

**L-Soft Sweden AB**



# **Data Administrator's Manual**

**LISTSERV<sup>®</sup> Maestro, version 1.2**



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## About This Manual

Every effort has been made to ensure that this document is an accurate representation of the functionality of LISTSERV® Maestro. As with every software application, development continues after the documentation has gone to press, so small inconsistencies may occur. We would appreciate any feedback on this manual. Send comments by e-mail to:

[MANUALS@LSOFT.COM](mailto:MANUALS@LSOFT.COM)

The following documentation conventions have been used in this manual:

- Quotations from the screen will appear in italics enclosed within quotation marks.
- Clickable buttons will appear in bold.
- Clickable links will appear in bold.
- Directory names, commands, and examples of editing program files will appear in Courier New font.
- Emphasized words or phrases will be underlined.
- Hyperlinks, actual or fictitious, will be underlined unless they are part of a screen shot or direct quotation from the screen.

Some screen captures have been cropped and annotated for emphasis or descriptive purposes.



The “Tip” symbol is used to indicate practical advice or applications for using a feature.



The “Caution” symbol is used to indicate possible pitfalls and other important information.

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## Section 1 Introduction to LISTSERV® Maestro Data Administration

Designed specifically to work with LISTSERV 1.8e (or later) and LSMTP 1.1b (or later), LISTSERV Maestro allows users to easily create and send personalized e-mail messages using a Web interface. Incorporated into the powerful tool is a tracking component that can collect data every time a recipient opens an e-mail message or clicks on a URL contained within the message.

The LISTSERV Maestro program is comprised of three components that work together:

- **The Administration Hub** – Controls all user and program settings. It is the central component that stores registry and account information. It is accessed both by the Maestro User Interface and by Maestro Tracker to store and retrieve settings. It has its own administrator user interface.
- **The Maestro User Interface** – The actual user interface. Individuals and groups use it to create and distribute customized e-mail messages. It is also used to access, view, and download the collected tracking data.
- **The Maestro Tracker** – Receives and compiles tracking data from delivered e-mail messages.

In addition to LISTSERV Maestro's three components, LISTSERV Maestro also relies on the existence of two other external components:

- An installation of LISTSERV® 1.8e build October 31, 2003 (or later).
- An installation of LSMTP® 1.1b (or later).

These two components must be configured to work together.

LISTSERV Maestro can connect to a separate database installation to store its own internal data. This is a necessary requirement for all Linux and Solaris installations and highly recommended for Windows installations operating in a production environment. See the LISTSERV Maestro 1.2 Administration's Manual for more information. Supported databases are:

- Oracle® 8i, Oracle® 9i and compatible versions
- DB2® V7.2 and compatible versions
- MySQL™ 3.23.42 and compatible versions
- SQL® Server 7.0 and 2000

LISTSERV Maestro can also use a separate database to select recipients from database tables. Supported databases are:

- Oracle® 8i, Oracle® 9i and compatible versions
- DB2® V7.2 and compatible versions
- MySQL™ 3.23.42 and compatible versions
- SQL® Server 7.0 and 2000
- Any database that is reachable using ODBC – this is read-only access

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The three LISTSERV Maestro components, the two external components, and the optional database may be installed on any combination of hosts, from one single host shared by all components to six dedicated hosts, one for each component. For more information on host restrictions, installing LISTSERV Maestro, and starting and stopping the LISTSERV Maestro service, see the LISTSERV Maestro Installation Manual. For more information on preparing databases to work with LISTSERV Maestro, see the LISTSERV Maestro Administrator's Manual.

## 1.1 System Requirements

Depending on the operating system of the client used for the access, the following browsers are supported when accessing the Maestro User Interface or Administration Hub:

- Client with Windows – Microsoft Internet Explorer 5.5 or later, Netscape 7.0 or later and Mozilla 1.0.0 or later.
- Client with Linux – Netscape 7.0 or later and Mozilla 1.0.0 or later.

To access the Maestro User Interface or the Administration Hub, we strongly recommend that only Windows or Linux be used with the browsers and browser versions listed. Other operating systems, browsers, or browser versions are not supported.

The client does not necessarily have to have the same operating system as the LISTSERV Maestro server. A Linux client can be used to access LISTSERV Maestro on a Windows server and vice versa.

It is important to note that recipients of e-mail being tracked by LISTSERV Maestro may use whatever browser they wish to access the URLs contained in the message. Tracking will occur no matter which browser is used by e-mail recipients.

## Section 2 Understanding the LISTSERV<sup>®</sup> Maestro User Interface

The opening screen of LISTSERV Maestro's interface contains various sets of functional and navigational icons. The top right of each screen in the LISTSERV Maestro interface includes all or a subset of these four icons:

*Table 1 Navigational Icons*



**Home** brings the user back to the opening screen – the LISTSERV Maestro home page.



**Up One Level** brings the user up one level in the program, not necessarily back to the previous screen.



**Log out** ends the LISTSERV Maestro session and closes the account.

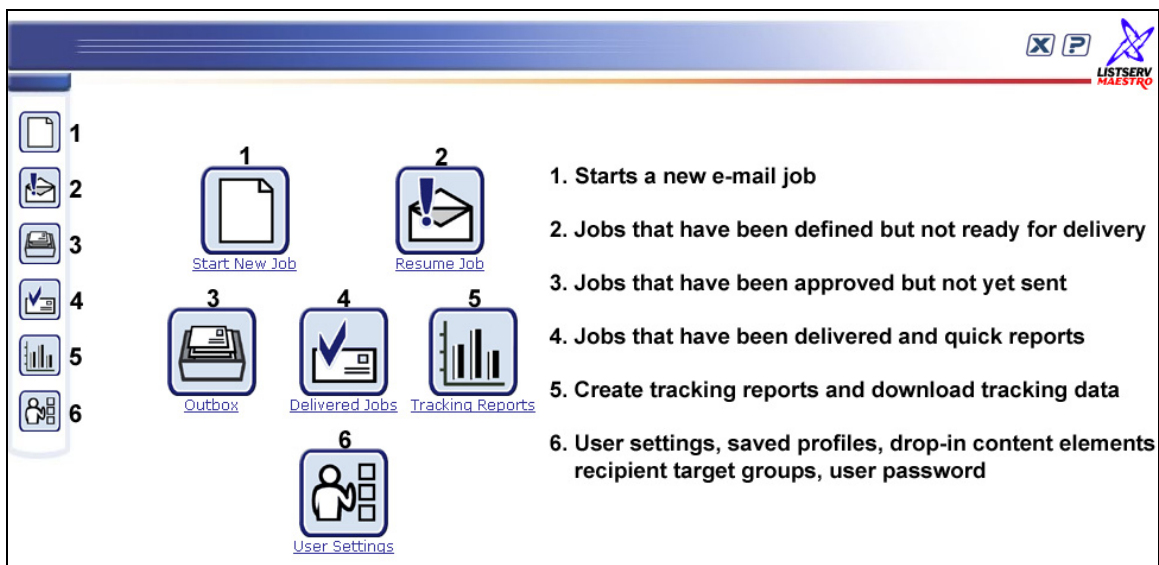


**Help** provides access to page specific online help.



LISTSERV Maestro's functionality centers on characterizing the various parts of an e-mail "job". A "job" refers to all of the elements that make up the creation, scheduling, delivery, and tracking of customized e-mail messages. Throughout LISTSERV Maestro documentation, "job" and "e-mail job" are used interchangeably and represent the same thing – the summation of the multiple functions that make up the definition and distribution of customized e-mail messages.

Figure 1 LISTSERV Maestro Home Page



The center of the opening screen of LISTSERV Maestro contains six large icons that activate the major functional areas of the program:

- **Start New Job** – Starts the definition of a new e-mail job.
- **Resume Job** – Lists all jobs that have been started but have not yet been approved for delivery. Jobs listed here can be edited.
- **Outbox** – Contains a listing of jobs that have been defined, scheduled, and approved for delivery, but have not yet been sent. The Outbox also lists jobs that have failed during delivery for some reason.
- **Delivered Jobs** – Lists all the e-mail jobs that have been delivered. From here it is possible to generate "quick reports" on a selected job.
- **Tracking Reports** – Engages the reporting wizard to produce graphs and reports from the tracking data collected from delivered messages.
- **User Settings** – Stores information about sender profiles, drop-in content elements, and recipients target groups. Also listed here are individual user preferences and change password options.

These icons are repeated along the left side of every screen for navigational purposes.

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## Section 3 The Data Administrator

Using data from an institution's database for the creation of targeted e-mail messages is one of LISTSERV Maestro's most powerful features. In order to use this feature successfully, a thorough understanding of where the data is housed and how it is organized is necessary. In many cases, the person who is creating e-mail jobs is not the person who has access to and oversees institutional data. In recognition of these different roles, and to facilitate LISTSERV Maestro's ability to communicate with databases (directly or through LISTSERV) a special account type called "Data Administrator" has been introduced.

The data administrator account can simplify and streamline the use of databases to select recipients and recipient data to the point where regular account holders do not need to know anything about how and where data is stored. To do this, the data administrator creates predefined recipients lists, complete with a name and description called "*recipients target groups*." Regular account holders can then use these target groups to select the recipients for their jobs. The data administrator builds the recipients target groups by writing SQL statements to retrieve data from a database. The data administrator also designs the methods regular users employ to select the data (in a series of check boxes, drop-down menus and/or text boxes).

There are many advantages to using recipient target groups.

- Using recipient data stored in a database can save time and system resources.
- The database can be continually updated until the time the job is sent, ensuring that the most current data is used for the job.
- Recipient target groups are shared among group members and can be reused for multiple jobs.
- Parameters can be inserted into recipient target groups so that regular account holders have some control over what recipients are retrieved from the database for each job. Using parameters also reduces the number of individual SQL statements that need to be written for jobs.
- The data administrator does not need to be involved with any other parts of e-mail jobs.
- Specific recipient target groups can be removed from use without deleting them. They can be reinstated whenever desired.
- Recipient target groups can be organized into categories for easy recognition.

