



## LISTSERV Maestro Admin Tech Doc 2

# Backups

September 29, 2021 | © L-Soft Sweden AB  
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This document is a LISTSERV Maestro Admin Tech Doc. Each admin tech doc documents a certain facet of the LISTSERV Maestro administration on a technical level. This document is number 2 of the collection of admin tech docs and explains the topic “Backups”.

Last updated for LISTSERV Maestro 10.0-1 on September 29, 2021. The information in this document also applies to later LISTSERV Maestro versions, unless a newer version of the document supersedes it.

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# 1 Introduction

It is a standard best-practice for any administrator, to make regular backups of any critical software and data.

LISTSERV Maestro allows you to archive a consistent backup of the data collected in the application, so that you can restore it after a crash situation.

The problem with backing up data from an application that is distributed as separate components, possibly even over different servers, is, that it is not simply enough to run separate backups of each of these components.

Consider the situation, where a backup in the Administration Hub is triggered. After the backup has been started, the Maestro User Interface component then stores some new data into the hub, which will not be part of the backup, since it was stored after the backup was started. After this, the backup of the Maestro User Interface is started. Once both backups are complete, you have sets of data that are not consistent with each other: The backup of the Maestro User Interface contains data that “assumes” that a certain value was stored in the hub, while the backup of the Administration Hub does not contain this data. Should the situation arise where both components need to be restored from this backup, they would be restored with inconsistent data, and probably not perform as required.

LISTSERV Maestro resolves this problem by giving the Administration Hub component the responsibility of a backup master: The Administration Hub will centrally trigger a backup on all connected components (including itself) in a way, that the backup data saved by each component is consistent with the backup data of all other components.

## 2 Configuring the Backup Time

The application wide backup is triggered once per day. This means, that each day at a certain time, the Administration Hub as the backup master will start a backup of each component.

You can set this time via the Administration Hub user interface: Select **Main Menu** → **HUB Settings** → **General Administration**. Here you can enter the time of the daily backup (in the form “hh:mm” with values from 00:00 to 23:59).

## 3 Configuring the Backup Location

Each component has its own backup location (which is necessary, since the components may reside on different servers).

The default location for the backup is the folder “`backup`” in the home folder of the component in question.

You can use a different folder if you want. This is configurable via the Administration Hub:

- To set the backup folder of the Administration Hub component, select **Main Menu** → **HUB Settings** → **General Administration**.
- To set the backup folder of the Maestro User Interface component, select **Main Menu** → **LUI Settings** → **General Administration**.
- To set the backup folder of the Maestro Tracker component, select **Main Menu** → **TRK Settings** → **General Administration**.

The folder you configure may either be an absolute path, like “C:\MyFolder\backup” (on Windows) or “/myfolder/backup”, or it may be a relative path, like “myFolder/backup”, which is then interpreted as being relative to the home folder of the component.

The backup folder as a subfolder of the component’s home folder is only a default setting. In a production environment, it is advisable to change the location of the backup folder to point to a dedicated location outside of the installation folder. This can for example be a special backup folder somewhere else in the file system, preferably on a separate disk. It can also be on an external disk or network drive.

If the location is reachable for all components (either because the components are installed on the same server anyway, or because all components have access to the backup location, for example if the backup folder is accessible via the network), then it is perfectly OK to specify the same backup folder for all three components. In such a case, the backups of the three components will be collected nicely in the same folder. There is no danger that the backups will overwrite each other.

**WARNING:** This applies only to LISTSERV Maestro 5.0-25 or later. For older LISTSERV Maestro versions, it is important to specify different backup locations for all three components!

## 4 Configuring the Backup History

Nothing is worse than a backup that contains corrupted data – usually you only realize this when you need the backup in an emergency and then it is too late.

Although the risk of corrupted data can never be fully removed, LISTSERV Maestro gives you greater safety by allowing you to create a backup history:

This is done with a configurable value for the number of “previous” backups that you want to keep.

