match job:

- Name, the name of the match job including profile path.
- Next run, the time and date the match job will run next.
- Last run, the time and date the match job was last run.
- Activity, during matching it will display progress of how many rows that are matched, duplicate removal progress if it is activated, post steps progress if any and afterwards it will display the elapsed time.
- Status, percentage of how far in the matching process we are during the match job run and a status text when job is finished.
- Total rows, the total number of rows in the input file used in the matching process.
- Estimated finished time, the estimated time and date that the match job will be finished.
- Candidates, number of candidates found during a match job.

Name		Next run	Last run	Activity	Status	Total rows	Estimated finished ti...	Candidates
⊟ admin/manual.1			2016-11-09 14:50	Elapsed time: 00:02:23	done	501	2016-11-09 14:52	16
Started by:	admin	Match time:	00:02:21 (3.5/sec, Flow execution time: 00:02:18)		Result file:		admin.manual.1.company_manual.csv.pdf	
Number of match (85.4%)	427	Match file:	match.company_manual.csv		Candidate file:		candidate.company_manual.csv	
Number of no-match (11.4%)	57	No match file:	nomatch.company_manual.csv					

By clicking on the plus sign (located leftmost on a match job row) you will get additional information about the match job. You can also download the match file, no-match file, candidate file, filtered file or the result PDF file directly by clicking on the filename links (only visible when a match job has finished successfully). If you have configured your profile to combine output files in any way, there may be different number of links than shown in the picture.

User Management

During initial installation of Unimatch, a default user named "admin" with no password and with full privileges is created. A user with admin permission can manage profiles and match jobs for all users whilst a non-admin user only can see and manage their own profiles and match jobs.

To manage users, select the User tab in the right area. Users with a green arrow located top-left of the user icon indicates that the user is logged into Unimatch. By right-clicking on a user icon and choose "Logout user(s)" you can force a user to logout. This feature is only available for admin users. If a user is being edited, a lock symbol is displayed in the bottom-left corner of a user icon. Trying to edit a locked user will result in an error window showing which user and IP-address that currently holds the lock.

Adding Users
To add a new user click on the "Add User" (👤) button which will bring up the user editing window.

On the general tab you can edit the basic user settings. These are:

User Id	Name of the user
Password	Password for the user
Filter file	By specifying a filter file that contains valid Boolware field names you can control which fields that the user can see and use when creating profiles. The file should be a .CSV file in UTF-8 and contain one Boolware field name on each line. Click on the browse button and locate the file that you want to use. If you do not choose a file, all Boolware columns will be available for use in the profile wizard. The file will be uploaded to the Unimatch server when you hit the OK-button in the user window.
Remove filter file	By clicking on the button you can clear the filter file edit box making all Boolware fields available for the user
Administrator	If the user should be an administrator or not.
Profile access	If the user should be able to create or modify profiles.
Email for error notification	Enter an email address to receive an email when running a scheduled job and an error occurs. If you enter an address it will override any address set on the system level.
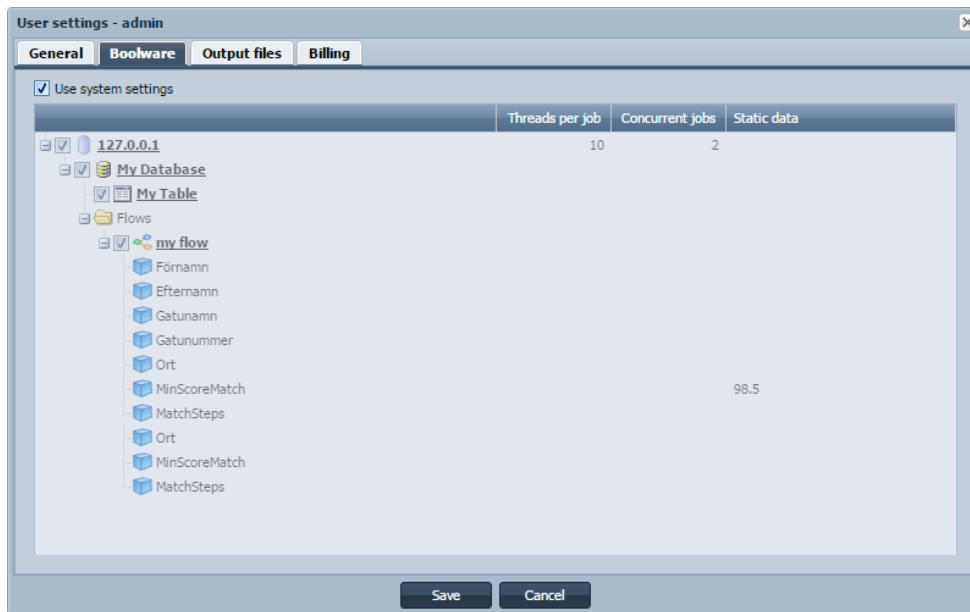
On the Boolware tab you can change Boolware settings for the user which overrides any settings made in the system settings window or you can tick the "Use system settings" checkbox. If you want to override the Boolware settings for the user you can then use the add/remove buttons to add/remove Boolware servers for the user. The server, database, table and flow that you select will be the default ones used when the user are creating new profiles.

Note: A user that does **not** have administrator rights but have profile access will not see the Boolware tab when creating new or editing profiles and will use the default values that are configured for the user.
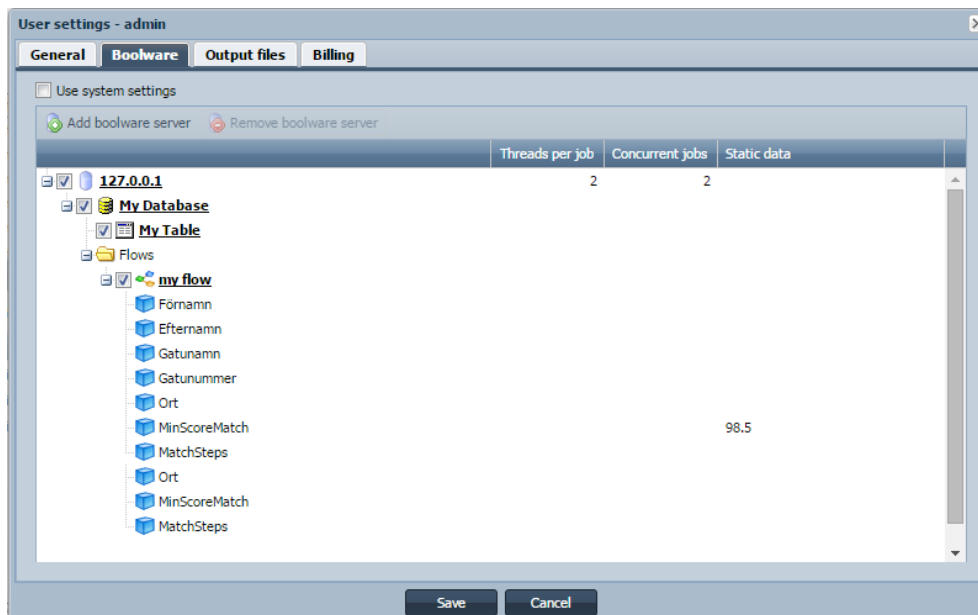
For each Boolware server you can see the number of threads per job and max number of concurrent jobs set. To change these values you have to go to the system settings.