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### 3.1 Data Administrator's Requirements

In order to effectively assume the role of a data administrator in LISTSERV Maestro, it is necessary to have access to and information about the systems involved. Data administrators need:

- A LISTSERV Maestro user account with the right to “*administer target group and hosted recipient data*” enabled. The LISTSERV Maestro administrator can create this type of account. For more information, see Section 9.2 Editing Account Information and Assigning Single User Settings in the LISTSERV Maestro 1.2 Administration Manual.
- In the case of LISTSERV Maestro accessing the database:
  - To know the type of database and specific name of the database used. This determines the database plugin that LISTSERV Maestro uses to communicate with the specific type of database, for example IBM DB2 or MySQL. For more information on database plugins, see Section 5.2 Registering a Database Plugin in the LISTSERV Maestro 1.2 Administration Manual.
  - Access to the database user account that is set up to work directly with LISTSERV Maestro including:  
Username and Password
  - For more information on preparing specific databases for use with LISTSERV Maestro, see Section 4.2 Preparing the Database in the LISTSERV Maestro 1.2 Administration Manual.
- In the case of LISTSERV accessing the database:
  - Database server name if not the default
  - Name of the E-mail column
  - Name of the Name column (this is optional)
  - Names of any additional columns in the database to be used for mail merging
- To understand how the institution's data is stored and organized, including table names and relationships as well as column types and names:
  - Impacts the ability to write SQL statements and parameters within SQL statements to retrieve specific data.
- Working knowledge of SQL

Being familiar with Section 5.1 Drop-In Content and Section 11.2 Creating Drop-In Content Elements in the LISTSERV Maestro 1.2 User's Manual can also be helpful to data administrators. The concepts used in defining and creating drop-in elements is very similar to defining and creating parameters in SQL statements. Both use special tags to set the name of the element or parameter off from the rest of the text. Tags for drop-ins and parameters follow very similar rules.

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## Section 4 Creating Recipients Target Groups

To create recipients target groups, the data administrator must first log into his/her account. Recipients target groups are created and saved under **User Settings** in the Maestro User Interface. Click on the bottom icon labeled **User Settings** to open “*Account specific settings.*” Click on **Recipients Target Groups** to open the “*Recipients Target Groups*” screen. This screen lists all defined target groups (if any) and provides a method to create new target groups.

Figure 2 Recipients Target Groups

The screenshot shows the 'Recipients Target Groups' interface. At the top, it says 'All defined target groups for your account.' Below this is a 'Category:' dropdown menu currently set to '<No Category>'. A scrollable table lists three target groups:

Name	Target Group Type	Description	Status	Actions
<a href="#">LISTSERV selects</a>	LISTSERV Retrieves Recipients from Database	testing LISYSERV selects from a database	Enabled	<a href="#">Copy</a> <a href="#">Delete</a>
<a href="#">Mail Type</a>	LISTSERV Maestro Retrieves Recipients from Database	Recipients preference of mail type - HTML or plain text. Appears as a check box. If checked, HTML mail will be sent. If unchecked, plain text mail will be sent. Uses "maestro_recipients_less" table in Oracle customer database	Enabled	<a href="#">Copy</a> <a href="#">Delete</a>
<a href="#">Pet Type</a>	LISTSERV Maestro Retrieves Recipients from Database	Selects recipients pet type. Appears as a single input field. Uses "maestro_recipients-less" table in Oracle customer database.	Enabled	<a href="#">Copy</a> <a href="#">Delete</a>

Below the table are links for [Delete Category](#) and [Rename Category](#). At the bottom, there is a section 'Create a new Target Group of the following type:' with a dropdown menu set to '-- Select --' and a 'Create' button.

The Recipients Target Groups screen shows the list of target groups in the selected category. Choose the category to view from the “*Category*” drop-down menu. The table below will then be refreshed to show all target groups in that category. Target groups not assigned to a specific category will be displayed under “<No Category>” in the drop-down menu. Each target group is displayed with the following information:

- **Name** – The name of the target group. The name is a clickable link used to open the target group for editing in the target group wizard.
- **Copy** – Use the **Copy** link to create a new target group as a copy of the selected one. The name of a copied target group will be listed alphabetically as “*Copy of 'original name'*”. This name can be changed when editing the target group.
- **Delete** – Click the **Delete** link to delete the selected target group.
- **Target Group Type** – Displays the type of the target group. Currently two types are supported: “*Maestro Retrieves Recipients from Database*” and “*LISTSERV Retrieves Recipients from Database*” (see Section 4.1 [Selecting the Type of Target Group](#) for more details).
- **Description** – The description of the target group.

- 
- **Status** – The current status of the target group:
    - **Incomplete** – The definition of this target group has not yet been completed. It may be partially defined and in this state while the target group administrator is still editing it.
    - **Complete** – The definition of this target group has been completed, but the target group has not been enabled for use in the recipients wizard for the recipients definition of a job. A target group in this state has been completed by the data administrator, but has not yet been enabled to allow users to select it for recipients definition, or it has been "un-enabled" by unchecking the checkbox, taking access away from normal users.
    - **Enabled** – The definition of this target group has been completed and the target group has been enabled for use in the recipients wizard. A target group in this state has been completed by the data administrator and has been enabled for use as a recipients definition.

Below the list that displays the target groups in the selected category are links to manipulate the category itself:

- **Delete Category** – Allows the currently selected category to be deleted. Only available if the current category is empty. Not available for "<No Category>".
- **Rename Category** – Allows the name of the currently selected category to be changed. Not available for "<No Category>".

## 4.1 Selecting the Type of Target Group

To create a new target group, scroll to the bottom of the screen and find the drop-down menu that says "Create a new Target Group of the following type:" There are two ways that LISTSERV Maestro can create a target group: having LISTSERV Maestro run the `SELECT` statement by directly communicating with the database, or having LISTSERV run the `SELECT` statement for DBMS backed LISTSERV installations.

- **LISTSERV Maestro Retrieves Recipients from Database** – This target group type is based on the recipients type "Select Recipients from a Database", as available in the recipients wizard during recipients definition of a job. For more information on this part of the recipients wizard, see Section 4.2.6 Selecting Recipients From a Database in the LISTSERV Maestro 1.2 User's Manual.

If this target group type is selected, the target group wizard will require that a database connection, a SQL statement, merge column headers, and duplicate elimination be entered, the same way as when using the underlying recipients type in the recipients wizard. Optionally, the SQL statement may be parameterized. Using parameters in the SQL statement allows the user to define variables in the recipient wizard when this target group is used for a recipient definition. For more information on using parameters see Section 5 [Defining Parameters](#).

- **LISTSERV Retrieves Recipients from Database** – This target group type is based on the recipients type "Let LISTSERV Select Recipients From a Database", as available in the recipients wizard during recipients definition of a job. For more information on this part of the recipients wizard, see Section 4.2.7 Letting LISTSERV Select Recipients From a Database in the LISTSERV Maestro 1.2 User's Manual.

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If this target group type is selected, the target group wizard will require that a database name, a SQL statement, and merge column headers be entered, the same way as when using the underlying recipients type in the recipients wizard. Optionally, the SQL statement may be parameterized. Using parameters in the SQL statement allows the user to define variables in the recipient wizard when this target group is used for a recipient definition. For more information on using parameters see Parameters.

Pick one of these two options and then click the **Create** button. The option selected here will determine the way the recipients target groups wizard will look and what kinds of information will be needed to complete the wizard.

## **4.2 The Recipients Target Groups Wizard**

The target groups wizard takes the data administrator through all the steps necessary to define the settings of the target group. The Recipients Target Groups Wizard is comprised of multiple screens. The top row of the wizard displays links to these screens. The screen that is currently open is marked with a highlighted background. Depending on the choices made on some of the wizard screens, other screens may become disabled or be displayed differently. If a wizard screen is disabled, it means that the screen is not necessary with the current selections and can be safely ignored.

When the wizard is entered for the first time for a newly created target group, it is necessary to click **Finish** or **Save & Exit** in the wizard to actually create the target group. Exiting the wizard by clicking **Cancel**, clicking any of the navigational icons, or by closing the browser, will not create a new target group.

If the wizard is exited by any method within an existing target group, the target group will remain, but any changes made since the last save will not be applied.

The **Finish** button is only available on the "*Summary*" screen of the wizard. The Summary screen only becomes available if the entire wizard is completed. If the wizard is closed by clicking **Finish**, then the target group will exist in the "*Complete*" or in the "*Enabled*" state, depending on whether the "*Yes, allow the definition of recipients based on this target group*" checkbox on the summary screen was selected or not.

The **Save & Exit** button is available on every screen. Clicking this button saves the current state of the wizard, allowing the data administrator to re-enter the wizard and complete the definition. This will put the target group in any of the three states "*Incomplete*", "*Complete*" or "*Enabled*," depending on whether all screens in the wizard were completed, and if "*Yes allow the definition of recipients based on this target group*" checkbox on the summary screen was selected or not.

A completed target group may be enabled at any time by entering the target groups wizard, and going directly to the Summary screen (click on the **Summary** link in the menu bar). On the Summary screen, check the box "*Yes, allow the definition of recipients based on this target group*".

Existing target groups may be edited by clicking on the name of the target group and making changes to any of the wizard screens, then clicking **Save & Exit**.

## 4.2.1 LISTSERV Maestro Selects Recipients from a Database

This target group type is based on the recipients type "*Select Recipients from a Database*", as available in the recipients wizard during recipients definition of a job. There are multiple screens that take the data administrator through the process of defining a recipients target group using LISTSERV Maestro to select recipients from a database.

### General

The "*General*" screen in the wizard defines the name, category, and description of the target group. Both name and description are mandatory. Enter a meaningful name and a good description so the regular users who are selecting target groups in the recipients wizard will have all the information they need to decide which target group to use.

Target groups can be clustered in categories, making it easier for regular users to select a target group. A category is meant to contain target groups that are related to each other. The intent of categories is to minimize the time needed to locate a specific target group. By selecting a category first, users do not need to browse through all the available target groups, but only those in the relevant category.

To add a target group to a category, select the category for the target group from the drop-down menu. To create a new category, click the **New Category** link and define a new category by entering its name into the edit field. Target group categories are optional. If no category is selected or created, target groups are placed into "<No Category>."

Figure 3 Target Groups Wizard - General

**Target Group Definition**

General Source Parameters Parameter Details Sample Data Recipients Details Duplicate Elimination Summary

Cancel Save & Exit <- Back Next ->

**General**

Enter a target group name and a description. Optionally, select a category or create a new one.

Name:  Category:  [Select Existing Category](#)

Category:  [New Category](#) **Click here to enter add a new category**

Description:

Click **Next ->** to continue.

### Source

On the Source screen of a target group where LISTSERV Maestro retrieves the recipients, select the database plugin that matches the database to be accessed. Once a selection has been made, the screen will automatically refresh with input boxes for connection parameters.

---

The Source screen may appear slightly different for each of the different compatible database types.

Next, enter the connection values required by that plugin, such as host name, database name, password, and/or TCP/IP port. These values depend on the database being accessed.

Enter the SQL statement that will be executed to retrieve the recipients in the corresponding edit box. This statement is executed using the connection data specified above. The statement may be a fixed statement or it may contain parameters that are later filled out by a regular user when this target group is used in a recipients definition. See Section 5 [Defining Parameters](#) for more information on how to parameterize the SQL statement and for details about the meaning of the opening and closing tag input fields.