Each time a new backup is stored, it is stored into the backup folder configured for the component (see previous section). If you configured LISTSERV Maestro to keep a certain number of previous backups, then this folder will also contain the specified number of older backups. At the end of each backup procedure, LISTSERV Maestro automatically removes all older backups that exceed the number of “old backups to keep” (where the oldest backups are removed first).

By keeping a backup history, you can insure yourself against corrupted backup data by some degree. Of course, if the amount of application data grows large, it may not be possible to keep a lot of old backups around (which take space on the disk). Also, keeping older backups on the same disk does not insure you against failure of the disk itself (head crash, etc.). So you should **always** save the backup to an external backup medium as described in the next chapter.

**Note:** You can also set the number of old backups to keep to “0”, which is totally acceptable if you save the backup to an external medium each day anyway.

**Note:** The above information applies only to LISTSERV Maestro 5.0-25 and later. In older LISTSERV Maestro versions, the backup history was instead realized by creating backup folders with a running index in the name. For example “backup”, “backup1”, “backup2”, etc.

## 5 Saving the Backup to an External Medium

Once LISTSERV Maestro has finished its backup, the configured backup folder of each component contains the data that is required to restore this component to the state of the moment when the backup was triggered (plus it may also contain older backups of previous days, if a backup history was configured – see previous section).

It is advisable that you save these folders to an external backup medium (for example a backup tape or other storage device). One approach is to use a special external post-backup process that is automatically triggered after the backup (see next section).

Or you can use your standard backup tool to configure a daily backup of the folders in question. Schedule this daily backup to occur at a time **after** LISTSERV Maestro completes its backup. There should be a long enough period between the backup triggered inside of LISTSERV Maestro and the backup to the external medium triggered by your backup tool, so that all components have enough time to complete their backups. Otherwise you would be backing up partial data to your external medium.

(For small installations, the backup inside of LISTSERV Maestro will not take more than a few minutes, however, as the data in your LISTSERV Maestro installation accumulates over time, backups will naturally take longer. You should periodically check the system statistics to see how long the backup actually takes and schedule your external backup accordingly, at a safe time after the LISTSERV Maestro backup finishes.)

Remember that you have to configure your external post-backup command or backup tool such, that it backs up **all** backup folders of all components. That means that there can be up to three backup folders to save to an external medium, which may also reside on different servers, depending on your installation: One for the Administration Hub, one for the Maestro User Interface and one for Maestro Tracker. (Unless you have configured your components to write their backups into the same backup folder, in which case you have only this one folder to write to an external medium.)

## 6 Configuring External Post-Backup Processes

The administrator may define external processes that are executed after a backup finishes. For example this can be used to automatically copy the backup folders to a tape, or to notify the admin, etc. Two different external processes can be defined, one to be executed after a successful backup and one after a backup failure.

Each process is specified in form of an external command that is executed by the Administration Hub when the backup completes. If you need to execute more than one command, they can be put into a batch file (Windows) or shell script file (Unix/Linux). Then the name of that batch/script file is entered as the external command that is to be executed (with all necessary parameters).

The administrator may also specify the work folder for the commands (same folder for both commands).

A **Test** link for each command allows a test-run of the command. A new window will popup that shows the output of the command. In this window the administrator also has the option of stopping the external process, if that is required. If this popup window is closed before the process terminates, then the process will still be running, i.e. simply closing the window will **not** terminate the external process. If later the output of the test process (if it is still running) is to be viewed again, or if the test process is to be terminated (if it does not terminate by itself), the administrator can access the process via the **View list of currently active "after backup" processes** link.

**Note:** Commands should **not** define external processes that run forever. I.e. each external process should terminate itself when it is done with whatever action it is supposed to execute. If processes run forever, then these processes will accumulate and slowly but surely bring the server down by hogging resources, because each time a backup finishes, a new process will be started.

If several external processes are run via a batch/script file, the administrator needs to make sure that all processes started by the batch/script file terminate themselves at some point.

If for some reason an external process was started, that has not terminated itself (maybe there is a defect in the external process, or the process was started by mistake), then you can click on the **View list of currently active "after backup" processes** link. This shows a list of all currently active external processes started by the Administration Hub, either as an actual "after backup" process that was started when a backup was completed, or because the administrator clicked on one of the **Test** links.

