

Complete FOSS Audio Streaming Guide

A guide to setting up a web radio using free and open source software.

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Introduction

Audio streaming over the Internet or Web Radio can be an exciting hobby or community project. And it's not as difficult as you may think. There are many programmes and sites available but there is frequently a charge for software or services. In this guide I will show you how to set up your own web radio for free. What I don't cover in this guide is the actual hardware side of things if you are going to use a mixing desk and broadcast in real time. There is a set of extremely useful guides however that do cover this and much more available at <http://www.streamingsuitcase.com/frame.html>.

The guide is broken roughly into 4 parts:

- Using Dynebolic to stream audio
- Installing Ubuntu Linux desktop operating system
- Audio streaming on Ubuntu
- Audio streaming on Windows

Each part is useable as a stand alone module but if you follow the whole manual, you should end up with a fairly good grasp of streaming audio and where to go for additional knowledge. After each section there is a list of useful web sites relating to that particular section

Using Dynebolic for streaming Audio over the web

You can obtain a copy of Dynebolic from the dynebolic web site – <http://dynebolic.org> and go to downloads. There are two versions available v1.4.1 and v2.0. For the purpose of this exercise you have to use v 1.4.1 as some of the required software doesn't seem to be available in the newer version 2.0. I haven't been able to find out the reason for this as yet. You will have to know how to download an ISO image and burn it to disc (not simply copy it to disc) and also your PC will have to be configured to boot from a CD. If it isn't you will need to make changes to your Setup, which can usually be accessed by pressing “Del” during the boot sequence. If this is all gobbledygook to you, then you will have to get a friend or qualified PC engineer to do this for you. Dynebolic can be loaded straight off the CD without any changes to your hard drive i.e. you just put the CD in the drive and switch on – the PC will load the dynebolic operating system rather than the one on the hard drive. This is OK, but if you are going to have a web radio, then you need some audio material. This can be in the form of MP3 or Ogg Vorbis tracks either already on your hard disc or on a USB device. For this demo, I initially used a couple of tracks on a USB stick. You will need a PC or Laptop connected either to a router with a broadband connection or to a broadband modem via ethernet. You may also benefit from a second PC which you can use for testing. If this is all in place, let's get going.

Throughout this Dynebolic guide, I use the term “rightclick” or “rclick” for the right mouse button. If I don't specify rclick then assume left click.

For my demo, I used my laptop connected to my router by ethernet cable. I also have my normal desktop PC connected to the router and the router is connected to a cable broadband router.

Starting Dynebolic

Boot from the CD – when the boot sequence has finished (and this doesn't take long as the dynebolic distro uses a minimal windows system) you should hear a dynebolic welcome sound and see a “welcome to dynebolic” window. Close this window.

Set the screen resolution if it is required – I have found that laptops and flat screens will only work correctly with the correct resolution set, you may find with a normal screen that you don't have to change the resolution – if you can see icons at the top left, top right and bottom left of your screen, then your resolution is OK. If the screen moves as you move your pointer to an edge then you need to change your resolution.

Most things are started by clicking anywhere on the desktop, but try and click towards the higher and left part of the screen, as the drop down menus will be off screen if you start too low down.

click on desktop – click system – click set video – choose the correct resolution.

The icons for your drives are located at the top right of the screen. click and hold on an icon, move your pointer to the left and on to “launch” and let go. This should open a window showing the contents of your hard drive or USB stick. Unfortunately it doesn't seem to be possible to save anything to the desktop. You should also be able to see the mount point of the device for example my USB stick is /rem/usb and my second hard drive partition is /vol/hd2. You may also find your USB stick appearing at /vol as well. I don't intend to go in to the directory structure of Linux, but the other one you need to know is /home/shared as this is often the place where you will store things. You can copy things to and from the drives just as you would in windows.

Starting Streaming

To start streaming, you need to start the Icecast streaming engine and then start some software to forward the audio to icecast. Dynebolic is set up to use its own programme called MuSE. There are other streaming servers available and other programmes to forward the audio to the server and some of these will be investigated in a later article.

Start Icecast – click on “desktop, audio, stream, Icecast2-start streaming server”. This should open a window with Changed group and changed userid. Minimise this window by clicking on top left icon.