At the bottom of the screen, use the option buttons to define when the SQL statement will be executed:

- **During recipient definition** – The SQL statement will be executed when this target group is used in the recipients wizard to define the recipients of a job, and when the Summary screen of that recipients wizard is entered. This means that if the user chooses this target group in the recipients wizard, then the list of the actual recipients is defined at the moment the user completes the recipients wizard. If the database content changes between that moment and the actual sending of the job, those changes will not be reflected in the list of recipients of the job.
- **Just before sending** – The SQL statement will be executed when this target group is used in the recipients wizard to define the recipients of a job at the moment before the job is actually sent. This means that if the end user chooses this target group in the recipients wizard, then the list of the actual recipients is defined at the moment the job is actually sent, which may be some time after the recipients wizard is completed. If the database content changes between the completion of the recipients wizard and the actual sending of the job, those changes will be reflected in the list of recipients of the job.



**Important:** If the database is not available during the sending of the job, the job will fail. Be sure to coordinate sending time and database maintenance time to avoid any conflicts.



Figure 4 Target Groups Wizard - Source

**Target Group Definition**

General Source Parameters Parameter Details Sample Data Recipients Details Duplicate Elimination Summary

Cancel Save & Exit <- Back Next ->

**Source**

Supply the database connection details and an SQL statement.

Database Plugin: IBM DB2 V7.2 Driver Database Plugin

Database Name: TST\_12

DB2 Server User Name: db2admin

Password: .....

SQL Statement:

```
select * from mae_recipients where  
CITY = '{{city}}'  
AND AGE = '{{age}}'  
AND GENDER = '{{age}}'
```

Type in the select statement here

Parameter placeholders in the SQL statement are enclosed by the following tags:  
Opening Tag: {{ Closing Tag: }}

The recipients will be retrieved:  During recipient definition  Just before sending

**Decide when the recipients will be retrieved from the database**

Click **Next ->** to continue.

## Parameters

If parameters are part of the SQL statement on the Source screen, they will need to be further defined on the Parameters screen. All parameters appear as clickable links. Parameters highlighted in yellow are undefined, and parameters appearing as normal links have already been defined. Click on any parameter, highlighted or not, to select it. Fill out the parameter's initial definition, or edit an existing definition in the lower part of the screen. The definition of the parameters made here will affect the choices that the end user will have when using this target group in the recipients wizard. For more information on creating parameters, and the different parameter types, see Section 5 [Defining Parameters](#).

Figure 5 Target Groups Wizard – Parameters

**Target Group Definition**

General Source **Parameters** Parameter Details Sample Data Recipients Details Duplicate Elimination Summary

Cancel Save & Exit <- Back Next ->

**Parameters**

Enter the necessary details (input type and further validation rules) for each of the parameters in the SQL statement.  
Click the parameter link in the SQL statement to select the parameter for editing.

SQL Statement: select \* from mae\_recipients where CITY = '{{city}}' AND AGE = '{{age}}' AND GENDER = '{{gen}}'

**Parameter Details**

Parameter: city  
Label: City  
Description: City of residence (optional)  
Input Type: Selection List (Single Value)  
 Specify list entries manually  Retrieve list entries from database

SQL Statement:  
select distinct CITY from mae\_recipients

The label appears to the end user to identify what input is required

A description can appear after the input to assist the end user

Select the type of input that appears to the regular user

Specify whether to type the list entries in manually or have them retrieved from the database

Once a label and an optional description have been entered, select the input type of the parameter. There are four different types of input for parameters, check box, edit field, selection list, and date and/or time.

### Parameter Details

The Parameters Details screen defines additional information about target group parameters and allows the data administrator to arrange the order of the parameter presentation on the screen.

If one or more parameters are of the type “Restrict values(s) to floating point numbers” the decimal separator that the database uses needs to be defined. This will be either a dot (period) “.” or a comma “,”. The selection of dot or comma here only defines how the floating point number will be formatted for replacement in the SQL statement. In the recipients wizard, the end user will always use a dot as the decimal separator when entering a floating point number.

Figure 6 Parameter Details

The screenshot shows the 'Parameter Details' screen within the 'Target Group Definition' wizard. The top navigation bar includes links for 'General', 'Source', 'Parameters', 'Parameter Details' (which is highlighted), 'Sample Data', 'Recipients Details', 'Duplicate Elimination', and 'Summary'. Below the navigation bar are buttons for 'Cancel', 'Save & Exit', '<- Back', and 'Next ->'. The main content area is titled 'Parameter Details' and contains the instruction: 'Supply additional information about the target group parameters.' There are two sections: 'Decimal Separator' with a dropdown menu set to 'Dot (.)' and a note: 'Select Dot (.) or Comma (,) as the decimal separator for any parameters that have floating point numbers.'; and 'Parameter Presentation Order' with a list box containing 'city (City)', 'gen (Gender)', and 'age (Age)', and 'Up'/'Down' buttons. A note states: 'Use the Up and Down links to change the order of the parameters on the screen.'

Click **Next ->** to continue.

### Sample Data

The next screen in the target groups wizard is called “*Sample Data*.” The screen will appear as it would to regular users who are selecting recipients using this target group in the define recipients wizard. Use this screen to verify order, labels, descriptions, parameter types, and values. If the order of the parameters needs to be changed, click the **<- Back** button. If labels or descriptions need to be changed, click the **Parameters** link in the top links bar to re-enter the Parameters screen.

When the Sample Data screen is displayed, any SQL statements that are required to determine the values of single selection or multiple selection lists are executed. By executing the SQL statements, the drop-down lists or multi-line lists are filled in with values that can be selected.

Using the selections lists, checkboxes, input fields, and/or date fields, make selections for each parameter type on the sample data screen. Click **Next ->** to continue.

Figure 7 Target Groups Wizard - Sample Data

The screenshot shows the 'Sample Data' screen within the 'Target Group Definition' wizard. The top navigation bar includes links for 'General', 'Source', 'Parameters', 'Parameter Details', 'Sample Data' (which is highlighted), 'Recipients Details', 'Duplicate Elimination', and 'Summary'. Below the navigation bar are buttons for 'Cancel', 'Save & Exit', '<- Back', and 'Next ->'. The main content area is titled 'Sample Data' and contains the instruction: 'Please enter valid input values for the target group parameters.' There are three input fields: 'City of residence:' with a dropdown menu set to 'New York', 'Gender:' with a dropdown menu set to 'Male', and 'Age:' with a text input field containing '50'.

---

The values entered in the Sample Data screen are used to fill out the actual target group SQL statement the same way as it will later happen in the recipients wizard. The SQL statement will be executed and retrieve up to ten sample recipients that will be displayed on the next screen, "Recipients Details." The "filled out" statement will be displayed on the Summary screen of the wizard as further verification that the statement and the parameters are correct.



If this is the first time the target groups wizard is engaged for a new target group definition, be sure and click **Save & Exit** to save all previous work on the target group if it is necessary to close the wizard before the Summary screen is reached.

## Recipients Details

The Recipients Details screen specifies how the headers from the recipients data will be used. It is necessary to decide whether additional data will be used for mail merging and tracking, define which column contains the e-mail address, and to edit the column headers, if necessary.

The Recipients Details screen is split into three sections to accommodate the data administrator. At the top of the screen, under "Usage of Recipients Data," use the option buttons to select one alternative:

- **Use additional recipient data for mail merging and tracking** – All recipient data column headers can be used in the text of the message as merge fields in the form "&NAME;". For more information on merge fields see Section 5.6 Merge Fields and Conditional Blocks in the LISTSERV Maestro 1.2 User's Manual. Bulk sending of the mail is not possible with this option.
- **Ignore additional recipient data and send job as bulk e-mail** – The job is sent as bulk e-mail (which might be slightly more efficient). However, in this case, mail merging in the text of the message is not possible. All recipient columns except for the e-mail column will be ignored (see below).

In the middle section of the screen under "Recipient Identification Columns," specify which of the recipients columns contains the e-mail addresses that will be used for delivery. Select the matching column name from the drop-down menu.

If the "Use additional recipient data for mail merging and tracking" option was selected, it becomes possible to also select the column that contains the recipients' names from the corresponding drop-down menu. This is an optional selection, but if chosen, the names will be included in the "To:" field of each individual message, making the mail more personalized.

Choosing the "Use additional recipient data for mail merging and tracking" option also allows the headers of all columns to be edited. This might be required if the column headers do not match the names that are used as the merge fields. For example, if the table happens to have "non-meaningful" headers such as "COL1, ... COLn", then they can be renamed here to give them more meaningful names. This makes it much easier to use them for mail merging. Changing the header names in LISTSERV Maestro does not in any way affect the actual database table; it only renames the columns for the purposes of LISTSERV Maestro's mail merging.

Choosing the "Ignore additional recipient data and send job as bulk e-mail" option requires that the values for the "To:" field are entered manually. Since with bulk sending all recipients

receive exactly the same mail content (including all mail headers), it is not possible to have different "To:" fields for different recipients (just as it is not possible to have mail merging). However, some sort of "To:" field is required. Following e-mail standards, it must contain an e-mail address (usually of the recipient) and, optionally, a name. Since all recipients will be getting the same "To:" field value, it cannot contain an actual recipient's address or name. Therefore, with such bulk jobs, it has become common practice to input a generalized e-mail address of your own organization – probably the sender address or an "info" address, with a matching name. An example of this practice might be "info@mycorp.com" as the address and "Your MyCorp Team" as the name. Input values that fulfill institutional or company requirements into the matching edit fields. With this option selected column headers cannot be renamed, but that is not necessary, since mail merging is disabled.

Figure 8 Target Groups Wizard - Recipients Details

**Target Group Definition**

General Source Parameters **Parameter Details** Sample Data **Recipients Details** Duplicate Elimination Summary

Cancel Save & Exit <- Back Next ->

**Recipients Details**

Select the columns in the recipient data containing the e-mail address and name.

**Usage of Recipients Data**

Use additional recipient data for mail merging and tracking  
 Ignore additional recipient data and send job as bulk e-mail  
(No mail merging possible, only "blind" tracking possible)

**Recipient Identification Columns**

Select the columns that identify the recipients e-mail address and name:

E-mail Column: EMAIL\_ADDRESS  
 Name Column: F\_NAME (optional)

**Header Definition**

F_NAME	L_NAME	EMAIL_ADDRESS	MODEL_NUM	PET
Xavier	Xero	Xavier@maestro-demo.lsoft.com	5454	bird

## Duplicate Elimination

On the Duplicate Elimination screen, define how duplicate recipients that may exist in the database will be handled. Choose between the following options:

- **Do not remove duplicates** – All recipients retrieved by the SQL query will be used for delivery, even if some of them are duplicates.
- **Remove duplicates with the same e-mail addresses** – If the list of recipients retrieved by the SQL query contains entries with the same e-mail address, then only the first of these entries will be used for delivery, the others will be ignored.
- **Use my list of columns to determine duplicates** – If the list of recipients retrieved by the SQL query contains entries with the same values in all of the columns selected in the column list below this option, they will be considered duplicates. Only the first of instance of each will be used for delivery; the others will be ignored. Select the columns that will

be considered for this comparison from the list. Use SHIFT and CTRL to select multiple entries.