Only processes that are still running are shown in this list. Each process is shown with the date and time when it was started, the command that was used to start it, and a link that allows to open the popup window described above, which continuously shows the output of the external process (if any) and which allows to terminate the external process (while it is still running).

If any of the commands is left empty, then no external process will be started at the corresponding "after backup" condition. If the work folder is left empty, then the application home folder of the Administration Hub will be used as the work folder.

## 7 Identifying Backups: The Backup ID

Since the LISTSERV Maestro components store their backup data into separate backup files, you need to know which of the files belong together (in case you keep a backup history or retrieve a backup from an external medium).

This can be done via the backup ID: Each backup gets a unique ID which is shared by all components participating in the backup.

This backup ID is reflected in the filenames of the backup files: Each component has its own backup file, so a complete LISTSERV Maestro backup consists of three backup ZIP-files (one for LUI, one for HUB and one for TRK), that all have the same backup ID in their filenames.

In addition, each component also writes a "`readme.txt`" file into the backup file itself, that also contains the backup ID, together with output about backup start and end time and its success or error state.

**Note:** The above information applies only to LISTSERV Maestro 5.0-25 and later. In older LISTSERV Maestro versions, the backup was not written to a ZIP-file, therefore there is no filename that contains the backup ID either. In older backups, you have to check the mentioned "`readme.txt`" in the backup folder to find out the backup ID.

## 8 Restoring a Backup

Before you restore a backup, you first need to determine exactly which backup you want to restore. For example in case of a fatal and unexpected failure (like a disk crash), you will likely want to restore the most recent backup, to minimize data loss. But if for example you want to restore the backup to recover lost data that was accidentally deleted by a user at some point in the past, then you need to restore the latest backup in which this data is still present – which may not necessarily be the most recent backup.

Once you have determined which backup you want to restore, take note of the backup ID of this backup, as you will need it to identify the backup files (or folders) during the restore procedure.

The method for restoring a backup differs depending on the backup format, which in turn depends on the LISTSERV Maestro version that initially stored the backup:

- The new **ZIP-file backup format** is created by LISTSERV Maestro **5.0-25 and later**.
- The old **folder based backup format** is created by LISTSERV Maestro **5.0-24 and older**.

Please follow the instructions in the following sub-section that corresponds to the format of the backup that you want to restore.

## **8.1 Restoring a new-style ZIP-file backup**

Backups in this new format are written by the LISTSERV Maestro versions **5.0-25 and later**. The LISTSERV Maestro instance into which such a backup is to be restored must be at least of the same version as the LISTSERV Maestro that initially stored the backup. Of course it can also be of a newer version.

A backup of this format consists of exactly three backup ZIP-files: One ZIP-file for each of the components (LUI, HUB and TRK). The ZIP-files in turn contain the actual backup data.

To restore such a ZIP-file backup, proceed as follows:

### **1. Find the backup ZIP-files from all components that belong to the same backup set.**

Once you have decided which backup you want to restore, and have determined its ID, you need to find the three backup files that contain the data of this backup. Each backup ZIP-file contains the backup ID as part of its filename, so you can easily see which backup a given ZIP-file belongs to.

Find the three backup ZIP-files (one for each component) that contain the desired backup ID in their filename.

These three files together constitute the backup set that you want to restore.

### **2. Verify that the backup was successful.**

Only restore a backup if the backup was complete and successful, with no errors during the backup procedure!

You can find out if a backup was successful by checking the backup log in the folder

```
[maestro_install_folder]/hub/logs
```

For each backup that is triggered by the Administration Hub, a report with the name "backupReport\_ID.txt" (where "ID" is replaced with the ID of the backup in question) is saved into this folder.

If the backup was a successful backup, you will find an entry like this at the end of the log file:

```
The backup was completed successfully  
Final completion date: <date here>
```

If you find such an entry, then you know that the backup was a successful backup. If the backup was (partially) unsuccessful, then the report will instead contain entries about the errors that occurred.