Start MuSE – click, “audio, stream, MuSE”. You should now have a window “codename STREAMTIME”.

To add audio, click in the centre of this new window and choose “add file”, navigate to location of your audio files and choose one.

Change single play to loop, highlight the track by clicking on it and click the > play button. You should now hear the music coming out of your PC speakers.

Click the icon towards the top left of the streamtime window (looks a bit like a plug waiting to be inserted in the wall) – it's on the left of a bank of six icons. This should open a further window called icecast configuration. Choose the type of audio (MP3 or Ogg Vorbis – see later for more info on these formats) and type “hackme” in the password box. Click “connect” in bottom left.

If you are successful you should see “started streaming on <http://localhost:8000/live> “ or similar at the bottom of the STREAMTIME window. You are now streaming.

To check if you are up and running, you can go to your second PC and open Winamp (or on Linux XMMS) and open (play) a location (or URL).

add the location in the following format –

`http://{ip address of streaming computer on local network}:8000/live`

or `/live.ogg` if you have chosen Ogg Vorbis.

To find your ip address open a terminal and in windows type `ipconfig` or in Linux `ifconfig`.

On dynebolic, you open a terminal by “rclick, xterm”.

My machine was 192.169.2.182, so I typed <http://192.168.2.182:8000/live.ogg>.

After a few seconds the stream should start playing albeit slightly delayed from the original. If this is all OK, then you can substitute your local ip address with the ip address of your broadband connection (to find this, open a browser and go to <http://www.dslreports.com/whois>) and you should again hear the stream. If so, then you can access your audio from any web connected machine anywhere in the world as long as they have a suitable player.

Voila, instant web radio. If you didn't get this far check Problems below.

Problems

1. When using a router like mine, you need to forward port 8000 to the machine that is doing the streaming or the router will block the connection. On my router the procedure is to set up a virtual server under NAT (Network Address Translation). This involves linking port 8000 to the internal IP address of the server machine for both UDP and TCP. In my case the server IP was 192.168.2.165. To find your machines internal IP address open a terminal in Linux and type `ifconfig`, in windows type `ipconfig`. You will have to check your own server documentation or search the web for help if you are in this situation as different manufacturers call this by different names. If however you use downloading programmes such as DC++ or various multiplayer gaming programmes then you will be familiar with this problem and will hopefully have already learned the process.
2. I initially tried to play a rather large MP3 file that was a recording of my band at around 80 Mb. Although the audio played at first, the audio started to stutter fairly frequently. This didn't happen when I played a shorter track, so was probably a buffer problem.
3. You can check if Icecast is running by going to <http://localhost:8000> from either PC where you should get an icecast administration screen.
4. The stream at the moment doesn't appear in any of the Web Radio directories.
5. I couldn't access the stream directly from a web browser, only from Winamp or XMMS. If you go to a site that has a directory of streaming servers like the icecast directory on <http://dir.xiph.org/index.php> then you can open your player directly by clicking on the link. This may well be resolved when I work out how to get the stream to appear in a directory.
6. **Be aware that dynebolic v 2.0 doesn't appear to have icecast available anymore. I don't know the reason for this and can't find any reference to it at the moment.**
7. There are security implications when running icecast in this manner as the dynebolic platform allows you to run as the root user – i.e. you can do everything without limitations. A normal Linux setup doesn't recommend running as root, only dropping into root to perform specific functions. This quote from “Spot's perspective on technology” (<http://spot.river-styx.com/viewarticle.php?>) –

For one, everything in dyne:bolic runs as root. It simplifies things, as nothing is off limits, so there is no fighting with device permissions and the like. The down side is the host machine, and to some extent the hosting network, are at risk by accident or malice. The password for root is 'luther' and although it can be changed and saved with the nest, there still is a problem. If you are not at the console during boot up to answer the prompt, the nest loading will be skipped, bringing back the default, unless you have mastered and burned a new cd. One power failure, and your network is open on ssh with a known root password. This is call for some serious firewall considerations.