The recipient sample at the bottom of the screen is displayed to make it easier to understand the contents of each column. This will assist with deciding which columns to be considered for comparison and which not to be considered.

Figure 9 Target Groups Wizard - Duplicate Elimination

**Target Group Definition**

General Source Parameters Parameter Details Sample Data Recipients Details Duplicate Elimination Summary

Cancel Save & Exit <- Back Next ->

**Duplicate Elimination**

To avoid unnecessary and, in most cases, unwanted double messages to the same recipient, use this page to remove duplicates from your recipient data.

**Duplicate Elimination Options**

Do not remove duplicates

Remove duplicates with the same e-mail address

Use my list of columns to determine duplicates

F\_NAME  
L\_NAME  
EMAIL\_ADDRESS  
MODEL\_NUM

**Recipient Sample**

F_NAME	L_NAME	EMAIL_ADDRESS	MODEL_NUM	PET
Xavier	Xero	Xavier@maestro-demo.Isoft.com	5454	bird



Removing duplicates from recipient data can be a useful way to ensure that multiple messages are not sent to the same recipient. It is common practice for one person to have more than one e-mail address, for example, a work e-mail address and a personal e-mail address. By creatively selecting one or more criteria to remove duplicates, it is possible to avoid sending multiple messages to the same person with different e-mail addresses. Similarly, several recipients may use the same e-mail address, for example, family members sharing an ISP may also share an e-mail address. In this case, it might be desirable to send multiple messages to the same address shared by multiple recipients, but addressed to each individual using the e-mail account.

## Summary

The Summary screen displays all the important details about the target group for verification. The screen is split into categories listing the relevant details for each part of the target group. A target group that has been created by the data administrator is not automatically enabled for use in the recipients wizard. The data administrator must explicitly enable the use of each target group. Target groups need to be enabled individually, giving the target group administrator control over the use of each target group. This way, groups can be created in advance, and only enabled when needed. Similarly, target groups can be disabled, preventing users from accessing them, without permanently deleting them.

To enable a target group, check the box labeled “Yes, allow the definition of recipients based on this target group.” located under the first category, “General Information.” Target groups that are enabled meet all the requirements for the definition of recipients, and they are available for use in the recipients wizard.

To disable a target group, uncheck the box labeled “Yes, allow the definition of recipients based on this target group.” This will put the target group into a state called "Complete," where all the requirements for the definition of recipients are met, but the target group is not released for use in the recipients wizard.

Figure 10 Target Groups Wizard - Summary

**Target Group Definition**

General Source Parameters Parameter Details Sample Data Recipients Details Duplicate Elimination Summary

Cancel Save & Exit <- Back Finish

**Summary**

This page summarizes the settings specified for this target group definition.

**General Information**

Name: city, age, gender  
 Description: city of residence, age and gender from mae\_recipients in DB2  
 This target group definition meets all requirements necessary for the definition of recipients.  
 Yes, allow the definition of recipients based on this target group.

**SQL Statement and Parameters**

SQL Statement: `select F_NAME, L_NAME, EMAIL_ADDRESS, INTEREST1, INTEREST2 from mae_recipients where CITY='{{city}}'  
 AND GENDER='{{gen}}'  
 AND AGE={{age}}`

Parameters:

Name	Label
city	City of residence
gen	Gender
age	Age

**Recipients Statistics**

The recipients will be retrieved: During recipient definition  
 SQL Statement: `select F_NAME, L_NAME, EMAIL_ADDRESS, INTEREST1, INTEREST2 from mae_recipients where CITY='New York'  
 (with replaced sample parameter values) AND GENDER='m'  
 AND AGE=50`

E-Mail Column: EMAIL\_ADDRESS (contains valid e-mail addresses)  
 Name Column: F\_NAME  
 Usage of Recipients Data: Used for mail merging and tracking

**Duplicate Elimination**

Selected Duplicate Elimination: Use my list of columns to determine duplicates

**Recipients Sample**

F_NAME	L_NAME	EMAIL_ADDRESS	MODEL_NUM	PET
Xavier	Xero	Xavier@maestro-demo.lsoft.com	5454	bird

## 4.2.2 LISTSERV Selects Recipients from a Database

This target group type is based on the recipients type "Let LISTSERV Select Recipients From a Database", as available in the recipients wizard during recipients definition of a job. There are multiple screens that take the data administrator through the process of defining a recipients target group using LISTSERV to select recipients from a database. LISTSERV Maestro to select recipients from a database.

---

## General

The “*General*” screen in the wizard defines the name, category, and description of the target group. Both name and description are mandatory. Enter a meaningful name and a good description so the regular users who are selecting target groups in the recipients wizard will have all the information they need to decide which target group to use.

Target groups can be clustered in categories, making it easier for regular users to select a target group. A category is meant to contain target groups that are related to each other. The intent of categories is to minimize the time needed to locate a specific target group. By selecting a category first, users do not need to browse through all the available target groups, but only those in the relevant category.

To add a target group to a category, select the category for the target group from the drop-down menu. To create a new category, click the **New Category** link and define a new category by entering its name into the edit field. Target group categories are optional. If no category is selected or created, target groups are placed into “<No Category>.”

Figure 11 Target Groups Wizard - General

**Target Group Definition**

General Source Parameters Parameter Details Sample Data Recipients Details Summary

Cancel Save & Exit <- Back Next ->

**General**

Type the name of the new category here

Enter the target group name and the description. You may optionally supply a category.

Name: Type in descriptive name Category: Web signup form data Select Existing Category

Category: LISTSERV selects **New Category** Click here to enter add a new category

Description: Descriptions should assist the regular users in selecting the most appropriate target group for their jobs.  
Selects CITY, AGE, and GENDER from the Web signup form database on special interests.

Click **Next ->** to continue.

## Source

On the Source screen of a target group where LISTSERV retrieves the recipients from a database, enter the database server if the default database as configured in LISTSERV is not going to be used. For more information about configuring databases for LISTSERV, see Section 4 DBMS and Mail-Merge Support in the 1.8 e LISTSERV Developers Manual.

Enter the SQL statement in the corresponding edit box. The statement may be a fixed statement or it may contain parameters that are later filled out by a regular user when this target group is used in a recipients definition.



If parameters are being used, opening and closing tags are used to denote the parameter. The tags can be changed from their default values of opening “{” and closing “}” curly brackets by entering other characters in the corresponding boxes. The quote character and an escaped quote character used by the database to enclose string literals also needs to be entered in the corresponding boxes. See Section 5 [Defining Parameters](#) for more information on how to parameterize the SQL statement and for details about the meaning of the opening and closing tag input fields.

Figure 12 Target Groups Wizard – Source

The screenshot shows the 'Target Group Definition' wizard with the 'Source' tab selected. The 'Source' section contains a text box for the 'Database Server' (optional) and a larger text box for the 'SQL Statement'. The SQL statement is: `select * from mae_recipients where city='{{city}}'`. Below the SQL statement, there are input fields for 'Opening Tag' (default: {{), 'Closing Tag' (default: }}), 'Quote' (default: '), and 'Escaped Quote' (default: '). The wizard has navigation buttons: 'Cancel', 'Save & Exit', '<- Back', and 'Next ->'. The 'Next ->' button is highlighted.

Click **Next ->** to continue.

## Parameters

If parameters are part of the SQL statement on the Source screen, they will need to be further defined on this screen. All parameters appear as clickable links. Parameters highlighted in yellow are undefined, and parameters appearing as normal links have already been defined. Click on any parameter, highlighted or not, to select it. Fill out the parameter’s initial definition, or edit an existing definition in the lower part of the screen. The definition of the parameters made here will affect the choices that the end user will have when using this target group in the recipients wizard. For information on creating parameters and the different parameter types available, see Section 5 [Defining Parameters](#).

Figure 13 Target Groups Wizard – Parameters

Once a label and an optional description have been entered, select the input type of the parameter. There are four different types of input for parameters, check box, edit field, selection list, and date and/or time.

### Parameter Details

The Parameters Details screen defines additional information about target group parameters and allows the data administrator to arrange the order of the parameter presentation on the screen.

If one or more parameters are of the type “*Restrict values(s) to floating point numbers*” the decimal separator that the database uses needs to be defined. This will be either a dot (period) “.” or a comma “,”. The selection of dot or comma here only defines how the floating point number will be formatted for replacement in the SQL statement. In the recipients wizard, the end user will always use a dot as the decimal separator when entering a floating point number.

Figure 14 Parameter Details

The screenshot shows the 'Parameter Details' screen within the 'Target Group Definition' wizard. At the top, there is a navigation bar with links for 'General', 'Source', 'Parameters', 'Parameter Details' (which is highlighted), 'Sample Data', 'Recipients Details', and 'Summary'. Below the navigation bar are buttons for 'Cancel', 'Save & Exit', '<- Back', and 'Next ->'. The main content area is titled 'Parameter Details' and contains the instruction: 'Supply additional information about the target group parameters.' There are two sections: 'Decimal Separator' and 'Parameter Presentation Order'. The 'Decimal Separator' section has a dropdown menu set to 'Dot (.)' and a note: 'Select Dot (.) or Comma (,) as the decimal separator for any parameters that have floating point numbers.' The 'Parameter Presentation Order' section shows a list of parameters: 'city (City)', 'gen (Gender)', and 'age (Age)'. To the right of this list are 'Up' and 'Down' buttons, which are circled in red. A note next to them says: 'Use the Up and Down links to change the order of the parameters on the screen.'

Click **Next ->** to continue.

## Sample Data

The next screen in the target groups wizard is called “*Sample Data*.” The screen will appear as it would to regular users who are selecting recipients using this target group in the define recipients wizard. Use this screen to verify order, labels, descriptions, parameter types, and values. If the order of the parameters needs to be changed, click the **<- Back** button. If labels or descriptions need to be changed, click the **Parameters** link in the top links bar to re-enter the Parameters screen.

Using the selections lists, checkboxes, input fields, and/or date fields, make selections for each parameter type on the sample data screen. Click **Next ->** to continue.