On the "Output files" tab you can specify what will happen with the output files when a job has finished successfully and changing these values will override any values set in the system settings. If values have been set in the system settings, they will be shown in the disabled input boxes. If you tick the "Send email with output files when job is finished" you will receive the include files chosen (match, no-match, candidate and result PDF) attached in a mail. If you tick the "Copy output files to specified folder on Unimatch server when job is finished" and then clicking on the "Browse…" button you will get a directory/file browser window displaying the contents on the Unimatch server (the directories/disks that the Unimatch server can access) and you can choose a directory that the output files will be copied to when the job finish successfully. All copied output files will get a timestamp in front of the file name, e.g. "20131205114620.match.my input file.txt". You can also control which files that should be copied to the folder specified, by ticking the appropriate checkbox for the file.

On the "Billing" tab you can activate and define billing information. Tick the "Use billing" checkbox to activate billing for the user. Configuring user-defined billing settings will override any system billing settings. The system billing settings will be shown in the grey and disabled input boxes and lists if you don't tick the "Use billing" checkbox.

When the Boolware flow returns a match for an input record, Unimatch scans this match record and tries to find the boolware columns that are mapped to a billing counter and when it is found the counter will be increased by the amount (steps) specified for the counter.

On the "General" tab inside the Billing tab you can enter the email address where the billing information should be sent when the job finish. When ticking the "Count multiple lines" checkbox, all the multiple records returned when the result string from the flow begins with "multi_match" will be scanned for any boolware columns mapped to a counter and when found they will be increased.

On the "Counters" tab you can choose from which server, database and table that you want to show table columns from and to map a counter to a table column you just drag the counter row and drop it on a table column row (or the other way around; drag a table column and drop it on a billing counter row). You can map the same counter to different table columns. If you double-click in the Name column in the Billing counters list you can rename the counter at your choice. The name of the counter will be used in the billing information e-mail or in the billing log. If you double-click in the steps column you can change how much the counter should be increased each time.
There are a total of ten different counters that can be used and mapped to table columns. To delete a mapping, just select it and press the backspace key or delete key on the keyboard or right-click with the mouse to get a popup-menu with menu items for delete.

On the "Log" tab you can define which variables you want to use. The billing counters that have been mapped to a table column will be listed along with other pre-defined variables in the "Available variables" list. To select a variable, just drag it to the "Selected variables" list or double-click on the variable. To delete a variable, just select it and press the backspace key or the delete key on the keyboard or right-click with the mouse to get a popup-menu with menu items for delete.

Editing User

To edit a user, select the user and click on the button "Edit User" (👤) which will bring up the user editing window (described above).

Removing Users

To remove a user, select the user to remove and click on the button "Remove User" (👤).

Creating Job Profile

To add a new job profile, select a user in the top-left area and click on button "+job profile" ( ). Now a wizard will pop-up that will guide you in the process of creating a new job file.

Step 1. Profile name

First you need to enter a profile name. Each match job profile needs to have a unique name.

Step 2. Input format

Select the format for the input type. You can select different kinds of text files (flat files, tab-, comma and semicolon- delimited files), Excel files or a database (Boolware or a JDBC database). If the JDBC database that you want to use is not listed then the driver is not recognized by Unimatch or is not manually placed in the "jdbc" folder where the Unimatch application is installed.

For CSV files or Excel files
Click Upload to select the input file you want to match. The file will directly be uploaded to the Unimatch server. Unimatch will also count the number of rows in the file and display the number in the box below.

After an input file has been uploaded, if any errors are found within the first 200 rows of the file, the button "View input file errors" will be enabled (to the right in the preview grid caption) and by clicking on this button it will display the errors found in the file. You cannot save the profile if any error exists.

The button "Validate input file" will run through and validate the complete input file and give you information about any errors found in it (could be time consuming on large input files).

Select start row for the input file and if first line contains field names. Field names will be used later for column mappings and also displayed during resolving candidates. If the file doesn't contain field names, each column in the input file will have the name "Column1, Column2 etc.".

At the bottom of the tab there is a preview list and it will show the first 10 lines from the input file and it will use the settings for the input file so you can easily see if correct settings are applied.

For databases
Choosing any of the databases changes the area below input type to the following:

Enter the settings for the database and in the field "Select SQL" you enter the select sql query to retrieve records from the database.

Choosing Boolware as database will show a slightly different layout where you specify a complete Boolware XML request (only single softboolXML_request are allowed, not softboolXML_reque**ts**) to retrieve records from the database.

Step 3: Boolware settings and column mapping

Next step is to select a Boolware server, database, table and a Boolware flow.
If the user that profile is created for does not have administrator right, the Boolware tab will not be shown and the default user settings will be used instead.

To add a new Boolware server for the current profile, click "Add boolware server" (⊚) and enter the IP-address or the DNS name for the Boolware server. To remove a Boolware server, select the server and click on "Remove boolware server" (⊚). When creating a new profile the boolware servers from the system settings (or user settings if overridden) will be listed as default values. Changes made here affects only the current profile.

Unimatch displays, in the example data column in the input columns list, the first record in the input file which contains data for all columns as a help when mapping columns.

Map input columns (⇨) to flow variables (▣) by drag-and-drop input column names from the input columns list onto the flow variable names in the boolware tree. To remove a mapping, select it in the boolware tree and press "delete" key on your keyboard or right-click and choose "Remove input file column" from the popup menu.

If you want the same input column to map to another flow variable, just drag-and-drop the same input column to another flow variable. The same applies for the case where

you want to have two or more input columns to map against a single flow variable. They will be separated in the matching process by a blank/space when sending data to the Boolware flow.

For each Boolware server you can see the number of threads per job and max number of concurrent jobs set. To change these values you have to go to the system settings.