8. Dynebolic is set up by default for an American keyboard layout. This can be changed in system, set language. Also the touchpad on my laptop was far too sensitive. I couldn't find any way to deal with this.
9. I haven't found out yet how to use a playlist in MuSE

Enhancements

1. Booting from Hard Drive and Nesting
 - a) You can speed up the system and free up your CD drive by copying the /dyne directory from the disk onto your hard drive. You still need to boot from the disk, but you will be asked if you want to boot from the drive and the disk will be ejected.
 - b) You can also add a directory (called a nest) on your hard drive where you can save the contents of your “home” folder and also some user settings. Although it saved my keyboard settings, it doesn't seem to save my video settings. This function is called a persistent/home directory and is accessed from rclick, system, save settings, nest on harddisk or USB key. You can choose the size of the nesting folder.
2. Adding a microphone – this can be done in MuSE by clicking the microphone icon. You can then mix speech and music just like a real radio. You can also add extra channels by clicking the appropriate button and mix audio tracks.
3. Instead of the microphone, you could add an external sound source such as an MP3 player or even a feed from an external mixing desk and play your radio station in real time.

A discussion on MP3 v OGG VORBIS

You may not know what MP3 is. You could quite easily be using, playing, listening to, recording MP3 files without really appreciating what they are. Unfortunately when using MP3 on FOSS, there are a number of things that you need to be aware of. MP3 is a compressed form of music. There had to be a way of compressing music when people started recording digitally and swapping music over the internet. With a normal .wav file, the size of the file is equivalent to around 10 Mb per minute of recorded sound. This isn't too different for audio CD's where you can fit around 80 mins of music on a 700 Mb disc. You can see then that a 3 minute song in .wav format takes around 30 Mb of disc space. In terms of download speed, when using a telephone line this would take around 3 hours to transfer. A compression format was devised called MP3 which effectively reduces the file size by a factor of 10, making a 3 minute song fit into a file size of around 3 Mb. This was just about manageable over a phone line and of course with broadband, we don't even think about it.

Now MP3 is called a “lossy” compression format in that some of the original is lost and so can never be re-created exactly as before, but to most people the difference is negligible. I believe that some people can tell the difference especially at higher volumes which is one reason why professional DJ's won't use the format, but the reproduction quality of most people's music players limits the quality of sound far more than the use of the MP3 format. However, it is now an extremely popular format especially with the rise in popularity of MP3 players. Unfortunately it's a proprietary codec (coder/decoder) and as such isn't free and is subject to certain licensing restrictions. When you purchase an MP3 player or a Windows programme that needs the codec, this is taken into account in the purchase price, but with FOSS, this isn't the case. You will find that FOSS doesn't usually come with an MP3 codec “out of the box”. It is usually possible to find a way of downloading the appropriate codec but you will almost certainly be in breach of copyright and therefore breaking the law. On a personal level you may be willing to take this risk in the same way that many people did when copying LP's onto audio tape (another breach of copyright), but if you are going to start broadcasting and possibly even charging for your service, then you have to take this into consideration. There is an alternative to MP3 though and it is called Ogg Vorbis. It is another compression codec which many people say is superior to MP3 and is also FOSS, so you can use it without without fear of breaching the MP3 license – you will still need to ensure that you aren't breaching any broadcasting copyrights, but that's another matter. At least with Ogg Vorbis, you can broadcast your own work without fear.

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The problem is that Ogg Vorbis isn't nearly as popular as MP3 and needs a player that will recognise the format. Fortunately there are a few available – Winamp for Windows and XMMS for Linux are just a couple. It is worth noting at this point that one of the most popular Web Radio listing services, that run by Icecast itself has recently dropped MP3 listings and will only list Ogg Vorbis streams. This isn't to say that you can't use MP3 if you are broadcasting to people who know your address, just that you can't add your Web Radio to the Icecast listing.

Where to go from here

You may be completely satisfied with what you have attained using Dynebolic if the above method meets your requirements. Given a dedicated PC (which incidentally doesn't need to be a high specification machine – an old Pentium 2 or 3 would easily suffice) you can be up and running quite quickly with dynebolic. However if you need to make changes or want to do other things as well, or try other streaming software, you may find dynebolic a little limiting. The next step is to try a similar exercise but using a full Linux distribution, and then to have a look at the additional software that is available. The next two sections will be investigating the use of streaming software on an Ubuntu Desktop Linux PC, covering the installation of Ubuntu as well as the use of it for streaming.