Figure 15 Sample Data

The screenshot shows the 'Sample Data' screen within the 'Target Group Definition' wizard. At the top, there is a navigation bar with links for 'General', 'Source', 'Parameters', 'Parameter Details', 'Sample Data' (which is highlighted), 'Recipients Details', and 'Summary'. Below the navigation bar are buttons for 'Cancel', 'Save & Exit', '<- Back', and 'Next ->'. The main content area is titled 'Sample Data' and contains the instruction: 'Please enter valid input values for the target group parameters.' There are three input fields: 'City of residence:' with a dropdown menu set to 'New York', 'Gender:' with a dropdown menu set to 'Male', and 'Age:' with a text input field containing '50'.

The values entered in the Sample Data screen are used to fill out the actual target group SQL statement the same way as it will later happen in the recipients wizard. The “filled out” statement will be displayed on the Summary screen of the wizard as further verification that the statement and the parameters are correct.



If this is the first time the target groups wizard is engaged for a new target group definition, be sure and click **Save & Exit** to save all previous work on the target group if it is necessary to close the wizard before the Summary screen is reached.

## Recipient Details

When LISTSERV selects recipients from a database the screen is split into two sections, “*Recipient Identification Columns*” and “*Additional Merge Columns*.”

Under “*Recipient Identification Columns*” specify which of the recipients columns in the database contains the e-mail addresses that will be used for delivery. Type the column name in the corresponding edit box. Optionally, specify which of the recipient columns in the database contains the names of the recipients by typing the column name in the corresponding edit box. If a column name is entered, the names of the recipients will be included in the “To:” field of each individual message, making the mail more personalized.

If other data in the database is going to be used for mail merging, it is necessary to identify each of the column names. Under “*Additional Merge Columns*” type each column name in the corresponding edit box, one name per row. Mail merging is optional, but if employed, other recipient data can be used in the message making it more personal. For more information on using merging fields, see the LISTSERV Maestro 1.2 User’s Manual, Section 5.6 Merging Fields and Conditional Blocks.

Figure 16 Recipient Details for LISTSERV Selects Recipients from a Database

**Target Group Definition**

General Source Parameters **Recipients Details** Sample Data Summary

Cancel Save & Exit <- Back Next ->

**Recipients Details**

Specify the names of the recipient identification and additional merge columns.

**Recipient Identification Columns**

Select the names of the columns that identify the recipients e-mail address and name:

E-mail Column:

Name Column:  (optional)

**Additional Merge Columns**

Enter the names of the additional columns that will be used for mail merging (one per row):

Merge Columns:  (optional)

AGE  
INTEREST1  
INTEREST2

## Summary

The Summary screen displays all the important details about the target group for verification. The screen is split into categories listing the relevant details for each part of the target group. A target group that has been created by the data administrator is not automatically enabled for use in the recipients wizard. The data administrator must explicitly enable the use of each target group. Target groups need to be enabled individually, giving the target group administrator

control over the use of each target group. This way, groups can be created in advance, and only enabled when needed. Similarly, target groups can be disabled, preventing users from accessing them, without permanently deleting them.

To enable a target group, check the box labeled “Yes, allow the definition of recipients based on this target group.” located under the first category, “General Information.” Target groups that are enabled meet all the requirements for the definition of recipients, and they are available for use in the recipients wizard.

To disable a target group, uncheck the box labeled “Yes, allow the definition of recipients based on this target group.” This will put the target group into a state called “Complete,” where all the requirements for the definition of recipients are met, but the target group is not released for use in the recipients wizard.

Figure 17 LISTSERV Selects from a Database - Summary

The screenshot shows the 'Target Group Definition' wizard with the 'Summary' tab selected. The interface includes a navigation bar with tabs for 'General', 'Source', 'Parameters', 'Parameter Details', 'Sample Data', 'Recipients Details', and 'Summary'. Below the navigation bar are buttons for 'Cancel', 'Save & Exit', '<- Back', and 'Finish'. The main content area is titled 'Summary' and contains the following information:

**Summary**  
This page summarizes the settings specified for this target group definition.

**General Information**  
Name: Opt-in-date  
Description: OPT in date for recipients  
This target group definition meets all necessary requirements for the definition of recipients.  
 Yes, allow the definition of recipients based on this target group.

**SQL Statement and Parameters**  
Database Server: <default>  
Quote Character: '  
Escaped Quote: ''  
SQL Statement: `select * from mae_recipients where opt_in_date='{{optin}}'`

Parameters:

Name	Label
optin	enter the opt-in date

**Recipients Statistics**  
SQL Statement: `select * from mae_recipients where opt_in_date='2003-'`  
(with replaced sample parameter values)  
E-Mail Column: EMAIL\_ADDRESS

## Section 5 Defining Parameters

Parameters are the placeholders within the SQL statement that are replaced with values chosen by a regular user during the recipient definition of the job. By using parameters, the data administrator can use the same basic SQL statement for many jobs, turning over the details to the regular user, who can use them without having to know anything about the actual SQL that lies behind the target group, or even know SQL in general. This saves time and effort for all team members. It also allows group members to share the same target groups, while permitting each target group to be used to create different recipient definitions for individual jobs.

---

## 5.1 Fixed and Parameterized SQL Statements

A SQL statement for a target group can either be a "fixed" statement, or a parameterized statement. A fixed statement contains SQL code that is fixed, meaning that it will be used in the same form every time it is used with the target group. For example:

```
select * from recipients
```

Or more complex:

```
select email, name, city from recipients where age >= 30 and age <= 39
```

Such a fixed statement will always yield the same results regardless of the circumstances of how the target group is used (as long as the actual database content does not change). A fixed statement is useful, but only for certain circumstances. The first example given here would simply select all entries from a certain table. If that is the required behavior, then a fixed statement is the correct statement type to use.

The second example selects only those recipients that are in their thirties (age >= 30 and <= 39). This is very limiting. Targeting a different age group would necessitate creating a new target group with a different SQL statement. In fact, with fixed statements, every different age group would require its own target group and SQL statement. Setting up these fixed statements would involve a lot of work for the LISTSERV Maestro data administrator, as well as take away flexibility for the end users.

Using a parameterized statement can save time and effort as well as giving end users more flexibility in selecting recipients. A parameterized statement contains placeholders in the SQL code that are replaced by the end user, who uses the target group for the actual recipients definition. These placeholders are not "real" SQL code, but a sort of "meta" code. By using placeholders, parts of the SQL statement that are not yet "known" can be defined at the moment the SQL statement is entered into the system. These placeholders are then replaced with actual values before the statement is executed. (This behavior is very similar to the use of Drop-In Content elements as described in Section 5.1 Drop-In Content in the LISTSERV Maestro 1.2 User's Manual.)

Continuing with the example above, using placeholders makes it possible to create a parameterized SQL statement that selects all recipients of a certain age range. The end user who employs the target group in a recipients definition is left with the decision of what age range to use when creating the recipients definition. This example shows how the actual age range values are replaced with placeholders "{{from}}" and "{{to}}":

```
select email, name, city from recipients where age >= {{from}} and age <= {{to}}
```

### 5.1.1 Parameter Placeholders

A placeholder is any string of characters that appears between special opening and closing tags. By default, the opening tag is "{" and the closing tag is "}". Everything surrounded by these two tags will be treated as parameter placeholders, and not as part of the actual SQL statement. Different tags can be defined if the default tag strings are used somewhere else in the statement and therefore cannot be recognized as placeholder tags. Enter different tags in the two edit boxes below the SQL statement input field on the Source screen. See Figure 4 for the exact location of the edit boxes.

---

Parameter placeholders must follow these specific rules to function correctly:

- Any occurrence of a pair of the currently defined opening and closing tags will be interpreted as a placeholder. The opening and closing tags themselves are also considered part of the placeholder. The text between the tags is considered the parameter name.
- Any string of characters can be used between the tags, becoming the parameter name.
- The same parameter name can be used for several placeholders (with certain restrictions, see below). In this case, they are simply considered multiple occurrences of the same parameter, all of which will be replaced with the same value once the placeholders are replaced with the regular user's selection.
- A placeholder can be used in any position in the SQL statement. The most common locations for placeholders, however, are in comparisons in the where-clause of the statement.
- A placeholder that is not enclosed with string literal quotes (as in "age >= {{from}}") is considered an integer parameter because the entire placeholder is replaced with the value (so that it becomes, for example "age >= 30"). The value must be an integer; otherwise the execution of the statement will result in an error or in unexpected results.
- A placeholder that is enclosed with string literal quotes (as in "city = '{{name}}'") is considered a non-integer parameter (a string or floating-point). Here, the entire placeholder, but not the enclosing quotes, is replaced. The example becomes "city = 'New York'", and the value may be any string.

Any occurrences of the quote character itself in the value will automatically be escaped. For example, a placeholder is defined as "lastname = '{{name}}'" and a last name of O'Brian occurs within a row (value of "O'Brian"). After replacement, the resulting data would automatically become "lastname = 'O'Brian'" (or whatever escape of the quote character is the correct one for the database in use). Do not define values with quote characters already escaped, since that would lead to a double-escaped character.

- Placeholders in in-clauses require special attention. An in-clause is a SQL construct that allows an OR comparison with a range of values. Instead of writing "value = x or value = y or value = z" it is possible to write "value in (x,y,z)", enumerating the possible values in a comma separated list within parenthesis.

To parameterize this, use a placeholder instead of this comma separated list, as with "value in ({{arg}})" or in the quoted form "value in ('{{arg}}')". Both forms are very similar. The placeholder will be replaced with a comma separated list representing all choices the user makes. Do not include a whole list of placeholders, but only a single placeholder. This single placeholder is then be replaced by the list of the choices the user makes.

If the non-quoted form is chosen, then the choices are also not quoted, so they must be integer values. If the quoted form is chosen, then all choices will be quoted (each one separately) and any quotes appearing in a choice value will automatically be escaped.

Here are some examples:

Assume "value in ({{arg}})" and that the user selected the choices "1", "5", "23" and "412". This will result in a replacement like this: "value in (1,5,23,412)".

Assume "lastname in ('{{arg}}')" and that the user selected the choices "Miller", "O'Brian" and "Wagner". This will result in a replacement like this: "lastname in ('Miller','O'Brian','Wagner')".

- Two placeholders that have the same parameter name must also have the same integer/non-integer type. You cannot define an integer parameter and use the same parameter name for a non-integer parameter, or vice versa.
- Two placeholders that have the same parameter name must also have the same in-clause/non-in-clause type. You cannot define a parameter inside of an in-clause and use the same parameter name for a parameter outside of an in-clause, or vice versa.

## 5.2 Available Parameter Types

There are four basic parameter types, check box, edit field, selection list, and date and/or time. Each parameter type is only available for certain types of select statements. Table 2 summarizes which parameter types are available for which kinds of statements.