If you do not have access to the "logs" folder (for example because a disk crash destroyed the disk of your Administration Hub installation), then you can still find out if a backup was successful, but you have to check all three backup ZIP-files in the backup set: In the backup ZIP-file of each component you will find a "readme.txt" file that contains the success state of that particular component backup. Check all three "readme.txt" files from the three backup files in the backup set and make sure that all three of them report their component backup as successful.



### 3. Only in some cases: Do a fresh installation of LISTSERV Maestro.

If the original LISTSERV Maestro instance is still in working order and the purpose of the backup restore is simply to restore a previous state of the application user data (for example if the application user data was corrupted, or if some LISTSERV Maestro objects, like a mail job or subscriber data, were accidentally deleted), then it is not necessary to do a reinstallation of the application. In this case, simply skip the next step and proceed.

If the original LISTSERV Maestro instance is no longer operational (for example after a disk crash), then you will need to do a fresh installation (this also includes uninstalling the old files, unless you start from scratch on new hardware). If you do this, install the components on the servers where you need them.

After the re-install, do not yet start the components. Instead check the settings in

```
[maestro_install_folder]\commands\UserConfig.cmd (Windows)
```

```
[maestro_install_folder]/commands/UserConfig.sh (Linux/Solaris)
```

to verify that all settings (like minimum/maximum memory allocation, run-user, etc.) are correct for the new installation.

If you are using the internal MySQL system database and have made modifications to its configuration (for example by editing the file “my.ini” in the folder “lui/database”) then you may want to make similar modifications in the new installation (where applicable).

**Important:** If you install on new hardware, then the new hardware must use the same host names and IP addresses as the old (broken) hardware. Similarly, if LISTSERV Maestro previously was installed on a single server or distributed over several servers, then the new installation must use the same single/multiple server configuration. If you want to change host names and/or IP addresses, or want to change how LISTSERV Maestro is distributed over several servers, then you must do this as a separate step **after** the backup restore, with one exception: You can restore the backup into a different system database than the one that is originally referenced by the backup data. See section 8.3 below for details.

### 4. Only in some cases: Clean the external system database.

Only necessary if the original LISTSERV Maestro used an external system database.

Skip this step if LISTSERV Maestro was configured to use the internal system database.

The connection settings for the system database are included in the data that is stored in the backup. Because of this, the restored LISTSERV Maestro instance connects to the same external system database that was in use when the backup was originally stored.

But to safeguard against inadvertent data loss, it is not possible to restore a backup into an external database that already contains data.

Therefore, if you plan to restore the backup of a LISTSERV Maestro instance that uses an external system database, you need to use the appropriate database tools to delete all data from the database into which the backup is to be restored. Usually that means deleting all existing tables (usually lots of tables with names that start with “LUI\_”).

**Important:** Before manually cleaning a LISTSERV Maestro database in this fashion, make doubly sure that you clean the correct database and that it is not still in use by a different LISTSERV Maestro instance!

If the external database is not empty, then the LUI component will stop the backup restore process (during startup, as described in step 7 below) and will write a corresponding error

message to the LUI log file. If this happens, either cleanup the external database or prepare a new empty database for use. Then log in to the HUB and go to **Main Menu → LUI Settings → System Database Status**. On this page, either trigger another attempt to use the (now empty) original external database or supply the connection settings for the new external database. The backup restoration will then proceed promptly.

## 5. Prepare for backup restore – create the “backupRestore.ini” files.

(Skip if you use the convenience tool on Windows, see note below.)

For each of the three components, create a text file that is called “backupRestore.ini” and put this file into the home folder of the component. I.e. at the end, you must have the following three files:

```
[maestro_install_folder]/hub/backupRestore.ini  
[maestro_install_folder]/lui/backupRestore.ini  
[maestro_install_folder]/trk/backupRestore.ini
```

(If your LISTERV Maestro installation is distributed over several servers, then these folders will also be on different servers.)