Documentation and useful web sites

1. There is a full Dynebolic user manual on the CD viewable in windows or Linux.
2. <http://muse.dyne.org>
3. <http://dynebolic.org/index.php?show=docs>
4. <http://flossmanuals.org/muse>
5. <http://www.icecast.org/docs.php>
6. http://muse.dyne.org/?open=michel_xtremehowto

How to Install and Set Up Ubuntu Desktop Linux version 6.06 (Dapper Drake)

Introduction

This paper isn't designed to be a wholesale introduction to Linux. It is intended for those who have had their curiosity whetted and are technical enough to manage installing an operating system from scratch. It is the culmination of many months of research on my part and also actively using Linux as my main operating system. I have tried to cover the elements that had me flumoxed from the start in order to save everyone from having to go through the hours and hours of scouring the internet for answers to problems that I came up against. Obviously I haven't encountered every problem that there is but I think that I have found enough sources of information for covering the majority of situations in the migration from Windows. It has to be stressed however that Linux is not an attempt to copy Windows. It is different in many ways and the software that is available differs from the equivalent Windows software. Also the drivers for many pieces of hardware just don't exist for Linux, so it is unlikely that it will ever become a wholesale replacement for Windows. In fact, I use a dual boot system and often drop back into Windows for a particular program or a particular operation.

The beauty of Linux is that it is now a fully fledged operating system with much if not all the software that is required for normal use and also some fairly specialised uses. And the best bit is that it is free. Now Linux has actually been around for a good few years but even for those who knew about it, wasn't really a viable alternative to Windows. It was a bit like using the old DOS system and early windows, you had to be prepared to learn many manual commands in order to get anything done. In recent months however, Linux has come of age and the Graphical Interfaces for most of the manual operations make learning the commands mostly redundant. There are a number of problems however.

Unfortunately Linux has developed along a number of parallel lines and with a number of competing interfaces. Different teams approached problems in different ways and so there are lots of different versions of Linux to choose from. We have already looked at one – dynebolic – which is a ready made media version with a very cut down interface that runs off a CD in order to make things as simple as possible. There are others that install onto a hard drive and run just like windows. The major ones are Suse, Red Hat (Fedora), Debian and Mandrake, and each has a number of derivatives. There are also two major competing desk tops – KDE and GNOME. The software for each isn't usually compatible with the other. Each also has a different look and feel. The one you decide to use really depends on your preferences.

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I have tried all the major distributions (distros) and found different problems with each, such that I wasn't prepared to go the whole way and change from windows. However towards the back end of 2005 I came across a distro called Ubuntu and I have been hooked ever since. Ubuntu is easy to install, easy to add additional software, has a library of literally thousands of programmes, has a bouyant user base and user forum and has the most complete and easy to use documentation that you could want. I'm only writing this guide as part of the project so as to help people get started and save time, but everything that follows is available from other sources in one for or another. Incidentally, Ubuntu used GNOME desktop, but there is a KDE version – Kubuntu – and also a version dedicated to educational requirements – Edubuntu. Each one is regularly updated and easily downloaded and installed. I would suggest however that you run the live version of Ubuntu before deciding to do a full install. This runs from a CD and gives you both a flavour of the system and also an advance look at whether it will recognise all your hardware. Printers, Modems and some USB devices can be a problem. Once you have decided to go ahead another suggestion that I would make is to avoid a dual boot system unless you are fairly PC literate. Check out your local paper or small Computer shop for an older PC. I got two pentium 2's for £25 from a local PC shop recently and made one good one with lots of memory. A pentium 2 will run Linux well enough providing you have sufficient memory (256 Mb min) – it will just take a while to install and to boot - but a faster P3 or greater is better.

OK so I'm assuming you are installing to a single drive that is either clean or you aren't bothered about losing what is on it. For those wanting to have a go at dual booting see this site: <http://users.bigpond.net.au/hermanzone/>

Getting hold of the install CD

The current version of Ubuntu is 6.06 LTS code named Dapper Drake.