Table 2 Available Parameter Types for Select Statements

Available Parameter Types	Integer values outside any in-clause	Integers values inside an in-clause	Non-integer values (quoted) outside any in-clause	Non-integer values (quoted) inside an in-clause
Check Box	X		X	
Edit field single value	X		X	
Edit field multiple values		X		X
Selection list single value	X		X	
Selection list multiple values		X		X
Date and/or time			X	

### 5.2.1 Parameter Type Checkbox

This parameter type appears as a checkbox on the end user's screen. The checkbox has two associated values, one for the "checked" state and one for the "unchecked" state. Enter these values accordingly – they need to be different values.



Depending on the input from the user (if the box is checked or not), one or the other value will be used directly to replace the parameter placeholder. If the parameter placeholders were not quoted, then only integers can be entered as the two values. If the parameter placeholders were quoted, then any string can be entered for the values, and all occurrences of the quote character in these will be escaped automatically before the replacement. Remember do not escape quotes when entering the values.

Figure 18 Parameter Type Checkbox – Data Administrator's View

Figure 19 Parameter Type Checkbox – End User's View

## 5.2.2 Parameter Type Edit Field

This parameter type appears as a free input field on the end user's screen. The input is validated according to the sub-selection:

- "Restrict value(s) to integer numbers" – Only integer numbers are accepted as input.
- "Restrict value(s) to floating point numbers" – Only numbers (integer or floating point) are accepted.
- "Allow free text input" – Any kind of input (including numbers or text) is accepted.

The input from the end user will be used directly to replace the parameter placeholder. If the parameter placeholder was quoted, then all occurrences of the quote character in the user input will be automatically escaped before the replacement.

There are two versions of the Edit Field parameter type – single value and multiple values. In the single value version, the input field will be a one line input field, and the value entered by the end user will be the value used to replace the placeholder. This type is only available if the matching placeholder is not inside of an in-clause context. In the multiple values version, the input field will be rendered with multiple lines, and the end user may enter several lines of text. Each line will be interpreted as a separate value, and the placeholder will be replaced with a comma separated list of all values (of all lines). Empty lines will be ignored. This type is only available if the matching placeholder is inside of an in-clause context.

Figure 20 Parameter Type Edit Field, Single Value - Data Administrator's View

**Parameters**

Enter the necessary details (input type and further validation rules) for each of the parameters in the SQL statement.  
Click the parameter link in the SQL statement to select the parameter for editing.

SQL Statement: `select email_address, f_name, l_name, age, gender from mae_recipients where interest1='{{modelnum}}'`

**Parameter Details**

Parameter: modelnum

Label:

Description:  (optional)

Input Type:

Validation rule to apply on the input values:

- 
- 
- 
- 

Figure 21 Parameter Type Edit Field, Single Value – End User's View

**Define Recipients**

[Options](#) [Source](#) [Source Details](#) [Recipients Details](#) [Summary](#)

**Input Values for Target Group Parameters**

Enter values for all parameters of the selected target group.

Enter the model number here:

### 5.2.3 Parameter Type Selection List

This parameter type appears as a selection list with multiple entries on the end user's screen. If the parameter is in an in-clause, the list is rendered as a multi-line list field, and the end user may select multiple entries by holding down the `SHIFT` or `CTRL` key. Otherwise, the list is rendered as a drop-down list and the end user may select only a single entry.

---

For parameters where LISTSERV Maestro selects from a database, the entries in the selection list can be specified in two ways. They can be specified manually on this wizard screen or a SQL statement can specify them. The SQL statement will then be used to retrieve the values that will appear in the list from the database. Use the option buttons to choose between the two methods. For parameters where LISTSERV selects from a database, all entries must be specified manually on this wizard screen.

### Manual specification

Each value consists of two parts, the visible text in the selection list, that is the text that the end user actually sees in the list, and the invisible value associated with that entry. This invisible value, associated with the entry selected by the end user, will be used directly to replace the parameter placeholder. If the parameter placeholder was not quoted, then only integers can be used as the internal value of each entry. If the parameter placeholder was quoted, then any string can be entered for the internal values, and all occurrences of the quote character in these will be escaped automatically before the replacement. Do not escape quotes when entering the values.

To add a new entry, click on the **New** link to the right of the list. Enter the visible text into the left edit fields, and the internal value into the right field. Click on **Save Entry**. The new entry will be added to the list.

To modify an existing entry, simply select the entry in the list, then edit its visible text and/or internal value in the two edit fields above and click **Save Entry** to save the changes. The entry will be updated accordingly.

To change the ordering of the entries, select the entry to move and click **Up** or **Down** to move it in the list. To delete an entry select it and click **Delete**.

Figure 22 Parameter Type Selection List, Manual Specification – Data Administrator's View

**Parameters**

Enter the necessary details (input type and further validation rules) for each of the parameters in the SQL statement.  
Click the parameter link in the SQL statement to select the parameter for editing.

SQL Statement: `select F_NAME, L_NAME, EMAIL_ADDRESS, INTEREST1, INTEREST2 from mae_recipients where CITY='{{city}}'`

**Parameter Details**

Parameter: city

Label:

Description:  (optional)

Input Type:

Specify list entries manually  Retrieve list entries from database

Text in Selection List  Internal Parameter Value

- Albany
- Baltimore
- Brooklyn
- Buffalo
- Carson City
- Chicago
- Dublin

Figure 23 Parameter Type Selection List – End User's View

### Database specification

Enter a SQL statement into the edit box. This statement will be executed with the same connection parameters that were specified on the Source screen of the wizard. The result set retrieved will be used to populate the selection list. The values from the first column of the result set will be used as the visible text of the selection list entries. If there is a second column in the result set, its values will be used as the internal values for the entries. If there is no second column, then the values from the first column will be used both for the visible text and the internal values. Any further columns in the result set are ignored.

Make sure that the internal values match the quote context of the parameter. If the parameter placeholder is not quoted, then the internal values must be integer values (that is the values from the second result set column, or the ones from the first column, if there is only one column). If the values are not integers, then the parameter placeholder must be quoted (any necessary escaping of quotes in the values will happen automatically).

This option is very useful if it is not possible or desirable to enter all the selection values by hand. There may be many different selections, and some of the values may not yet be known. For example, think of a target group that has the city where a recipient lives as one of the parameters in order to do mailings limited to the residents of a certain city:

```
select * from recipients where city='{{name}}'
```

If this parameter is assigned the type "Selection List" all possible cities could be entered manually. But, this approach requires a lot of work, and all the possible cities may not yet be known. Another drawback to using this approach is that the list would have to be updated manually each time a recipient from a new city is entered into the database. To avoid all this time and effort, use an SQL statement like:

```
select distinct city from recipients order by city
```

This statement accesses the same table as the target group itself (see the first SQL statement above) using the same database connection settings. It generates exactly one column that

contains all cities that are currently in the city column in the table, in alphabetical order. The end user can then simply select one of these cities.

Figure 24 Parameter Type Selection List, Multiple Values, Database Specification – Data Administrator's View

The screenshot shows a web interface for configuring a parameter. It includes a 'Parameters' section with instructions, an SQL statement, and a 'Parameter Details' section with fields for label, description, input type, and a list of database entries.

**Parameters**

Enter the necessary details (input type and further validation rules) for each of the parameters in the SQL statement.  
Click the parameter link in the SQL statement to select the parameter for editing.

SQL Statement: `select F_NAME, L_NAME, EMAIL_ADDRESS, INTEREST1, INTEREST2 from mae_recipients where CITY IN ('{{city}}')`

**Parameter Details**

Parameter: city

Label:

Description:  (optional)

Input Type:

Specify list entries manually  Retrieve list entries from database

SQL Statement:

Figure 25 Parameter Type Selection List, Multiple Values – End User's View

The screenshot shows the 'Define Recipients' screen with navigation tabs and a list of cities for selection.

**Define Recipients**

Options Source Source Details Recipients Details Summary

Cancel <- Back Next ->

**Input Values for Target Group Parameters**

Enter values for all parameters of the selected target group.

City of residence:



**Important:** The list may only have a maximum of 100 entries, in order to not overburden the user interface and to protect against abuse. If more entries than this is required, it would probably be better to use the "Edit Field" type for this parameter, and let the end user input the value manually, instead of selecting it from a list with too many entries.

---

## 5.2.4 Parameter Type Date and/or Time

This parameter type appears as an input box on the end user's screen. Choose sub-selections for "*Date Input Format*" and/or "*Time Input Format*". Choose at least one or choose both. The selection determines whether the user will be asked to input a date, a time, or both. It also determines how the input fields will be arranged. Input fields will be rendered as three input fields for the date (day, month, year ordered according to specification), and/or as two or three input fields for the time (hours and minutes with or without seconds, according to your specification).

All end user time input must be in the 24h format from 00:00:00 to 23:59:59. An AM/PM input format is not available. In addition to defining how the date/time input will look for the end user, it is also necessary to define how the input from the user is converted into a string that matches the date/time format used in the database. Do this by entering a format string into the specified edit field.

In that format string, use any desired characters. For example, separation characters like ":" or ",", ". Also, use any of the format placeholders listed to the right of the edit field. Each format placeholder will later be replaced with the corresponding date/time value, in the corresponding format.

The possible format placeholders are:

- **year4** – Will be replaced with a four digit representation of the year value entered by the end user (for example "2002"). Available only if a date input format was selected.
- **year2** – Will be replaced with a two digit representation of the year value entered by the end user (for example "02"). Available only if a date input format was selected.
- **month2** – Will be replaced with a two digit representation of the month value entered by the end user (for example "09" or "12"). Available only if a date input format was selected.
- **month1** – Will be replaced with a one or two digit representation of the month value entered by the end user, with months January to September as one digit and months October to December as two digits (for example "9" or "12"). Available only if a date input format was selected.
- **day2** – Will be replaced with a two digit representation of the day value entered by the end user (for example "01" or "31"). Available only if a date input format was selected.
- **day1** – Will be replaced with a one or two digit representation of the day value entered by the end user, with days 1 to 9 as one digit and days 10 to 31 as two digits (for example "1" or "31"). Available only if a date input format was selected.
- **hour2** – Will be replaced with a two digit representation of the hour value entered by the end user (for example "08" or "23"). Available only if a time input format was selected.
- **hour1** – Will be replaced with a one or two digit representation of the hour value entered by the end user, with hours 0 to 9 as one digit and hours 10 to 23 as two digits (for example "1" or "23"). Available only if a time input format was selected.

- **min2** – Will be replaced with a two digit representation of the minute value entered by the end user (for example "04" or "59"). Available only if a time input format was selected.
- **min1** – Will be replaced with a one or two digit representation of the minute value entered by the end user, with minutes 0 to 9 as one digit and minutes 10 to 59 as two digits (for example "4" or "59"). Available only if a time input format was selected.
- **sec2** – Will be replaced with a two digit representation of the seconds value entered by the end user (for example "06" or "59"). Available only if the time input format with seconds was selected.
- **sec1** – Will be replaced with a one or two digit representation of the seconds value entered by the end user, with seconds 0 to 9 as one digit and seconds 10 to 59 as two digits (for example "6" or "59"). Available only if the time input format with seconds was selected.