If you want to add constant/static data to a flow variable, double-click in the static data column and enter the data you want to use. Static data can be used for sending control information to the Boolware flow. The default values set in a Boolware flow for a flow variable will be shown in the static data column. The values that you change and that differs from the default values will be displayed in bold and italic so you can easily see which values that has been changed in Unimatch.
Note that you can't map any input columns to a flow variable which contains static data. If any constant/static data is already configured when creating the flow (in user settings or system settings) it will appear in the static column automatically.
The last column in the boolware tree is "Display order". It controls in what order the mapped input columns appear when manually resolving any candidates. When you map an input column it will automatically be assigned a display order number but you can double-click in the column and use the spin control to change the value, which also affects the other mapped input columns so the display order sequence retains.

If you right click in the boolware tree you bring up a popup menu where you can delete a mapping, revert static data to the default value, copy and paste static data (see the boolware tab in the system settings description).

Step 4: Candidates

Select the table columns that should be displayed when manually resolving candidate records. After dragging the table columns to the candidate fields list you can also change the display name that is used when resolving candidates. The columns named "@score", "@row" and "@flowExitCode" are Unimatch system columns (indicated by an ⚙ icon) and will return the score value from the matching, the current row in the input file and the flow exit code from the matching. All other columns are Boolware columns as indicated by an ⬜ icon. When selecting columns to display for candidates you can also change the display name, which will be used in the header of the candidate list during resolving.

If you have configured a filter file in the user settings window the table columns that will be displayed is the ones that matches the fields entered in the filter file along with the Unimatch system columns. The filtering will take place on the column names regardless which boolware table being used.

Step 5: Match fields
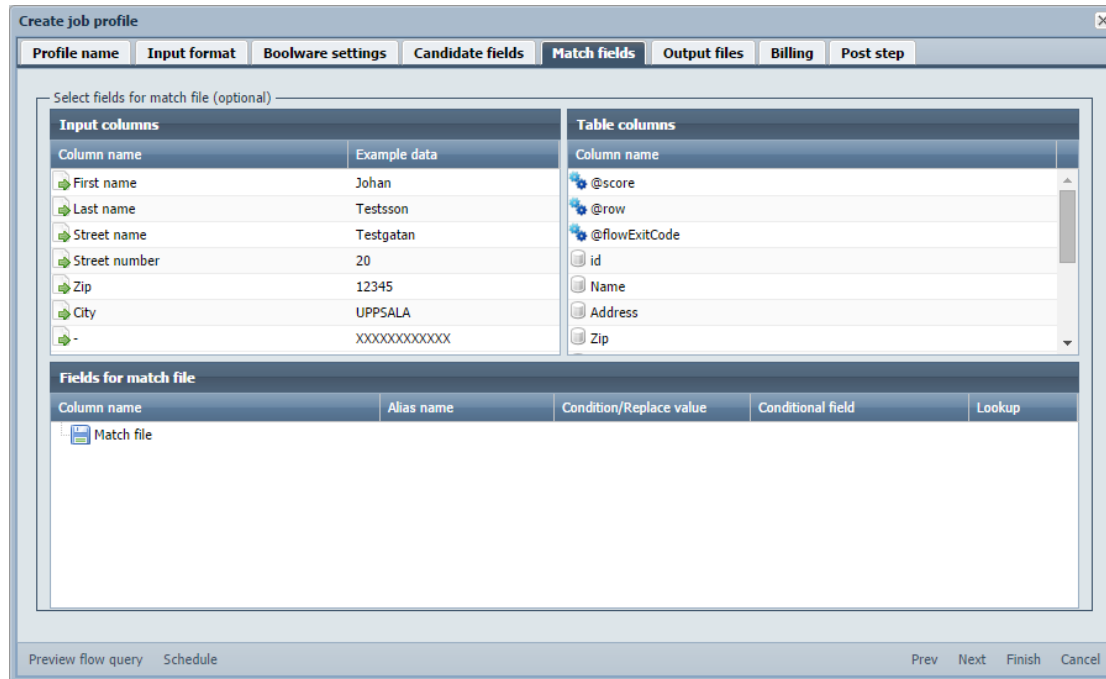
All fields in a database record are by default written to the output file for records that match. You can override this behavior if you want by drag-and-drop the fields you want in the output file from both the input columns list and the table columns list to the output field tree. The icon in front of the names indicates if it is a system column, table column or input file column. You can also double-click on an input file column or a table column to append it to the tree "root" level.

The following icons can exist in the tree:

	Unimatch system column
	Input file column
	Boolware table column
	Boolware table column that will not be outputted (lookup with replace)
	Lookup boolware column
	Group column
	Static text column
	Input file column selected for filtering
	Boolware table column selected for filtering
	Unimatch system column selected for filtering
	Group column selected for filtering

If you have configured a filter file for table columns in the user settings window the table columns that will be displayed is the ones that matches the fields entered in the filter file along with the Unimatch system columns.

In the output fields tree you can change the column name used in the output file (match file) by double-clicking in the "alias name" column.
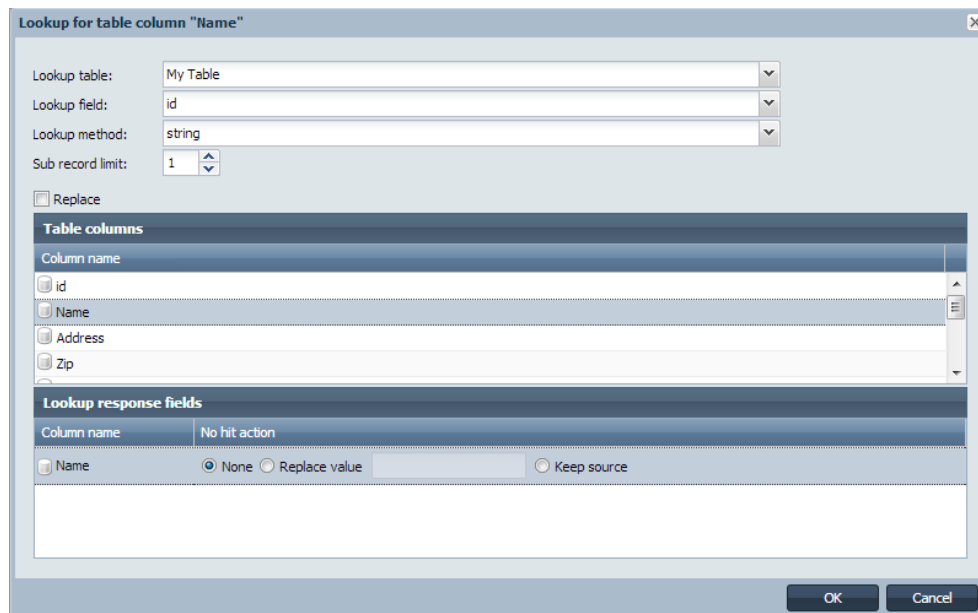
If you want to replace a value from a table column based on a condition, e.g. you have a phone number and don't want to output it in clear text you can use the "Condition/Replace value" column to replace it with another value. Double-click in the cell and enter the condition. The condition must be entered in the format "<value to find>;<value to replace>". E.g. entering "*;Oscar" will replace all possible values for a column with the specified value after the semicolon ("Oscar" in this case). You can enter multiple conditions, one on each line.

