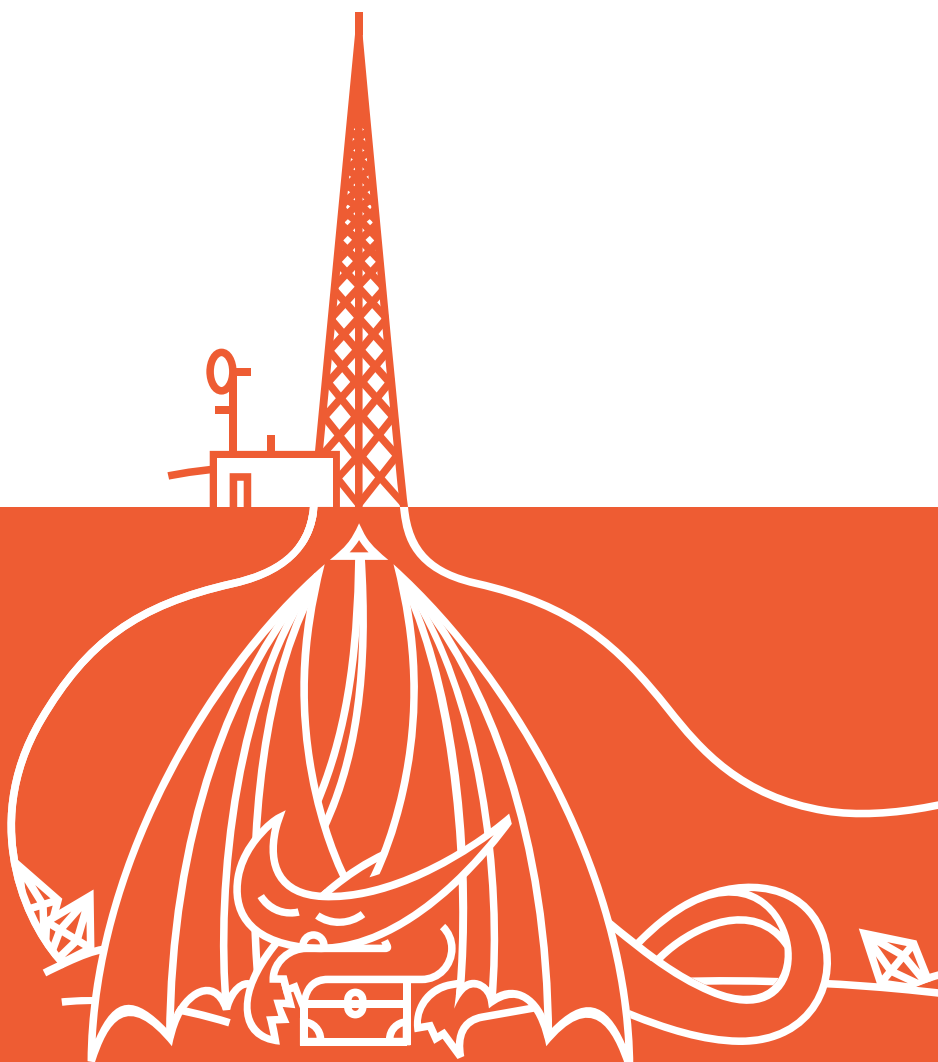


# Airtime

for Broadcasters

The open radio software for scheduling  
and remote station management

USER GUIDE



# **AIRTIME FOR BROADCASTERS**

Updated for Airtime 1.9.4

**AIRTIME FOR BROADCASTERS  
THE OPEN RADIO SOFTWARE FOR SCHEDULING  
AND REMOTE STATION MANAGEMENT**

**PUBLISHED:** September 2011

Updated for Airtime 1.9.4

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This manual has been edited and reworked by Daniel James, based on a collaborative effort at FLOSS Manuals. Thanks to all contributors!

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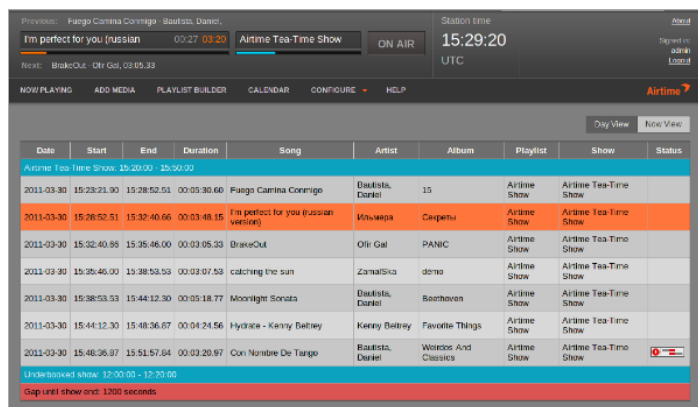
# **INTRODUCTION**

- 1. WHAT IS AIRTIME?**
- 2. RIGHTS AND ROYALTIES**

# 1. WHAT IS AIRTIME?

Updated for Airtime 1.9.4

Airtime is the open broadcast software for scheduling and remote station management. Web browser access to the station's media archive, multi-file upload and automatic metadata verification features are coupled with a collaborative on-line scheduling calendar and playlist management. The scheduling calendar is managed through an easy-to-use interface and triggers playout with sub-second precision.



The screenshot shows the Airtime web interface. At the top, there's a header with the station name 'Fuego Camina Corrijo', a user 'Bautista, Daniel', and a 'Logout' button. Below this is a navigation bar with 'NOW PLAYING', 'ADD MEDIA', 'PLAYLIST BUILDER', 'CALENDAR', 'CONFIGURE', and 'HELP'. The main content area displays a playlist for the 'Airtime Tea-Time Show'. The playlist table has columns for Date, Start, End, Duration, Song, Artist, Album, Playlist, Show, and Status. The current time is 15:29:20 UTC. The playlist includes tracks like 'I'm perfect for you (russian version)', 'Brave Out', 'catching the sun', 'Moonlight Sonata', 'Hydria - Kerly Bethay', and 'Con Nonbre De Tange'.

Date	Start	End	Duration	Song	Artist	Album	Playlist	Show	Status
Airtime Tea-Time Show: 15:20:00 - 15:50:00									
2011-03-30	15:20:21.30	15:28:52.51	00:05:30.60	Fuego Camina Corrijo	Bautista, Daniel	15	Airtime Show	Airtime Tea-Time Show	
2011-03-30	15:28:52.51	15:32:40.66	00:03:48.15	I'm perfect for you (russian version)	Musica	Capetiv	Airtime Show	Airtime Tea-Time Show	
2011-03-30	15:32:40.66	15:35:46.00	00:03:05.33	Brave Out	Offi Gal	PANIC	Airtime Show	Airtime Tea-Time Show	
2011-03-30	15:35:46.00	15:38:53.53	00:03:07.53	catching the sun	ZamaSika	dono	Airtime Show	Airtime Tea-Time Show	
2011-03-30	15:38:53.53	15:44:12.30	00:05:18.77	Moonlight Sonata	Bautista, Daniel	Beethoven	Airtime Show	Airtime Tea-Time Show	
2011-03-30	15:44:12.30	15:48:36.67	00:04:24.36	Hydria - Kerly Bethay	Kerly Bethay	Favorite Things	Airtime Show	Airtime Tea-Time Show	
2011-03-30	15:48:36.67	15:51:57.04	00:03:20.37	Con Nonbre De Tange	Bautista, Daniel	Worces And Classics	Airtime Show	Airtime Tea-Time Show	
Underbowed show: 17:00:00 - 17:30:00									
Gap until show end: 1200 seconds									

Airtime has been intended to provide a solution for a wide range of broadcast projects, from community to public and commercial stations. The scalability of Airtime allows implementation in a number of scenarios, ranging from an unmanned broadcast unit accessed remotely through the Internet, to a local network of machines accessing a central Airtime storage system. Airtime supports the playout of files in both the commonly used MP3 format and the open, royalty-free equivalent Ogg Vorbis.

Airtime manages the Liquidsoap stream generator, which is at the heart of the system. Liquidsoap generates streams from files in the Airtime media archive, which is indexed in a PostgreSQL database. Live shows are automatically recorded with Ecasound, using the soundcard line input. Editors and station controllers can use Airtime to build playlists and manage files (upload, add metadata, manage advertisements) inside the station or via the Internet, using a standard web browser such as Mozilla Firefox or Internet Explorer.

The scheduler in Airtime has a calendar view, organized by months, weeks and days. Here the program editors can schedule playlists and shows for their broadcast station. In some scenarios, the transmitter is situated outside the reach of the broadcaster and all program management has to be maintained through the web interface. Possible reasons for this scenario might be of a pragmatic nature (running many stations from one central office due to limited human resources) or an emergency (running a transmitter in a crisis area without putting staff at risk).

## AIRTIME WORKFLOW

This typical workflow is intended to clarify the difference between the various components that make up a complete Airtime system.

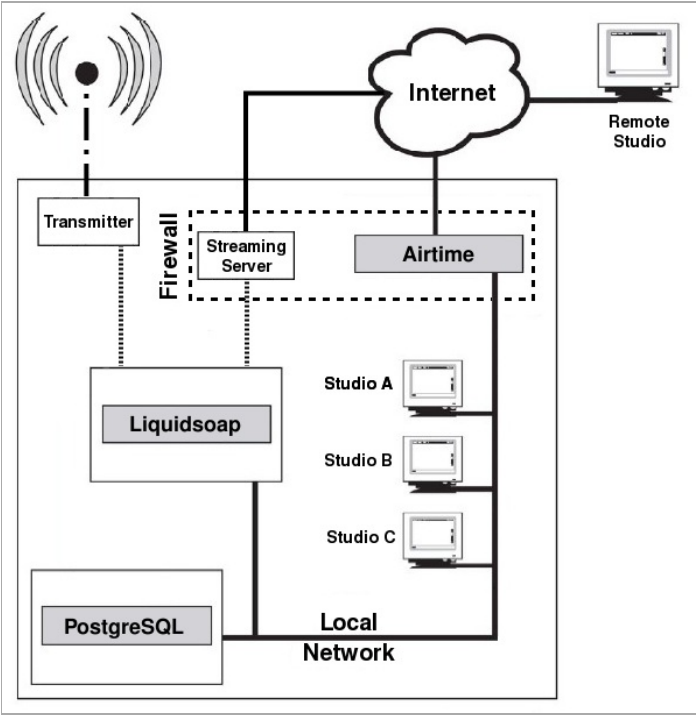
1. There are media files on a server, which include metadata in their tags (title, creator, genre and so on).
2. There is a PostgreSQL database which contains the location of those media files and their metadata. This means you can search for and select a set of media files according to the specific metadata that you require.
3. There is a Liquidsoap stream generator on the server which can take individual media files and assemble them into a continuous stream. This stream can be sent to a soundcard (e.g. for a broadcast mixer, on the way to an FM or DAB transmitter) or to a streaming server for IP network distribution, such as LAN, local WiFi or the Internet. You can stream to a soundcard and to IP networks with the same server, if you wish.
4. Icecast (<http://www.icecast.org/>) is the default streaming server, but in theory you could stream from Liquidsoap to any online service, including Shoutcast (<http://www.shoutcast.com>). If a suitable software interface is not available for your streaming service of choice, you can send audio from Liquidsoap to a separate encoding or streaming machine via a soundcard.
5. Airtime manages all of these components, and provides an easy to use web interface to the system. It enables your station staff to:
  - a) upload media files to the storage server
  - b) automatically import the file metadata into the PostgreSQL database
  - c) edit the metadata for the files, if required
  - d) create and edit playlists of media files (playlists are also saved in the database)
  - e) schedule shows (which can contain playlists, or be live) for specific dates and times on a calendar
  - f) record live shows from the soundcard input with Ecasound, upload them to the storage server and import them into the database automatically
  - g) manage presenter access to the schedule calendar
  - h) see what is about to be played by Liquidsoap in the 'Now Playing' view

## EXAMPLE SYSTEM

Combining Airtime, the Liquidsoap stream generator, the PostgreSQL database and file storage, you can supply a broadcast station with all the functionality needed for automation.

In the diagram below, the media files are stored on a separate machine which also includes a PostgreSQL database, accessible through the local network. Liquidsoap outputs streams to both the transmitter and a streaming media server. The machine running Airtime is behind a firewall because it is connected both to the local network, and to the Internet for remote access. This enables Airtime to offer password-protected access to the media database and scheduling from both inside and outside the studio building.





## 2. RIGHTS AND ROYALTIES

If you're new to broadcasting, or have not streamed your station online before, reading the following brief explanation of compensation rules for musicians may save you a great deal of trouble later.

Independent music radio on the Internet is not what it might have been, due to royalty demands from SoundExchange in the USA, and similar organisations in other territories. These organisations are usually membership societies or government-sanctioned national authorities which are intended to collect money from broadcasters to compensate musicians for the use of their work. The royalty collection societies require payment before you can stream just about any music released on a commercial CD to the general public — whether you make any money out of streaming, or not. It's not so much the percentage of revenue demanded, but that there is usually an annual minimum fee to pay, which hurts small stations disproportionately.

For example, in the UK, the MCPS-PRS Limited Online Music Licence covers non-commercial music streaming by groups and individuals, as long as their gross revenue is less than £12,500 per year. The cost is on a sliding scale, up to £1,120 plus 20% tax per year for delivering up to 450,000 individual streams or serving 25,000 files; after that, you have to apply for a full MCPS-PRS Online Music Licence. That doesn't sound too bad at first, but 25,000 files per year works out at less than four downloads per hour for a round-the-clock website. This licence only covers publishing rights, not recording rights, so you have to negotiate an additional licence from Phonographic Performance Limited to actually play records or CDs.

Typically, you have to provide full statistical details to the royalty society of all music streamed or downloaded from your site. Even if your radio station is mostly speech, there are many limitations in the small print of these music licences. For instance, you can't use music for promotional purposes, and you can't stream a whole opera, without negotiating separate licences. Weirdly, you are not allowed to play a piece of music in a 'derogatory context' to the writer or performers; no drummer jokes allowed, then.

However, the biggest pitfall is that these MCPS-PRS licences only cover listeners in the UK. So if your Internet station picked up a significant number of listeners in other countries, you would have to pay for similar music licences in those countries as well. It's no wonder that many not-for-profit radio stations have disappeared from the virtual airwaves over the last few years, since not having the right licences could leave the operator liable to legal action. If you want to go down the paid licence route, and you can afford it, check out the <http://www.prsformusic.com> and <http://www.ppluk.com> websites for UK licence details. In the USA, the <http://www.soundexchange.com> website currently quotes a \$500 minimum annual fee for non-commercial webcasters, plus a usage fee above a certain number of listener hours, for the right to stream music from its member record labels.

Free content streaming offers the chance that DIY Internet radio could rise again. Since royalty collection societies like MCPS-PRS and SoundExchange can only represent the interests of their own members, it follows that if you are not a member, you can stream your own self-produced content without paying for their licences. If you state somewhere on your website that the stream is of your own copyrighted material, and is made available to the public under a specific licence, then no-one should misunderstand your intentions. You might be able to persuade other people to allow you to stream their content too, as long as they do not have a conflicting legal obligation, such as having previously joined one of the many royalty collection societies around the world. You can ask for permission to stream when website visitors upload their own music files to you via a HTML form, much as the likes of MySpace do. Or you can collect files licensed under an appropriate Creative Commons (<http://www.creativecommons.org>) or other free content licence.

Explicit permission to stream on your particular server is always going to be the ideal, so think about your own terms and conditions before you accept files from third parties for streaming. How, for example, would you know if someone uploaded a file to your online radio station that unknown to you, had been ripped from a commercially released CD? That's the kind of thing that could get you in trouble with the licensing authorities and copyright holders.

# USING AIRTIME

- 3. GETTING STARTED**
- 4. PREFERENCES**
- 5. MANAGE USERS**
- 6. MANAGE MEDIA FOLDERS**
- 7. SUPPORT SETTINGS**
- 8. NOW PLAYING**
- 9. ADD MEDIA**
- 10. PLAYLIST BUILDER**
- 11. CALENDAR**
- 12. HELP**

# 3. GETTING STARTED

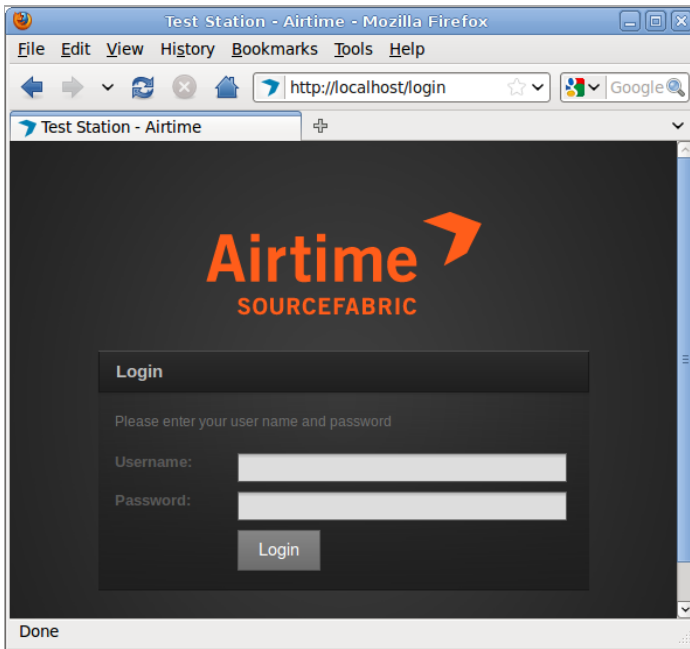
If the Airtime server has a web browser installed, you can access the administration interface by opening the address:

`http://localhost/login`

If you have set up Airtime so that it can be accessed from other computers, you would use a domain name instead. For example:

`http://airtime.example.com/login`

You can log in for the first time with the username admin and password admin.



After you have logged in as admin for the first time, a pop-up window will ask if you wish to send technical support data about your server to Sourcefabric. These details can be viewed by clicking on the Show me what I am sending link, which expands a scrolling window. The data helps Sourcefabric engineers resolve any problems with your Airtime installation, as well as count the number of installations worldwide. Sourcefabric has a privacy policy regarding data collection, which you can read by clicking the link to <http://www.sourcefabric.org/en/about/policy/> further down. After checking the Send support feedback and privacy policy boxes, you can submit the data by clicking the Yes, help Airtime button.

Register Airtime

Help Airtime improve by letting us know you are using it. This info will be collected regularly in order to improve your user experience.

☒ Send support feedback

Click the box below to advertise your station on [Sourcefabric.org](http://sourcefabric.org). In order to promote your station, "Send support feedback" must be enabled. This data will be collected in addition to the support feedback.

☐ Promote my station on Sourcefabric.org

Show me what I am sending

CPU : Intel(R) Core(TM) i7 CPU X 980 @ 3.33GHz  
TOTAL\_RAM : 24734156 kB  
FREE\_RAM : 1693052 kB  
OS : Ubuntu 10.10 x86-64  
AIRTIME\_CONFIG\_FILES : OK  
POSTGRESQL DATABASE : OK

☒ By checking this box, I agree to Sourcefabric's [privacy policy](#).

Remind me in 1 week

Yes, help Airtime

This window also offers the opportunity to Promote my station on Sourcefabric.org (on the page [http://sourcefabric.org/en/products/airtime\\_whosusing](http://sourcefabric.org/en/products/airtime_whosusing)) by checking the box. Fill in the form which will appear with some details about your station. The contact details are only requested for verification purposes, and will not be made available to the public. Click the Browse button to select a Station Logo image from the file manager on your computer.



On the right hand side, the Master Panel features an On Air indicator, which turns from gray to red whenever a file is being played out. There is also a clock indicating the Station time and time zone. Over on the far right side, an About link opens a pop-up window with some information about the version of Airtime installed. The name of the user currently logged in is displayed, and below this there is the link to Logout.



## CHECKING AN ICECAST SERVER

If you have enabled the Icast streaming option when you installed Airtime, you can check that the Icast server is running by opening port 8000 of the server in your web browser. For example, on the server itself, you can use:

`http://localhost:8000/`

You should see the Icast status page, with details of the connection that Airtime has made to Icast. If you have only just installed Airtime, there won't be any media playing out yet.

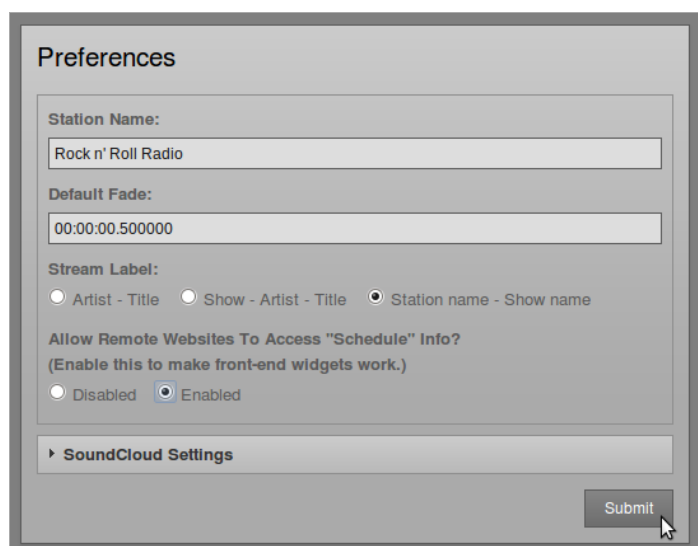




## 4. PREFERENCES

On the Configure menu, click Preferences to set your Station Name and the Default Fade time that you would like to set for automated crossfades. The Stream Label option allows you to set the metadata that will be sent with direct Icecast streams; Artist and Title, Show, Artist and Title, or Station name and Show name.

You can also enable live, read-only access to the Airtime schedule calendar for your station's public website with the Allow Remote Websites to Access Schedule Info? option, if you wish. (There is more about this feature in the Advanced Configuration section of this book). Then click the Submit button.



The screenshot shows a web-based 'Preferences' form. At the top is the title 'Preferences'. Below it are several sections: 'Station Name:' with a text input field containing 'Rock n' Roll Radio'; 'Default Fade:' with a text input field containing '00:00:00.500000'; 'Stream Label:' with three radio button options: 'Artist - Title', 'Show - Artist - Title', and 'Station name - Show name' (which is selected); 'Allow Remote Websites To Access "Schedule" Info?' with a subtext '(Enable this to make front-end widgets work.)' and two radio button options: 'Disabled' and 'Enabled' (which is selected). At the bottom is a collapsed section titled 'SoundCloud Settings' with a right-pointing triangle icon. In the bottom right corner of the form is a 'Submit' button with a mouse cursor hovering over it.

### SOUNDCLOUD SETTINGS

If your station has a SoundCloud account (on <http://soundcloud.com>), you may want to upload live show recordings to this service automatically. Click the small black triangle next to SoundCloud Settings to show this option. Apart from checking the Upload Recorded Shows To SoundCloud box, you will need to enter your SoundCloud login email address and password, and the metadata that SoundCloud will use to categorize your show recordings. You can also set a default genre, track type and copyright license here, including public domain, all rights reserved, or one of the Creative Commons licenses (see <http://creativecommons.org>).

▼ SoundCloud Settings

☒ Upload Recorded Shows To SoundCloud

SoundCloud Email:

soundcloud@example.com

SoundCloud Password:

●●●●●●●●●●●●●●●●

SoundCloud Tags: (separate tags with spaces)

rock rockabilly roots blues radio

Default Genre:

Rock

Default Track Type:

Recording

Default License:

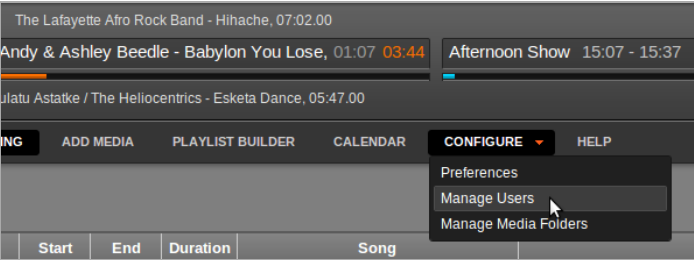
Creative Commons Attribution Share Alike

Submit

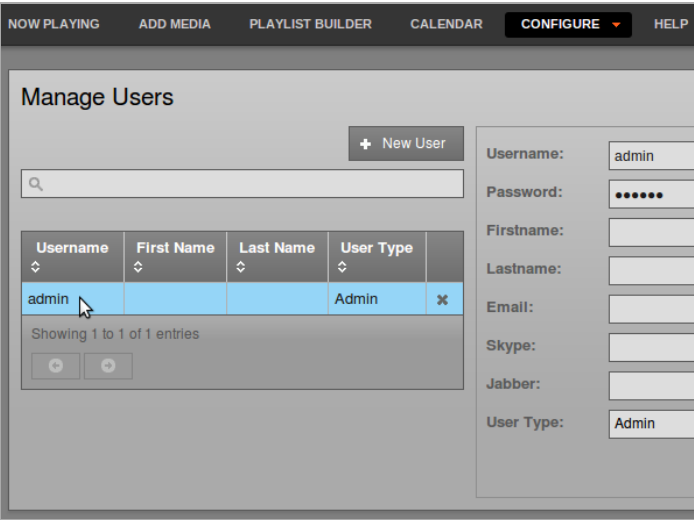
Please note that like most online distribution services, SoundCloud terms of service require you to have copyright in, or permission for Internet distribution from the copyright holder of, any media that you upload.