Go to www.ubuntu.com/download/ and click on one of the United Kingdom links. In the list that appears (and assuming that you are installing on a normal intel or AMD machine not an athlon64 or power PC) look for ubuntu 6.06 desktop i386 ISO. This acts initially like a live CD i.e. it boots into a working system so that you can try things out, but gives you an icon on the desktop to carry out a full install should you want to. Incidentally, it also gives you a look at the Official Ubuntu Book – in a folder on the desktop. If you aren't bothered about the live bit you could go straight for the “alternate” version which bypasses the live boot and goes straight into install. If you choose this option, you will carry out the installation as a user called OEM and will have the option later to reboot and set up your own new user. This is aimed at dealers, customising a Ubuntu installation prior to delivering to the customer, but is equally useable for a normal home installation.

When you have downloaded the ISO image, you can burn it to a disc (not just copy it) using a program like Nero express. Alternatively you can look for a CD on ebay (usually obtainable for a couple of pounds) or directly from the Ubuntu site (but with a 4-6 week wait).

Installing Ubuntu

If you have the desktop version, boot into Linux and then choose the install icon from the desktop. If you have the alternate version, boot from it and choose OEM mode.

n.b. if you can't boot from a CD you will need to make some changes to your BIOS, which is beyond the scope of this paper. You can maybe call a friend or ask a local Computer shop to make the change for you.

Once the install sequence starts, you get to set the language and keyboard language, the Hostname which is simply the name by which the computer will be known on a network and then the Partitioning. Choose the option to erase the disc and set up the default partitions which will be a EXT3 partition and a swap partition. The EXT3 is the Linux equivalent of the C: drive and the swap partition is equivalent to the windows swap/paging file. Along the way you will have to set the time zone and a password. Eventually you will get a reboot and you will be in to Ubuntu. If you used the alternate disc, you log in as OEM and the password that you set during install. If the desktop disc, then the username will also have been set during install.

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You can now have a play with the new system if you want.

What you need to know first

The things that you need to know first are:

- How to turn it off
- How to start programmes
- How to install additional programmes
- Where is the My Documents
- Where do the programmes go
- How to access the internet
- How to open a terminal for manual commands
- How to make changes to the way things look

Well if you look at the top left you will see **Applications Places System** and the a couple of icons

Applications holds all your programmes grouped into categories like Games, Graphic, Internet, Office etc. You'll soon find out where they all are.

Places has things like Home, Desktop, Network folders etc. all fairly self explanatory

System has Preferences, Administration, Help and Quit

The Icons are for Internet Browser and Email

What more do you need to know? Actually at this stage you don't need to know where the programmes go. Home is the equivalent of My Documents, Changes are made in System, Preferences and a terminal is accessible from Applications, accessories.

This just leaves new software. This falls into a number of categories. There is software that comes with the distro, and software that comes from repositories on the web. There are official repositories that hold stable versions of common software and there are unofficial repositories that may hold unstable beta versions or possibly even illegal software. What might constitute illegal software? Well you will almost certainly want to listen to MP3 files. Unfortunately MP3 is a licensed format and so can't be given away free, so the free distro won't have an MP3 codec installed as standard. There is one available but it is illegal to download and install it in the USA

for example. Software like this – and other codecs like DVD codecs – are found in unofficial repositories. At one time you would have had to search all over the internet for some of this stuff, but these days it is all fairly straightforward.

Installing New Software

You may have read stories in the past about having to compile your own software and use commands like “make-install lame-1.0.2.4.tar.gz” etc but although you can still do this kind of thing if you want, mostly you don't need to. Go to Applications Add/Remove and you will see a long list of software that is readily available. Try installing some (for example you may fancy some additional games so go ahead – put a tick next to one and install it. Couldn't be easier. But even though from scratch you have a Full Office Suite, Photo Editor, DTP software, Cd burning, Educational software, Games, a messaging programme and much more, that isn't the end of it.

Go now to System, Administration, Synaptic Package Manager. You will be asked for your password and then will have access to the whole official software library. Here you can search for hundreds of programmes like Audacity recording studio or Icecast streaming software. If you find them, you can install them. However you will only find what is in the official repositories, so you may want to add some extra repositories. We'll cover this in a little while. Firstly there is a couple of other things to do. Incidentally it might be worth mentioning that you can only do all this adding software if you are connected to the internet. I have a wifi router with a cable modem and so am always on line. If you have similar, then you may have noticed by now a square red and white icon at the top right telling you that you have updates available. Unlike windows, the Ubuntu update manager checks not just the operating system, but all the software as well for any updates. There will almost certainly be some, so you might as well click on the icon and get them.