The next column, "Conditional field", controls which table column that the conditional replace should look in when replacing a value. If this column is left blank, the table column that you specify the replace value for will be used.

The last column is the "Lookup" column and it is only applied on boolware table columns. You can use a lookup if you want to fetch a value from another Boolware table and add or replace the source value. E.g. you have a code and want to look up its description and output that value instead.

Lookup

Pressing the ⊕ icon will bring up the lookup configuration window for the column. When a lookup is configured for a column, the cell will contain two new icons. Clicking on the first icon (⬅) will bring up the lookup configuration window for editing and clicking on the second (⊖) will remove the lookup.

Select which Boolware table to perform the lookup in and which field should be the target. You can also choose which lookup method that should be used (string/word etc.). Then you can change the number of sub records you want to fetch in the lookup query and also if you want to replace the value used as the lookup input value or keep it. Depending on your choice in the lookup table list, Unimatch will display all available columns in that table in the "Table columns" list and you can drag-and-drop the columns that you are interested in into the "Lookup response fields" list.

In the "No hit action" column you can change what will happen when the lookup doesn't return a hit in the lookup table. There are three radio buttons that you can choose between:

- None
  No action required
- Replace value
  If you want to replace a value based on a condition when the lookup querying doesn't give a result (no hit) you can select this action. Enter the value you want to replace it with.
- Keep source
  If you don't want to return a value from the lookup when the lookup querying doesn't give a result (no hit) and want to keep the source value, tick this action.

When you have configured a lookup for a column, all the fields that you have selected in the lookup configuration window is displayed in the output field tree below the column. You can remove columns in a lookup by selecting them and press the "Delete"-key on the keyboard or choose "Remove columns" from the popup menu. You can also change column order within a lookup but if you want to add columns then you have to bring up the lookup window for editing.

Group fields

If you have several fields that you want to combine in a single output column in the output file or want to output data in a single column with data from field in a priority order (first field that contains any data) you can select the fields in the output field tree, right-click and select "Group selected fields" which will bring up the configure group window.
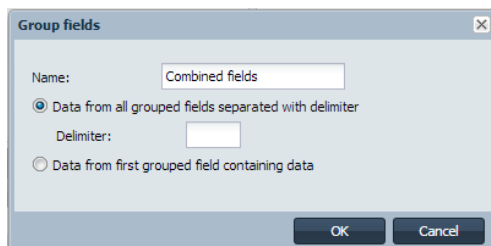
Here you can enter a name of the group that automatically will be set as the "Alias name" for the group column. Then you can choose if data from all grouped fields should be used with a specified delimiter (defaults to space/blank) or you want to use data from the first field that contains any. The priority order for the second radio button is the order in which the fields are added to the group. You can change the order in the output field tree by drag-and-drop.
You can later edit a group configuration by simply double-clicking on the group in the output field tree.

Static text column

If you want to add a static column (▤) with some text that will be the same for all match records then you right-click and select "Insert static text" from the popup menu. This will bring up a window where you enter the column header and then the column value. If you already have created a static column you can edit it by right-clicking and select "Edit static text". The static text column will be displayed in the list with the header name given and the text within parenthesis, e.g "My header (My value)".

Filter field to its own match file

By right-clicking on a column and select "Set filter" from the popup menu you tell Unimatch to output this column in another match file called "filtered". The column will not be written to the original match file. Every match record in the "filtered" file will be randomly written (not in the same order as the match file). After successful job the filtered file can be fetched via the job list or from the candidate resolve window. To remove a column from filtered file you select it and via the popup menu you select "Remove filter".

Step 6: Output files

On the "Output files" tab you can change the format of the output files (math, no-match and candidate). When creating a new profile it will default to the same settings as the input file. Choose file type, delimiter, encoding and text qualifier at your choice from the combo boxes.

The "Duplicate rule" setting lists all Boolware duplicate rules available for the Boolware server you have chosen. A duplicate rule will be used when a match job finish and will remove any duplicates from your match file. If you want to add duplicate rule you must use the Boolware Manager and create a duplicate rule for the table and then return to Unimatch and choose that rule on this tab.

The "Combine" checkboxes control how Unimatch should output the files. E.g. If you tick "Match" and "No-match", the match file and the no-match file will both be written to a single file where first all match records are listed and then all no-match records in the result file. The number of columns in the result file will be the largest number of columns from all combined files.
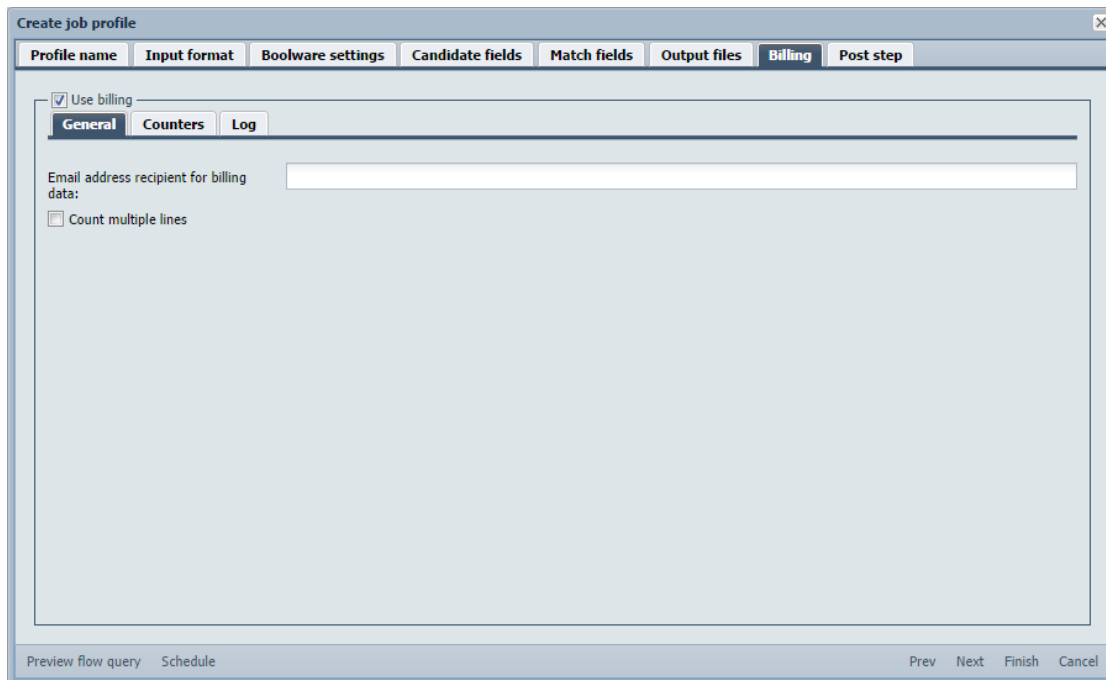
The "In-/output data on same line" lets the input control the output file. The output file will consist of the input record combined with its match/no-match or candidate records