# 5. MANAGE USERS

You should set a new administrator password immediately, using the Manage Users entry on the Configure menu.



On the left hand side of the Manage Users page, click on admin in the user list. The details for this user will appear in the box on the right hand side. At the moment, the admin user only has a Username and a Password.



Enter a secure password (as long and as varied as is practical) into the Password field. Keeping this password secure is essential for the smooth running of your station, because it enables access to all scheduling and management features. You can also enter other details for your user account on this page, including your full name and contact details. Then click the Submit button.

To add further user accounts to the system, one for each of your station staff that need access to Airtime, click the New User button. Enter a user name, password and contact details, and then select the User Type from the drop down menu, which can be Admin, Program Manager, DJ, or Guest. The difference between these user types is:

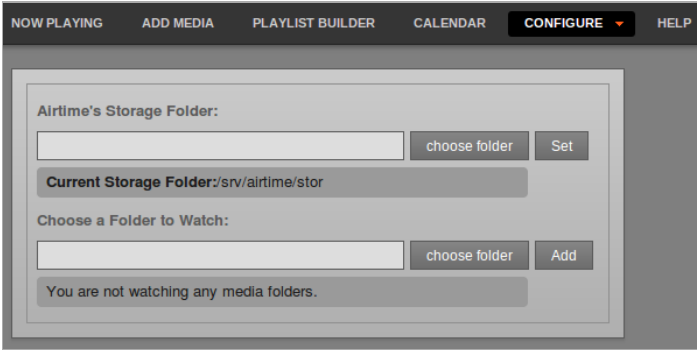
- An Admin (station manager) has read and write access to all the features of Airtime. This role should be reserved for trusted staff members only. If you give the Admin role to too many people, there could be arguments!
- A Program Manager has write access to the entire broadcast schedule, but cannot see the Configure menu and therefore cannot adjust Airtime preferences, manage user accounts or media folder settings.
- A DJ (presenter) only has write access to features related to the specific shows assigned to them by an Admin or Program Manager. The DJ can read data for other shows in the Calendar, but not write to them. This read access to other shows helps staff plan their own shows, for instance avoiding the scenario where two DJs play the same music by coincidence. Like a Program Manager, a DJ cannot see or use the Configure menu when they log in.
- A Guest can log in to read the forthcoming schedule or playlists, but has no write permission for any feature. Guest users cannot see the Add Media, Playlist Builder or Configure menus when they log in. The group of guest users might include the station accountant, or the show assistants.

New users that you add will be shown in the list on the left-hand side of the Manage Users page. If you have a large number of users on the system, you can use the search tool above the list (which has a magnifying glass icon) to identify specific user accounts. Click on the chevrons in the list headings to sort the search results by Username, Firstname, Lastname or User Type.

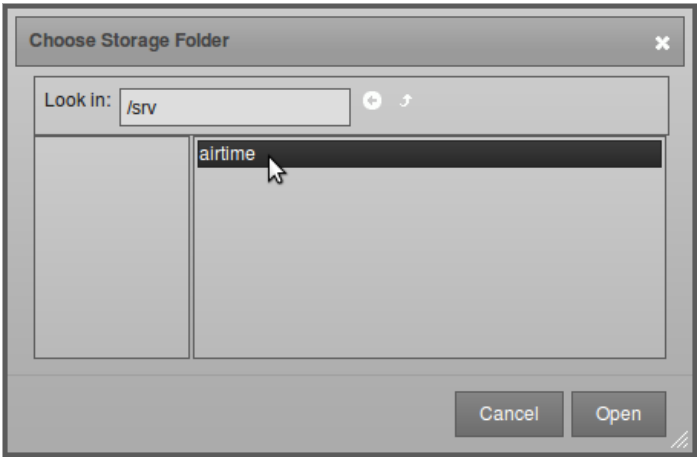
To edit a user account, click on that user's row in the list, change the user's details in the box on the right hand side, and then click the Submit button. To remove a user account, click the small x icon to the right side of its row in the list.

# 6. MANAGE MEDIA FOLDERS

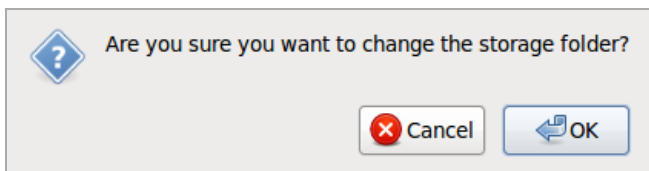
Airtime has a media storage archive, which by default is in the /srv/airtime/stor/ folder on your server. In Manage media folders on the Configure menu, you can change this default location, or add extra folders to be watched by Airtime. Any new media files you add to watched folders will be automatically imported into Airtime's database, and any deleted files will be automatically removed.



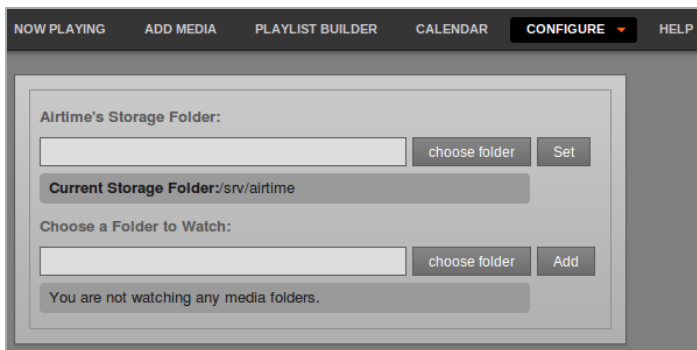
To change Airtime's storage folder, click the upper choose folder button. In the pop-up window that opens, double-click on the folder names to select the folder that you require. Then click the Open button to open that folder.



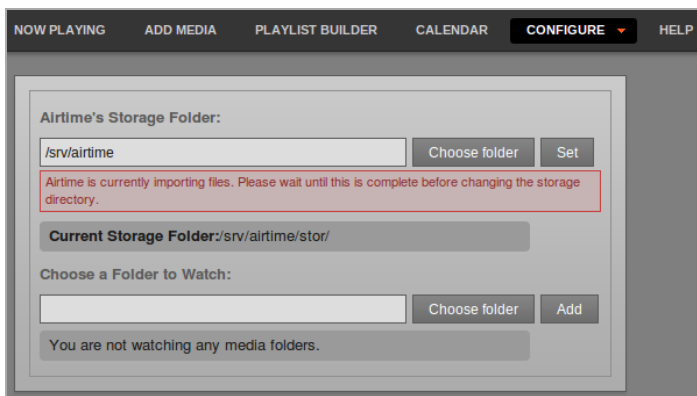
Back on the Manage Media Folders page, click the Set button to change the storage folder. Airtime will ask if you are sure about this action. Click the OK button to confirm your choice.



The Manage Media Folders page will now display the new storage location.

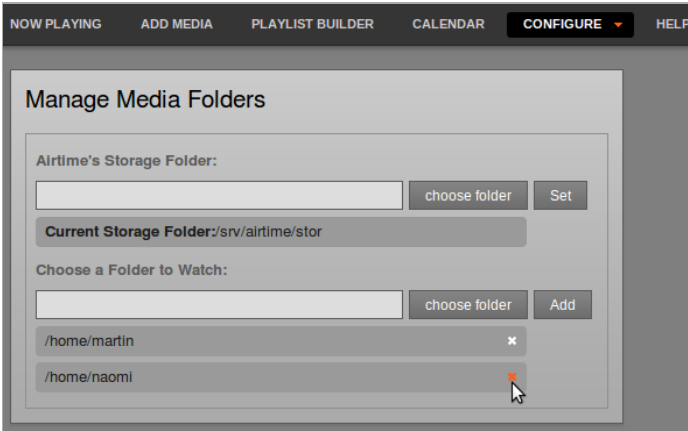


The storage folder cannot be changed while a file import is in progress. If you attempt to do this, an error message will be displayed.

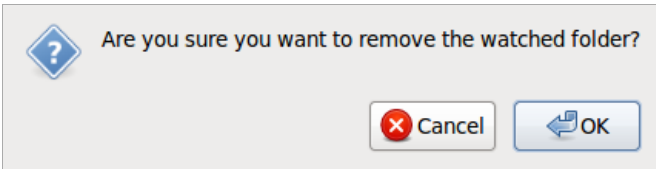


## WATCHING A FOLDER

Under Choose a folder to watch, click the lower choose folder button, open the folder you require, and then click the Add button. You can add as many watched folders as you require. To remove a watched folder, click the small x on the right side of its row in the list.



Again, you will be asked to confirm if you are sure about the action.



Edits to your stored and watched media files are automatically noticed by Airtime. If you edit any file in the archive, such as trimming the duration of a track, Airtime will automatically adjust the playlist and show lengths for that particular file.

The directory structure and file names in the storage archive are human-readable. This means you can find files for download and editing using a file browser on your server, as well as through the Search tab in the Playlist Builder.

## 7. SUPPORT SETTINGS

If you did not already register Airtime when you installed it, as shown in the Getting Started chapter, you can click Support Settings on the Configure menu to display Airtime's automated feedback options. Check the Send support feedback box in order to post technical details about your Airtime installation to Sourcefabric, over the Internet. These details help Sourcefabric diagnose any problem that you might be having with your broadcast automation system.

You may also wish to send details of your station to Sourcefabric, so that your station has the opportunity to be promoted with other Airtime users on the <http://www.sourcefabric.org> website. This feature also helps Sourcefabric target its support services to the countries where they are needed most. Check the box Promote my station on Sourcefabric.org and fill in the details of your station. You can upload a station logo file from your desktop computer by clicking the Browse button.



## Support Settings

Help Airtime improve by letting us know you are using it. This info will be collected regularly in order to improve your user experience.

☒ **Send support feedback**

Click the box below to advertise your station on [Sourcefabric.org](http://Sourcefabric.org). In order to promote your station, "Send support feedback" must be enabled. This data will be collected in addition to the support feedback.

☒ **Promote my station on Sourcefabric.org**

Note: In order to promote your station, "Send support feedback" must be enabled

**Station Name** *(Required):*

Rock n' Roll Radio

**Phone:** *(for verification purposes only, will not be published)*

555 123 456

**Email:** *(for verification purposes only, will not be published)*

station\_manager@example.com

**Station Web Site:**

http://radio.example.com

**Country:**

Canada

**City:**

Toronto

**Station Description:**

Canada's most rocking radio!

**Station Logo:**

/home/daniel/Rock\_n\_roll\_radi

Browse...

Min. size: 200x200 Max. size: 600x600

Click on the Show me what I am sending link to expand a box which displays the technical data being returned to Sourcefabric. The data is collected according to the Sourcefabric privacy policy (<http://www.sourcefabric.org/en/about/policy/>) which you are required to agree to before you can submit the information.

Show me what I am sending

CPU : Intel(R) Core(TM) i7 CPU X 980 @ 3.33GHz  
TOTAL\_RAM : 24734156 kB  
FREE\_RAM : 2444864 kB  
OS : Ubuntu 10.10 x86-64  
AIRTIME\_CONFIG\_FILES : OK  
POSTGRESQL\_DATABASE : OK

☒ By checking this box, I agree to Sourcefabric's [privacy policy](#).

Submit



# 8. NOW PLAYING

This page provides two views of the files your station is playing, which can be switched using the Day View and Now View buttons in the top right corner of the administration interface. If you've only just installed Airtime, there won't be any files shown in either view yet.

The default is Now View, in which files that have already been played are removed from the top of the list automatically. Show titles have a blue background, while individual files have a light gray background. The row for the currently playing file is displayed with an orange background. Any underbooked shows (shows with insufficient content to fill the time allowed) are displayed with a row indicating the length of the gap in seconds. These Gap until show end rows have a red background.

NOW PLAYING    ADD MEDIA    PLAYLIST BUILDER    CALENDAR    CONFIGURE ▾    HELP				
Date	Start	End	Duration	Song
Drive-time Show: 15:57:00 - 16:27:00				
2011-03-30	15:57:00	16:00:21.90	00:03:21.90	Ozon
2011-03-30	16:00:21.90	16:05:52.51	00:05:30.60	Fuego Camina Conmigo
2011-03-30	16:05:52.51	16:09:40.66	00:03:48.15	I'm perfect for you (russian version)
2011-03-30	16:09:40.66	16:12:46.00	00:03:05.33	BrakeOut
2011-03-30	16:12:46.00	16:15:53.53	00:03:07.53	catching the sun
2011-03-30	16:15:53.53	16:21:12.30	00:05:18.77	Moonlight Sonata
2011-03-30	16:21:12.30	16:25:36.87	00:04:24.56	Hydrate - Kenny Beltrey
2011-03-30	16:25:36.87	16:28:57.84	00:03:20.97	Con Nombre De Tango
Underbooked show: 12:00:00 - 12:20:00				
Gap until show end: 1200 seconds				



On the right hand side of the Now View, the Playlist and Show that each file is a part of is displayed. (Creating playlists and shows is covered in later chapters of this book). If a show is overbooked, which means the total playout length is longer than the time allowed for the show, a red and white warning icon is shown in the Status column. This warning icon indicates that the file in this row will be cut off when the show ends.

Airtime 				
Day View Now View				
Artist	Album	Playlist	Show	Status
Альмепа	Секреты	Airtime Show	Drive-time Show	
ir Gal	PANIC	Airtime Show	Drive-time Show	
malSka	démo	Airtime Show	Drive-time Show	
utista, Daniel	Beethoven	Airtime Show	Drive-time Show	
enny Beltrey	Favorite Things	Airtime Show	Drive-time Show	
utista, Daniel	Weirdos And Classics	Airtime Show	Drive-time Show	

A live show that is set for recording is displayed with a dark gray background, to indicate that it does not contain any playlists.

NOW PLAYING ADD MEDIA PLAYLIST BUILDER CALENDAR CONFIGURE ▾ HELP					
Date	Start	End	Duration	Song	Artist
Live Show: 15:56:00 - 16:00:00					
Recording show "Live Show"					

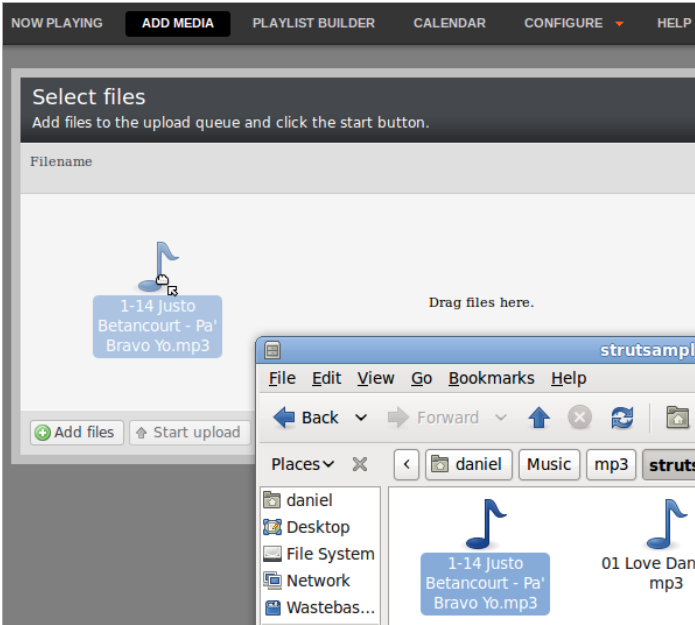
The Day View is similar to the Now View, except that files which have already played out are displayed at the top of the window. You can select which day of the schedule you wish to view by clicking on the date box, just to the left of the Day View button, and selecting a day from the pop-up calendar.

Airtime 				
03/30/2011 Day View Now View				
Artist	Album	Playlist	Show	Status
rey	Favorite Things	Short playlist	Overbooked show	
	Fatness	Short playlist	Overbooked show	
Orchestra	Das Summen der Teile	Airtime Show	Airtime Tea-Time Show	
Daniel	15	Airtime Show	Airtime Tea-Time Show	
	Секреты	Airtime Show	Airtime Tea-Time Show	

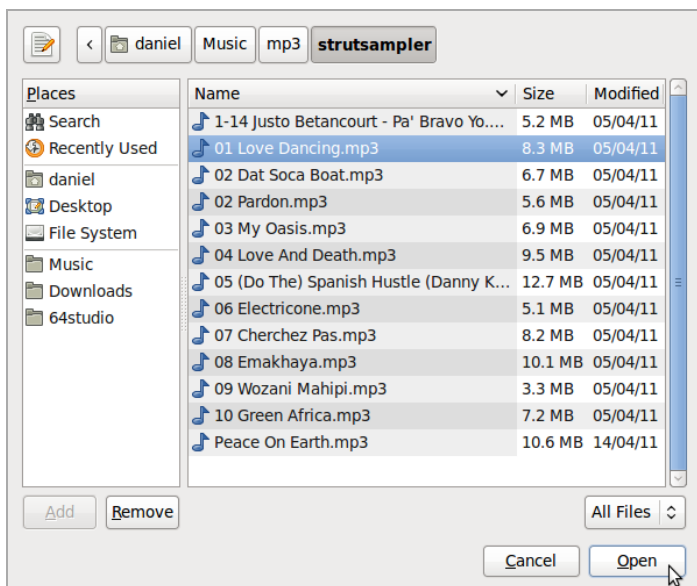
## 9. ADD MEDIA

If you do not have direct access to the Airtime server, you can add files to the Airtime storage and database using the Add media page of the administration interface. This page includes an upload queue for files which supports drag and drop from your computer's file manager, if you are using the recommended Firefox 3.6 web browser.

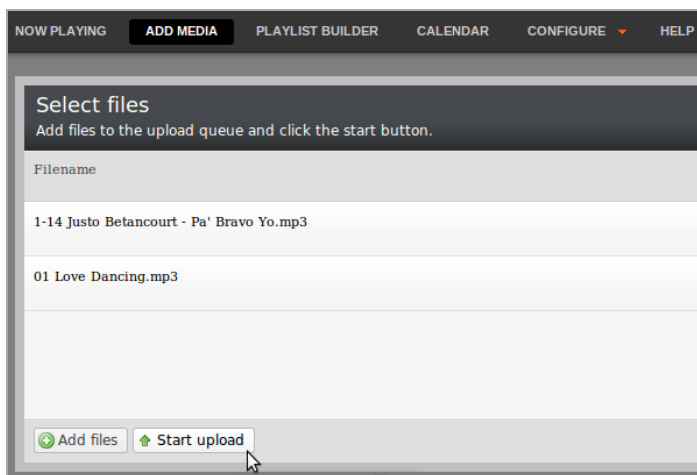
The Add Media page is not visible to Guest users.



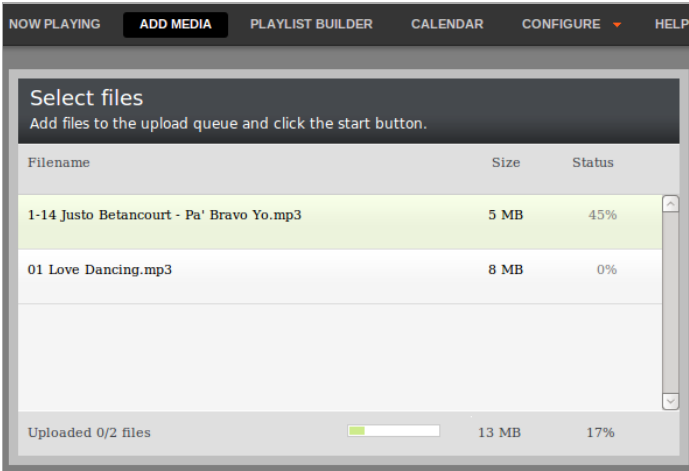
If your web browser does not support drag and drop, you can use the Add files button, which has a white plus sign in a green circle icon, to open a file selection window on your computer.



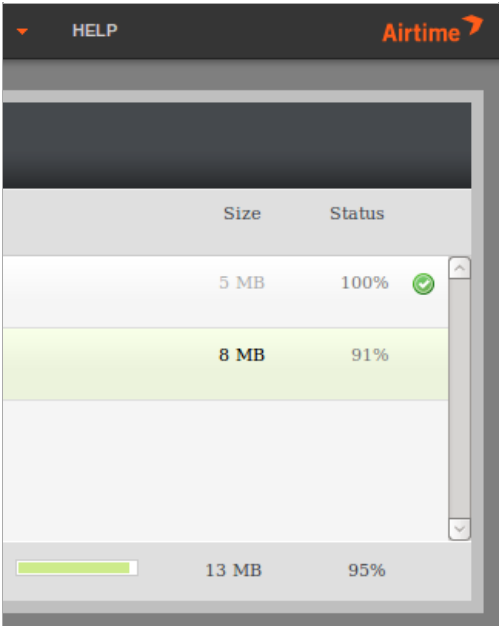
After you have added all the files that you require to the upload queue, click the Start Upload button, which has a green arrow icon.



The row of the file currently being uploaded is highlighted in pale green. At the bottom of the upload queue, a progress bar and percentage indicates how much of the upload has taken place so far.



Once it has been uploaded successfully, each file row displays a white check mark in a green circle icon.



Your files are now imported into the Airtime storage and database, ready to be included in your broadcast playlist.

# 10. PLAYLIST BUILDER

This page of the Airtime interface enables you to search the media archive, sort and display the search results by the criteria that you choose, and drag and drop search results into an open playlist. You can also re-arrange the currently open playlist by dragging and dropping.

The Playlist Builder page is not visible to Guest users.

## THE SEARCH TAB

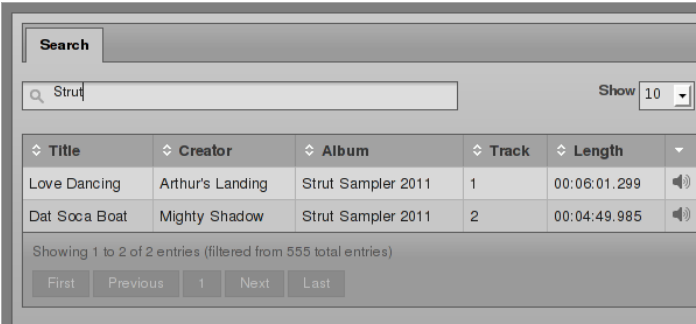
On the left hand side of the Playlist Builder page, the Search tab lists both the media and the playlists in the Airtime storage archive, with ten entries shown per page by default. Click on the Show entries drop-down menu in the top right corner to select the display of 10, 25, 50 or 100 entries per page, according to your preference.

Click the column headings Title, Creator, Album, Track, Length or Type to sort the entries. In the Type column, audio files are represented by a loudspeaker icon, while playlists are represented with a document icon. At the bottom of the window, click the First, Previous, Next, Last or individual page number buttons to browse the media archive.

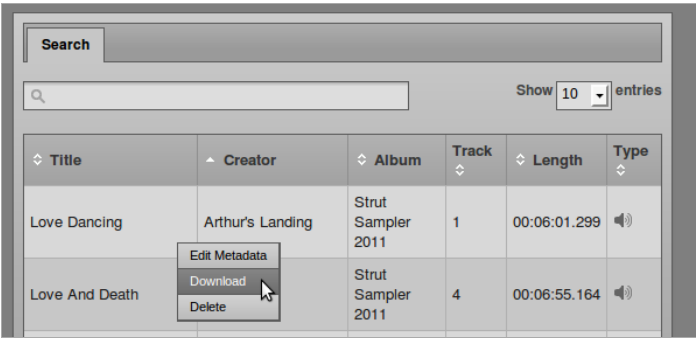
Search					
<input type="text"/>			Show 10 entries		
◆ Title	◆ Creator	◆ Album	Track ▲	◆ Length	◆ Type
Panic	Ofir Gal	PANIC	1	00:03:27.464	🔊
Blue Orchid	The White Stripes	Get Behind Me Satan	1	00:02:37.56	🔊
Gulag Orkestar	Beirut	Gulag Orkestar	1	00:04:38.961	🔊
Seven Nation Army	Ben L'Oncle Soul	Ben L'Oncle Soul	1	00:02:59.43	🔊
Dayvan Cowboy	Boards of Canada	Trans Canada Highway	1	00:05:01.453	🔊
The High Road	Broken Bells	Broken Bells	1	00:03:52.254	🔊
Who Was In My Room Last Night?	Butthole Surfers	Independent Worm Saloon	1	00:04:09.38	🔊
Blue Rondo A La Turk	The Dave Brubeck Quartet	Time Out	1	00:06:46.177	🔊
Balrog Boogie	Diablo Swing Orchestra	The Butcher's Ballroom	1	00:03:53.186	🔊
Bombay	El Guincho	Pop Negro	1	00:03:39.324	🔊
Showing 1 to 10 of 555 entries					
First Previous 1 2 3 4 5 Next Last					

Type a search term into the box in the upper left corner, with the magnifying glass icon. You can search by Title, Creator, Album, Track number, or Length. For example, to search for all files between seven and eight minutes long, enter 00:07 into the search box. Like an Internet search engine, the filtered entries shown are refined as you type - there is no need to press the Enter key on your keyboard.