**Note:** On Windows, LISTERV Maestro comes with a convenience tool that allows you to create these three “backupRestore.ini” files with a simple drag-and-drop procedure, without the need to create and edit the files manually (see section 8.1.1 below for details). If you use this tool, then it replaces the manual steps described here in step 5 and 6, and after using the tool you can continue directly with step 7 below.

## 6. Prepare for backup restore – edit the “backupRestore.ini” files.

(Skip if you use the convenience tool on Windows, see note in step 5 above.)

If you have created the “backupRestore.ini” files manually (not using the mentioned Windows convenience tool), then you now need to prepare them further.

Edit each of these files with a text editor and add the following entry (one such entry into each of the three files):

```
BackupFile=PATH_TO_BACKUP_FILE
```

where you replace “PATH\_TO\_BACKUP\_FILE” with the full path and filename of the backup ZIP-file that corresponds with the given component. For example, if you are editing the “backupRestore.ini” for the LUI component (in the LUI home folder), then you must make an entry that points to the LUI backup ZIP-file. (Make sure that the user account that is used to run LISTERV Maestro has read access on the backup ZIP-files.)

The path can either be an absolute path or it can be a relative path. A relative path is interpreted as relative to the location of the “backupRestore.ini” that contains the entry.

**Important:** If you want to use the backslash character “\” in a path (on Windows), then you have to escape it by using a double backslash “\\”. Or simply use the forward slash “/” (works on Windows too). For example, either write:

```
C:/Sample/MyFolder/BACKUP_FILE.ZIP          or  
C:\\Sample\\MyFolder\\BACKUP_FILE.ZIP
```

(Note: The “backupRestore.ini” files will be automatically removed after the first startup of LISTERV Maestro, if the restore was successful.)

## 7. Start LISTSERV Maestro normally.

During the first startup, LISTSERV Maestro will restore all backup data from the backup ZIP-files. The time it takes to restore will vary depending on the amount of data being restored. Please be patient.

To verify the correct restoration of the backup, check the special backup restore log files: For each component, a “`backupRestore.log`” file is created in the same folder where the “`backupRestore.ini`” is located. So you need to check three versions of this log file – one for each component. Each log file will tell you which data was restored, and if the restoration was successful or if there were any errors. You have successfully restored the full LISTSERV Maestro backup if all three logs report a successful backup restore.

**Tip:** With the logs, you can also do a final check that you did indeed restore the same backup into each component. Each “`backupRestore.log`” quotes the filename of the backup ZIP-file from which the backup was restored. The filename in turn contains the backup ID. Make sure that the backup IDs in the filenames that are quoted in all three logs do indeed match.

**Note:** If a “`backupRestore.log`” already exists, then the new log entries are appended to the end of the log. So if you should restore several backups at different times, and do not delete the “`backupRestore.log`” in the meantime, then you will have a nice record of all your backup restores in this log file.

The LISTSERV Maestro instance is now restored and is running in the state that was saved in the restored backup. The backup restore procedure is complete.

### 8.1.1 Convenience Tool to prepare the `backupRestore.ini` files (Windows only)

Starting with version 10.0-1, the Windows version of LISTSERV Maestro comes with a convenience tool that creates and prepares the necessary “`backupRestore.ini`” files for you, via a simple drag-and-drop procedure.

As described above, the backup that needs to be restored consists of three backup ZIP-files, one for each of the three components LUI, HUB and TRK.

Once you have located these backup ZIP files, you can create the matching “`backupRestore.ini`” files using drag-and-drop, as follows:

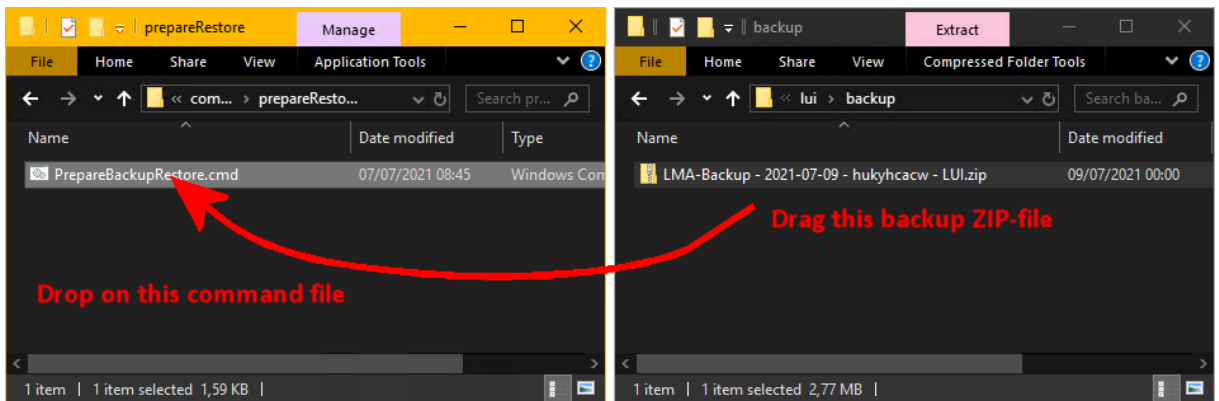
1. Open two Windows explorer windows and arrange them on your desktop in a fashion that they do not overlap and allow you to perform a drag-and-drop operation from one window to the other.
2. In the first window, navigate to the following folder:

```
[maestro_install_folder]\commands\prepareRestore\
```

In this folder you should see a single file called “`PrepareBackupRestore.cmd`”.

3. In the second window, navigate to the folder that contains the backup ZIP-file that you want to restore.
4. Use the mouse to drag the backup ZIP-file from the second window and drop it directly **onto** the “`PrepareBackupRestore.cmd`” file in the first window.

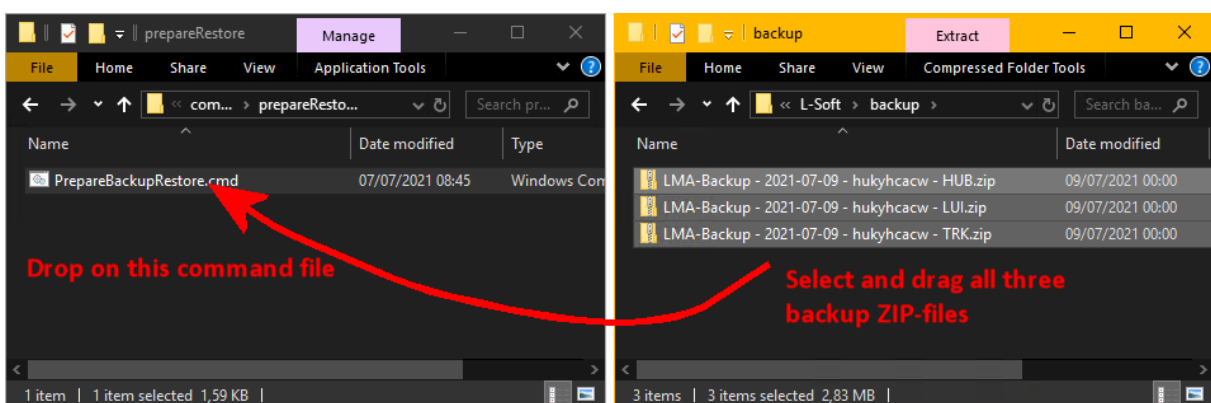
It is **important** that you drop the ZIP-file exactly **on** the “PrepareBackupRestore.cmd” file and not on the empty area of the folder (dropping on the empty area would move/copy the ZIP-file to the folder instead).



5. If the ZIP-file is dropped correctly, a command window is opened and shows the output of the tool.
6. Repeat the procedure above (from step 3 on) with the remaining two backup ZIP-files, for the two other components (if necessary on different servers, if you have an installation of LISTSERV Maestro where the components are distributed to multiple servers). Make sure that the three backup ZIP-files match (that they have the same backup ID).

Once you have performed the drag-and-drop operation for all three components, your three “backupRestore.ini” files are properly created and prepared. You can now proceed with the backup restoration by restarting LISTSERV Maestro as described in the previous section.