While typing the format string into the input field, the sample date/time "Sep. 1, 2002 08:04:06 AM" will continuously be converted into that format and the result displayed below the input field. For example, if "month2/day2/year4 - [hour2:min2:sec2]" is entered as the format, then the sample will display:

"09/01/2002 - [08:04:06]"

The input from the end user will be applied to the format string entered in the same way as with the sample date, and the resulting string will be used to replace the parameter placeholder. All occurrences of the quote character in the date/time string will be escaped before the replacement.

Figure 26 Parameter Type Date and/or Time – Data Administrator's View

**Parameters**

Enter the necessary details (input type and further validation rules) for each of the parameters in the SQL statement.  
Click the parameter link in the SQL statement to select the parameter for editing.

SQL Statement: `select email_address, f_name, l_name, gender, age, interest1, opt_in_date from mae_recipients where opt_in_date <='{date}'`

**Parameter Details**

Parameter: date

Label:

Description:  (optional)

Input Type:

Specify how the date/time input will look for the user:

Date Input Format:  Time Input Format:

Specify how the date/time value is converted into a database-readable format:

Enter the conversion format using any separators and other characters the format requires, using the placeholders shown next to the input field. They will be replaced with the corresponding four, two, or one digit value.

     year4, year2,  
month2, month1,  
day2, day1

Preview of conversion for "Sep. 1, 2002 08:04:06 AM":  
09/01/2002

Figure 27 Parameter Type Date and/or Time – End User's View

**Define Recipients**

Options Source Source Details Recipients Details Summary

Cancel <- Back Next ->

**Input Values for Target Group Parameters**

Enter values for all parameters of the selected target group.

enter the opt-in date: mm dd yyyy



**Important Note:** This database format always requires a 24h time format from 00:00:00 to 23:59:59. This input type cannot be used to generate a database time format that includes AM/PM information with hours from 1 to 12. It is also not possible to generate a database date format where the month or day of the week is given in long text, like "Monday, December 2nd, 2003". If such a time format is necessary, use the Edit Field type instead, and let the end user input the date and time manually in the format required by the database (use the parameter's description field to tell end users which format they need to use to be compatible with the database).

## Section 6 Using the ODBC Driver Plugin

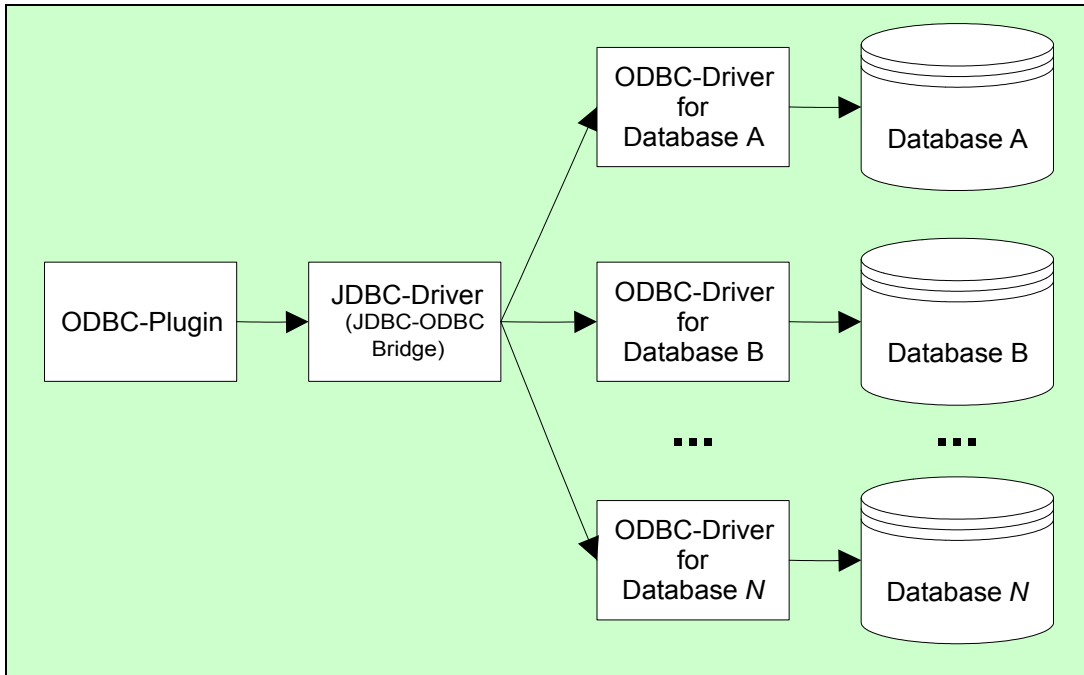
The ODBC driver plugin is a special database plugin that allows recipient information or drop-in content to be pulled from any ODBC data source. In contrast to the normal LISTSERV Maestro database plugins, which are usually designed for a specific JDBC driver, that in turn is designed for a specific database, the ODBC driver plugin is designed to access Java's built in JDBC-ODBC bridge. This bridge provides access to all available ODBC drivers and the databases they support.

The ODBC driver plugin can be used in the recipient wizard with the recipient type "Select Recipients From a Database". It can also be used in the target group wizard with the target group type "LISTSERV Maestro Retrieves Recipients from Database" to retrieve recipient information from an ODBC data source, or on the database drop-in page to retrieve content information.

ODBC drivers exist for many purposes, making a wide range of data available to LISTSERV Maestro for recipient retrieval or drop-in content definition. For example, ODBC drivers exist for plain text files in CSV format and for Microsoft Excel files, allowing for access to CSV files or Excel sheets as if they were database tables, including `WHERE`-clauses to select only a subset of the content from the file/sheet and `JOINS` between several files/sheets to augment the data from one file with data from another. With the ODBC driver for Microsoft Access and a matching setup in Access itself, a Microsoft Outlook address book can be directly accessed as a recipients source.



Figure 28 ODBC Plugin



## 6.1 Setting Up the ODBC Driver Plugin

Before the ODBC driver plugin can be used for recipient or drop-in content definition, it must first be registered as an available plugin in the Administration Hub. This needs to be done by the LISTSERV Maestro administrator. Please see the LISTSERV Maestro 1.2 Administrator's Manual, Section 5.2 Registering a Database Plugin for details.

## 6.2 Setting Up the ODBC Data Source

Before it is possible to access an ODBC data source from inside of LISTSERV Maestro, the data source needs to be set up first. How this is accomplished depends on the ODBC driver being used for the data source and the operating system being used.

In Microsoft Windows 2000, for example, an ODBC data source can be set up using the Start menu: "Start → Settings → Control Panel → Administrative Tools → Data Sources (ODBC)".

Please see the documentation of the ODBC driver and the operating system for instructions on setting up an ODBC data source.



**Important note:** When setting up the data source, configure it in such a way that later, from inside LISTSERV Maestro, only the data source name needs to be supplied, along with the user name (optional), the user password (optional) and the SQL select statement to access the data source. No other configuration parameters must be required when accessing the data source from LISTSERV Maestro. All necessary configuration must have taken place when the data source was set up in the operating system environment. This setup must be done on the server where the Maestro User Interface (LUI) component of LISTSERV Maestro is installed.

### 6.3 Accessing the ODBC Data Source from LISTSERV Maestro

Once a data source is set up in the operating system environment access to this data source from inside of LISTSERV Maestro can occur any time, even if a browser on a computer other than the server where the Maestro User Interface itself is installed is being used (accessing LISTSERV Maestro remotely from a different computer). The data source can be used for recipient definition (recipients wizard or target group wizard) or for content definition using a database drop-in.

Please see the LISTSERV Maestro 1.2 User's Manual, Section 4.2.6 Selecting Recipients From a Database for more information on the recipients type “*Select Recipients From a Database*”, and Section 11.2 Creating Drop-In Content Elements for more information on database drop-ins. Section 4.2.2 of this manual has more information on the target group type “*LISTSERV Maestro Retrieves Recipients from Database*”.

The common factor all these functions share is that they need the database connection details to specify from where the recipients or the drop-in content will be retrieved. To do so, select the “*ODBC Driver Database Plugin*” from the drop-down list of available plugins and then specify the name of the data source to be accessed, the database user name and the password (if a username and/or password is required or not depends on your data source setup – if no username or password is required by the data source, simply leave the corresponding field empty). Next, enter the SQL statement needed to retrieve the recipients/content desired. The syntax of this SQL statement also depends on the ODBC driver and data source in use and may differ from case to case. Again, see the documentation of the ODBC driver being used to access the data source for details.

Figure 29 Using the ODBC Plugin to Define a Target Group

**Target Group Definition**

General Source Parameters Parameter Details Sample Data Recipients Details Duplicate Elimination Summary

Cancel Save & Exit <- Back Next ->

**Source**

Supply the database connection details and an SQL statement.

Database Plugin: ODBC Driver Database Plugin

Data Source Name: ABCXLS

Database User Name:

Password:

SQL Statement:

```
select F_NAME, L_NAME,
       STATE,
       EMAIL_ADDRESS
from [recipients_new$]
where STATE = '{{statesel}}'
```

The select statement syntax will vary depending on your data source and operating system. This statement uses an Excel spreadsheet as the data source.