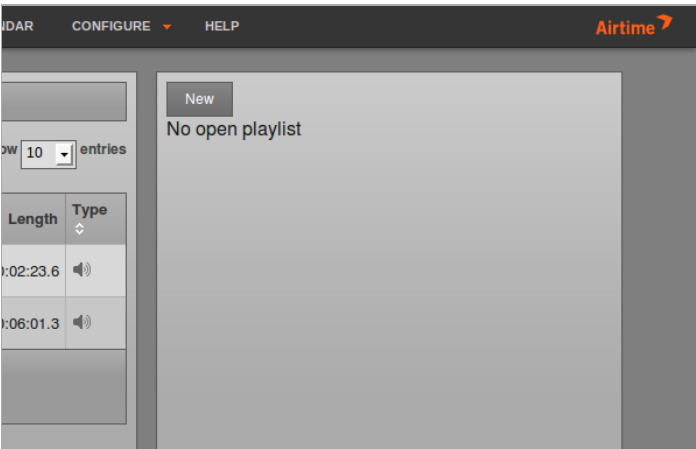


Clicking on a file row in the Search tab opens a pop-up menu which enables you to Edit Metadata for that file, Download it to your local computer or mobile device for audition or editing, or Delete it from the Airtime storage server. The Delete option should be used with caution, because this action cannot be undone. For this reason, only admin users are allowed to delete files.



## CREATING A NEW PLAYLIST

Once you have found the media that you require using the Search tab, you can create a new playlist on the right hand side of the Playlist Builder page. Click the New button to begin.



Enter a Title and Description for the playlist, then click the Submit button. Setting good quality metadata here will help you find the playlist using the Search tab later, so you should be as descriptive as possible.

Playlist Metadata

Title: My playlist

Description: This is an example playlist

Submit

Next, drag and drop files from the Search tab on the left into the new playlist on the right.

PLAYLIST BUILDER

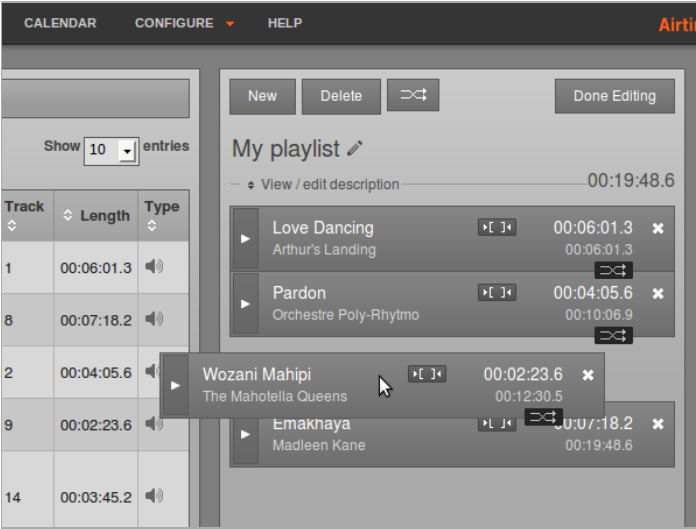
My playlist

Empty playlist

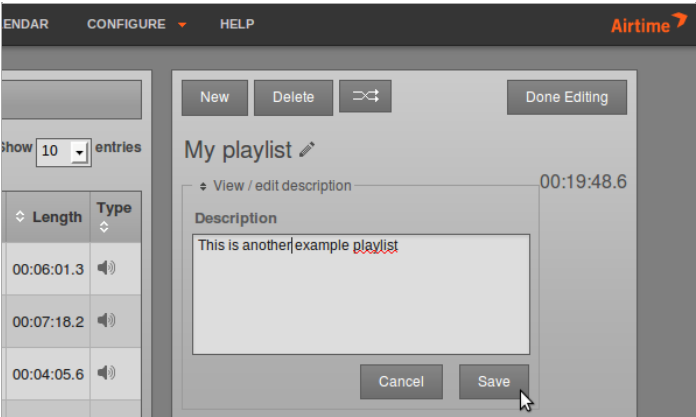
Creator	Album	Track	Length	Type
Arthur's Landing	Strut Sampler 2011	1	00:06:01.3	Love Dancing
Photobells	Strut Sampler 2011	9	00:02:23.6	Arthur's Landing
Various Artists	Fania Records 1964-1980 The Original Sound Of Latin New York	14	00:03:45.2	

After dragging files into the new playlist, the total playlist time is displayed in the top right corner. The duration of an individual file is shown in each row of the playlist in a white font, and beneath this figure the time since the beginning of the playlist is displayed in a smaller light gray font.

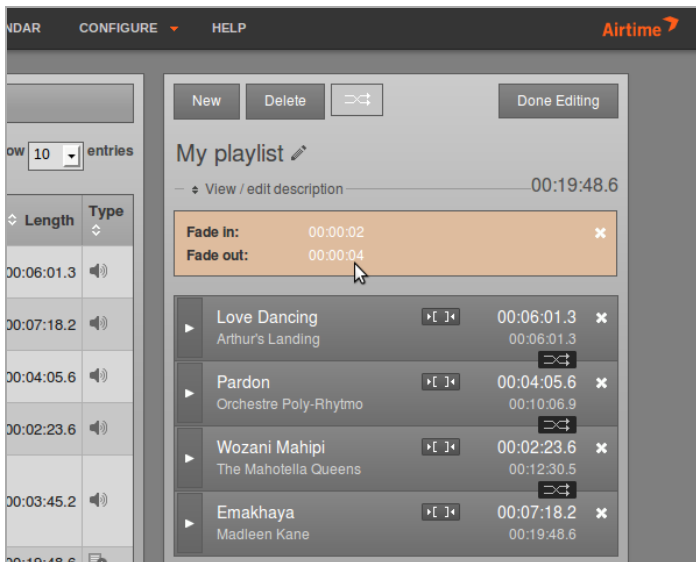
To audition a playlist file in your web browser, click the white triangle play/pause button on the left side of each row. Click the small white x icon on the right hand side of each row to remove a file from the playlist. You can also drag and drop files to re-order them.



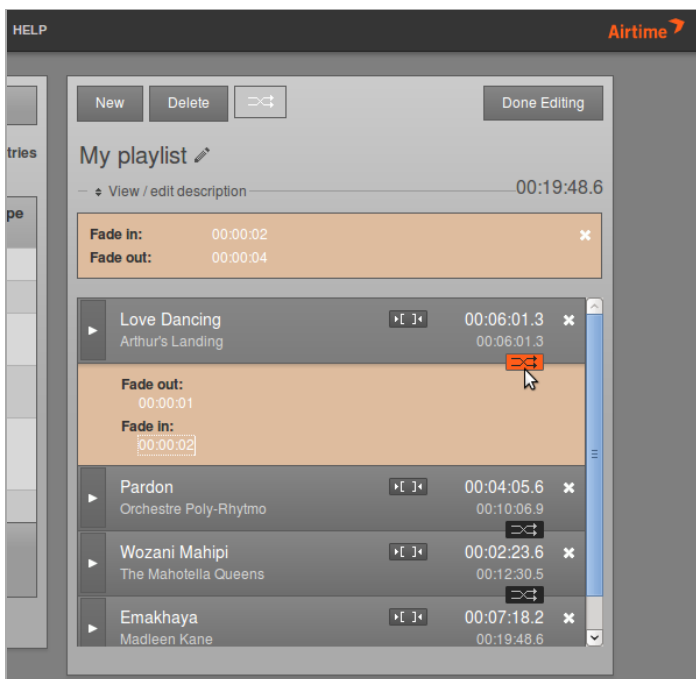
Click on the pencil icon to the right of the name of the playlist to edit it, or click on View/edit description to open a box for entering playlist metadata.



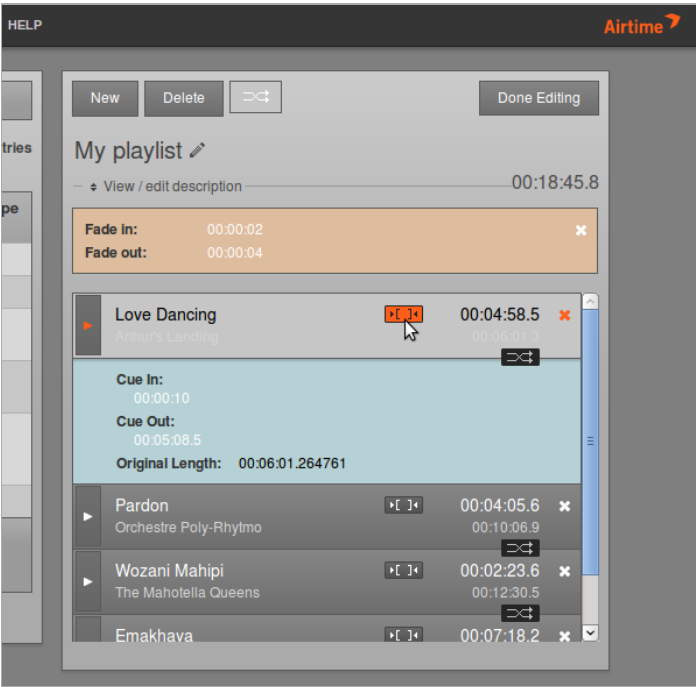
Click the playlist Crossfade button (two horizontal white arrows crossing in a gray rectangle), to the right of the New and Delete buttons, to open a beige bar in which you can set the Fade in and Fade out times for this playlist.



Click any one of the smaller Crossfade buttons between file rows to open another beige bar which enables you to set fade in and fade out times between two adjacent files in the playlist. The crossfade buttons for adjacent files change to an orange background when you click them.



Each file in the playlist also has a button with two square brackets, which enables you to set cue in and cue out times for that particular file. Like the crossfade button, it changes to an orange background when you click it. The length of the file in the playlist is updated automatically, but the Original Length of the file is also displayed for your reference.

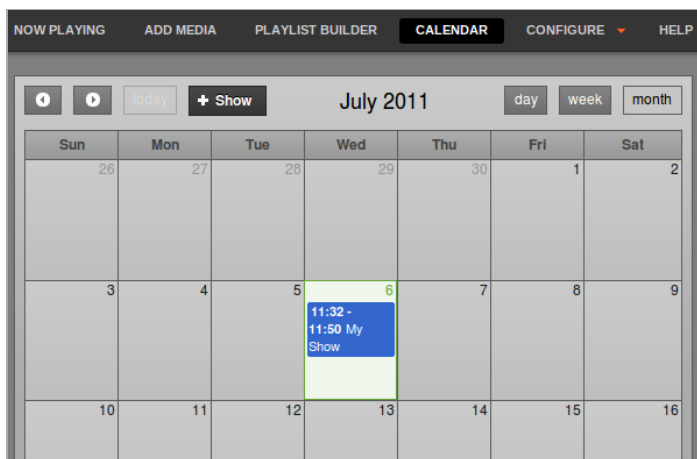


When your playlist is complete, click the Done Editing button in the top right corner. If you want to edit the playlist contents or the playlist metadata later, you can find it by Title, Creator or Length using the Search tab. Click on the playlist in the search results list, and select Edit from the pop-up context menu. A playlist that is already open for editing will show the option Close in the context menu instead. You can also Delete a playlist from this context menu.

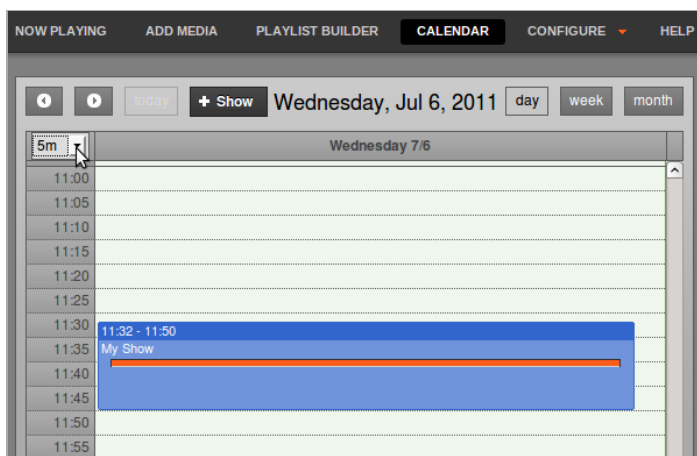


# 11. CALENDAR

The Calendar page of the Airtime administration interface has three views: Day, Week and Month, which can be switched using the gray buttons in the top right corner. By default, the Month view is shown, with today's date highlighted by a pale green background.



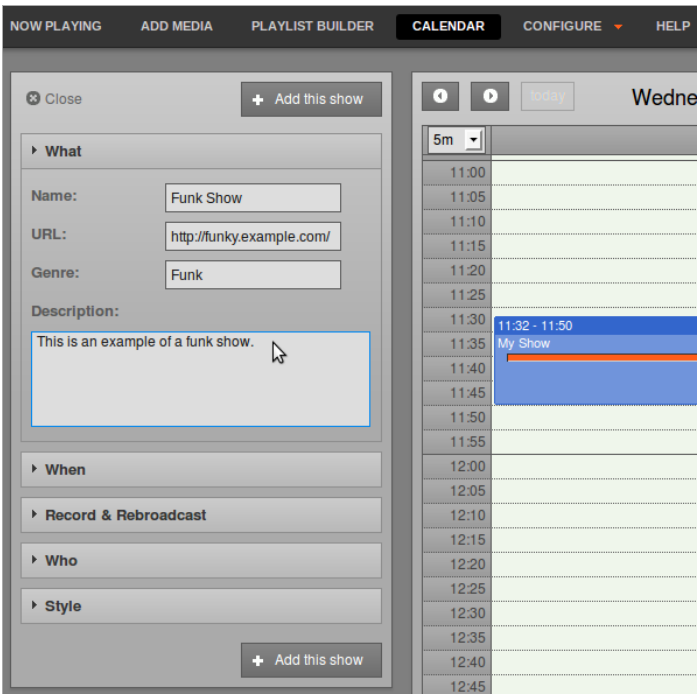
In the top left corner of the page, you can go back or forward through the Calendar by clicking on the buttons which have a small gray triangle in a white circle. Click the Today button to jump to today's date in the current view. In the Day or Week views, there is also a drop-down menu which allows you to set the resolution displayed for the calendar, ranging from one minute per row to sixty minutes per row.



# ADDING A SHOW

Only Admins and Program Managers can use this feature. To add a new show to the Calendar, click the + Show button in the top left corner of the page, or click on any empty row in the Calendar itself. Either of these actions opens the Add this show box, which has five sections, arranged vertically: What, When, Record & Rebroadcast, Who, and Style. Click the small black triangle to the left of the section name if you wish to minimize or maximize it.

In the What box, enter the name, public website URL, genre and description for the show that you are creating.



Next, in the When section, if you clicked on a date in the Calendar this should already be entered in the Date/Time Start field. To set another date for the show, click on the date in the Date/Time Start field and select the alternative date that you require for the show from the small pop-up calendar which will appear. Click on the adjacent time field to set the start time for the show, with the pop-up Hour and Minute box. The minute values in the pop-up time boxes are rounded to the nearest five minutes, but you can adjust the times manually by clicking into the fields and typing. Repeat the process to set the Date/Time End fields. The Duration of the show will be displayed automatically, based on the start and end times you have set.

**When**  
 Date/Time Start: 2011-07-06 11:50  
 Date/Time End: 2011-07-06 12:15  
 Duration: 25m  
 Repeats? ☐

**Record & Rebroadcast**  
**Who**  
**Style**

+ Add this show

Hour							Minute		
00	01	02	03	04	05	00	05	10	
06	07	08	09	10	11	15	20	25	
12	13	14	15	16	17	30	35	40	
18	19	20	21	22	23	45	50	55	

To schedule a regular show, check the Repeats? box and select either Weekly, Bi-weekly or Monthly from the Repeat Type drop-down menu that will appear. Then check the boxes for the days of the week that you want to schedule the regular show on. Set the Date End for the regular show to finish, or check the No End box to schedule the show indefinitely.

**When**  
 Date/Time Start: 2011-07-07 12:00  
 Date/Time End: 2011-07-07 13:50  
 Duration: 1h 50m  
 Repeats? ☒

Repeat Type: weekly  
 Select Days:  
☐ Sun ☒ Mon ☒ Tue ☒ Wed ☒ Thu ☒ Fri  
☐ Sat

Date End: 2012-07-05  
 No End? ☐

**Record & Rebroadcast**  
**Who**  
**Style**

+ Add this show

July 2012						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

In the Record & Rebroadcast section, the Record? box enables automatic recording of the soundcard line input, if your Airtime server has one, at the time of the show. Shows set for live recording cannot also contain playlists. The default audio format for live recordings is MP3, and the recording files are saved in the storage directory that was set when Airtime was installed.



If you wish the recording to be played out at a later time, check the Rebroadcast? box, and then select up to ten date and time slots in the Repeat Days box.

Record & Rebroadcast

Record?

☒

Rebroadcast?

☒

Repeat Days:

+1 days

@

01:10

+7 days

@

01:10

+8 days

@

13:10

+

Who

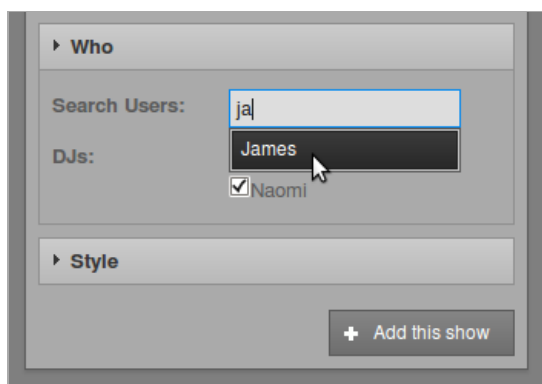
Style

+ Add this show

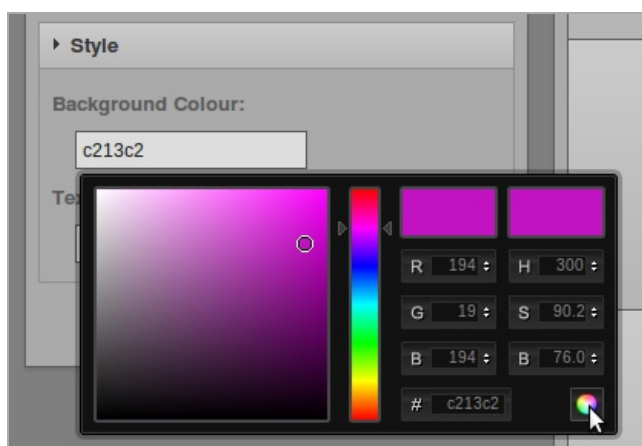
Shows set for recording have a small red dot icon in the calendar, while rebroadcast shows have a white loop icon.

Sun	Mon	Tue	Wed	Thu
1	2	3	4	5
8	9	10	11	12
		18:00 - 19:00 Funk Show		
15	16	17	18	19
		18:00 - 19:00 Funk Show		
22	23	24	25	26
		18:00 - 19:00 Funk Show		
29	30	31	1	2

In the Who section, type the first few letters of the name of the show's DJ (presenter) in the Search Users field to select a name from the database, or check one of the DJs boxes in the vertical list below. This association of a DJ name with a particular show enables that DJ to add playout media to the show, so it is important to get the DJ's name right.



Finally, select a Background Colour and Text Colour from the Style section, so that the new show can be easily identified in the Calendar. Click the colored circle icon in the lower right corner to close this pop-up window.



Click the Add this show button at the top or bottom of the box. The new show will now be displayed in the Calendar, with a regular slot if you have chosen to schedule one.

## EDITING A SHOW

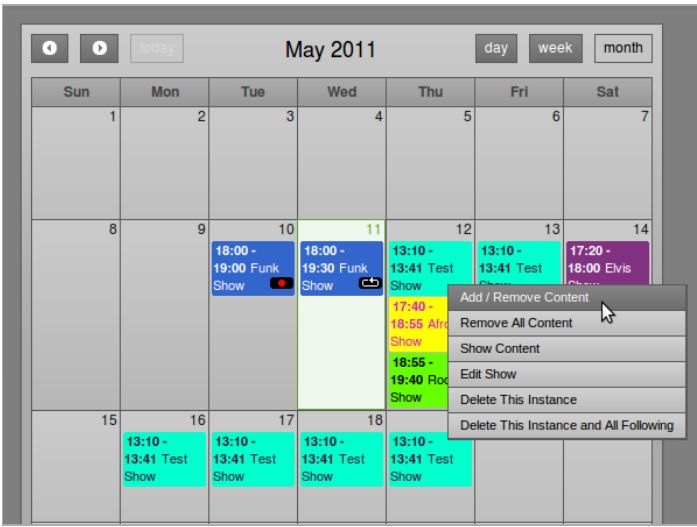
Show configuration and metadata can be changed at any time until broadcast of that show commences. Click on the show in the Calendar, and select Edit Show from the pop-up context menu. This opens the Update Show box, which is almost exactly the same as the Add this Show box. Click the Update Show button at the top or bottom of the box when you are done.

Alternatively, individual shows can be clicked on and dragged to new days and times in the calendar. However, Airtime will not allow you to drag a future show into the past, or drag a show onto a day where this would cause show times to overlap.

In the Day and Week views, show length can be adjusted by clicking on the lower edge of the show box, and dragging the edge of the box upwards or downwards. The new show length is calculated automatically. Airtime will not allow you to drag a show end time beyond the start of the next show.

## ADDING CONTENT TO A SHOW

To add content to a show, click on it in the Calendar, and select Add/Remove Content from the pop-up context menu.



This action opens the Schedule Media pop-up window. Just like when using the Playlist Builder to find files, you can search for playlists and drag them into the Items In This Show box.

Schedule Media

Elvis Show: Sunday July 10 14:15 - Sunday July 10 15:00

Search:

Show
10
entries

Title

Creator

Length

Editing

My playlist
admin
00:19:48.613881

My playlist
admin
00:19:48.613881

Showing 1 to 1 of 1 entries

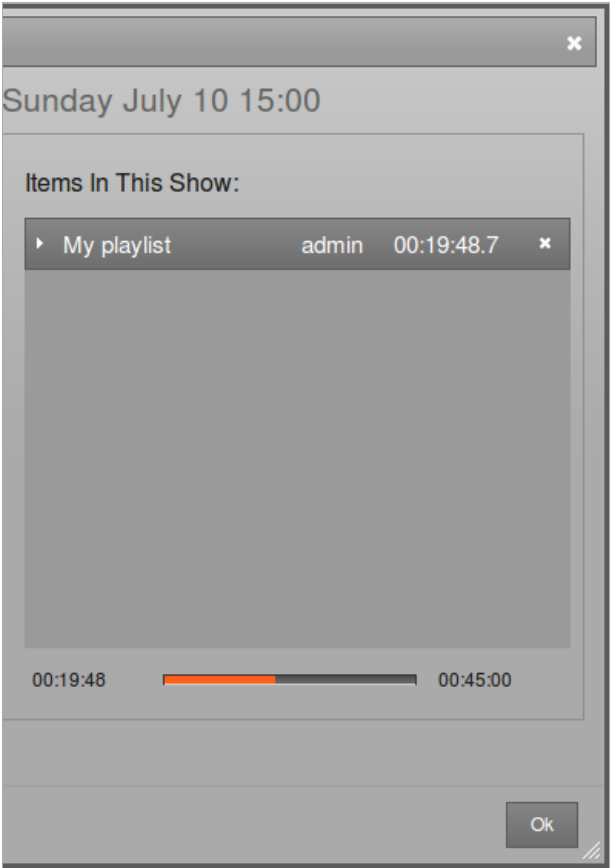
First
Previous
1
Next
Last

Items In This Show:

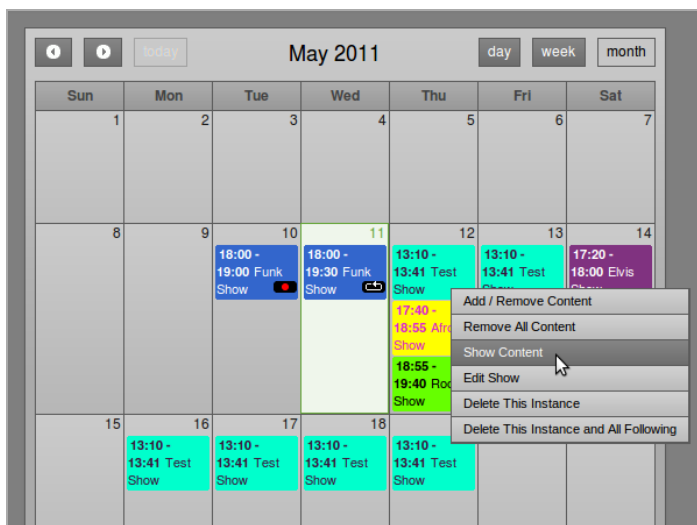
Nothing Scheduled

00:00:00
00:45:00

The orange progress bar underneath the Items in this Show box updates automatically to show how much time remains from the allocated show duration. If you add too much media relative to the length of time allocated to the show, Airtime will display a warning, and playout will be cut when the show ends. Click the small white triangle on the left of each row to see details of the playlist, or click the white x icon on the right side to remove it from the show.