on every line. It has no effect and will not be enabled if you don't tick any of the "Combine" checkboxes.

The "Add row number and flow exit code in no-match file" will add the input file row number and the flow exit code first on every row in the no-match file.

The "Send email with output files when job is finished" and "Copy output files to specified folder on Unimatch server when job is finished" are the same as described in system settings and user settings but you can override these settings on a profile level.

Step 7: Billing

The next tab in the wizard is the "Billing" tab. It is the same as the billing tab in system settings and user settings and allows you to override these settings on a profile level.

Step 8: Post step

On the last tab the user can choose amongst available post steps to be executed when a match job successfully ends. These post steps are administrated by an admin user and is set up in the system settings dialog. Here a user can select if the post steps should be active or not and by clicking on the "Add step" button a new row in the list below is created and a list of available steps are shown. A user can add multiple steps to the list. The order in which post steps are executed are in the order that they are displayed in the list. The user can change this order by using drag-and-drop of the rows in the list. By double-clicking in the arguments column for a row a user can enter specific arguments which are sent to the post step when executing. If a user chooses a command line execution step, which is defined in the system settings dialog, they will not be able to edit the arguments column.

Click on "Remove step" to remove all selected post steps.

At the bottom-left of the profile wizard there are two buttons, "Preview flow query", which will display the flow query XML that is going to be sent to the boolware flow and "Schedule", which will allow you to schedule the match job directly.

When done, click on "Finish" to save the profile.

Running Match Job
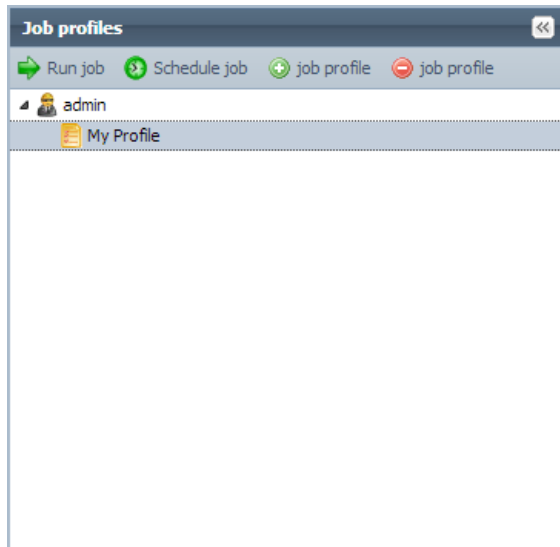
To run a match job, select a profile and click "Run job" (➡). The job starts immediately and will show up in the match job list below.

If an error occurs during matching, the status column in the match job list turns red and reads "error". To get the reason for the error, just double-click on the match job row and a message box will appear with a description of the error. If a warning occurs during matching, the status column in the match job list turns green and reads "warning".

When a job finish successfully the status column remains white and reads "done".

Scheduling Match Job
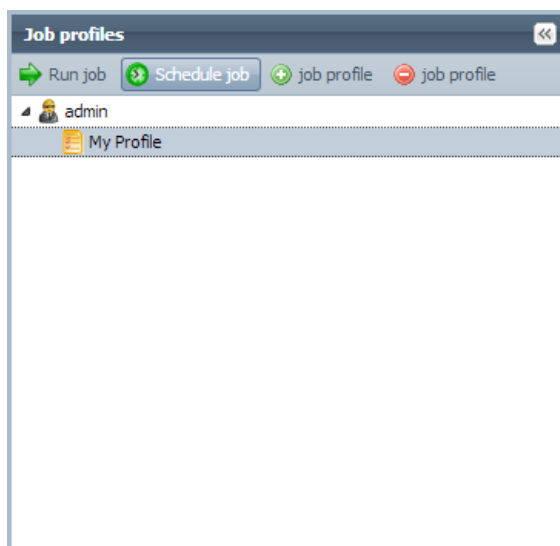
To schedule a match job, select a profile and click "Schedule job" (🔵) or open the profile and press on the "Schedule" button. A new window appears where you specify when the job is to be run.

There are two types of scheduling methods, "Normal" and "File monitoring". With normal scheduling it runs only on repeat, date and time parameters and with file monitoring you are telling Unimatch to wait for a particular file or files to appear in a directory (and is accessible) before starting the match job. Note that "File monitoring" is not accessible for profiles that use a database as its input format (JDBC/Boolware). The "Browse" button lets you browse the Unimatch server directories for the file or you can enter the directory and file (with or without wildcards) that Unimatch should wait for manually. If you enter wildcards in the filename Unimatch will start a match job for each file that matches the filename. Wildcards for file extensions are not allowed. Multiple files can be specified delimited with a semicolon.

When using file monitoring you can also let Unimatch verify the file before starting the match job by just ticking the "Verify on start" checkbox. If the verification fails, the match job will not start and you will have an error (red status column) in the status column of the match job in the match job list. If the file to monitor is not in place at the time you schedule Unimatch to look for it, the match job will have a warning (green status column). The "Max number of rows for a job to start" sets a maximum limit of number of lines in the input file for starting the match job. An empty value means no check for number of rows. Using wildcards for the file to monitor will force you to enter a value for the maximum number of rows for a job to start and will also automatically set file verification on start.

The "First start (every 24th hour)" option indicates that the match job will be started daily at the given time. The "Last time to run" option indicates last time for the match job to run. The "Run once on scheduled time" option means that match job should only run once on a given first start. The "Repeat on given hour or minute during 24 hours" means that you give the time interval for repetitions hourly or minutely during a 24 hour period from a given first start. The "Don't run" option means that you give the time interval when the match job shall not run.