So far so good, but there are still quite a lot of things that you haven't got and things that are different between Ubuntu and Windows that will cause you problems or take ages to find the answer to. Fortunately there are a few things around to help you. First is the unofficial Ubuntu starter guide (<http://ubuntuguide.org/wiki/Dapper>) This was an unofficial guide originally started by just one person but now managed in a much more official capacity. It contains guides on how to do just about anything from how to set the Num Lock to come on at startup to how to set up an Apache Web Server and everything in between. Second is Automatrix!

Installing Automatix

Automatix is a script that has been developed, again initially by an individual, to automate many of the changes that you will want to make in order to get your system just right. Things like the codecs mentioned earlier, how to set the CD drive so that it ejects the CD when you press the button (believe me it's continually annoying if you don't do this one), software for peer to peer networks and Skype amongst lots of other things. If you can follow the next bit and get this right, you have the rest cracked.

Installing and using Automatix

Go to <http://www.getautomatix.com> and you should be faced with a set of instructions. Make sure that you follow the ones for Dapper. When I wrote this, Automatix was at version 6.2-5.

You are told to add a certain line: *deb http://www.beerorkid.com/automatix/apt dapper main or similar* to your sources.list. Fine but how do you do this?

Open a terminal (Applications, accessories, terminal) you should get a smallish window with [name@computername:~\\$](#) in the top left.

Type *sudo gedit /etc/apt/sources.list* – you will be asked for your password and then a new window should appear with a whole lot of text with things like:

```
## Uncomment the following two lines to fetch updated software from the network
deb http://archive.ubuntu.com/ubuntu dapper main restricted
deb-src http://archive.ubuntu.com/ubuntu dapper main restricted
```

So lets have a quick look at what we have done here. Opening a terminal is like going to the command prompt in windows. Sudo tells the system that you want to use Super User privileges i.e. like administrator hence the need for the password. gedit is the command to get and edit the following file. /etc/apt is the directory structure from the top level going down and sources.list is the name of the text file. Unfortunately, although you could have found this file by going to Places, computer, Filesystem, etc, apt you wouldn't have been able to edit it as you aren't logged on as superuser – this is normal for Linux and you might as well get used to it. Some of the lines in the text file tell Ubuntu where the various repositories are. If a line has # in front, then it is a comment and is ignored. You will see if you look, that many of the lines that look like repositories i.e. some ending in universe and multiverse are commented out. This is normal and you could add these repositories by simply deleting the # in front of each of these. This would in fact give you the repositories needed for most of the

software that you will need, but we are going to let Automatix do this for us. All you have to do is scroll down to the bottom and add

```
deb http://www.beerorkid.com/automatix/apt dapper main
```

then save and close sources.list

Next type in each of the following three lines one at a time with enter after each.

```
wget http://www.beerorkid.com/automatix/apt/key.gpg.asc  
gpg --import key.gpg.asc  
gpg --export --armor 521A9C7C | sudo apt-key add -
```

then

“sudo apt-get update” (this forces the system to update its list of software from the new repository list)

and finally

“sudo apt-get install automatix” (*apt-get install is the manual way of installing software*).

You should now find that under Applications, System Tools you now have Automatix. Click on this and the programme will run. Pick what you want from the list, but definitely eject CD, Numlock On, all codecs, Audacity and anything else that takes your fancy. The installation may take some time but it's worth it. You will be asked if it's OK for Automatix to overwrite your sources.list – say it's OK.

Well that's nearly it for setting up the basic system. You will now have many more software packages available in Synaptic. A couple of things to mention. Linux sound management is still a little odd. If you want to use something like Audacity, then you have to turn off your system sounds (System, Preferences, Sound and remove the tick from Play System Sounds). You may also need to turn up your Mic and Line faders. Double click on the speaker icon at the top right - or install Alsamixergui and do it from there.

One enhancement over windows that I wouldn't like to be without now is the multiple worktops. Look in the bottom right and you will see four grey squares. Each is a desktop. Open a document or similar and you should see something appear in the first little square. Lets say that you now want to go on line, but don't want to minimise or shut down the document, you can click on the second square and you get a clean

desktop to work on. Lets say now that you still have a web page open but want to check another site without loosing the existing one. Open the third desktop and work there. You can go back to any of your earlier desktops at any time.