When your show has all the required content, click the OK button in the bottom right corner to close the window. Back in the Calendar, click on the show and select Show content from the pop-up context menu to view a list of content now included in the show.

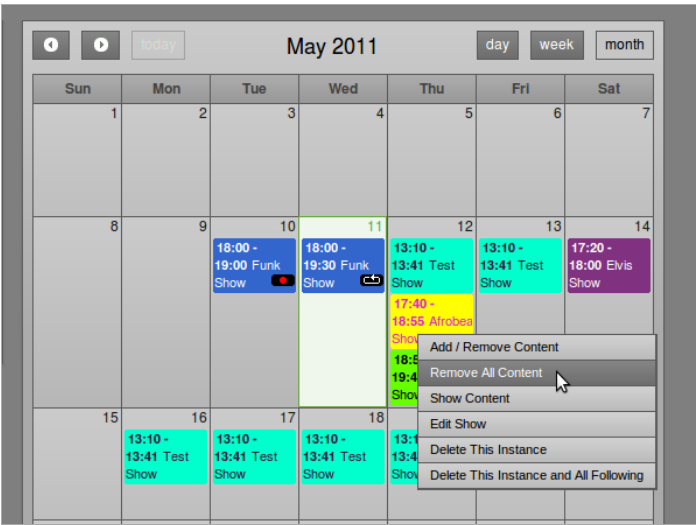


Click on any row in the Show Contents window to download the individual file for audition, or further editing. Once you're done, click the OK button in the bottom right corner, or the white x icon in the top right corner, to close the window.

Show Contents					
Start	Title	Creator	Album	Length	Genre
2011-03-21 13:10:00	Love Dancing	Arthur's Landing	Strut Sampler 2011	00:06:01.299	
2011-03-21 13:16:01.299	Баллада № 1 (женский романс)	Ильмера	Секреты	00:04:18.37	Blues
2011-03-21 13:20:19.669	WO QUI NON COIN / COWBOY BEBOP	Aoi Tada	Space Bio Charge	00:03:42.66	Anime
2011-03-21 13:24:02.329	Respect	Aretha Franklin	I Never Loved A Man the Way I Love You	00:02:24.953	Oldies
2011-03-21 13:26:27.282	Cherry Blossom Girl	Air	Talkie Walkie	00:03:39.472	Other
2011-03-21 13:30:06.754	Seven Nation Army	Ben L'Oncle Soul	Ben L'Oncle Soul	00:02:59.43	R&B
2011-03-21 13:33:06.184	Warlock	Desmond Dekker	Rockin' Steady The Best of Desmond Dekker	00:03:55.391	Ska
					Ok

# REMOVING CONTENT FROM A SHOW

To remove an individual playlist from a show, click on the show in the Calendar, and select Add/Remove Content from the pop-up menu. In the Schedule Media window which opens, use the white x icon to remove the playlist from the show content. To remove all playlists from a show, click on the show in the Calendar, and select Remove All Content from the pop-up menu.



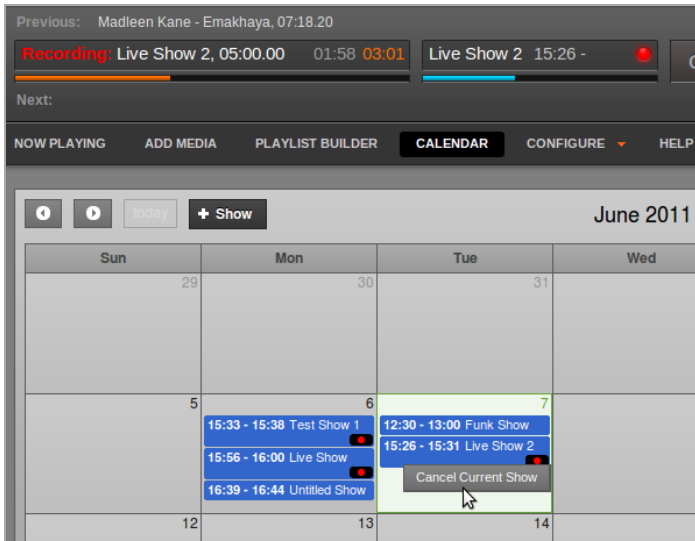
# DELETING A FORTHCOMING SHOW

To delete one instance of a forthcoming show, click on the show in the Calendar, and select Delete This Instance from the pop-up menu. If you wish to delete all future instances of this particular show, select Delete This Instance and All Following from the pop-up menu.

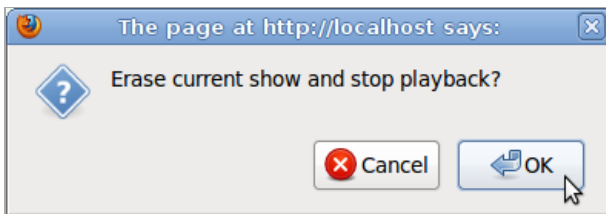
You cannot delete or remove content from shows that have already played out. These shows have only one option on the pop-up menu, which is Show Content.

# CANCELING PLAYOUT AND RECORDING

If you wish to cancel the recording of a live show and delete the recorded file from the storage server, click on the show in the Calendar and select Cancel Current Show from the pop-up menu. In the same way, it is also possible to immediately cancel playout of a playlist based or pre-recorded show while it is running.



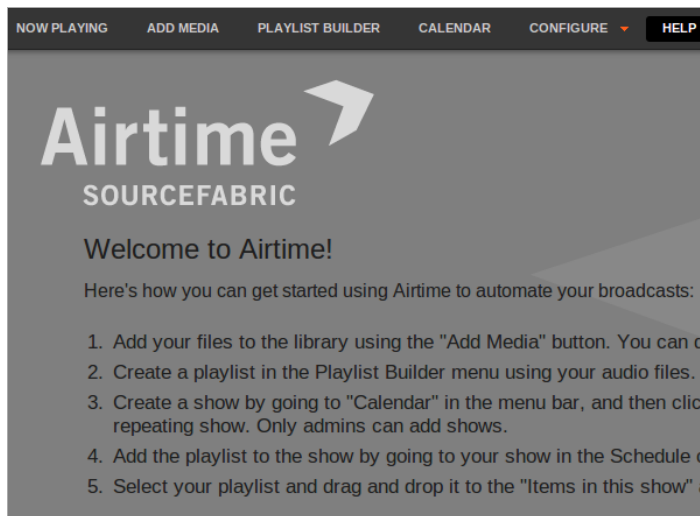
Airtime will ask you if you are sure about this action, as it cannot be undone.





# 12. HELP

The Help menu in Airtime offers a 'quick start' guide for new users.



You can visit the Airtime online support forum, and sign up for the mailing list, at <http://forum.sourcefabric.org/index.php/f/14/>

This forum is mirrored by the mailing list, so posts on the forum appear on the mailing list and vice versa. You can therefore also post a message there by emailing [airtime-support@lists.sourcefabric.org](mailto:airtime-support@lists.sourcefabric.org)

To subscribe to forum updates via mail, please register or login to the forum by clicking the appropriate link. Then click the 'Subscribe' button at the top of each forum page.

## BUG REPORTING

Airtime needs your input to improve. If you think you've found a bug, please visit <http://dev.sourcefabric.org/> and sign in, using the same login and password that you registered for the Airtime forum. Create a bug report by selecting Create Issue, then Airtime, and then Bug. That way, the Airtime team can keep track of your problem and notify you when it has been fixed. You can also suggest improvements and new features for Airtime on that site.

## CONTACT

Finally, when all other avenues have been exhausted, email us directly at [contact@sourcefabric.org](mailto:contact@sourcefabric.org) and we'll try to help!

## OTHER HELP

The UNESCO wiki Community Radio - A user's guide to the technology: <http://cr-userguide.web4all.in/> features a very comprehensive guide to setting up a community radio station. This guide is aimed at people thinking about setting up a radio station in India, but includes lots of practical advice that would be useful in any country.

# INSTALLATION

- 13. PREPARING THE SERVER**
- 14. EASY INSTALL**
- 15. MANUAL INSTALLATION**
- 16. AUTOMATED INSTALLATION**
- 17. CONFIGURATION**
- 18. SETTING THE SERVER TIME**

# 13. PREPARING THE SERVER

The following instructions assume that you have root access (sudo on Ubuntu) to a GNU/Linux server, and are familiar with basic command line tasks. Experienced system administrators may prefer to skip to the Expert install chapter in the appendix of this book.

The recommended Airtime server platform is Ubuntu 10.04 'Lucid Lynx' LTS. Debian 6.0 'squeeze' is also a good option. The server should have at least a 1GHz processor and 512MB of RAM. The Airtime installation does not use much disk space, but you should allow plenty of storage capacity for the media archive. A hot-swap RAID array is recommended for the media archive, in case of disk failure. You should also consider a UPS or other battery powered system to offer some protection against short-term power failures.

The Airtime web administration interface is intended to work with any browser, on any desktop or mobile platform. The recommended web browser is Mozilla Firefox 3.6.

## SOUNDCARDS

If you intend that your Airtime server will have a direct audio output to a broadcast transmitter or a separate stream encoder, your server machine must have a soundcard supported by an ALSA driver. Almost all standard soundcards have ALSA drivers built into the Linux kernel, which do not need to be installed separately. If in doubt about driver support for your soundcard, check the ALSA soundcard matrix at: <http://www.alsa-project.org/main/index.php/Matrix:Main>

If your Airtime machine will only be used to stream to an Icecast streaming media server, you do not require a soundcard to be installed on the server side. This option is suitable for Airtime installations at your ISP's datacenter, remote from any transmitter.

## DISABLE DESKTOP AND OTHER SOUNDS

If you are installing Airtime on a desktop computer, make sure you disable or remove any programs that could send unintended audio to a soundcard you are using for broadcast output. This includes alert sounds which play when the computer is ready for use, or when a user logs in. On Ubuntu, these sounds are configured using System -> Preferences -> Sound on the main desktop menu. This configuration dialog only works when the PulseAudio sound server is installed.

You may prefer to remove all unwanted sound files from the computer, in case they could be played unintentionally via the soundcard. For example, on Ubuntu you may wish to remove the ubuntu-sounds package, with the following command:

```
$ sudo apt-get purge ubuntu-sounds
```

## REMOVE PULSEAUDIO, IF INSTALLED

The PulseAudio sound server is not compatible with Airtime soundcard output, but is installed by default on Ubuntu. To remove PulseAudio from an Ubuntu machine, type the following command:

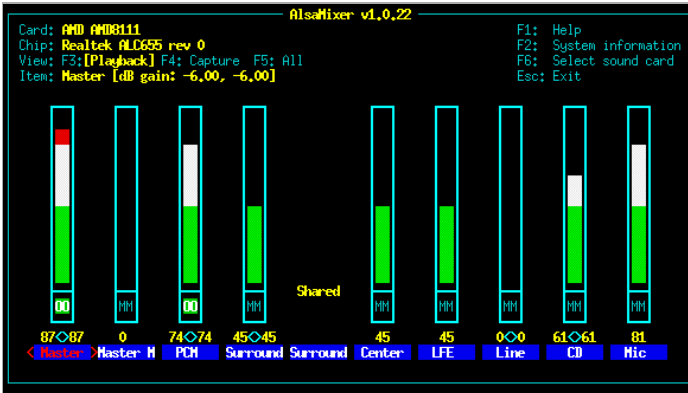
```
$ sudo apt-get purge pulseaudio
```

Removing the pulseaudio package on a desktop Ubuntu machine may force the removal of the ubuntu-desktop metapackage. However, this metapackage is only installed on the system for managing upgrades; removing it does not remove the GNOME desktop.

After removing PulseAudio, if your Airtime machine has a desktop, you can install a mixer applet which can control the ALSA soundcard driver directly, such as gnome-alsamixer:

```
$ sudo apt-get install gnome-alsamixer
```

On a server with a soundcard but without a desktop, you can control sound input and output levels using the command line program alsamixer:



This program should already be installed on an Ubuntu or Debian machine with a soundcard. If not, you can install it with the command:

```
$ sudo apt-get install alsa-utils
```

## REMOVE WEBMIN, IF INSTALLED

The webmin control panel (<http://www.webmin.com>) has been known to remove Apache and PHP packages on Debian and Ubuntu systems, which can cause the Airtime package to be removed in turn. This problem is easily reversed by re-installation of the affected packages, but it has the potential to disrupt your broadcast playout from Airtime. Webmin is not likely to be installed on your server unless your system administrator has installed it manually. This is because webmin was removed from official Debian and Ubuntu package repositories some years ago.

## RABBITMQ ON DEBIAN

In Debian 6.0 (Squeeze) the rabbitmq-server daemon does not start automatically after a reboot. This should be fixed before installing Airtime, to prevent problems at playout time. If the rabbitmq-server package was installed before the last reboot, you will need to run:

```
# invoke-rc.d rabbitmq-server start
```

as the root user before the installation of Airtime. If it is not already installed, run the following command as root:

```
# apt-get install rabbitmq-server
```

After a fresh installation, rabbitmq-server will start automatically, so there is no need to run the `invoke-rc.d` command mentioned above.

In either case, you should then edit lines 13 and 14 of the file `/etc/init.d/rabbitmq-server` (as root) to show:

```
# Default-Start:    2 3 4 5
# Default-Stop:     0 1 6
```

and then run the command (as root):

```
# update-rc.d rabbitmq-server defaults
```

This should make sure that rabbitmq-server starts after the next reboot.

## PROCEED TO INSTALLATION

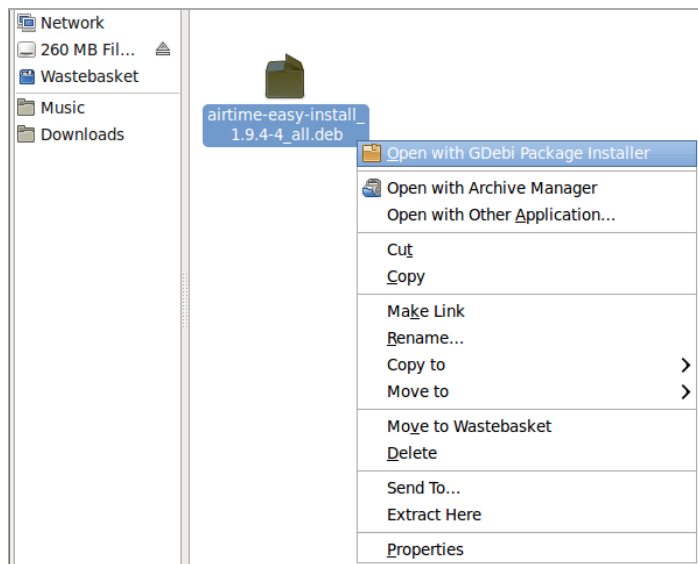
Now your server should be ready for Airtime to be installed. Depending on your requirements, you should now proceed to either chapter Easy install, the chapter Manual installation or the chapter Automated installation.

# 4. EASY INSTALL

The airtime-easy-install package sets up a typical Airtime configuration without prompting you for any settings. You can then install the latest Airtime package from the Sourcefabric repository with a few clicks. It is suitable for test installations, where the Airtime administration interface is accessed at the `http://localhost` URL.

You can download the airtime-easy-install package from the `http://apt.sourcefabric.org/misc/` directory. You should stay connected to the Internet throughout the installation, as a number of dependency packages have to be installed from online repositories.

On Ubuntu 10.04 'lucid' or Debian 6.0 'squeeze', you can run the airtime-easy-install package from your desktop using the program GDebi. In the desktop file manager, right-click on the airtime-easy-install package and select Open with GDebi Package Installer:



Or for an Ubuntu lucid or Debian squeeze server without a desktop, you can use gdebi on the command line:

```
$ sudo gdebi airtime-easy-install_1.9.4-4_all.deb
```

If gdebi is not installed, you can run the command:

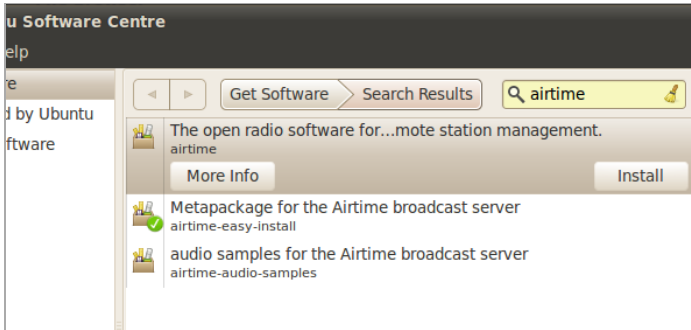
```
$ sudo apt-get install gdebi
```

Later versions of Ubuntu have replaced GDebi with the program software-center. On a desktop installation, right-click on the package and select Open with Ubuntu Software Center. This program can also be run from the command line, for example:

```
$ software-center airtime-easy-install_1.9.4-4_all.deb
```

Any of the methods above should resolve package dependencies automatically.

Once the installation of `airtime-easy-install` has completed, you can install the latest Airtime package on a desktop system using your usual package manager, such as Ubuntu Software Center, or Synaptic on Debian.



On a server, you can use the commands:

```
$ sudo apt-get update
$ sudo apt-get install airtime
```

## CONFIGURE FOR PRODUCTION

To convert a test installation into a production installation, you can run the command:

```
$ sudo dpkg-reconfigure airtime
```

The `dpkg-reconfigure` command will run through the configuration steps shown in the Automated installation chapter, so that you can set the correct hostnames and passwords for your production Airtime server.



# 15. MANUAL INSTALLATION

You do not normally need to install Airtime manually, unless you are testing a development version of the software. Versions of Airtime recommended for production use are available for download and upgrade via secure apt, as shown in the Automated installation chapter.

## FULL INSTALL

The airtime-full-install script has been tested on Ubuntu GNU/Linux servers and is designed to configure your server for you, using typical default settings.

1. In the server terminal or console, download Airtime from <https://sourceforge.net/projects/airtime/files/> with wget. For example, to download version 1.9.4, you could use the command:

```
$ wget http://downloads.sourceforge.net/project/airtime/1.9.4/airtime-1.9.4.tar.gz
```

2. Unzip the downloaded file in your home directory. This action will create a subdirectory called airtime-1.9.4:

```
$ sudo tar -xvzf airtime-1.9.4.tar.gz -C ~/
```

3. Run the airtime-full-install script:

```
$ sudo ~/airtime-1.9.4/install_full/ubuntu/airtime-full-install
```

The installation script will indicate which files are being installed on your system, and the directories they are being unpacked into. Finally, it will run the airtime-check-system script to confirm that your server environment is set up correctly.

```
*** Verifying your system environment ***
CPU = Dual Core AMD Opteron(tm) Processor 170
Total RAM = 6128244 kB
Free RAM = 167276 kB
OS = Ubuntu 10.04.3 LTS x86-64
AIRTIME_CONFIG_FILES = OK
POSTGRES_SQL_DATABASE = OK
PYTHON_KOMBU_VERSION = 1.2.0
PYTHON_POSTER_VERSION = 0.8.1
PYTHON_MUTAGEN_VERSION = 1.20
PYTHON_PYINOTIFY_VERSION = 0.9.2
RABBITMQ_SERVER = OK
AIRTIME_VERSION_URL = http://localhost:80/api/version/api_key/%api_key%
APACHE_CONFIGURED = YES
AIRTIME_VERSION = 1.9.4
PLAYOUT_ENGINE_PROCESS_ID = 24021
PLAYOUT_ENGINE_RUNNING_SECONDS = 7
LIQUIDSOAP_PROCESS_ID = 24025
LIQUIDSOAP_RUNNING_SECONDS = 7
MEDIA_MONITOR_PROCESS_ID = 24078
MEDIA_MONITOR_RUNNING_SECONDS = 7
SHOW_RECORDER_PROCESS_ID = 24055
SHOW_RECORDER_RUNNING_SECONDS = 7
ICECAST_PROCESS_ID = 23649
```

```
-- System setup looks OK!
```

```
***** Install Complete *****
```

You are now ready to proceed to the Configuration chapter.

## MINIMAL INSTALL

The alternative `airtime-install` script does not attempt to configure your server, an option which you may find more suitable if you have special requirements.

1. In the server terminal or console, install the list of dependencies. For example, on Ubuntu 10.04 (Lucid Lynx) LTS you could enter the command:

```
$ sudo apt-get install apache2 curl ecasound gzip libao-ocaml \
libapache2-mod-php5 libcamomile-ocaml-dev libesd0 libmad-ocaml \
libmp3lame-dev libportaudio2 libsamplerate0 libsoundtouch-ocaml \
libtaglib-ocaml libvorbis-ocaml-dev monit mpg123 odbc-postgresql \
patch php-pear php5-curl php5-gd php5-pgsql python2.6 \
python-virtualenv rabbitmq-server sudo tar unzip
```

The other dependency to install is `phing` (note that you must use the version number shown):

```
$ sudo pear channel-discover pear.phing.info
$ sudo pear install phing/phing-2.4.2
```

2. Check that the Apache web server modules that Airtime requires are enabled:

```
$ sudo a2enmod php5 rewrite
```

The server should respond:

```
Module php5 already enabled
Module rewrite already enabled
```

3. Create a directory to contain the Airtime web interface:

```
$ sudo mkdir -p /usr/share/airtime/public
```

4. Next, create the Airtime virtual host configuration file for Apache:

```
$ sudo nano /etc/apache2/sites-available/airtime
```

and enter the information below, substituting your server's hostname for `airtime.example.com` and your system administrator's email address for `admin@example.com`. Make sure you set the `DocumentRoot` and `Directory` paths correctly. This should match the public directory that the installer will unpack the web interface into, which by default is the `/usr/share/airtime/public/` directory.

```
<VirtualHost *:80>
    ServerName airtime.example.com
    ServerAdmin admin@example.com
    DocumentRoot /usr/share/airtime/public
    php_admin_value upload_tmp_dir /tmp

    <Directory /usr/share/airtime/public>
        DirectoryIndex index.php
        AllowOverride all
        Order allow,deny
        Allow from all
    </Directory>
</VirtualHost>
```

Press `Ctrl+O` to save the file, then `Ctrl+X` to exit the nano editor.