Parameter placeholders in the SQL statement are enclosed by the following tags:

Opening Tag: {{ Closing Tag: }}

The recipients will be retrieved:  During recipient definition  Just before sending

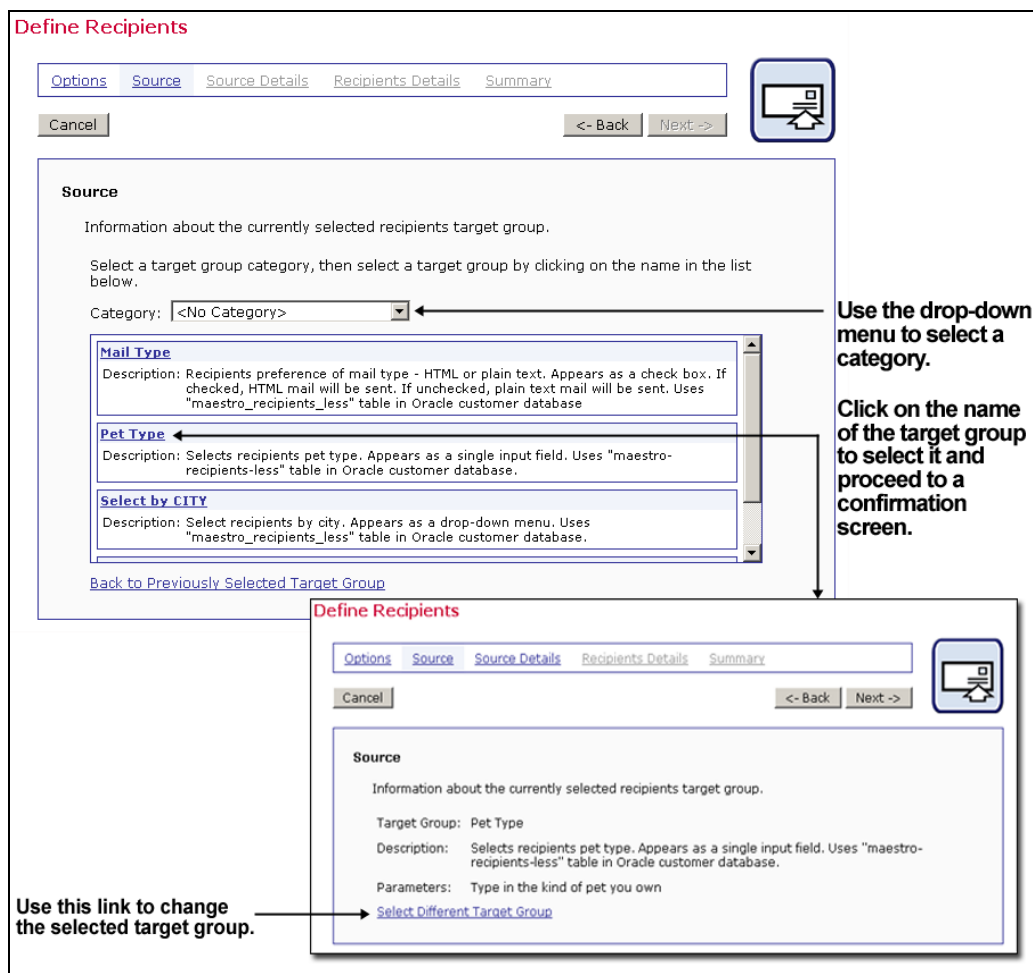
## Section 7 Using Enabled Target Groups in the Recipients Wizard

Once Recipients Target Groups have been created and enabled by the Data Administrator, they can be used in the recipients wizard to define recipients for an e-mail job. For more information on using the recipients wizard, see Section 4 Defining Recipients of an E-mail Job in the LISTSERV Maestro 1.2 User's Manual.

The recipient wizard is comprised of five separate screens. On the first screen “*Options*”, users can elect to “*Send to a Recipients Target Group.*” The second screen, called the “*Source*” screen will then contain a listing all of the available target groups. The data administrator may place target groups on this screen within categories for organizational purposes. Use the drop-down menu to select a category (if appropriate). Once the category is selected, the target groups listed in the table will change to list only those in that category.

To select a target group to use for the recipients list, click on the name of the target group. The Source screen will confirm the selection. If the selection is correct, click the **Next ->** button. To change the target group, click the link **Select Different Target Group**, which will re-open the first source screen.

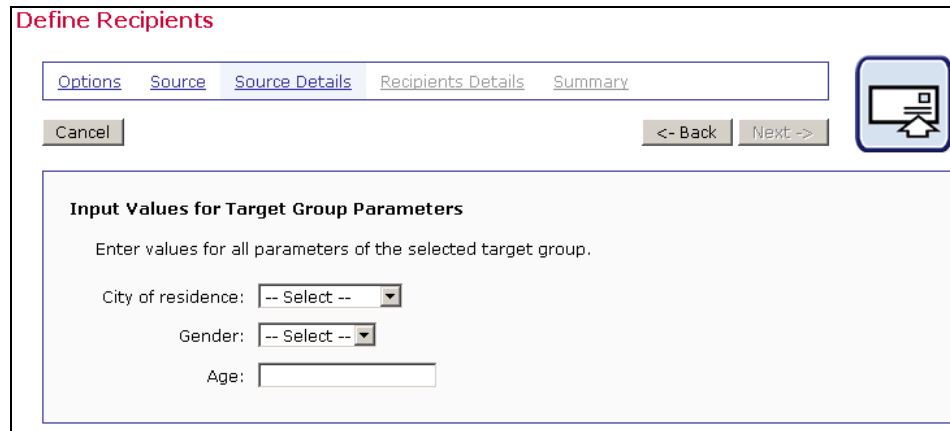
Figure 30 Source Screen for Recipients Target Groups



Click **Next->** to continue to the “*Source Details*” screen.

If there are parameters in the SQL statement, the Source Details screen will display the input values for the target group parameters. This screen will appear the same as the “*Sample Data*” screen does in the recipients target groups wizard. Make the desired selections from the checkboxes, drop-down menus, and/or input boxes.

Figure 31 Define Recipients Using a Target Group



The screenshot shows a web-based wizard titled "Define Recipients". At the top, there are five tabs: "Options", "Source", "Source Details" (which is active), "Recipients Details", and "Summary". Below the tabs are three buttons: "Cancel", "<- Back", and "Next ->". To the right of the buttons is a small icon of a computer monitor with a cursor pointing to it. The main content area is titled "Input Values for Target Group Parameters" and contains the instruction "Enter values for all parameters of the selected target group." Below this instruction are three input fields: "City of residence:" with a dropdown menu showing "-- Select --", "Gender:" with a dropdown menu showing "-- Select --", and "Age:" with a text input box.

Click **Next->** to continue.

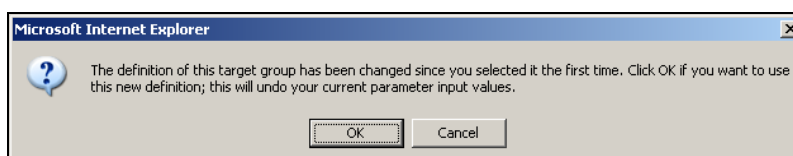
Since all further settings, such as header usage and duplicate elimination, have already been defined during the creation of the target group, the “*Recipients Details*” screen is not necessary and there is no “*Duplicate Elimination*” item on the “*Summary*” screen. The “*Source Details*” screen will go directly to the “*Summary*” screen. From there, click the **Finish** button to save the recipient definition for the job and return to the Workflow screen.



**Important:** When a target group is selected within a job, LISTSERV Maestro makes a copy of the selected target group, and the target group remains in that job exactly as it was defined at the time that the target group was selected for that job. If any changes are made to a target group after it has been enabled, the data administrator should inform all users of the change. If the new definition of the target group is required for the current job, the user needs to refresh the target group definition by following these steps:

1. Re-open the Recipients Wizard
2. Click on the link **Select Different Target Group** on the Source screen
3. Select the same target group
4. The Recipients Wizard will display a message informing the user that the target group has changed since it was originally defined, and the user will need to reenter the parameters for the target group.

Figure 32 Message End User Sees if Target Group Has Been Changed



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## Glossary of Terms

**Administration Hub (HUB)** – A component of the LISTSERV Maestro program that allows the administrator to create user accounts, and assign and change settings for the entire application.

**Column** – A vertical set of data, as in a table or spreadsheet.

**Database Plugin** – Is used to connect LISTSERV Maestro to a database and to allow the user to select recipient data from a database table in the recipient wizard. The user selects the matching plugin for the database he/she wants to access then provides the connection data (like host name, port, user name, password, etc.) and LISTSERV Maestro is then able to access that database to select the recipients.

**DBMS** – Stands for Database Management System. It is a collection of programs that enables users to store, modify, and extract information from a database. Examples of DBMSs are Microsoft® Access, Oracle® 9i, MySQL™ and many others.

**E-mail Merge** – Placing variables that are extracted from a database into an e-mail message template. This operation permits individual personalization of otherwise bulk e-mail messages.

**Field** – In databases, a field is the smallest unit of information that can be accessed. Fields generally have certain attributes associated with them that stipulated the type of data contained within the field. In database management systems, a field can be required, optional, or calculated. A collection of fields is called a record.

**Floating point number** – Any number that has a decimal place.

**Header** – A special row of data that defines and labels the columns in a database file.

**In-clause** – A part of the where-clause of a SQL statement, which allows the specification that a certain field or expression must have exactly one of several allowed values (with the allowed values usually given in form of a comma-separated list), for the where-condition to be true.

**JDBC** – Stands for Java Database Connectivity. This is a Java API developed by JavaSoft, a subsidiary of Sun Microsystems, that enables Java programs to execute SQL statements. This allows Java programs to interact with any SQL-compliant database. Nearly all relational database management systems (DBMS) support SQL, and because Java itself runs on most platforms, JDBC makes it possible to write a single database application that can run on different platforms and interact with different DBMSs.

**Join** – In relational databases, a join operation matches records in two tables. The tables must be joined by at least one common field. That means that the join field is a member of both tables. A join operation is part of a Select statement.

**Maestro User Interface (LUI)** – A component of the LISTSERV Maestro program that allows regular users to create e-mail jobs and tracking reports.

**Multiple value** – A parameter type that allows for one or more values to fill in the select statement.

**ODBC** – Stands for Open Database Connectivity. It is a standard database access method developed by Microsoft Corporation. The goal of ODBC is to make it possible to access any

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data from any application regardless of the database management system (DBMS) handling the data.

**Parameter** – In LISTSERV Maestro, a parameter acts like a placeholder for a part of a SQL statement that will be inserted into the whole statement when the regular user defines it.

**Quote character** – In a SQL statement: a character (usually the single quote) used to enclose string literals, to set them off from the rest of the SQL statement.

In a text file (CSV-file) containing data: a character or symbol used to surround a separator character that is used in the actual data in a column so that the separator character is not confused with the character that appears in the data. For example, if a comma (,) is used as the separator character in a database file, all the fields of data are separated by a comma. If the comma is also used within a field, a quote character must surround the entire field. If the quote character is used in a field, it must be used twice, or “escaped.”

**Record** – In database management systems, a record is a complete set of information. Records are made up of a number of fields, each of which contains an item of information. A set of records constitutes a file.

**Select Statement** – A SQL statement in form of a query that is issued to a database to retrieve data.

**Single value** – A parameter type that allows for the selection of only one value to fill in the select statement.

**SQL** – Abbreviation of Structured Query Language. SQL is a standardized query language for requesting information from a database.

**SQL Statement** – A statement written in SQL that is issued to a database to retrieve data or to create, insert, update, or delete data in the database.

**String literal** – A series of characters that are to be interpreted as literal text and not as an expression or name in the surrounding statement. Usually a string literal is set off from the text of the surrounding statement by enclosing it in a special quote character. Therefore, if the text of the string literal is supposed to contain the quote character itself, this contained quote character must be escaped in an appropriate way.

**Where-clause** – A part of a SQL statement that sets the condition that the data must satisfy for the statement to be executed on it. For example, in the case of a select statement, the condition that the data must fulfill to be included in the returned data.

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