You can drag any location (Home for example) or Programme onto the desktop for quick access.

Nicks Favourites

For CD burning	try	K3b
For playing music	try	XMMS
For playing DVD's	try	Xine
For recording music	try	Audacity
For DeskTop Publishing	try	Scribus
For any MS Office app	try equivalent OpenOffice.org application	
For photo editing	try	The Gimp
For Messaging	try	Gaim
For Video editing	try	Kino

You have built in software to set up a web server (apache), web databases (mysql) and web programming (PHP) and a web authoring tool Nvu. You can install Moodle Virtual Learning Environment and Edupress web logging and podcasting software.

Really there isn't much that you can't do with Ubuntu.

Some Useful Resources

<http://ubuntuguide.org/wiki/Dapper>

http://ubuntustudio.com/wiki/index.php/Welcome,_Musicians!

<http://www.alsa-project.org/documentation.php>

<http://www.ubuntuforums.org/>

<https://wiki.ubuntu.com/>

<http://www.132solutions.com/ubuntu.php>

and don't forget the Official Ubuntu Book which you will find in a folder called examples either on your desktop or in your home folder – look for book.toc. You also have lots of documentation under Help – either an icon on the top tool bar or under System.

Audio Streaming with Ubuntu

I have already shown in an earlier guide – “**Audio Streaming with dynebolic**” – how to set up a web radio using the dynebolic platform. Although this is an extremely easy way to get started, there were a number of problems doing it this way. In this guide I am going to show you how to do the same in Ubuntu as we did in dynebolic, but then I will show you some enhancements to overcome the shortcomings of Dynebolic. Initially we will just get the same software working in Ubuntu – namely icecast2 server and MuSE player and coder. I am working on the assumption that you have installed Ubuntu as in my guide “Installing Ubuntu” and have a working “always on” Broadband connection. It may also be worth trying the dynebolic method first so as to build up some familiarity with audio streaming.

Getting to know Icecast2

Icecast2 is a FOSS streaming server. This means that it takes a feed from a player/encoder such as MuSE and forwards it out onto the internet for others to connect to and listen to. The actual installation is relatively simple and you don't really need to know where it has been installed to – Ubuntu knows where it is. Once installed it is started from the command line in conjunction with a user defined configuration file. The magic is in the configuration file and we will spend a little time looking at this. Incidentally dynebolic uses a configuration file for Icecast2 just the same and it can be changed in the same way, but it may not be possible to save the new configuration when the PC is turned off. There is a basic config file included with the installation and we will tailor this to our own requirements. Lets install Icecast2 and have a look at this now.

Go to System, Administration, Synaptic Package Manager (use your normal password), click on search, search for icecast2, when it's found click in the little box, click mark for installation, apply and apply. That's the installation taken care of.

As we aren't going to make any changes at this stage we can look at the file merely by navigating to it and clicking on it. Go to Places, Computer, file system /usr/share/doc/icecast2 and click on icecast_minimal.xml.dist. You should see the following:

<!-- This config file contains a minimal set of configurable parameters, and mostly just contains the things you need to change. We created this for those who got scared away from the rather large and heavily commented icecast.xml.dist file. -->

```
<icecast>
  <limits>
    <sources>2</sources>
  </limits>
  <authentication>
    <source-password>hackme</source-password>
    <relay-password>hackme</relay-password>
    <admin-user>admin</admin-user>
    <admin-password>hackme</admin-password>
  </authentication>
  <directory>
    <yp-url-timeout>15</yp-url-timeout>
    <yp-url>http://dir.xiph.org/cgi-bin/yp-cgi</yp-url>
  </directory>
  <hostname>localhost</hostname>
  <listen-socket>
    <port>8000</port>
  </listen-socket>
  <fileserve>1</fileserve>
  <paths>
    <logdir>/var/log/icecast2</logdir>
    <webroot>/usr/share/icecast2/web</webroot>
    <adminroot>/usr/share/icecast2/admin</adminroot>
    <alias source="/" dest="/status.xml"/>
  </paths>
  <logging>
    <accesslog>access.log</accesslog>
    <errorlog>error.log</errorlog>
    <loglevel>3</loglevel> <!-- 4 Debug, 3 Info, 2 Warn, 1 Error -->
  </logging>
</icecast>
```