5. Create the PHP configuration file `/etc/airtime/airtime.ini` in nano:

```
$ sudo nano /etc/airtime/airtime.ini
```

with the following contents:

```
[PHP]
memory_limit = 512M
magic_quotes_gpc = Off
file_uploads = On
upload_tmp_dir = /tmp
```

Save and exit nano, then link this file to the system's PHP configuration with the command:

```
$ sudo ln -s /etc/airtime/airtime.ini /etc/php5/conf.d/airtime.ini
```

6. Enable the new configuration by entering the command:

```
$ sudo a2ensite airtime
```

The server should respond:

```
Enabling site airtime.
Run '/etc/init.d/apache2 reload' to activate new configuration!
```

You may also need to disable the default site configuration, which may otherwise interfere with your Airtime installation:

```
$ sudo a2dissite default
```

As suggested by the output of the command above, reload the web server configuration.

```
$ sudo /etc/init.d/apache2 reload
```

The server should respond:

```
* Reloading web server config apache2
```

7. Download Airtime from <https://sourceforge.net/projects/airtime/files/> with `wget`. For example, to download version 1.9.4, you could use the command:

```
$ wget http://downloads.sourceforge.net/project/airtime/1.9.4/airtime-1.9.4.tar.gz
```

8. Unzip the downloaded file in your home directory. This action will create a subdirectory called `airtime-1.9.4`:

```
$ sudo tar -xvzf airtime-1.9.4.tar.gz -C ~/
```

9. Monit is a utility which Airtime uses to make sure that the system runs smoothly. Enable it by opening the `/etc/default/monit` file in the nano editor:

```
$ sudo nano /etc/default/monit
```

Find the line that begins with `startup` and change the value to `1`:

```
startup=1
```

Save the file with `Ctrl+O` and close nano with `Ctrl+X`. Now copy the Monit configuration from the Airtime install directory to the `/etc/monit/conf.d/` directory:

```
$ sudo cp ~/airtime-1.9.4/python_apps/monit/airtime-monit.cfg /etc/monit/conf.d/
```

Open the `/etc/monit/monitrc` file in nano:

```
$ sudo nano /etc/monit/monitrc
```

At the end of the file, add the line:

```
include /etc/monit/conf.d/*
```

Save the file with `Ctrl+O` and close nano with `Ctrl+X`. Then start Monit with:

```
$ sudo invoke-rc.d monit start
```

More information about monit is available in the chapter Using Monit.

10. On Debian squeeze, make sure the rabbitmq-server daemon has started:

```
$ sudo invoke-rc.d rabbitmq-server start
```

11. Finally, run the airtime-install script:

```
$ sudo ~/airtime-1.9.4/install_minimal/airtime-install
```

Once the airtime-check-system script confirms that the install has been successful, you are now ready to proceed to the Configuration chapter.

## INSTALL SCRIPT OPTIONS

By default, the airtime-install script preserves any existing configuration or installation that it finds on the server. However, it is also possible to dictate the behaviour of the script with a command line option, as follows:

--help -h	Displays usage information.
--overwrite -o	Overwrite any existing config files.
--preserve -p	Keep any existing config files.
--no-db -n	Turn off database install.
--reinstall -r	Force a fresh install of this Airtime version

## MANUAL UNINSTALL

To manually uninstall Airtime from the server, run the airtime-uninstall script from the original installation directory, for example:

```
$ sudo ~/airtime-1.9.4/install_minimal/airtime-uninstall
```

Optionally, you can also delete the Airtime storage archive and configuration folders, if you have backups and are not going to need the data on this particular server again. The rm command should be used with caution, because it has no undo feature.

```
$ sudo rm -r /srv/airtime
$ sudo rm -r /etc/airtime
```

# 16. AUTOMATED INSTALLATION

This installation method is intended for computers running Ubuntu or Debian GNU/Linux, and is the recommended method for production Airtime systems. If you have previously performed a manual installation of Airtime on the server, you should run the `airtime-uninstall` script to remove it before setting up the server for automated installation.

## SET UP REPOSITORIES FOR UBUNTU

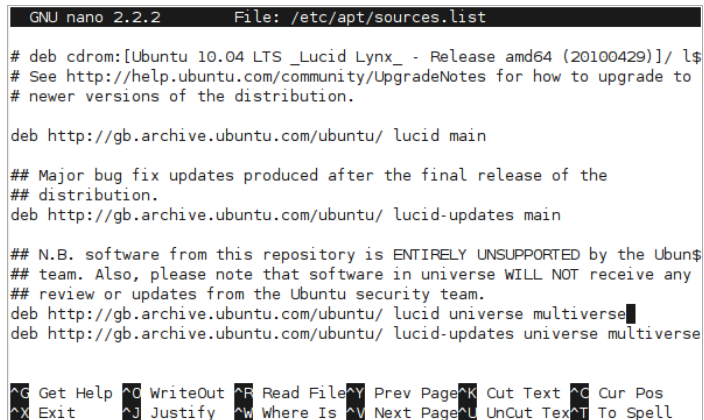
When installing on an Ubuntu server, a few of the packages that Airtime relies on are in the Ubuntu universe or multiverse repositories. If either of these repositories is disabled, you can enable them in the `/etc/apt/sources.list` file, by opening the nano editor in your server's console. The nano editor should be installed by default, but if not, you can install it with the command:

```
$ sudo apt-get install nano
```

Then open the `sources.list` file with the command:

```
$ sudo nano /etc/apt/sources.list
```

For an Ubuntu Lucid server, find the lines which begin `deb` and end with `lucid universe` or `lucid-updates universe`, adding `multiverse` to the end of these lines, if it is not there already. The multiverse repository is required for the `libmp3lame0` library, which is an MP3 encoder.



```
GNU nano 2.2.2      File: /etc/apt/sources.list

# deb cdrom:[Ubuntu 10.04 LTS _Lucid Lynx_ - Release amd64 (20100429)]/ l$
# See http://help.ubuntu.com/community/UpgradeNotes for how to upgrade to
# newer versions of the distribution.

deb http://gb.archive.ubuntu.com/ubuntu/ lucid main

## Major bug fix updates produced after the final release of the
## distribution.
deb http://gb.archive.ubuntu.com/ubuntu/ lucid-updates main

## N.B. software from this repository is ENTIRELY UNSUPPORTED by the Ubuntu$
## team. Also, please note that software in universe WILL NOT receive any
## review or updates from the Ubuntu security team.
deb http://gb.archive.ubuntu.com/ubuntu/ lucid universe multiverse
deb http://gb.archive.ubuntu.com/ubuntu/ lucid-updates universe multiverse

^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text   ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is ^V Next Page ^L UnCut Tex ^T To Spell
```

The exact repository mirror URLs in your `sources.list` file will differ from the above screenshot, depending on your location.

The Sourcefabric repository contains packages for Airtime, and any other packages which Airtime requires. To add the Sourcefabric repository to an Ubuntu Lucid server, scroll to the end of the `sources.list` file and add the following line:

```
deb http://apt.sourcefabric.org/ lucid main
```

For Ubuntu Maverick, Natty or Oneiric, substitute `maverick`, `natty` or `oneiric` in place of `lucid` in the line above.

```
GNU nano 2.2.2      File: /etc/apt/sources.list

## Also, please note that software in backports WILL NOT receive any revisions
## or updates from the Ubuntu security team.
# deb http://gb.archive.ubuntu.com/ubuntu/ lucid-backports main restricted
# deb-src http://gb.archive.ubuntu.com/ubuntu/ lucid-backports main restricted

## Uncomment the following two lines to add software from Canonical's
## 'partner' repository.
## This software is not part of Ubuntu, but is offered by Canonical and to
## respective vendors as a service to Ubuntu users.
# deb http://archive.canonical.com/ubuntu lucid partner
# deb-src http://archive.canonical.com/ubuntu lucid partner

deb http://security.ubuntu.com/ubuntu lucid-security main
deb http://security.ubuntu.com/ubuntu lucid-security universe

deb http://apt.sourcefabric.org/ lucid main
```

Press **Ctrl+O** (the **Ctrl** key and the letter **O** together) to save the file, then **Ctrl+X** to exit the nano editor.

## SET UP REPOSITORIES FOR DEBIAN

On a Debian squeeze server, you can edit the `/etc/apt/sources.list` file as root with the command:

```
# nano /etc/apt/sources.list
```

Packages for MP3 encoding are not included in official Debian repositories. You can obtain the necessary `libmp3lame0` and `libmp3lame-dev` packages by adding the following repository to the end of the file:

```
deb http://www.debian-multimedia.org squeeze main non-free
```

To add the Sourcefabric repository to a Debian squeeze server, add the following line to the end of the file:

```
deb http://apt.sourcefabric.org/ squeeze main
```

Press **Ctrl+O** (the **Ctrl** key and the letter **O** together) to save the file, then **Ctrl+X** to exit the nano editor.

## INSTALL THE SOURCEFABRIC SIGNING KEY

Reload the system's package list with:

```
$ sudo apt-get update
```

You will see an error message about a missing public key.

```
Hit http://gb.archive.ubuntu.com lucid Release
Hit http://gb.archive.ubuntu.com lucid-updates Release
Hit http://gb.archive.ubuntu.com lucid/main Packages
Hit http://gb.archive.ubuntu.com lucid/universe Packages
Hit http://gb.archive.ubuntu.com lucid/multiverse Packages
Hit http://gb.archive.ubuntu.com lucid-updates/main Packages
Hit http://gb.archive.ubuntu.com lucid-updates/universe Packages
Hit http://gb.archive.ubuntu.com lucid-updates/multiverse Packages
Fetched 491B in 2s (218B/s)
Reading package lists... Done
W: GPG error: http://apt.sourcefabric.org lucid Release: The following si
gnatures couldn't be verified because the public key is not available: NO
_PUBKEY 0888FE5B174C1854
daniel@office:~$
```

To fix this system error, you need to install the sourcefabric-keyring package, which contains the package signing key. This encryption key is a security measure which helps ensure that the Airtime packages you will be downloading in future have not been tampered with by a third party. You can install the key with the command:

```
$ sudo apt-get install sourcefabric-keyring
```

When prompted, press the **y** key on your keyboard to install the sourcefabric-keyring package without verification. If you wish to verify the authenticity of the package signing key, please contact Sourcefabric for assistance.

```
daniel@office:~$ sudo apt-get install sourcefabric-keyring
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed
  sourcefabric-keyring
0 upgraded, 1 newly installed, 0 to remove and 7 not upgraded.
Need to get 3,610B of archives.
After this operation, 49.2kB of additional disk space will be used.
WARNING: The following packages cannot be authenticated!
  sourcefabric-keyring
Install these packages without verification [y/N]? y
Get: 1 http://apt.sourcefabric.org/ lucid/main sourcefabric-keyring 0.1 [3
,610B]
Fetched 3,610B in 0s (12.3kB/s)
Selecting previously deselected package sourcefabric-keyring.
(Reading database ... 348822 files and directories currently installed.)
Unpacking sourcefabric-keyring (from .../sourcefabric-keyring_0.1_all.deb)
...
Setting up sourcefabric-keyring (0.1) ...
daniel@office:~$
```

Update your computer's software sources again, to confirm that you are now using a trusted software repository:

```
$ sudo apt-get update
```

You should no longer see the error message about the missing public key.

## INSTALL THE DATABASE MANAGEMENT SYSTEM

Airtime uses a PostgreSQL database to keep track of media assets and associated metadata in its storage server. Depending on the scale of your Airtime installation and the hardware available, you may wish to install PostgreSQL on a separate server. If you only have one server, you can install the postgresql package on the same machine as Airtime with the command:

```
$ sudo apt-get install postgresql
```

## INSTALL A STREAMING SERVER

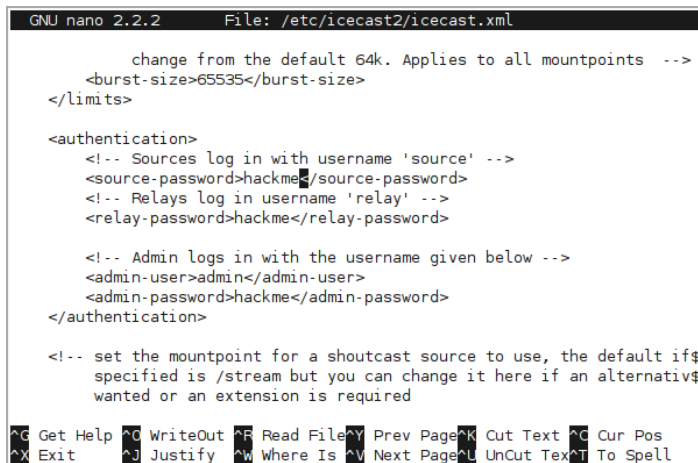
Optionally, you may wish to stream directly from Airtime to an Icecast media distribution server, without requiring a soundcard or mixer in the broadcast chain. This option is particularly suitable for fully automated stations, in which all shows are played out using Airtime. You can install the icecast2 package on your server with the command:

```
$ sudo apt-get install icecast2
```

In some scenarios, you may wish to stream from Airtime to a remote Icecast server, for example when Icecast is installed on a server in a datacenter with greater bandwidth available than an Airtime server located at your broadcast studio has. This separation may become necessary if your stream becomes popular, because each additional listener which connects to the Icecast stream uses additional bandwidth. In this case, you do not need to install the icecast2 package on the Airtime server.

Before running Icecast for the first time, you should edit the file `/etc/icecast2/icecast.xml` to change the default `<source-password>`, `<relay-password>` and `<admin-password>` values from 'hackme' to something more secure.

```
$ sudo nano /etc/icecast2/icecast.xml
```



```
GNU nano 2.2.2      File: /etc/icecast2/icecast.xml

      change from the default 64k. Applies to all mountpoints -->
    <burst-size>65535</burst-size>
  </limits>

  <authentication>
    <!-- Sources log in with username 'source' -->
    <source-password>hackme</source-password>
    <!-- Relays log in username 'relay' -->
    <relay-password>hackme</relay-password>

    <!-- Admin logs in with the username given below -->
    <admin-user>admin</admin-user>
    <admin-password>hackme</admin-password>
  </authentication>

  <!-- set the mountpoint for a shoutcast source to use, the default if$
        specified is /stream but you can change it here if an alternativ$
        wanted or an extension is required
```

You should also set the value of `<hostname>` to the domain name of the Icecast server, for example:

```
<hostname>icecast.example.com</hostname>
```

Save and close the `icecast.xml` file with `Ctrl+O` and `Ctrl+X`. Then set the Icecast server to start automatically when the server boots in the `/etc/default/icecast2` file:

```
$ sudo nano /etc/default/icecast2
```

by setting the value of `ENABLE` to true on the last line of that file:

```
ENABLE=true
```

Save and close this file with `Ctrl+O` and `Ctrl+X`, then start Icecast:

```
$ sudo service icecast2 start
```



The server should respond:

```
Starting icecast2: Starting icecast2
Detaching from the console
icecast2.
```

## INSTALL AIRTIME

You can now install the Airtime package with:

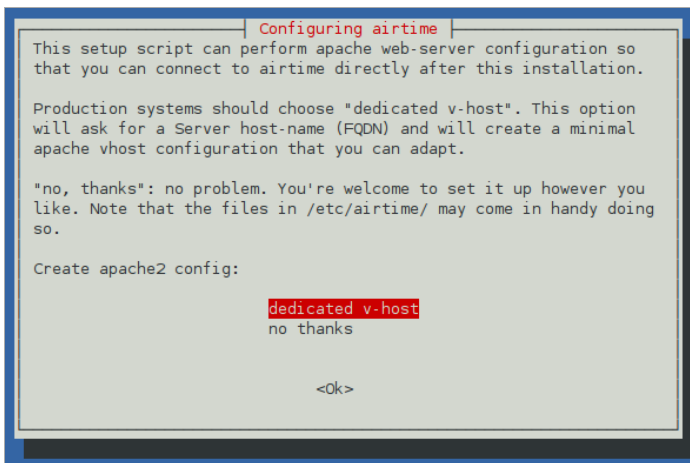
```
$ sudo apt-get install airtime
```

This command will install all of the Airtime components, plus any other packages that Airtime requires in order to run.

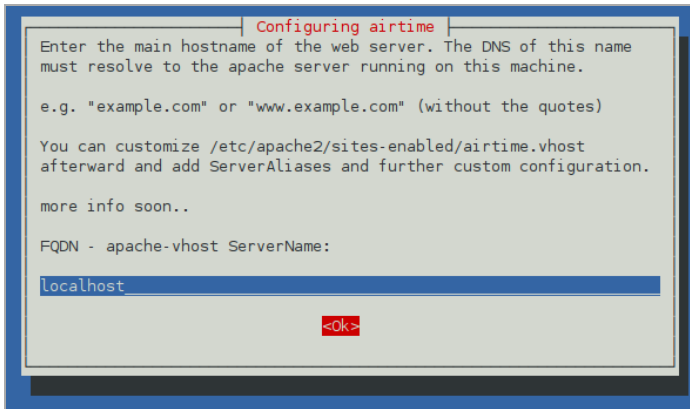
```
$ sudo apt-get install airtime
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  airtime-audio-samples lame mpg123
The following NEW packages will be installed
  airtime
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 0B/15.6MB of archives.
After this operation, 73.1MB of additional disk space will be used.
Preconfiguring packages ...
Selecting previously deselected package airtime.
(Reading database ... 400129 files and directories currently installed.)
Unpacking airtime (from .../airtime_1.9.4-10_amd64.deb) ...
```

Once all the packages have been downloaded and installed, you will be asked a few questions about the configuration of the Airtime system. You can accept the default settings by pressing the Enter key, or use the Tab key to change your selection.

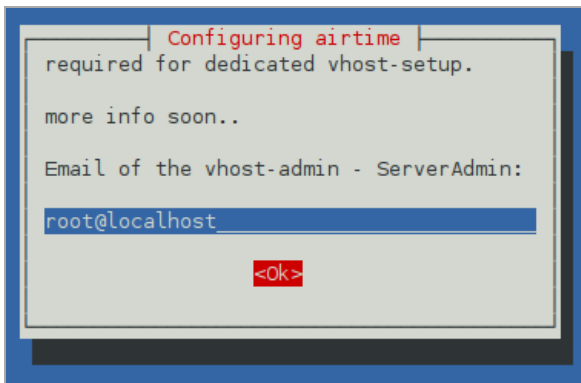
Firstly, you will be asked if you wish to create an Apache virtual host web server configuration automatically.



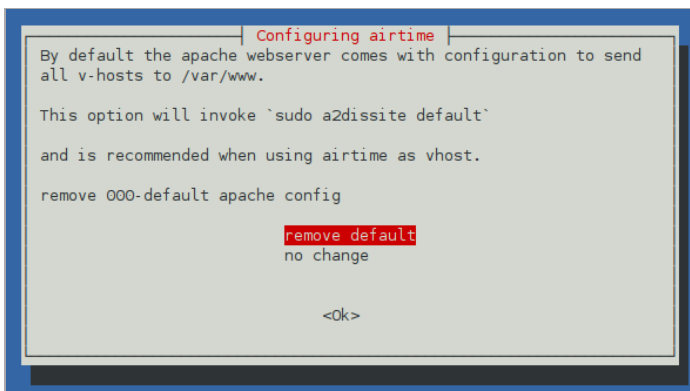
If so, you will need to enter the domain name that your station staff will use to access Airtime. For a test server that will only be accessed directly from the same machine, you can use the default setting of localhost here.



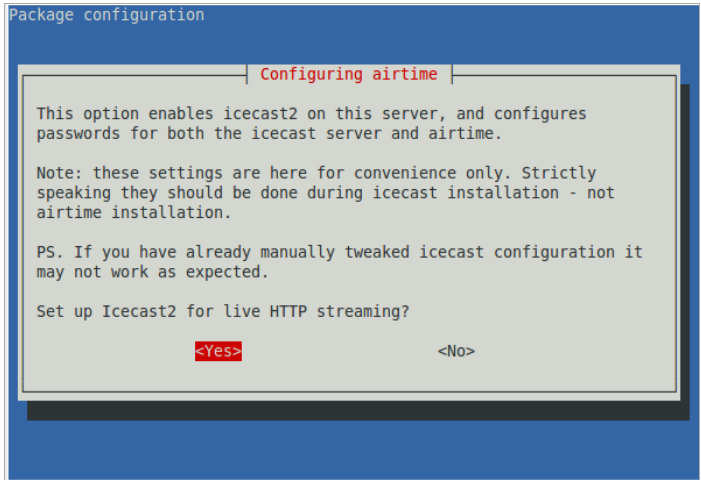
Next, set the contact email address of the server administrator, which is good practice in case of any server problems. For a test server, using an address at the localhost is acceptable.



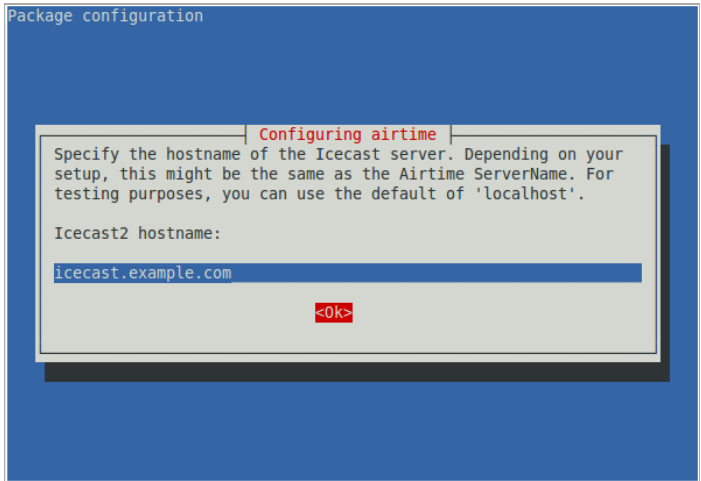
Debian and Ubuntu servers are set up with a default Apache configuration, which might block station staff from accessing Airtime. If you wish, this default configuration can be removed automatically for you.



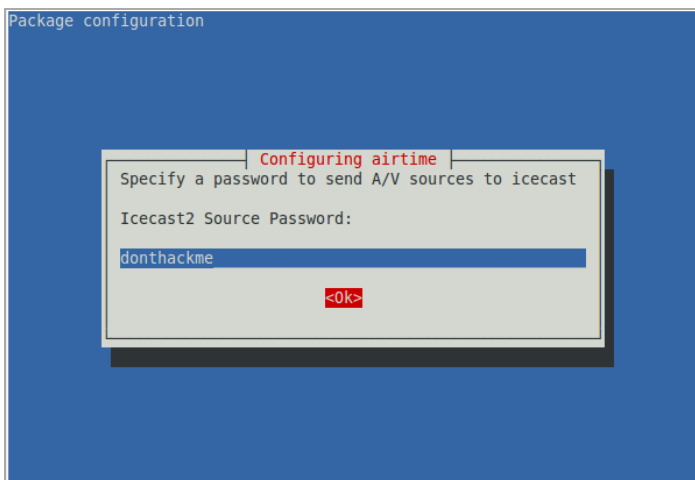
If you are setting up Airtime to stream directly to Icecast without using a soundcard in between, you can set the hostname and passwords for the Icecast server during the Airtime installation.



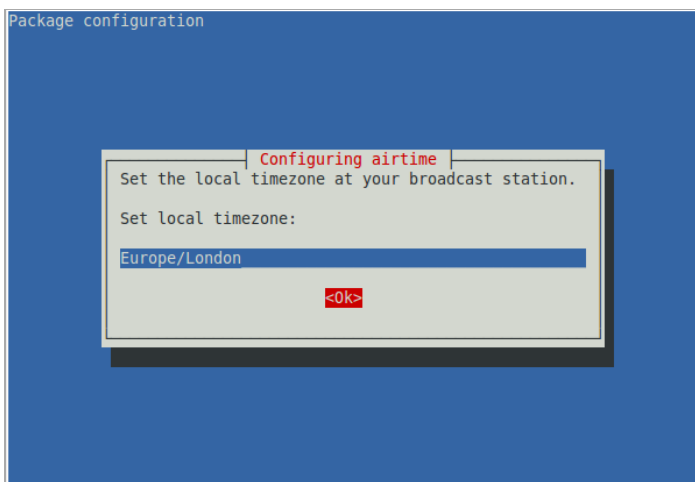
First, set the hostname of the Icecast server. If you have Icecast installed on the same machine as Airtime, you can use localhost here.



The security of your streaming server depends on the strength of the passwords that you choose. You should set strong passwords for source, relay and admin access.



Finally, you will be asked for the local timezone at your station. You can find a list of timezones in the Appendix of this book.



On some GNU/Linux distributions, you may be warned about upgrading the rabbitmq-server package, even if you have never installed this package before. If RabbitMQ is only being used by Airtime on your server, it is safe to press the Enter key to continue.



The Airtime installer will then run a script to check that your server environment is set up correctly.

```
*** Verifying your system environment ***
CPU = Dual Core AMD Opteron(tm) Processor 170
Total RAM = 6128244 kB
Free RAM = 167276 kB
OS = Ubuntu 10.04.3 LTS x86-64
AIRTIME_CONFIG_FILES = OK
POSTGRESQL_DATABASE = OK
PYTHON_KOMBU_VERSION = 1.2.0
PYTHON_POSTER_VERSION = 0.8.1
PYTHON_MUTAGEN_VERSION = 1.20
PYTHON_PYINOTIFY_VERSION = 0.9.2
RABBITMQ_SERVER = OK
AIRTIME_VERSION_URL = http://localhost:80/api/version/api_key/%api_key%
APACHE_CONFIGURED = YES
AIRTIME_VERSION = 1.9.4
PLAYOUT_ENGINE_PROCESS_ID = 24021
PLAYOUT_ENGINE_RUNNING_SECONDS = 7
LIQUIDSOAP_PROCESS_ID = 24025
LIQUIDSOAP_RUNNING_SECONDS = 7
MEDIA_MONITOR_PROCESS_ID = 24078
MEDIA_MONITOR_RUNNING_SECONDS = 7
SHOW_RECORDER_PROCESS_ID = 24055
SHOW_RECORDER_RUNNING_SECONDS = 7
ICECAST_PROCESS_ID = 23649

-- System setup looks OK!

***** Install Complete *****
```

You are now ready to proceed to the Configuration chapter.