**Tip:** If your LISTSERV Maestro is configured to store the three component backup ZIP-files in the same folder, then you can drag-and-drop all three files at once, in a single operation. This creates the three necessary “backupRestore.ini” files in a single step.



## 8.2 Restoring an old-style folder based backup

Backups in this old format were written by the LISTSERV Maestro versions **5.0-24 and older**. The LISTSERV Maestro instance into which such a backup is to be restored must be at least of the same version as the LISTSERV Maestro that initially stored the backup. Of course it can also be of a newer version (including the versions 5.0-25 and later).

A backup of this format consists of exactly three backup folders: One folder for each of the components (LUI, HUB and TRK). The folders in turn contain the actual backup data, in form of several files and sub-folders.

To restore such a folder based backup, proceed as follows:

### 1. Find the backup folders from all components that belong to the same backup set.

Once you have decided which backup you want to restore, and have determined its ID, you need to find the three backup folders that contain the data of this backup: To find out which backup folder belongs to which backup, check the backup ID that is included in the “`readme.txt`” that is contained in each backup folder.

With this method, you need to find the three backup folders (one for each component) that contain the desired backup ID in their “`readme.txt`”.

These three folders together constitute the backup set that you want to restore.

### 2. Verify that the backup was successful.

Only restore a backup if the backup was complete and successful, with no errors during the backup procedure!

You can find out if a backup was successful by checking the backup log in the folder

```
[maestro_install_folder]/hub/logs
```

For each backup that is triggered by the Administration Hub, a report with the name “`backupReport_ID.txt`” (where “ID” is replaced with the ID of the backup in question) is saved into this folder.

If the backup was a successful backup, you will find an entry like this at the end of the log file:

```
The backup was completed successfully  
Final completion date: <date here>
```

If you find such an entry, then you know that the backup was a successful backup. If the backup was (partially) unsuccessful, then the report will instead contain entries about the errors that occurred.

If you do not have access to the “`logs`” folder, then you can still find out if a backup was successful, but you have to check all three backup folders in the backup set: In the backup folder of each component you will find a “`readme.txt`” file that contains the success state of that particular component backup. Check all three “`readme.txt`” files from the three backup folders in the backup set and make sure that all three of them report their component backup as successful.

### 3. Only in some cases: Do a fresh installation of LISTSERV Maestro.

If the original LISTSERV Maestro instance is still in working order and the purpose of the backup restore is simply to restore a previous state of the application user data (for example if the application user data was corrupted, or if some LISTSERV Maestro objects, like a mail

job or subscriber data, were accidentally deleted), then it is not necessary to do a reinstallation of the application. In this case, simply skip the next step and proceed.

If the original LISTSERV Maestro instance is no longer operational (for example after a disk crash), then you will need to do a fresh installation (this also includes uninstalling the old files, unless you start from scratch on new hardware). If you do this, install the components on the servers where you need them.

After the re-install, do not yet start the components. Instead check the settings in

```
[maestro_install_folder]\commands\UserConfig.cmd (Windows)
[maestro_install_folder]/commands/UserConfig.sh (Linux/Solaris)
```

to verify that all settings (like minimum/maximum memory allocation, run-user, etc.) are correct for the new installation.

If you are using the internal MySQL system database and have made modifications to its configuration (for example by editing the file "my.ini" in the folder "lui/database") then you may want to make similar modifications in the new installation (where applicable).

**Important:** If you install on new hardware, then the new hardware must use the same host names and IP addresses as the old (broken) hardware. Similarly, if LISTSERV Maestro previously was installed on a single server or distributed over several servers, then the new installation must use the same single/multiple server configuration. If you want to change host names and/or IP addresses, or want to change how LISTSERV Maestro is distributed over several servers, then you must do this as a separate step **after** the backup restore, with one exception: You can restore the backup into a different system database than the one that is originally referenced by the backup data. See section 8.3 below for details.

#### 4. Only in some cases: Clean the external system database.

Only necessary if the original LISTSERV Maestro used an external system database.

Skip this step if LISTSERV Maestro was configured to use the internal system database.