On the "Specify week days" tab you can specify which week days that the match job should run, Sunday - Saturday. On the "Specify months" tab you specify which that the match job should run, January - December.

You must choose a first start before you can save the scheduling settings. Press "OK" to save the settings and add the scheduled match job to the job list.

Resolving Candidates/Edit match job

When the match job has finished successfully you can double-click on the row in the match job list to open up the tab for resolving candidates and for more information about the match job. Here you can also download the combined file, the match result file, the filtered file, the no-match file, the candidate file and the result PDF file by clicking on the corresponding button. If a file is not present due to profile settings then the corresponding button is not displayed.

When opening a match job it is put in an edit state meaning that another user cannot open the match job. All changes that is made (column order/size, resolving candidates) are saved internally but not in the final match files until you press the "save" button, close the tab and answer "yes" to save or click any of the buttons for download files (you will be prompted about changes). Closing the tab and select no from the "save changes?" query will revert all changes you have made. Choosing yes will move all your changes into the final match files.

If you have activated any post steps in Unimatch, you can run these manually from the button "Run post steps" (⋯). A new dialog is display where you can choose all post steps that you want to run and in what order. Click on "Run" to start the post steps.

When you have opened a match job it will be locked for editing so other users can't open it. If a user is trying to open a match job which is already opened they will get a message telling that the match job is locked and by which user and at which IP-address. You close the match job by clicking on the "close" (✖) symbol on the tab.
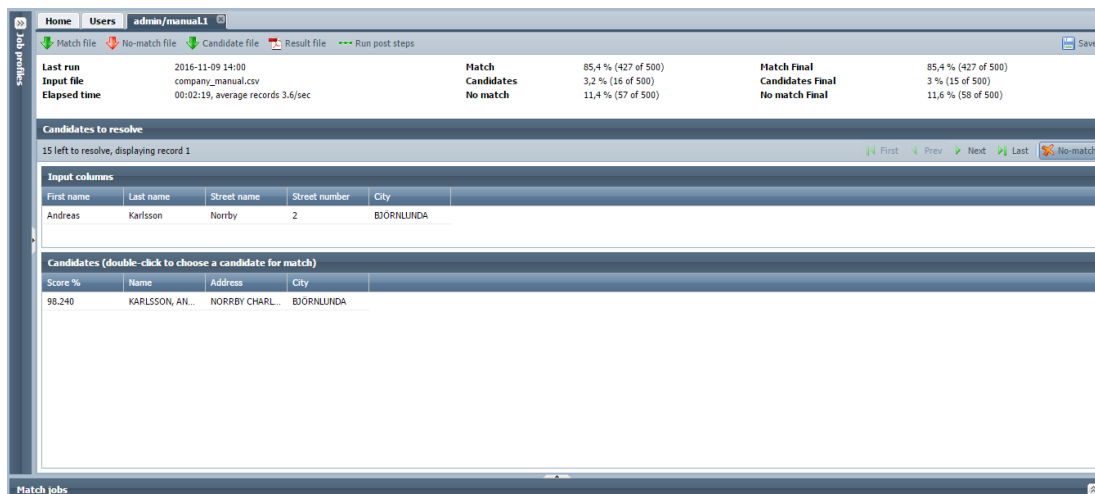
On the top there is some general statistics about the match job. The information shown is:

- Last run, date and time the job was run.
- Input file, the input file used in the matching process.

- Elapsed time, the time it took to run the match job and also the matching speed.
- Number of match/no match/candidates, how many input file records that resulted in match/no match/candidates.
- Number of final match/no match/candidates, the "current" counters of the above but also takes the manual matching/resolving into consideration. When you resolve a candidate or choose "No-match", these counters will update to show the new values.

Below the statistics area you find the candidates that need manual matching. It shows the total number of candidates that need manual match and you can navigate between all candidates by click on the navigation buttons to the right (◄ First ◄ Prev ▶ Next ▶ Last).

The "Input columns" area shows what input file record that generated this candidate.
Below this list are all the candidates that were found for the input file record.
You can drag the columns in both these lists to change the column widths. You can also drag-and-drop the columns in the candidate list if you want to see them in another order than you specified during the creation of the profile. The column width information and the order of the columns are stored along with the match job so if you return to the match job at a later time the stored settings for widths and order is used.

When you have found a candidate for match you just double-click on it to select the candidate. If you can't find a candidate for match and want to treat it as a no-match, just press the "No-match" (✖) button.
The application will automatically go to the next input record that needs manual match and display it when you have chosen a match or no-match.

Help and Support
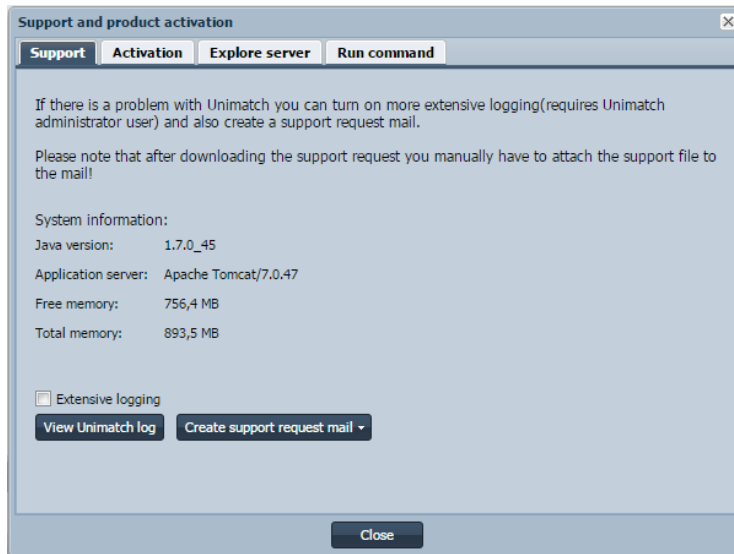
If you get any errors when running match jobs or have some other problem with Unimatch you can click on the question mark () at the bottom-right of the application to bring up the support/activation window.

On the support tab you can click on "Create support request mail" and turn on "Extensive logging". The button will show a popup menu with checkboxes for each menu item representing what should be included in the support request. Select the last menu item ">> Create support request" to actually create the request.