# 17. CONFIGURATION

The Debian/Ubuntu package of Airtime sets PHP preferences in the file `/usr/share/airtime/public/.htaccess` but if you have used one of the manual installation methods, you should check that the PHP time zone matches local time at your station. You can edit the `.htaccess` file in the nano editor with the command:

```
$ sudo nano /usr/share/airtime/public/.htaccess
```

Find the following line, and change it to the correct timezone for your station, for example:

```
php_value date.timezone "Europe/London"
```

You can find the correct timezone value for your location in the Appendix of this book.

```
GNU nano 2.2.2 File: /usr/share/airtime/public/.htaccess

php_value post_max_size 500M
php_value upload_max_filesize 500M
php_value request_order "GPC"
php_value session.gc_probability 0
php_value date.timezone "Europe/London"
php_value phar.readonly Off

RewriteEngine On
RewriteCond %{REQUEST_FILENAME} -s [OR]
RewriteCond %{REQUEST_FILENAME} -l [OR]
RewriteCond %{REQUEST_FILENAME} -d
RewriteRule ^.*$ - [NC,L]
RewriteRule ^.*$ index.php [NC,L]
RewriteBase /

SetEnv APPLICATION_ENV development

^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

Press `Ctrl+O` to save the `.htaccess` file, then `Ctrl+X` to exit the nano editor.

## CONFIGURE LIQUIDSOAP

The broadcast playout from Airtime is configured via Liquidsoap. You can open the `liquidsoap.cfg` file for editing with the command:

```
$ sudo nano /etc/airtime/liquidsoap.cfg
```

If you require output to an ALSA soundcard device on the Airtime server, in addition to a direct Icecast or Shoutcast stream, you should change the value of `output_sound_device` from the default of `false` to `true`:

```
output_sound_device = true
```

If you do not require a stream in either Ogg Vorbis or MP3 format, you can set the values of `output_icecast_vorbis`, `output_icecast_mp3` or `output_shoutcast` to `false`. Disabling unused streaming features will reduce the CPU load on your server, because stream encoding places a continuous demand on system resources. If your server is

underpowered, you may prefer to perform the stream encoding on a separate machine.

```
GNU nano 2.2.2      File: /etc/airtime/liquidsoap.cfg
#####
# Liquidsoap config file                                     #
#####

#####
# Output settings                                           #
#####
output_sound_device = true
output_icecast_vorbis = true
output_icecast_mp3 = false
output_shoutcast = false

#output_bitrate = 128
#output_samplerate = 44100
#output_stereo = true

#####
# Logging settings                                          #
#####
log_file = "/var/log/airtime/pypo-liquidsoap/<script>.log"
#log_level = 3
```

If using the Debian/Ubuntu package, you may have set up direct streaming to Icecast during the installation. To set up the Airtime server for direct streaming manually, set the value of `icecast_pass` to the `<source-password>` value that you set in the Icecast configuration file. If you are streaming to a separate Icecast server, set the value of `icecast_host` to the domain name or IP address of the other machine. The value of `icecast_port` can be left as the default of 8000, unless you have been provided with a different port number by the system administrator of the Icecast server. Shoutcast has similar settings, except with a default port of 9000.

```
#####
# Icecast Stream settings                                     #
#####
icecast_host = "127.0.0.1"
icecast_port = 8000
icecast_pass = "hackme"

# Icecast mountpoint names
mount_point_mp3 = "airtime.mp3"
mount_point_vorbis = "airtime.ogg"

# Webstream metadata settings
icecast_url = "http://airtime.sourcefabric.org"
icecast_description = "Airtime Radio!"
icecast_genre = "genre"

# Audio stream metadata for vorbis/ogg is disabled by default
# due to a number of client media players that disconnect
# when the metadata changes to a new track. Some versions of
# mplayer and VLC have this problem. Enable this option at your
# own risk!
output_icecast_vorbis_metadata = false

#####
# Shoutcast Stream settings                                     #
#####
shoutcast_host = "127.0.0.1"
shoutcast_port = 9000
shoutcast_pass = "testing"

# Webstream metadata settings
shoutcast_url = "http://airtime.sourcefabric.org"
shoutcast_genre = "genre"

^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is ^V Next Page ^U UnCut Tex ^T To Spell
```

You can also configure the values of `mount_point_mp3`, `mount_point_vorbis`, `icecast_url`, `icecast_description`, and `icecast_genre` to suit your station. Shoutcast has similar options `shoutcast_url` and `shoutcast_genre`. The option `output_icecast_vorbis_metadata` defaults to false because some media player clients are known to disconnect from the stream when Ogg Vorbis metadata changes to show new track information.

Once you're done, save and close the `/etc/airtime/liquidsoap.cfg` file with `Ctrl+O` and `Ctrl+X`. Then restart Airtime's playout engine to enable the new settings, with the command:

```
$ sudo invoke-rc.d airtime-playout restart
```

The server should respond:

```
Restarting Airtime Playout: Done.
```

## CONFIGURE THE DATABASE

Optionally, you may wish to edit the file `/etc/airtime/airtime.conf` to set the PostgreSQL database host, and the username and password to connect to the database with.

```
$ sudo nano /etc/airtime/airtime.conf
```

You can also set options for RabbitMQ messaging, the Airtime API and Soundcloud in this file, although you should not normally need to adjust the defaults.



```
GNU nano 2.2.2      File: /etc/airtime/airtime.conf

[database]
host = localhost
dbname = airtime
dbuser = airtime
dbpass = airtime

[rabbitmq]
host = 127.0.0.1
port = 5672
user = guest
password = guest
vhost = /

[general]
api_key = MHKY5WDGHF9UVJI7607Y
web_server_user = www-data
airtime_dir = /var/www/airtime
base_url = localhost
base_port = 80

[soundcloud]
connection_retries = 3
time_between_retries = 60

^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Tex ^T To Spell
```

Save and close the file with Ctrl+O and Ctrl+X. If you have changed the database settings, you should now run the command:

```
$ sudo airtime-update-db-settings
```

to make sure all of Airtime's database configuration files are updated. This command should output a large amount of text to the server console, ending with:

```
BUILD FINISHED
```

and a report of the total time taken to update the configuration.

You should now be able to log in to the Airtime administration interface, as shown in the Getting started chapter.

# 18. SETTING THE SERVER TIME

Accurate time keeping on your server is vital for optimal Airtime performance. You can confirm that the date and time of your server are set correctly with the date command:

```
$ date
```

The server should respond with the date, time, time zone and year in a format similar to the following example:

```
Mon Mar 7 14:59:17 GMT 2011
```

The time zone reported should match the continent and city set in the .htaccess file during Airtime installation, such as GMT in the example above matching Europe/London. If not, see the section Adjusting the server time zone below.

Although it is possible to set the date and time of the server manually, this is not recommended because the server clock can drift over time, compromising the accuracy of your broadcast schedule. If your Airtime server is permanently connected to the Internet, you can synchronize your server to a time server with the ntp program. If ntp is not yet installed, you can enter the following command on Debian or Ubuntu:

```
$ sudo apt-get install ntp
```

Optionally, open the ntp configuration file in the nano editor to add further time server names:

```
$ sudo nano /etc/ntp.conf
```

On Ubuntu GNU/Linux, the default time server is ntp.ubuntu.com, but there are many other time servers available on the public Internet, including the group of servers listed at <http://www.pool.ntp.org/> for each country. Using a variety of NTP servers located closely to your Airtime server will produce the most accurate results. For example, for a server in the United Kingdom you could use the following list:

```
# You do need to talk to an NTP server or two (or three).
server ntp.ubuntu.com
server 0.uk.pool.ntp.org
server 1.uk.pool.ntp.org
server 2.uk.pool.ntp.org
server 3.uk.pool.ntp.org
```

Enter the server names you require, press Ctrl+O to write out the /etc/ntp.conf file, then Ctrl+X to exit nano. Restart the ntp service with:

```
$ sudo service ntp restart
```

The server should respond:

```
* Stopping NTP server ntpd          [ OK ]
* Starting NTP server ntpd         [ OK ]
```

Then use the ntpq -p command to confirm that ntp is working. This command should produce output similar to the following screenshot:

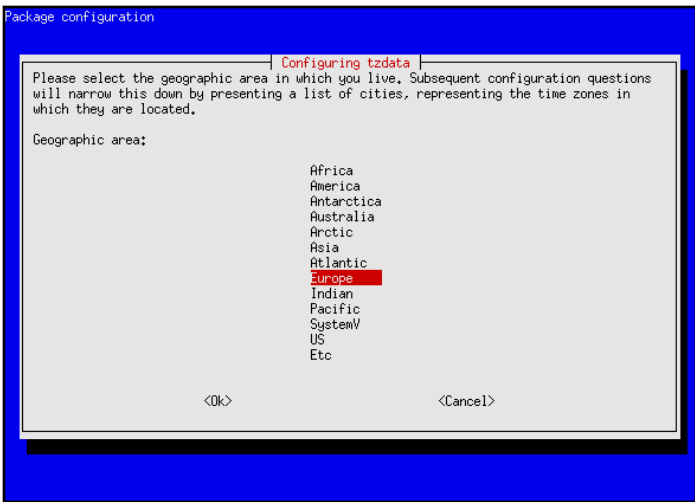
```
daniel@office:~$ ntpq -p
      remote           refid      st t when poll reach  delay  offset  jitter
=====
europium.canoni 193.79.237.14    2 u  49   64    3 131.386 141.365  1.328
dnscache-slough 213.222.193.35   2 u  45   64    3  23.594  84.480 31.209
ntp2.exa-networ 195.66.241.10    2 u  45   64    3  32.222  87.153 61.082
time.xilo.net    194.35.252.7     2 u  45   64    3  24.055  86.010 19.211
mantaray.netine 249.240.53.144   2 u  46   64    3  24.754  91.331 65.929
daniel@office:~$
```

## ADJUSTING THE SERVER TIME ZONE

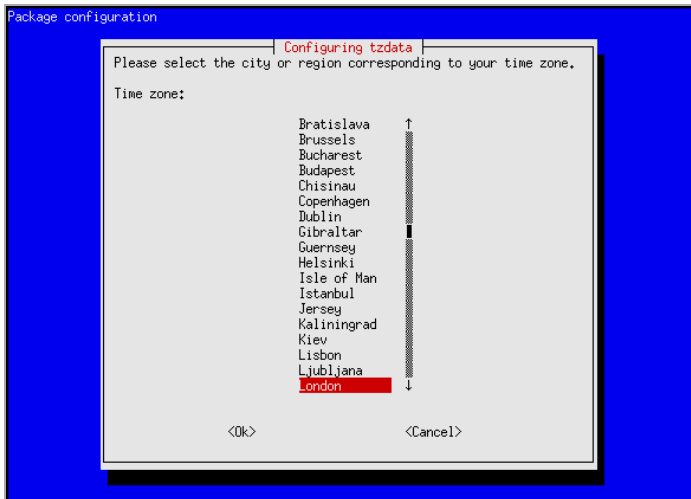
If your server is set to a different time zone than the one that you set during Airtime installation, your broadcast schedule may be played out at incorrect times. The datacenter which hosts your Airtime server could be located anywhere in the world. Some servers are set to Coordinated Universal Time or UTC (similar to Greenwich Mean Time or GMT), regardless of their location. If this is not appropriate for your station, on a Debian or Ubuntu server you can reconfigure the tzdata (time zone data) package with the command:

```
$ sudo dpkg-reconfigure tzdata
```

This command opens a menu in which you can select the continent that you require, by pressing the Enter key.



The next step is to select your nearest city, again by pressing the Enter key. The appropriate time zone is selected according to the information that you have entered.



The console output from the `dpkg-reconfigure tzdata` command will confirm the new setting.

```
Current default time zone: 'Europe/London'  
Local time is now:      Mon Mar  7 15:04:58 GMT 2011.  
Universal Time is now:  Mon Mar  7 15:04:58 UTC 2011.
```

# ADMINISTRATION

- 19. USING THE IMPORT SCRIPT**
- 20. THE AIRTIME-USER COMMAND**
- 21. BACKING UP THE SERVER**
- 22. UPGRADING**
- 23. TROUBLESHOOTING**

# 19. USING THE IMPORT SCRIPT

If you have a large number of files in your media library, importing these files one at a time into a broadcast automation system would be time-consuming and tedious. That's why Airtime includes a script that can import an entire directory of files in one go.

## METADATA QUALITY

The `airtime-import` script automatically imports any metadata that is in the files' ID3 tags. If these tags are incorrect or are missing information, you will have to either edit the metadata before importing them, or suffer the consequences. For example, if the tags have creator or genre metadata missing, it will be impossible to search for, playlist or schedule the media according to these criteria.

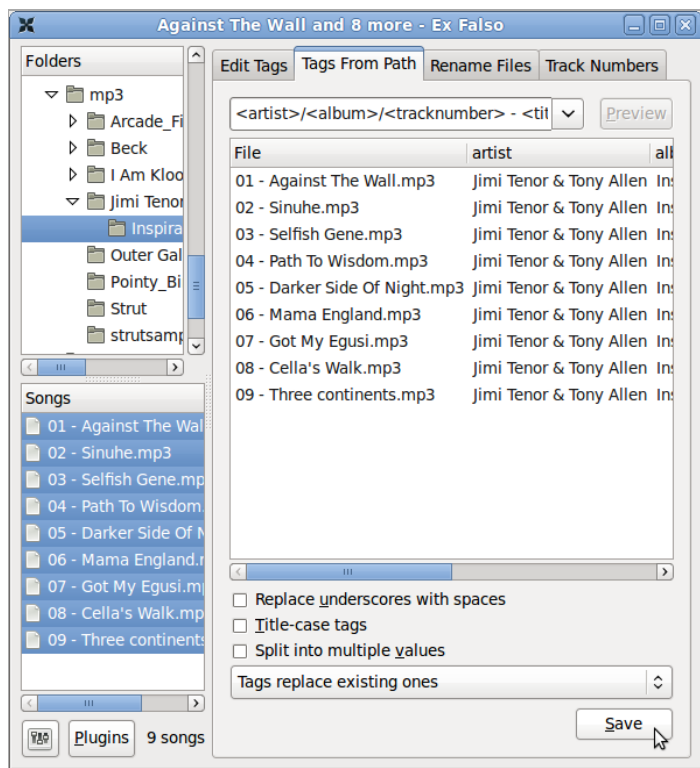
There are a number of programs available which can be used to correct mistakes or incomplete information in ID3 tags. On GNU/Linux, the program `Ex Falso` (<http://code.google.com/p/quodlibet/>) can be useful for batch setting and editing ID3 tags before importing files into your Airtime server. On an Ubuntu desktop machine, you can install this program with the command:

```
$ sudo apt-get install exfalso
```

After installation, you can run the program with the command:

```
$ exfalso
```

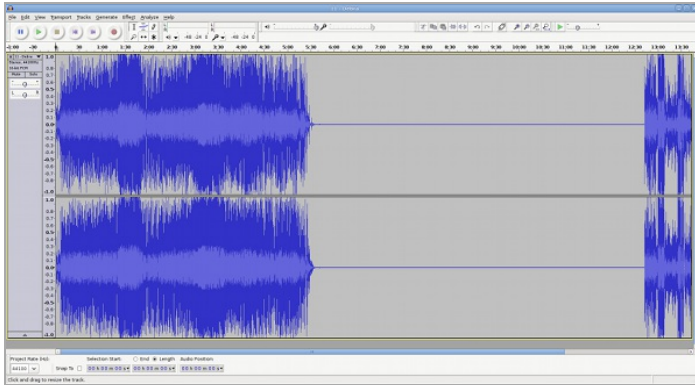
The `Tags From Path` feature of this program is a particularly useful time saver if you have a large archive of untagged files. Sometimes there is useful creator or title information in the file name or directory path structure, which can be converted into an ID3 tag automatically.



## SILENCE IN MEDIA FILES

Before importing media, it is good practice to check for any silent sections in the media files. While Airtime can compensate for leading and trailing silence with the use of cue-in and cue-out points in the Playlist Builder, it is better to trim these files to the intended length before upload. This is because trimmed files do not require station staff to set cue points over and over again, as media in the Airtime storage archive could potentially be re-used for many different shows. Audacity is a cross-platform editor suitable for the task of trimming audio files, available from <http://audacity.sourceforge.net/>

Very quiet introductions or over-long fades can also lead to apparent gaps in your broadcast playback. Some audio CDs feature a 'hidden track' at the end, which in fact uses a long period of silence within the final track, rather than an actual separate track on the disc. This means that CD encoding programs will encode both the hidden material and the silence in the media file. For example, the track Debra from the CD Midnite Vultures by Beck includes hidden material preceded by seven minutes of silence, as shown in the screen shot from Audacity below.



## COPYING VERSUS WATCHING

There are three main options when using the `airtime-import` script: Either to copy or move files into Airtime's main storage folder, or to watch files elsewhere. Each option has advantages and disadvantages, so you will have to think about how the files will be used in your station in the long term.

- For files that are copied or moved, you may run into problems with hard disk space if you do not remove files from the storage server periodically.
- For files that are watched, you must make sure that the files are actually going to be there at playout time, otherwise they will be skipped. For this reason, it is not recommended to use the watch option for easily-removable storage (like MP3 players or USB memory sticks). There's a strong likelihood that the storage might be unplugged and taken away before playout time. It is also important to make sure that any external hard disk with watched files is powered on, and stays on.

The `airtime-import` script works from the command line, so you must first log into a console on the Airtime server. In recent versions of Airtime, you no longer need to specify the full file system path to the media files that you wish to import. Copying is specified with the `copy` sub-command:

```
$ airtime-import copy <directory>
```

where `<directory>` is the root directory of the media files that you wish to import.

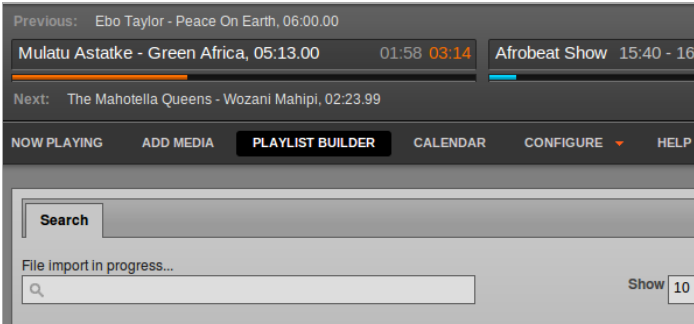
Alternatively, you may wish to delete the files from the original location after copying them to the storage archive, which is accomplished with the `move` sub-command:

```
$ airtime-import move <directory>
```

If the new files are exact duplicates of files that have already been imported, the script will detect this.

Any users logged into the administration interface will be warned if a file import is in progress. Users assigned the admin privilege should not attempt to change Airtime's default storage directory while an import is taking place.





Watching a new folder is specified by using the watch add sub-command:

```
$ airtime-import watch add <directory>
```

The script will report the name of the folder now being watched, for example:

```
$ airtime-import watch add /home/daniel/Music/mp3/Beck  
/home/daniel/Music/mp3/Beck/ added to watched folder list successfully
```

The watched folder will also be listed on the Manage Media Folders page in the Airtime administration interface. To obtain a list of currently watched folders in the server console, you can use the watch list sub-command:

```
$ airtime-import watch list  
/home/daniel/Music/mp3/Beck/
```

Any new files copied to a watched folder (for example, using your desktop computer's file manager) will automatically appear in the Airtime database, and are then ready for playout. In the same way, if you delete a media file using your file manager, it will be automatically removed from the Airtime database, and will no longer be available for playout.

If you wish to no longer watch a particular folder, use the watch remove sub-command:

```
$ airtime-import watch remove /home/daniel/Music/mp3/Beck  
/home/daniel/Music/mp3/Beck/ removed from watched folder list successfully
```

## GET OR SET THE STORAGE FOLDER PATH

The airtime-import script also enables you to read or write Airtime's storage folder path configuration. You can find out the current setting with the storage-dir get sub-command:

```
$ airtime-import storage-dir get  
/srv/airtime/stor
```

A new storage folder path can be configured using the storage-dir set sub-command:

```
$ airtime-import storage-dir set /home/daniel/Music/mp3/  
Successfully set storage folder to /home/daniel/Music/mp3/
```

The storage-dir set sub-command should be used with caution on a production server, because moving the storage folder during scheduled programming has the potential to disrupt your broadcast playout.

## 20. THE AIRTIME-USER COMMAND

Airtime includes a command-line tool `airtime-user` which can be used to add, update or remove user accounts. You can see the options for the command by typing it in the server console without any arguments:

```
$ airtime-user

airtime-user
=====
    This program allows you to manage Airtime users.

OPTIONS:
  --addupdate <username>
    Add the user or update user information.
  --delete <username>
    Remove the user.
```

For example, to create an account for a DJ known as Disco Dave, you could enter the following:

```
$ airtime-user --addupdate dave
Creating user
Enter password (min 6 characters): saturdaynightfever1977
Enter first name: Disco
Enter last name: Dave
Enter user type [(A)dmin|(P)rogram Manager|(D)J|(G)uest]: D
```

Existing user accounts can be updated using the same command.

# 21. BACKING UP THE SERVER

The following shell commands can be used for database backup and restore on a running PostgreSQL server in an Airtime system.

You can dump the entire database to a zipped file with the combination of the `pg_dumpall` command and `gzip`. The `pg_dumpall` command is executed as the user `postgres`, by using the `sudo` command and the `-u` switch. It is separated from the `gzip` command with the pipe symbol.