The connection settings for the system database are included in the data that is stored in the backup. Because of this, the restored LISTSERV Maestro instance connects to the same external system database that was in use when the backup was originally stored.

But to safeguard against inadvertent data loss, it is not possible to restore a backup into an external database that already contains data.

Therefore, if you plan to restore the backup of a LISTSERV Maestro instance that uses an external system database, you need to use the appropriate database tools to delete all data from the database into which the backup is to be restored. Usually that means deleting all existing tables (usually lots of tables with names that start with "LUI\_").

**Important:** Before manually cleaning a LISTSERV Maestro database in this fashion, make doubly sure that you clean the correct database and that it is not still in use by a different LISTSERV Maestro instance!

If the external database is not empty, then the LUI component will stop the backup restore process (during startup, as described in step 8 below) and will write a corresponding error message to the LUI log file. If this happens, either cleanup the external database or prepare a new empty database for use. Then log in to the HUB and go to **Main Menu → LUI Settings → System Database Status**. On this page, either trigger another attempt to use the (now empty) original external database or supply the connection settings for the new external database. The backup restoration will then proceed promptly.

## 5. Restore the Administration Hub (HUB).

Remove the existing versions of the file “hub.ini” and the folders “accountreg” and “hubreg”, including their contents, from the Administration Hub home folder:

```
[maestro_install_folder]/hub
```

and replace them with the versions from the backup folder of the Administration Hub component.

## 6. Restore Maestro Tracker (TRK).

Remove the existing versions of the file “tracker.ini” and the folder “data”, including its content, from the Maestro Tracker home folder:

```
[maestro_install_folder]/trk
```

and replace them with the versions from the backup folder of the Maestro Tracker component.

## 7. Restore the Maestro User Interface (LUI).

Remove the existing versions of the files “lui.ini” and the folders “luidata” and “registry”, including their contents, from the Maestro User Interface home folder:

```
[maestro_install_folder]/lui
```

and replace them with the versions from the backup folder of the Maestro User Interface component.

Edit the “lui.ini” file and add an entry like this:

```
RestoreBackup=path_to_backup_folder
```

where you replace “path\_to\_backup\_folder” with the path name that leads to the backup folder from which you copied the files and folders as described above (make sure that the user account that is used to run LISTSERV Maestro has read access on this folder).

The path can either be an absolute path or it can be a relative path. A relative path is interpreted as relative to the location of the “lui.ini” that contains the entry.

**Important:** If you want to use the backslash character “\” in a path (on Windows), then you have to escape it by using a double backslash “\\”. Or simply use the forward slash “/” (works on Windows too). For example, either write:

```
C:/Sample/MyFolder/backup
```

or

```
C:\\Sample\\MyFolder\\backup
```

(Note: This entry in the “lui.ini” file will be automatically removed after the first startup of LUI, if the restore was successful.)

## 8. Start LISTSERV Maestro normally.

During the first startup, LUI will restore the system database content from the backup folder, which may take a short while.

The backup restore is complete once all components have completed their start up procedure without errors.

### ***8.3 Using a different system database when restoring a backup***

The settings that determine which system database is used are part of the data that is stored in the backup. Consequently, when a backup is restored, LISTSERV Maestro attempts to connect to the same system database, using the connection settings in the backup, and will attempt to restore its data into this database.

In some situations, this is however not desired or not even possible, i.e. it may be necessary to restore a backup into a different system database than the one used originally. Usually because the original database no longer exists. For example, the whole reason for restoring a backup may be that there was a catastrophic failure of the original database server, which is now no longer available and a different database must be used.

In such a case, the backup restore process will output an error message in the LUI log file, notifying that it cannot connect to the system database using the currently configured settings (the ones that were restored from the backup data).

Fixing this problem is however rather straightforward: Log in to the HUB and go to **Main Menu → LUI Settings → System Database Status**. The page performs a connection check to the system database, using the current connection settings. Since in this situation the original database is no longer available, the check will fail and a corresponding message is shown. Supply the correct settings for the new system database and click OK. This immediately applies the new settings and the backup restoration will proceed promptly.