Extensive logging must be used with caution as it produces large log-files on the Unimatch server but in turn in can log vital information in order to solve a problem that have occurred. A good idea if an error occurs is to turn on extensive logging and re-run the problem trying to generate the error again. Then you can click on the "Create support request mail"-button to download a support file. It also brings up an e-mail window where you can describe the support request and where you attach the downloaded support file before sending the e-mail to Softbool technical support. If you don't turn off "Extensive logging" manually it will automatically be turned off next time the Unimatch server is restarted.

Clicking on the button "View Unimatch log" bring up all log files available (one for each day and the number of files depends on how many log file generations you have configured) and lets you choose a log file to view. This button is not visible for non-admin users.

The last two tabs are "Explore server" and "Run command" and are only visible to admin users of Unimatch.
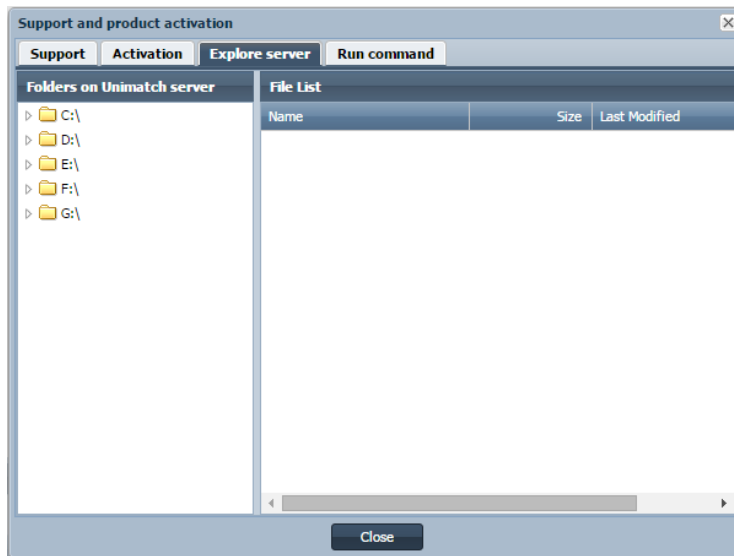
On the "Explore server" tab you can navigate on the server where Unimatch runs and display files. Here you also can upload and download files to a directory of your choice if the user who runs Unimatch/Apache Tomcat has appropriate privileges.
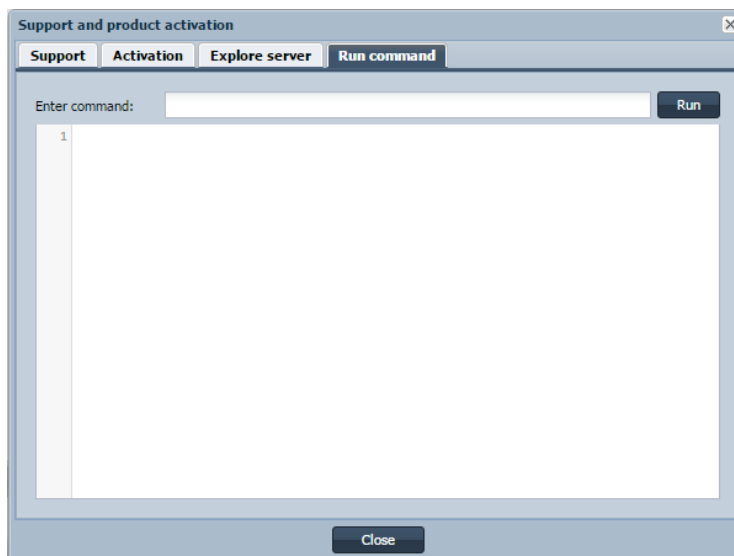
On the "Run command" tab you can run console/shell commands on the server where Unimatch runs. Enter the command and press on the "Run" button. The result of the command will be displayed in the area below. Not all commands are allowed but here you can for example list files, check environment settings, check processes etc. To list all or change disallowed commands read or edit "win.cmds.txt" or "linux.cmds.txt" in the directory "unimatch/WEB-INF/classes".

REST API for Unimatch

Unimatch has support for simple monitoring tasks via a REST API. The API uses HTTP Basic Authentication to authorize the caller and the user account that is used for this is a standard Unimatch user. We suggest that you create a new user in Unimatch that should be used for communicating via the REST API. The same match job user-filtering applies for the REST API (an administrator can see/access all match jobs whilst a non-admin only can see/access their own match jobs).

Information about all match jobs
GET   http://<IP:PORT>/unimatch/rest/matchjob/*

Example request:
http://localhost:8080/unimatch/rest/matchjob/*

Example response:
```
{
  "matchJob": [
    {
      "name": "admin.test.1",
      "isRunning": false,
      "startedBy": "admin",
      "progress": 100,
      "error": "",
      "totalRecords": 100,
      "handledRecords": 100,
      "activity": "Tidsåtgång: 00:03:21 (0.5/sek)"
    }, {
      "name": "admin.test.2",
      "isRunning": false,
      "startedBy": "admin",
      "progress": 100,
      "error": "",
      "totalRecords": 354,
      "handledRecords": 354,
      "activity": "Tidsåtgång: 00:00:05 (62.7/sek)"
    }
  ]
}
```

The fields for a match job are:
* name
  Name of the match job
* isRunning
  Indicates if the match job is running or not. Note that any pre- and post-steps before the actual matching begins will not update the *progress* field. The *isRunning*-flag will be set as soon as the match job starts and will set to false when the complete match job is finished.
* startedby
  The user who started the job
* progress
  A percentage progress figure of the actual matching process, excluding any pre- or post-steps (see field *isRunning*).
* error
  If any errors occurs or the job is cancelled, this field will contain a message.
* totalRecords
  Total number of records to match

- handledRecords
  Number of records processed
- activity
  An activity message for the match process

Information about a specific match job

GET   http://<IP:PORT>/unimatch/rest/matchjob/<NAME OF MATCH JOB>

Example request:
http://localhost:8080/unimatch/rest/matchjob/admin.test.1

Example response:
```
{
  "matchJob": [
    {
      "name": "admin.test.1",
      "isRunning": false,
      "startedBy": "admin",
      "progress": 100,
      "error": "",
      "totalRecords": 100,
      "handledRecords": 100,
      "activity": "Tidsåtgång: 00:03:21 (0.5/sek)"
    }
  ]
}
```

For a field description, see **Information about all match jobs** above.