```
$ sudo -u postgres pg_dumpall | gzip -c > airtime-backup.gz
```

This command can be automated to run on a regular basis using the standard cron tool on your server.

When restoring a production database on a cleanly installed Airtime system, it may be necessary to drop the empty database that was created during the new installation, by using the `dropdb` command. Again, this command is executed with `sudo` as the user `postgres`:

```
$ sudo -u postgres dropdb airtime
```

This `dropdb` command above is necessary to avoid 'already exists' errors on table creation when overwriting an empty Airtime database in the next step. These errors might prevent some data from being restored, such as user account data.

To restore, first unzip the backup file with `gunzip`, then use the `psql` command as the `postgres` user:

```
$ gunzip airtime-backup.gz  
$ sudo -u postgres psql -f airtime-backup postgres
```

You should now be able to log in to the Airtime web interface in the usual way.

For safety reasons, your regular database backups should be kept in a directory which is backed up by your storage backup tool of choice; for example, the `/srv/airtime/database_backups` directory. This should ensure that a storage restore can be made along with a matching and complete version of the Airtime database from the day that the storage backup was made.

## STORAGE BACKUP

Backing up the Airtime database with `pg_dumpall` will not back up the Airtime media storage server, which is likely to need a great deal more backup space. Creating a compressed file from hundreds of gigabytes of storage server contents is likely to take a very long time, and may have little benefit for the amount of CPU power used, if the media files are already stored in a highly compressed format. It is also impractical to copy very large backup files across the network on a daily basis.

Instead, it is preferable to use an incremental backup technique to synchronise the production Airtime server storage with a backup server each day or night. If the backup server also contains an Airtime installation, it should be possible to switch payout to this second machine relatively quickly, in case of a hardware failure or other emergency on the production server.

A standard incremental backup tool on GNU/Linux servers is `rsync` (<http://rsync.samba.org/>) which can be installed using the package manager of your GNU/Linux distribution. However, incremental backup alone cannot help in the scenario where a file which later proves to be important has been deleted by an administrator. For backups that can be rolled back to restore from an earlier date than the current backup, the tool `rdiff-backup` (<http://www.nongnu.org/rdiff-backup/>) can be deployed.

## 22. UPGRADING

Before upgrading a production Airtime server, you should back up both the PostgreSQL database and the storage server used by Airtime. This is especially important if you have not already set up a regular back up routine. This extra back up is a safety measure in case of accidental data loss during the upgrade, for example due to the wrong command being entered when moving files. See the chapter Backing up the server in this book for details of how to perform these back ups.

If you have deployed Airtime using the method shown in the Automated installation chapter, you can upgrade in the same way. A new Airtime package available in the Sourcefabric repository can be installed with:

```
$ sudo apt-get update
$ sudo apt-get upgrade
```

If you have used the method shown in the Manual installation chapter, you should repeat the installation steps of downloading and unpacking the tarball to an installation directory, and running the `airtime-install` script. The installation script will detect an existing Airtime deployment and back up any configuration files that it finds.

After the upgrade has completed, you may need to clear your web browser's cache before logging into the new version of the Airtime administration interface. If the playout engine starts up and detects that a show should be playing at the current time, it will skip to the right point in the track and start playing.

In Airtime 1.9.0 onwards, the concept of linked files was replaced with the concept of watched folders. If you are upgrading from a version of Airtime earlier than 1.9.0 and you have previously linked files, the folders they are in will not be watched until you add them to your watched folder list. See the chapter Manage Media Folders for more details.

# 23. TROUBLESHOOTING

If your Airtime server is not working as expected, individual components of the system can be stopped, started or restarted using the service command:

```
$ sudo service airtime-playout      start|stop|restart|status
$ sudo service airtime-media-monitor start|stop|restart|status
$ sudo service airtime-show-recorder start|stop|restart|status
```

On Debian squeeze, use the command `invoke-rc.d` in place of `service` in the commands above.

The `status` option runs the `airtime-check-system` script to confirm that all of Airtime's dependencies are installed and running correctly.

Airtime stores log files under the directory path `/var/log/airtime/` which can be useful for diagnosing the cause of any problems. The `less` command, when used with the `+G` option, enables reading the Airtime playout log file from the end:

```
$ less +G /var/log/airtime/pypo/pypo.log
```

If you want to watch a log file as it continues, such as the Liquidsoap log, you can use the `tail` command with the `-f` option:

```
$ sudo tail -f /var/log/airtime/pypo-liquidsoap/lscript.log
```

You can interrupt `tail` by pressing `Ctrl-C` on your keyboard. The Airtime media monitor has its own log, in the file:

```
/var/log/airtime/media-monitor/media-monitor.log
```

and the Airtime show recorder has a log in the file:

```
/var/log/airtime/show-recorder/show-recorder.log
```

Copies of these log files may be requested by Sourcefabric engineers while they are providing technical support for your Airtime deployment.

# **ADVANCED CONFIGURATION**

**24. USING MONIT**

**25. AUTOMATED FILE IMPORT**

**26. EXPORTING THE SCHEDULE**

**27. INTERFACE CUSTOMIZATION**

**28. INTEGRATION WITH MIXXX**

**29. STREAM HANDOVER**

# 24. USING MONIT

Monit is a utility which can be used to manage and monitor processes, files, directories and filesystems on your Airtime server. It is installed by default when you install Airtime.

To view the Monit web interface, open port 2812 of your server in a web browser, for example:

`http://localhost:2812/`

You will have to log in to see the Monit web interface. The default username is admin and the default password is monit.

monit: service manager - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://localhost:2812/

monit: service manager

monit 5.0.3

Home>

### Monit Service Manager

Monit is running on office with *uptime, 3h 23m* and monitoring:

System	Status	Load	CPU	Memory
<u>office</u>	running	[1.10] [1.16] [1.06]	42.3%us, 7.7%sy, 0.1%wa	20.4% [1250564 kB]

Process	Status	Uptime	CPU	Memory
<u>airtime-playout</u>	running	3h 23m	0.0%	0.1% [11928 kB]
<u>airtime-liquidsoap</u>	running	3h 23m	8.9%	0.4% [29692 kB]
<u>airtime-show-recorder</u>	running	3h 52m	0.0%	0.1% [11340 kB]

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Done

To configure Monit to send email alerts, edit the file `/etc/monit/monitrc` to uncomment the set mailserver parameter. Change this line to show the name of the SMTP server on your Airtime server's network, as provided by your system administrator.

```
$ sudo nano /etc/monit/monitrc
```



```

GNU nano 2.2.2      File: /etc/monit/monitrc

#
# set statefile /var/.monit.state
#
## Set the list of mail servers for alert delivery. Multiple servers may b
## specified using comma separator. By default monit uses port 25 - this
## is possible to override with the PORT option.
#
# set mailserver mail.bar.baz,          # primary mailserver
#          backup.bar.baz port 10025,  # backup mailserver on port 1
#          localhost                  # fallback relay
#
## By default monit will drop alert events if no mail servers are availabl
## If you want to keep the alerts for a later delivery retry, you can use
## EVENTQUEUE statement. The base directory where undelivered alerts will
## stored is specified by the BASEDIR option. You can limit the maximal qu
## size using the SLOTS option (if omitted, the queue is limited by space
## available in the back end filesystem).
#

^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Po
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text ^T To Spe

```

Further down the configuration file, you can set the From: and To: addresses for the alert emails using the set mail-format and set alert parameters. Then uncomment the lines required.

```

GNU nano 2.2.2      File: /etc/monit/monitrc

## are expanded at runtime. For example, to override the sender:
#
# set mail-format { from: monit@foo.bar }
#
## You can set alert recipients here whom will receive alerts if/when a
## service defined in this file has errors. Alerts may be restricted on
## events by using a filter as in the second example below.
#
# set alert sysadm@foo.bar              # receive all alerts
# set alert manager@foo.bar only on { timeout } # receive just service-
#                                           # timeout alert
#
## Monit has an embedded web server which can be used to view status of
## services monitored, the current configuration, actual services paramete
## and manage services from a web interface.
#
# set httpd port 2812 and

```

Press Ctrl+O to save the file, then Ctrl+X to exit nano. Then restart monit with:

```
$ sudo invoke-rc.d monit restart
```

More information about using Monit is available at  
<http://mmonit.com/monit/documentation/>

# 25. AUTOMATED FILE IMPORT

The `airtime-import` script can be combined with the standard SFTP (secure FTP) program and `cron` daemon on a GNU/Linux server to enable automated file import from multiple remote desktop computers. This saves time for your station staff when using distributed production methods, or content syndication.

Traditional FTP servers use plain text passwords (without encryption) and are therefore not recommended for upload accounts on Airtime servers accessible from the public Internet. SFTP is a cross-platform protocol which works with many desktop programs including gFTP for GNU/Linux (<http://www.gftp.org/>). This program can be installed on Debian or Ubuntu desktop computers with the command:

```
$ sudo apt-get install gftp
```

Other popular SFTP clients include FileZilla for Windows (<http://filezilla-project.org/>) and Cyberduck for Mac and Windows (<http://cyberduck.ch/>).

To enable SFTP uploads, first invoke the `adduser` command to create the uploads account on the server. For security reasons this user account is restricted to using SFTP only; it cannot be used for executing other commands in a login shell.

```
$ sudo adduser --home /srv/airtime/uploads --shell /usr/lib/sftp-server uploads
```

The server will then invite you to type in the password for the new uploads user, and once again for confirmation. The security of your Airtime server depends on the strength of the password that you set, so be sure to use a long and complex password with upper case, lower case and numerical characters. It is not necessary to set a full name or other details for this account.

```
Adding user `uploads' ...
Adding new group `uploads' (1003) ...
Adding new user `uploads' (1002) with group `uploads' ...
Creating home directory `/srv/airtime/uploads' ...
Copying files from `/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for uploads
Enter the new value, or press ENTER for the default
  Full Name []:
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []:
Is the information correct? [Y/n] Y
```

Next, create a folder to contain the incoming files:

```
$ sudo mkdir /srv/airtime/uploads/incoming/
```

Then create a script to run once per hour:

```
$ sudo nano /etc/cron.hourly/airtime-upload
```

The script should import the newly uploaded files from the incoming folder specified, using the `copy` option, and then remove the original uploaded files. This step, rather than simply using the `watch` option on the `/srv/airtime/uploads/incoming/` folder, ensures that the uploads SFTP account does not have direct write access to the Airtime storage archive. That could be a security risk if the password was compromised.

```
#!/bin/sh

# Run the import script on fresh uploads

airtime-import copy /srv/airtime/uploads/incoming/

# Clean the incoming directory to save disk space

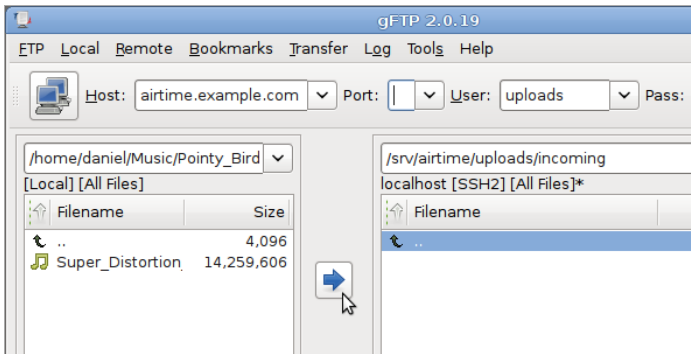
rm -r /srv/airtime/uploads/incoming/*.mp3
rm -r /srv/airtime/uploads/incoming/*.ogg
```

Finally, the script should be made executable so that the cron daemon can run it.

```
$ sudo chmod +x /etc/cron.hourly/airtime-upload
```

By default, Debian and Ubuntu GNU/Linux run cron.hourly tasks at 17 minutes past each hour. This value can be adjusted in the file /etc/crontab on the server, if required.

Remote users should connect to the Airtime server using their client software of choice, making sure that they specify an SFTP rather than FTP connection. The remote directory for the clients to use would be /srv/airtime/uploads/incoming/ as configured above.



For additional security, you could configure your Airtime server to use an encryption key pair for the uploads account, instead of a password. See <https://help.ubuntu.com/community/SSH/OpenSSH/Keys> for details of how to do this on an Ubuntu server.

## 26. EXPORTING THE SCHEDULE

Airtime has a feature which enables your station's current show and schedule information to be displayed on remote websites. This feature is included in Airtime because you would not usually invite the general public to access your Airtime server directly. If you had very large numbers of people requesting data from the Airtime server at once, the burst of network traffic might overload the server, potentially disrupting your broadcasts. If carried out maliciously, this network overload is known as a denial of service attack.

Instead, your public-facing web server can retrieve the schedule information from Airtime. This information can then be displayed on your broadcast station or affiliate websites by a content management system, such as Sourcefabric's Newscoop (<http://newscoop.sourcefabric.org/>). It can be presented using javascript widgets and styled with CSS, in any format that you require.

There are two kinds of information that can be retrieved remotely from Airtime; the metadata for the current show plus the following show (live-info), or the schedule for the current week (week-info). This metadata includes show names, times, descriptions and individual show URLs on your public website. That way, the audience for your station can click through from the schedule information to find out more about a particular show, or download a previous show recording that you might have made available.

If your Airtime server was accessible at <http://airtime.example.com> the live show information could be retrieved by your web server using this URL:

<http://airtime.example.com/api/live-info/?callback>

The comma-separated text metadata returned to your web server might be something like this:

```
{
  "env":"development",
  "schedulerTime":"2011-05-09 15:01:18",
  "currentShow":[{"start_timestamp":"2011-05-09 16:00:00",
    "end_timestamp":"2011-05-09 17:00:00",
    "name":"Funk Show",
    "id":"8",
    "instance_id":"8",
    "record":"0",
    "url":"http://funk.example.com/"}],
  "nextShow":[{"id":"9","starts":"2011-05-09 17:00:00",
    "ends":"2011-05-09 18:00:00",
    "show_id":"9",
    "record":"0",
    "rebroadcast":"0",
    "instance_id":null,
    "file_id":null,
    "soundcloud_id":null,
    "time_filled":null,
    "name":"Dance show",
    "url":"http://dance.example.com",
    "genre":"Dance",
    "description":"Techno, techno, techno, techno!",
    "color":"000000",
    "background_color":"ffea00",
    "start_timestamp":"2011-05-09 17:00:00",
    "end_timestamp":"2011-05-09 18:00:00"}],
  "timezone":"BST",
  "timezoneOffset":"+3600"
}
```

The information for the current week's schedule could be retrieved using the URL:

`http://airtime.example.com/api/week-info/?callback`

In this case, the metadata returned would be in a different format from the above example, something like the following. To keep the example short, this particular schedule export only contains four shows on a Monday. A full weekly schedule export would contain a great deal more text.

```
{
  "sunday":[],
  "monday":[
    {"show_starts":"2011-05-09 14:25:00",
     "show_ends":"2011-05-09 14:35:00",
     "show_name":"Elvis Show",
     "url":"http://elvis.example.com/"},
    {"show_starts":"2011-05-09 14:50:00",
     "show_ends":"2011-05-09 14:55:00",
     "show_name":"News",
     "url":"http://news.example.com/"},
    {"show_starts":"2011-05-09 16:00:00",
     "show_ends":"2011-05-09 17:00:00",
     "show_name":"Funk Show",
     "url":"http://funk.example.com/"},
    {"show_starts":"2011-05-09 17:00:00",
     "show_ends":"2011-05-09 18:00:00",
     "show_name":"Dance show",
     "url":"http://dance.example.com"}
  ],
  "tuesday":[],
  "wednesday":[],
  "thursday":[],
  "friday":[],
  "saturday":[]
}
```

If you see the message You are not allowed to access this resource when attempting to display schedule information in your web browser, log in to the Airtime administration interface, click Configure in the main menu, then Preferences. Set Allow Remote Websites To Access "Schedule" Info? to Enabled, click the Submit button, then refresh the browser window opened on the schedule export URL.

**Preferences**

**Station Name:**  
Rock n' Roll Radio

**Default Fade:**  
00:00:00.500000

**Stream Label:**  
☐ Artist - Title   ☐ Show - Artist - Title   ☒ Station name - Show name

**Allow Remote Websites To Access "Schedule" Info?**  
(Enable this to make front-end widgets work.)  
☐ Disabled   ☒ Enabled

▶ SoundCloud Settings

Submit

## CACHING SCHEDULE INFORMATION

If the Airtime server is behind a firewall, or you want to protect the Airtime server from large numbers of schedule requests, you may wish to cache the schedule information on a public-facing or intermediate server. You can then create a firewall rule that only allows the schedule server to connect to the Airtime server, in addition to any remote users of the Airtime web interface.

Your system administrator can set up schedule caching on a standard Apache and PHP enabled web server with the curl program installed, using the following steps:

1. Create a bash script on the schedule server that polls the Airtime server, and writes the metadata returned into a pair of temporary files:

```
$ sudo nano /usr/local/bin/airtime-schedule.sh
```

The content of this file should be like the following script, replacing `air1.example.com` with the name of your Airtime server:

```
#!/bin/sh

curl -s "http://air1.example.com/api/live-info/?callback=***" > /tmp/live-info
curl -s "http://air1.example.com/api/week-info/?callback=***" > /tmp/week-info
```

2. Make the bash script executable:

```
$ sudo chmod +x /usr/local/bin/airtime-schedule.sh
```

3. Create an Apache VirtualHost configuration for the schedule server:

```
$ sudo nano /etc/apache2/sites-available/schedule
```

containing a definition like the following, replacing `schedule.example.com` with the name of your schedule server:

```
<VirtualHost *:80>
    ServerName schedule.example.com
    DocumentRoot /var/www/schedule/
</VirtualHost>
```

4. In the schedule server's DocumentRoot folder, create the folders `api/live-info/` and `api/week-info/`

```
$ sudo mkdir -p /var/www/schedule/api/live-info/
$ sudo mkdir -p /var/www/schedule/api/week-info/
```

5. Create an `index.php` file in the `api/live-info/` folder:

```
$ sudo nano /var/www/schedule/api/live-info/index.php
```

containing the following code:

```
<?php
$filename = '/tmp/live-info'; // define here the path and name of uploaded live-info file

header('Content-Type: text/javascript');
header("Expires: Thu, 01 Jan 1970 00:00:00 GMT");
header("Cache-Control: no-store, no-cache, must-revalidate");

$callback = empty($_GET['callback']) ? null : $_GET['callback'];
$content = file_get_contents($filename);
$content = str_replace('***', $callback, $content);
echo $content;
?>
```

## 6. Create an index.php file in the api/week-info/ folder:

```
$ sudo nano /var/www/schedule/api/week-info/index.php
```

containing the following code:

```
<?php
$filename = '/tmp/week-info'; // define here the path and name of uploaded week-info file

header('Content-Type: text/javascript');
header("Expires: Thu, 01 Jan 1970 00:00:00 GMT");
header("Cache-Control: no-store, no-cache, must-revalidate");

$callback = empty($_GET['callback']) ? null : $_GET['callback'];
$content = file_get_contents($filename);
$content = str_replace('***', $callback, $content);
echo $content;
?>
```

## 7. Enable the new configuration and reload the Apache web server:

```
$ sudo a2ensite schedule
$ sudo /etc/init.d/apache2 reload
```

## 8. Create a cron job to run the bash script each minute:

```
$ sudo nano /etc/cron.d/airtime-schedule
```

containing the line:

```
* * * * * www-data /usr/local/bin/airtime-schedule.sh
```

The schedule server will now be serving the same show information as the Airtime server, with a cache lifetime of one minute. You can adjust the cache lifetime by altering the frequency of the cron job that polls the Airtime server.

# WEBSITE WIDGETS

Example HTML, Javascript and CSS code for your public website are provided in the widgets folder of the Airtime installation tarball. For the widgets to work on a typical web server, links to the Javascript and CSS code have to be included in the HTML page <head> element, like the following example:

```
<head>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<title>Airtime widgets</title>
<script src="js/jquery-1.6.1.min.js" type="text/javascript">
</script>
<script src="js/jquery-ui-1.8.10.custom.min.js" type="text/javascript">
</script>
<script src="js/jquery.showinfo.js" type="text/javascript">
</script>
<link href="css/airtime-widgets.css" rel="stylesheet" type="text/css" />
</head>
```

A full example is shown in the widgets/sample\_page.html file in the Airtime installation tarball.

The following code is for a small airtimeLiveInfo widget that displays information about the current show (show time elapsed, and show time remaining), as well as some information about the next show (start time and end time). In this example, the label text for onAirNow is translated into French for local language support:

```
<script>
```

```

$(document).ready(function() {
    $("#headerLiveHolder").airtimeLiveInfo({
        sourceDomain: "http://schedule.example.com/",
        text: {onAirNow:"Sur Les Antennes", offline:"Offline", current:"Current", next:
"Next"},
        updatePeriod: 20 //seconds
    });
});
</script>

```

On the public website, this widget can be made to look like the following screenshot:



The CSS properties color: and text-transform:uppercase have been used to style the onAirNow label. There is a full example CSS file widgets/css/airtime-widgets.css in the Airtime installation tarball.

The next widget airtimeShowSchedule is medium sized, and displays the upcoming show schedule for that day.

```

<script>
$(document).ready(function() {
    $("#onAirToday").airtimeShowSchedule({
        sourceDomain: "http://schedule.example.com/",
        text: {onAirToday:"On air today"},
        updatePeriod: 5 //seconds
    });
});
</script>

```

The widget code above can be styled to look like this screenshot:

On air today	
16:00 - 16:30	Newslink
16:30 - 17:00	Pages of History (EN)
17:00 - 17:30	L'Info Chez-Vous
17:30 - 04:00	Pages d'histoire
18:30 - 19:00	Choices (EN)
19:00 - 19:30	L'Info chez vous (FR)

Finally, the following code creates a large widget airtimeWeekSchedule that enables site visitors to browse through the show schedule for that week. In this example, all widget labels have been translated into French:

```

<script>
$(document).ready(function() {
    $("#scheduleTabs").airtimeWeekSchedule({
        sourceDomain:"http://schedule.example.com/",
        dowText:{monday:"Lundi", tuesday:"Mardi", wednesday:"Mercredi", thursday:"Jeu di", friday:"Vendredi", saturday:"Samedi", sunday:"Dimanche"},
        miscText:{time:"Temps", programName:"Nom du Programme", details:"Détails", readMore:"Lire La Suite"},
        updatePeriod: 600 //seconds
    });
});

```



</script>

Using the code above and CSS, the first six hours of the schedule each day can be styled to look like this:

Lundi	Mardi	Mercredi	Jeudi	Vendredi	Samedi	Dimanche	
TEMPS		NOM DU PROGRAMME				DÉTAILS	
00:00 - 00:30		Newslink (EN)				LIRE LA SUITE	
00:30 - 00:45		The Citizen (EN)				LIRE LA SUITE	
01:00 - 01:30		L'Info chez-vous				LIRE LA SUITE	
02:00 - 02:30		Music From Countries - Promo				LIRE LA SUITE	
02:30 - 03:00		Music From Countries - Promo				LIRE LA SUITE	
03:00 - 03:30		Newslink					
04:00 - 04:30		L'Info chez-vous (FR)				LIRE LA SUITE	
04:30 - 05:00		Fifty Fifty (FR)				LIRE LA SUITE	
05:00 - 05:30		Music From Countries - Promo				LIRE LA SUITE	
05:30 - 06:00		Music From Countries - Promo				LIRE LA SUITE	

The value of sourceDomain in the code examples above should match the URL that you wish to serve schedule information to the public from. If you have used the Caching schedule information method detailed above, this would be the URL of your schedule server, not the Airtime server directly.

# 27. INTERFACE CUSTOMIZATION

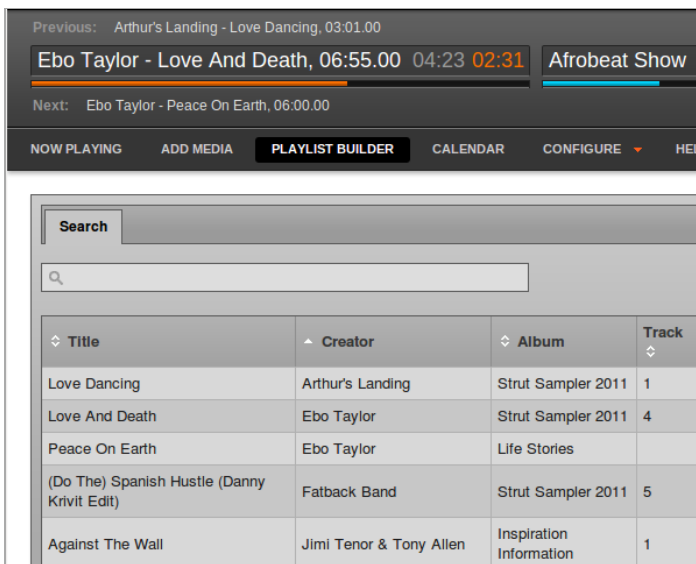
The Airtime administration interface, as a web application, is fully customizable using the same methods that you might use to update a website. For instance, you may wish to increase the font sizes or change the colours in the Airtime interface to better suit staff users with impaired vision. To do this, open one of the CSS files in the `/public/css/` directory under the Airtime DocumentRoot directory in an editor such as nano:

```
$ sudo nano /usr/share/airtime/public/css/styles.css
```

To change the background colour of the administration interface from dark gray to white, the `background:` property of the `body` tag could be changed to `#ffffff` as follows:

```
body {  
    font-size: 62.5%;  
    font-family:Arial, Helvetica, sans-serif;  
    background: #ffffff;  
    margin: 0;  
    padding: 0;  
}
```

Save the file with `Ctrl+O`, then refresh your browser to see the change to the interface background colour.



Any custom changes that you make to the administration interface should be backed up before upgrading Airtime to a newer version, otherwise they could be overwritten. If you have made improvements that you think might be useful to other Airtime users, please contact Sourcefabric and tell us about them.

# MODIFYING THE ICECAST INTERFACE

If you have installed Icast, in the directory `/etc/icecast2/web/` you will find several XSLT and other files which are used to generate the Icast web interface. If you are familiar with HTML you should be able to modify these pages, as they are well commented. You do have to be careful with syntax, because something as simple as a missing bracket can cause the Icast web interface to break down.

For example, you could change the `status.xml` page:

```
$ sudo nano /etc/icecast2/web/status.xml
```

Modifying the `status.xml` page is a good place to start, because this is the default page that site visitors see when they browse port 8000 on your Icast server. The most obvious change to make in the XSLT pages is the content of the `<title>` and `<h2>` tags, to announce the name of your station. You can also modify the `style.css` file in this directory to change colour and layout options.

After saving the file with `Ctrl+O`, refresh your web browser, and the new look should now be visible.



When you're happy with the way the web interface looks and the sound quality you are streaming, you can uncomment the `<directory>` section in the `/etc/icecast2/icecast.xml` file to have your new station automatically listed on the Icast directory website `http://dir.xiph.org` which could help you pick up a few more listeners. You can also put a link to the Icast status page at port 8000 on your station's homepage, to help integrate the two sites.

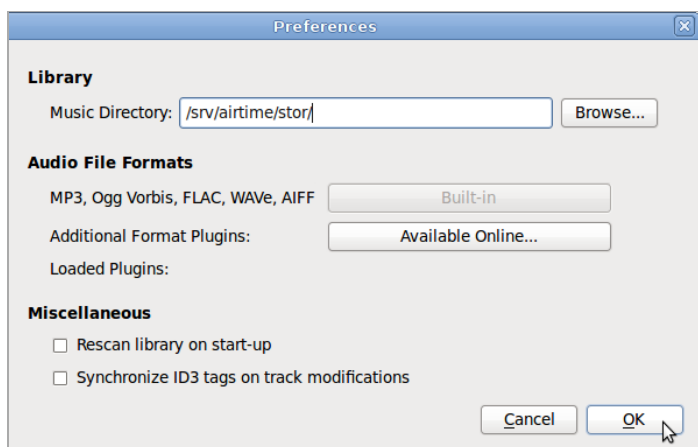
## 28. INTEGRATION WITH MIXXX

Mixxx is a cross-platform Open Source application for DJs, available from <http://www.mixxx.org/>

Installed on a desktop or laptop computer, Mixxx complements your Airtime server to provide a complete system for both live and scheduled broadcasting. Although Mixxx has many features designed for dance music DJs that require beat matching and pitch independent time stretching, the program can be used for any kind of manually triggered broadcast playlist, including live speech shows such as news or current affairs.

Mixxx supports a wide variety of popular hardware control surfaces, which can be connected to your computer using a USB cable. A control surface might replace or augment an analogue mixer in your studio, depending on your live mixing and playout requirements.

If you make the Airtime server's storage directory `/srv/airtime/stor/` accessible to a desktop machine as a read-only location, Mixxx will accept that location as its default music library when starting up for the first time. (This location can also be configured after installation by clicking Options, then Preferences, then Library in the main Mixxx menu).



You may need to adjust file and directory permissions so that the storage directory has read access from the desktop user account. Enabling write access directly to the storage server is not recommended, as this would allow desktop users to delete files which might be needed for playout later.

If the filesystem path has been configured correctly, the metadata for the files in the Airtime storage server will be displayed in the main window of the Mixxx interface. Individual files from the Airtime storage server can then be added to either of Mixxx's live players with a right-click on the filename, or by using the appropriate hardware buttons on a control surface. Therefore it is possible to manage the station's storage archive remotely and collaboratively through Airtime, while using Mixxx as the live playout client in multiple, remote studios.

Search...	Artist	Title	Duration	
Library	Orchestre Poly-Rythmo	Pardon	4:06	/srv/airtime/
Auto DJ	The Heshoo Beshoo Group	Cherchez Pas	5:55	/srv/airtime/
Playlists	Ebo Taylor	Love And Death	6:55	/srv/airtime/
Crates	Lloyd Miller & The Heliocentrics	Electricone	3:39	/srv/airtime/
Browse	Ebo Taylor	Peace On Earth	7:44	/srv/airtime/
Analyze	Madleen Kane	Emakhaya	7:18	/srv/airtime/
Rhythmbox	Arthur's Landing	Love Dancing	6:01	/srv/airtime/
	The Countach	My Oasis	5:00	/srv/airtime/
	Mighty Shadow	Dat Soca Boat	4:50	/srv/airtime/
	Mulatu Astatke	Green Africa	5:14	/srv/airtime/
	The Mahotella Queens	Wozani Mahipi	2:24	/srv/airtime/

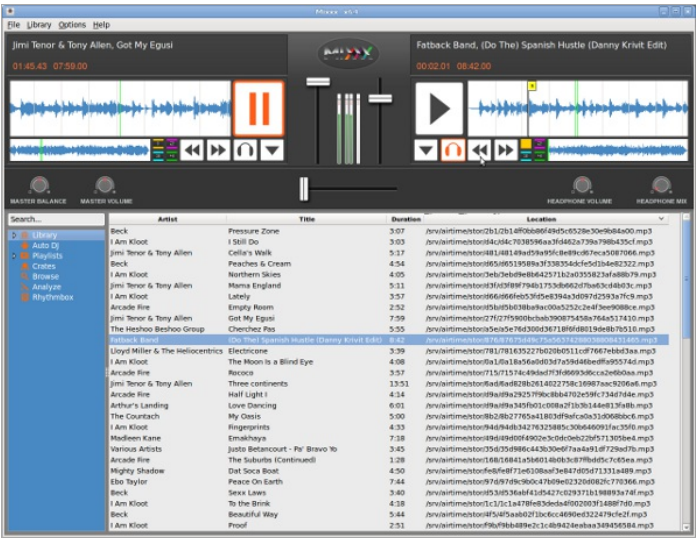
The Airtime storage archive can be exported like any other file server share. The method that you implement would depend on the operating system of your desktop client machines, and whether they were on the same local network as the Airtime server, or remote. For performance and redundancy reasons it is advisable to cache files required for a particular show on the client machine where Mixxx is installed. For example, for a GNU/Linux client machine, a nightly rsync download of new media in the archive would guard against network problems at payout time potentially disrupting a broadcast at a remote studio.

Mixxx users can also record a show, encode it, and then upload it through the Airtime web interface on a local or remote server for collaborative or user-generated broadcasts. In addition, Mixxx 1.9.0 or later includes a live streaming client which, like Airtime, is compatible with the Icecast media server.

## AIRTIME SKIN FOR MIXXX

An Airtime themed skin for Mixxx, designed with broadcast users in mind, is available for download from <https://sourceforge.net/projects/airtime/files/>

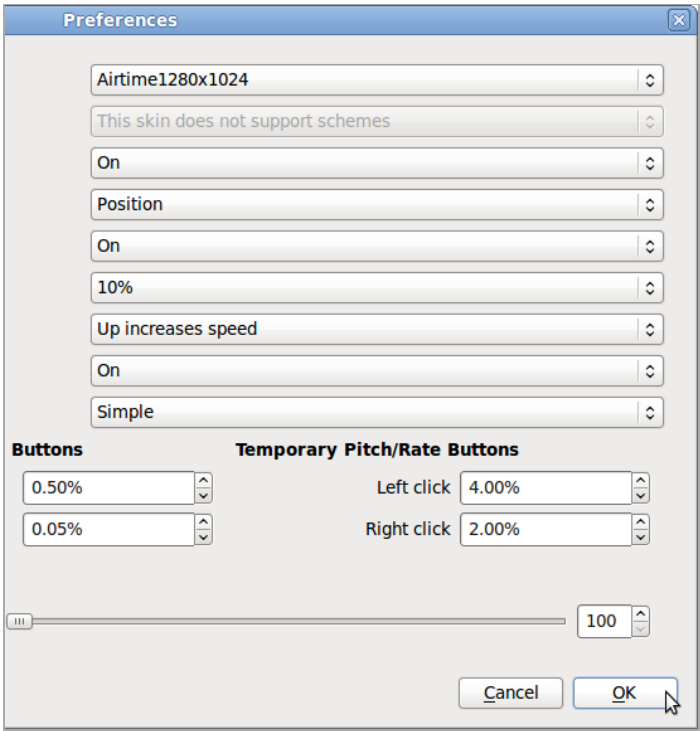
This skin is a simplified interface for live broadcasting which does away with pitch/tempo control, EQ, flange effect, looping and other features required by beat-matching dance music DJs. Instead, the emphasis is on a clear and uncluttered interface which does not require large mouse movements to operate the most important controls.



After downloading, extract the zip file and copy it to the skins directory on the computer where Mixxx is installed. For example, on Debian or Ubuntu:

```
$ unzip Airtime1280x1024_skin_for_Mixxx.zip
$ sudo cp -r Airtime1280x1024 /usr/share/mixxx/skins/
```

Then, start Mixxx and select the Airtime skin by clicking Options, Preferences, then Interface in the Mixxx main menu.



# 29. STREAM HANDOVER

In a typical configuration, the live output from the broadcast studio and the scheduled output from the storage archive are mixed together before being sent further along the broadcast chain, such as to a transmitter or streaming media server on the Internet.

If your Airtime server is hosted in a remote data centre, you may not have the option to handover the streaming media source from a live to scheduled show manually, because you have no physical access to connect a broadcast mixer to the server. Alternatively, you may have an Airtime server at the studio, connected to your main mixer, but wish stream handovers to take place automatically at the correct times. Disconnecting the stream and beginning another is less than ideal, because the audience's media players will also be disconnected when that happens.

The Icecast server has a fallback-mount feature which can be used to move clients (media players used by listeners or viewers) from one source to another, as new sources become available. This makes it possible to handover from Airtime scheduled output to a live show from another source, and handover to Airtime again once the live show has ended.

To enable fallback mounts, edit the main Icecast configuration file to define the mount points you will use, and the relationship between them.

```
$ sudo nano /etc/icecast2/icecast.xml
```

The example `<mount>` section provided in the `icecast.xml` file is commented out by default. Before or after the commented section, add three mount point definitions. The default mount point used by Airtime is `/airtime.ogg` which is shown in the `/etc/airtime/liquidsoap.cfg` file. You must also define a mount point for the live source (called `/live.ogg` in this example) and a mount point for the public to connect to (called `/stream.ogg` in this example).

```
<mount>
  <mount-name>/airtime.ogg</mount-name>
  <hidden>0</hidden>
</mount>

<mount>
  <mount-name>/live.ogg</mount-name>
  <fallback-mount>/airtime.ogg</fallback-mount>
  <fallback-override>1</fallback-override>
  <hidden>0</hidden>
</mount>

<mount>
  <mount-name>/stream.ogg</mount-name>
  <fallback-mount>/live.ogg</fallback-mount>
  <fallback-override>1</fallback-override>
  <hidden>0</hidden>
</mount>
```

These mount point definitions mean that a client connecting to a URL such as `http://icecast.example.com:8000/stream.ogg` will first fall back to the `/live.ogg` mount point if it is available. If not, the client will fall back in turn to the `/airtime.ogg` mount point for scheduled show payout.

Setting the value of <fallback-override> to 1 (enabled) means that when the /live.ogg mount point becomes available again, the client will be re-connected to it. If you wish to hide the /airtime.ogg and /live.ogg mount points from the public Icecast web interface, set the value of <hidden> in each of these definitions to 1.

## LIVE SOURCE CONFIGURATION

To integrate the live streaming source with Airtime, connect the live source to the Icecast server with the same parameters defined in the /etc/airtime/liquidsoap.cfg file, except for the mount point. This should be the live mount point you have defined in the /etc/icecast2/icecast.xml file, such as /live.ogg in the example above.

To configure Mixxx for streaming to Icecast, click Options, Preferences, then Live Broadcasting. For server Type, select the default of Icecast 2 when streaming to Debian or Ubuntu servers, as this is the version of Icecast supplied with those GNU/Linux distributions.

The screenshot shows the 'Preferences' dialog box for Mixxx, specifically the 'Live Broadcasting' tab. The window has a title bar 'Preferences' with a close button. Inside, there's a warning message: 'For technical reasons changing any shoutcast settings will cause an established connection to disconnect and reconnect.' Below this, the 'Server type' is set to '2' (Icecast 2) and the 'Mount' is '/live.ogg'. The 'Port' is '8000' and the 'Password' is masked with asterisks. Under the 'Encoding' section, 'Bitrate' is '128 kbps', 'Format' is 'Ogg Vorbis', and 'Channels' is 'Stereo'. The 'Custom metadata' section has a checked box for 'Enable custom metadata', with 'Artist' set to 'My Presenter Names' and 'Title' set to 'My Show Name'. At the bottom are 'Cancel' and 'OK' buttons.

Preferences

For technical reasons changing any shoutcast settings will cause an established connection to disconnect and reconnect.

Server type: 2 Mount: /live.ogg

Port: 8000 Password: \*\*\*\*\*

Encoding

Bitrate	Format	Channels
128 kbps	Ogg Vorbis	Stereo

Custom metadata

☒ Enable custom metadata

Artist: My Presenter Names

Title: My Show Name

Cancel OK

By default, Icecast streams are buffered to guard against network problems, which causes latency for remote listeners. When monitoring the stream from a remote location, you may have to begin the live stream a few seconds before the previous stream ends to enable a smooth transition.



# APPENDIX

- 30. EXPERT INSTALL**
- 31. TIME ZONES**
- 32. ABOUT THIS MANUAL**

# 30. EXPERT INSTALL

These quick install steps are suitable for experienced GNU/Linux system administrators. For a more detailed explanation, please read the chapter Automated installation in this book.

1. Edit the repositories file for your server:

```
$ sudo nano /etc/apt/sources.list
```

For Ubuntu Lucid servers, use the Sourcefabric repository:

```
deb http://apt.sourcefabric.org/ lucid main
```

and enable the multiverse repository if you need MP3 encoding support:

```
deb http://archive.ubuntu.com/ubuntu/ lucid multiverse
```

For Debian Squeeze servers, use the Sourcefabric repository:

```
deb http://apt.sourcefabric.org/ squeeze main
```

and enable the Debian Multimedia repository if you need MP3 encoding support:

```
deb http://www.debian-multimedia.org squeeze main non-free
```

2. Install the Sourcefabric package signing key:

```
$ sudo apt-get update  
$ sudo apt-get install sourcefabric-keyring
```

3. Install the database management system:

```
$ sudo apt-get install postgresql
```

4. Install the streaming media server (optional):

```
$ sudo apt-get install icecast2
```

5. Remove PulseAudio:

```
$ sudo apt-get purge pulseaudio
```

6. Install Airtime:

```
$ sudo apt-get install airtime
```

Refer to the Configuration chapter for configuration options. Now you should be able to log in to the Airtime administration interface, as shown in the Getting started chapter.

# 3 | . TIME ZONES

Use the appropriate time zone value from the list below in the php.ini file on your Airtime server.

## AFRICA

Africa/Abidjan, Africa/Accra, Africa/Addis\_Ababa, Africa/Algiers, Africa/Asmara, Africa/Asmera, Africa/Bamako, Africa/Bangui, Africa/Banjul, Africa/Bissau, Africa/Blantyre, Africa/Brazzaville, Africa/Bujumbura, Africa/Cairo, Africa/Casablanca, Africa/Ceuta, Africa/Conakry, Africa/Dakar, Africa/Dar\_es\_Salaam, Africa/Djibouti, Africa/Douala, Africa/El\_Aaiun, Africa/Freetown, Africa/Gaborone, Africa/Harare, Africa/Johannesburg, Africa/Kampala, Africa/Khartoum, Africa/Kigali, Africa/Kinshasa, Africa/Lagos, Africa/Libreville, Africa/Lome, Africa/Luanda, Africa/Lubumbashi, Africa/Lusaka, Africa/Malabo, Africa/Maputo, Africa/Maseru, Africa/Mbabane, Africa/Mogadishu, Africa/Monrovia, Africa/Nairobi, Africa/Ndjamena, Africa/Niamey, Africa/Nouakchott, Africa/Ouagadougou, Africa/Porto-Novo, Africa/Sao\_Tome, Africa/Timbuktu, Africa/Tripoli, Africa/Tunis, Africa/Windhoek

## AMERICA

America/Adak, America/Anchorage, America/Anguilla, America/Antigua, America/Araguaina, America/Argentina/Buenos\_Aires, America/Argentina/Catamarca, America/Argentina/ComodRivadavia, America/Argentina/Cordoba, America/Argentina/Jujuy, America/Argentina/La\_Rioja, America/Argentina/Mendoza, America/Argentina/Rio\_Gallegos, America/Argentina/Salta, America/Argentina/San\_Juan, America/Argentina/San\_Luis, America/Argentina/Tucuman, America/Argentina/Ushuaia, America/Aruba, America/Asuncion, America/Atikokan, America/Atka, America/Bahia, America/Bahia\_Banderas, America/Barbados, America/Belem, America/Belize, America/Blanc-Sablon, America/Boa\_Vista, America/Bogota, America/Boise, America/Buenos\_Aires, America/Cambridge\_Bay, America/Campo\_Grande, America/Cancun, America/Caracas, America/Catamarca, America/Cayenne, America/Cayman, America/Chicago, America/Chihuahua, America/Coral\_Harbour, America/Cordoba, America/Costa\_Rica, America/Cuiaba, America/Curacao, America/Danmarkshavn, America/Dawson, America/Dawson\_Creek, America/Denver, America/Detroit, America/Dominica, America/Edmonton, America/Eirunepe, America/El\_Salvador, America/Ensenada, America/Fort\_Wayne, America/Fortaleza, America/Glace\_Bay, America/Godthab, America/Goose\_Bay, America/Grand\_Turk, America/Grenada, America/Guadeloupe, America/Guatemala, America/Guayaquil, America/Guyana, America/Halifax, America/Havana, America/Hermosillo, America/Indiana/Indianapolis, America/Indiana/Knox, America/Indiana/Marengo, America/Indiana/Petersburg, America/Indiana/Tell\_City, America/Indiana/Vevay, America/Indiana/Vincennes, America/Indiana/Winamac, America/Indianapolis, America/Inuvik, America/Iqaluit, America/Jamaica, America/Jujuy, America/Juneau, America/Kentucky/Louisville, America/Kentucky/Monticello, America/Knox\_IN, America/La\_Paz, America/Lima, America/Los\_Angeles, America/Louisville, America/Maceio, America/Managua, America/Manaus, America/Marigot, America/Martinique, America/Matamoros, America/Mazatlan, America/Mendoza, America/Menominee, America/Merida, America/Mexico\_City, America/Miquelon, America/Moncton, America/Monterrey, America/Montevideo, America/Montreal, America/Montserrat, America/Nassau, America/New\_York, America/Nipigon, America/Nome, America/Noronha, America/North\_Dakota/Beulah, America/North\_Dakota/Center, America/North\_Dakota/New\_Salem, America/Ojinaga, America/Panama, America/Pangnirtung, America/Paramaribo, America/Phoenix, America/Port-au-Prince, America/Port\_of\_Spain, America/Porto\_Acre, America/Porto\_Velho, America/Puerto\_Rico, America/Rainy\_River, America/Rankin\_Inlet, America/Recife, America/Regina, America/Resolute, America/Rio\_Branco, America/Rosario, America/Santa\_Isabel, America/Santarem, America/Santiago, America/Santo\_Domingo, America/Sao\_Paulo, America/Scoresbysund, America/Shiprock, America/St\_Barthelemy, America/St\_Johns, America/St\_Kitts, America/St\_Lucia, America/St\_Thomas, America/St\_Vincent, America/Swift\_Current, America/Tegucigalpa, America/Tule, America/Tuvalu, America/Tijuana, America/Toronto, America/Tortola, America/Vancouver, America/Virgin, America/Whitehorse, America/Winnipeg, America/Yakutat, America/Yellowknife

## ANTARCTICA

Antarctica/Casey, Antarctica/Davis, Antarctica/DumontD'Urville, Antarctica/Macquarie, Antarctica/Mawson, Antarctica/McMurdo, Antarctica/Palmer, Antarctica/Rothera, Antarctica/South\_Pole, Antarctica/Syowa, Antarctica/Vostok

## ARCTIC

Arctic/Longyearbyen

## ASIA

Asia/Aden, Asia/Almaty, Asia/Amman, Asia/Anadyr, Asia/Aqtau, Asia/Aqtobe, Asia/Ashgabat, Asia/Ashkhabad, Asia/Baghdad, Asia/Bahrain, Asia/Baku, Asia/Bangkok, Asia/Beirut, Asia/Bishkek, Asia/Brunei, Asia/Calcutta, Asia/Choibalsan, Asia/Chongqing, Asia/Chungking, Asia/Colombo, Asia/Dacca, Asia/Damascus, Asia/Dhaka, Asia/Dili, Asia/Dubai, Asia/Dushanbe, Asia/Gaza, Asia/Harbin, Asia/Ho\_Chi\_Minh, Asia/Hong\_Kong, Asia/Hovd, Asia/Irkutsk, Asia/Istanbul, Asia/Jakarta, Asia/Jayapura, Asia/Jerusalem, Asia/Kabul, Asia/Kamchatka, Asia/Karachi, Asia/Kashgar, Asia/Kathmandu, Asia/Katmandu, Asia/Kolkata, Asia/Krasnoyarsk, Asia/Kuala\_Lumpur, Asia/Kuching, Asia/Kuwait, Asia/Macao, Asia/Macau, Asia/Magadan, Asia/Makassar, Asia/Manila, Asia/Muscat, Asia/Nicosia, Asia/Novokuznetsk, Asia/Novosibirsk, Asia/Omsk, Asia/Oral, Asia/Phnom\_Penh, Asia/Pontianak, Asia/Pyongyang, Asia/Qatar, Asia/Qyzylorda, Asia/Rangoon, Asia/Riyadh, Asia/Saigon, Asia/Sakhalin, Asia/Samarkand, Asia/Seoul, Asia/Shanghai, Asia/Singapore, Asia/Taipei, Asia/Tashkent, Asia/Tbilisi, Asia/Tehran, Asia/Tel\_Aviv, Asia/Timbu, Asia/Timphu, Asia/Tokyo, Asia/Ujung\_Pandang, Asia/Ulaanbaatar, Asia/Ulan\_Bator, Asia/Urumqi, Asia/Vientiane, Asia/Vladivostok, Asia/Yakutsk, Asia/Yekaterinburg, Asia/Yerevan

## ATLANTIC OCEAN

Atlantic/Azores, Atlantic/Bermuda, Atlantic/Canary, Atlantic/Cape\_Verde, Atlantic/Faeroe, Atlantic/Faroe, Atlantic/Jan\_Mayen, Atlantic/Madeira, Atlantic/Reykjavik, Atlantic/South\_Georgia, Atlantic/St\_Helena, Atlantic/Stanley

## AUSTRALIA

Australia/ACT, Australia/Adelaide, Australia/Brisbane, Australia/Broken\_Hill, Australia/Canberra, Australia/Currie, Australia/Darwin, Australia/Eucla, Australia/Hobart, Australia/LHI, Australia/Lindeman, Australia/Lord\_Howe, Australia/Melbourne, Australia/North, Australia/NSW, Australia/Perth, Australia/Queensland, Australia/South, Australia/Sydney, Australia/Tasmania, Australia/Victoria, Australia/West, Australia/Yancowinna

## EUROPE

Europe/Amsterdam, Europe/Andorra, Europe/Athens, Europe/Belfast, Europe/Belgrade, Europe/Berlin, Europe/Bratislava, Europe/Brussels, Europe/Bucharest, Europe/Budapest, Europe/Chisinau, Europe/Copenhagen, Europe/Dublin, Europe/Gibraltar, Europe/Guernsey, Europe/Helsinki, Europe/Isle\_of\_Man, Europe/Istanbul, Europe/Jersey, Europe/Kaliningrad, Europe/Kiev, Europe/Lisbon, Europe/Ljubljana, Europe/London, Europe/Luxembourg, Europe/Madrid, Europe/Malta, Europe/Mariehamn, Europe/Minsk, Europe/Monaco, Europe/Moscow, Europe/Nicosia, Europe/Oslo, Europe/Paris, Europe/Podgorica, Europe/Prague, Europe/Riga, Europe/Rome, Europe/Samara, Europe/San\_Marino, Europe/Sarajevo, Europe/Simferopol, Europe/Skopje, Europe/Sofia, Europe/Stockholm, Europe/Tallinn, Europe/Tirane, Europe/Tiraspol, Europe/Uzhgorod, Europe/Vaduz, Europe/Vatican, Europe/Vienna, Europe/Vilnius, Europe/Volgograd, Europe/Warsaw, Europe/Zagreb, Europe/Zaporozhye, Europe/Zurich

## INDIAN OCEAN

Indian/Antananarivo, Indian/Chagos, Indian/Christmas, Indian/Cocos, Indian/Comoro,  
Indian/Kerguelen, Indian/Mahe, Indian/Maldives, Indian/Mauritius, Indian/Mayotte,  
Indian/Reunion

## PACIFIC OCEAN

Pacific/Apia, Pacific/Auckland, Pacific/Chatham, Pacific/Chuuk, Pacific/Easter, Pacific/Efate,  
Pacific/Enderbury, Pacific/Fakaofu, Pacific/Fiji, Pacific/Funafuti, Pacific/Galapagos,  
Pacific/Gambier, Pacific/Guadalcanal, Pacific/Guam, Pacific/Honolulu, Pacific/Johnston,  
Pacific/Kiritimati, Pacific/Kosrae, Pacific/Kwajalein, Pacific/Majuro, Pacific/Marquesas,  
Pacific/Midway, Pacific/Nauru, Pacific/Niue, Pacific/Norfolk, Pacific/Noumea,  
Pacific/Pago\_Pago, Pacific/Palau, Pacific/Pitcairn, Pacific/Pohnpei, Pacific/Ponape,  
Pacific/Port\_Moresby, Pacific/Rarotonga, Pacific/Saipan, Pacific/Samoa, Pacific/Tahiti,  
Pacific/Tarawa, Pacific/Tongatapu, Pacific/Truk, Pacific/Wake, Pacific/Wallis, Pacific/Yap

# 32. ABOUT THIS MANUAL

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