Start a match job

POST   http://<IP:PORT>/unimatch/rest/jobprofile/<NAME OF JOB PROFILE>/start

Example request:
http://localhost:8080/unimatch/rest/ jobprofile /admin.test/start

Example response:
```
{
  "jobName": "admin.test.1"
}
```

The name of the job profile to start must be prefixed with the user name, e.g. to start the job profile "test" which is a profile that exists below the "admin" user you should enter "admin.test".
The response field *jobName* contains the match job name for the job profile started or a response with the *error* field set if any error occurs, e.g.
```
{
  "error": "Job profile not found!"
}
```

Cancel a match job

POST   http://<IP:PORT>/unimatch/rest/matchjob/<NAME OF MATCH JOB>/cancel

Example request:
http://localhost:8080/unimatch/rest/ matchjob /admin.test.1/cancel

This call returns an empty response if success or *error* field with a description if any error occurs.

Resume a match job
POST   http://<IP:PORT>/unimatch/rest/matchjob/<NAME OF MATCH JOB>/resume

Example request:
http://localhost:8080/unimatch/rest/ matchjob /admin.test.1/ resume

This call returns an empty response if success or *error* field with a description if any error occurs.

Restart a match job
POST   http://<IP:PORT>/unimatch/rest/matchjob/<NAME OF MATCH JOB>/restart[/<row to start from>]

Example request:
http://localhost:8080/unimatch/rest/ matchjob /admin.test.1/ restart
http://localhost:8080/unimatch/rest/ matchjob /admin.test.1/ restart/2

If row to start from is omitted then Unimatch will use the value set in the profile. This call returns an empty response if success or *error* field with a description if any error occurs.

Delete a match job
DELETE   http://<IP:PORT>/unimatch/rest/matchjob/<NAME OF MATCH JOB>

Example request:
http://localhost:8080/unimatch/rest/ matchjob /admin.test.1

This call returns an empty response if success or *error* field with a description if any error occurs.

Post step Java API

Unimatch allows you to write your own custom post steps by writing a java class which implements a certain interface. When you place your class in a .jar file, add the service information and upload it to Unimatch via the system settings dialog you can then select it for a profile and have it execute every time a successful match job finish.

When a post step is run a new folder will be created in the match job folder called "poststep". In this folder the input file used in the profile will be copied. If using an execution step the folder will also have a jobInfo.xml file with information about the match job otherwise match job information will be sent to the post step class.

The interface that you have to implement is the "IUnimatchPostStepV2" and it is a java service provider. Previous Unimatch used the interface "IUnimatchPostStep" and this is still valid but we suggest that you use the version 2 interface since it now supports progress information.

Each plugin runs in its own class loader (sandboxed) and because of that all dependencies for a plugin must be included in the plugin .jar in order to run without errors. The plugin must contain a folder in the root called "lib" where all dependencies resides. This folder will be expanded when Unimatch loads the plugin and is also the directory that gets added to the class path (for resources etc.). The plugin class loader will first look in the plugin "lib" directory before delegating to the system class loader.

Please note that the class implementing the Unimatch plugin interface must be unique amongst plugins.

A system property called "unimatch.plugin.base" is also available if, for instance, you want to do some logging from the plugin. The property points to the same directory as the plugin jar files resides.

The source code files for building a Unimatch plugin .jar are installed in the "pluginsrc"-folder where Unimatch is installed:

- IUnimatchPostStep.java   Interface
  IUnimatchPostStepV2.java   Interface version 2

- UPSMatchJobInfo.java   Job information class

- UPSResult.java   Result class

IUnimatchPostStep

This interface supports the following methods:

```java
package com.softbool.uni_match.poststeps.spi;

/**
 * Unimatch post step interface
 */
public interface IUnimatchPostStep {

    /**
     * Name of the post step
     * The name will be shown in the post step list and combo box for the profile
     *
     * @return the name of the post step
     */
```

```
        public String getName();

        /**
         * Description of the post step
         * The description will be shown in the post step combo box for the profile
         *
         * @return the description string
         */
        public String getDescription();

        /**
         * Default arguments (optional)
         * When choosing a post step in the profile the arguments edit box will be populated with this value
         *
         * @return default arguments string
         */
        public String getDefaultArguments();

        /**
         * Execute the post step
         *
         * @param jobInfo        the information of the match job
         * @param arguments      arguments that user entered in the profile for this post step
         * @return               an UPSResult object containing the result of the post step execution
         */
        public UPSResult run(UPSMatchJobInfo jobInfo, String arguments);
}
```

IUnimatchPostStepV2

This interface supports the following methods:

```
package com.softbool.uni_match.poststeps.spi;

/**
 * Unimatch post step interface version 2
 */
public interface IUnimatchPostStepV2 {

        /**
         * Name of the post step
         * The name will be shown in the post step list and combo box for the profile
         *
         * @return the name of the post step
         */
        public String getName();

        /**
         * Description of the post step
         * The description will be shown in the post step combo box for the profile
         *
         * @return the description string
         */
        public String getDescription();

        /**
         * Default arguments (optional)
         * When choosing a post step in the profile the arguments edit box will be populated with this value
         *
         * @return default arguments string
         */
        public String getDefaultArguments();

        /**
         * Execute the post step
         *
         * @param jobInfo        the information of the match job
         * @param arguments      arguments that user entered in the profile for this post step
         * @return               an UPSResult object containing the result of the post step execution
         */
        public UPSResult run(UPSMatchJobInfo jobInfo, String arguments);

        /**
         * Get post step progress
         *
         * @return a percentage value
         */
        public byte getProgress();
}
```

Step-by-step for creating a custom post step

1. Create a class that implements the "IUnimatchPostStepV2" interface.

2. Add code for all methods.

3. Build a .jar file of the project.

4. Add a "lib" directory in the root of the .jar and add all dependencies there.

5. Add the services information to the .jar file.
   For Unimatch to load the .jar file it is identified by a provider-configuration file in the resource directory "META-INF/services". The file's name is the fully-qualified binary name of the IUnimatchPostStepV2 implementation. The file contains a list of fully-qualified binary names of concrete provider classes, one per line. Space and tab characters surrounding each name, as well as blank lines, are ignored. The file must be encoded in UTF-8.

6. Now it is ready to be uploaded to Unimatch.

The built-in command line execution step

Unimatch has a built-in post step which executes a file that is configured in the system settings dialog. It executes the file with a given number of arguments as described below.

Arguments:

#1   path to job info xml file, a file containing the same information as the UPSMatchJobInfo.java class

#2   path to match file

#3   path to no-match file

#4   path to candidate file

Unimatch will look at the exit code from the execute file to determine if the post step was successful or not.
Exit codes that the post step handles:

0	Successful
4	Warning, output from command line will be written to the Unimatch log with the type "WARN"
8	Error, output from command line will be written to the Unimatch log with the type "ERROR" and the match job will stop with an error

Any other unknown exit code will be handled as 0, success.