The file is separated into sections. Each section starts with a word that tries to describe what that section does and with < and > surrounding it e.g. <authentication> is where various passwords are held. Each section finishes with the same word but with / in front e.g. </authentication>. You could almost use this file as it is, with the password “hackme” (remember this from dynebolic?) but it would fail because the logdir needs setting to suit your system. In a while, we will customise a version of this file to suit our needs. The passwords and logdir will be changed and we will add some security. Also take note of the lines

```
<yp-url-timeout>15</yp-url-timeout> and
<yp-url>http://dir.xiph.org/cgi-bin/yp-cgi</yp-url>.
```

These give the location of the streaming radio directory that we are going to use later (there are a number of different ones of these).

The port – 8000 – is the port that people will listen on and if you have a firewall or router, needs to be opened.

The next section on setting up is based on a document written by Jason Faulkner of 123 Solutions

Jason published his work in the free PCMECH newsletter (www.pcmech.com) and also makes it available from his own website. <http://www.132solutions.com/ubuntu.php>

First we make a folder within our home folder to keep any icecast2 related work in.

In a terminal type:

```
mkdir ~/.icecast2
```

This will create a hidden folder in your home directory (the . in front of the name denotes it as hidden – to view hidden folders go to “view, show hidden files” and the ~ puts it in the home folder in your own user area. If, like me, you have problems using the ~ symbol, simply use /home/[your user name] instead, i.e. for me it is /home/nick/.icecast2)

Now to copy the default configuration file into the new folder type:

```
sudo cp /usr/share/doc/icecast2/icecast_minimal.xml.dist ~/.icecast2/icecast2_config.xml
```

you will be asked for your normal user password for sudo (remember superuser) and the file will be copied into the new folder with the name “icecast2_config.xml”. Remember this as you need it later when starting icecast2.

We now want to edit the config file to suit our own system and requirements.

1. In the <authentication> section change the three passwords to something else but not your normal system password.
2. In the <paths> section change the logdir to /home/[your user name]/.icecast2
3. In order to make the whole server more secure add the whole of the following section at the bottom between </logging> and </icecast> i.e. put your cursor at the end of </logging>, hit carriage return three times to make some space, bring the cursor back into the space that you have made and type the following as you see it:

```
<security>
  <chroot>0</chroot>
  <changeowner>
    <user>icecast2</user>
    <group>icecast</group>
  </changeowner>
</security>
```

you should now by now be able to see the start and finish of the various sections and maybe even make some guess as to what they do. These are all the changes that we are going to make for now. Anything else will be left for a more advanced user guide. This should give us what we need for a simple setup. And remember there is no magic in these changes, it is simply a text file so you can edit it just as you would any other text file, the changes aren't logged until you save it.

OK, do that now – save and exit the config file. We have now set up Icecast2 and when we are ready we will start it with the command “

```
sudo icecast2 -c ~/.icecast2/icecast2_config.xml
```

but not quite yet.

One last thing is to change the access permissions for the .icecast2 folder. In a terminal type:

```
sudo chmod -R 0777 ~/.icecast2
```

Next we will install MuSE

Installing MuSE

Now MuSE isn't in the Ubuntu repositories. If you were to look you would actually find muse, but this is a different programme completely – confusing or what. The Muse held in the repository is a midi/audio sequencer not unlike Cubase. The MuSE that we are going to use is a Multiple Streaming Engine written specifically for this purpose by the people who brought us dynebolic. As it isn't in a repository we can't use Synaptic, we are going to get it from the site concerned. In a browser go to <http://muse.dyne.org/?info=download> . You will see various options under things like sourcecode and TGZ etc. As Ubuntu is a derivative of the main Debian Linux distro, we can use the DEB option.

Click on the DEB package and when asked click the option to open with the Gdebi package installer. This will install the MuSE package – still pretty easy isn't it? If there wasn't a dedicated DEB package then we would have had to go down the lines of compiling and installing but even that isn't too difficult once you are comfortable with using the command line.

We don't have any configuration to do with MuSE, the only downside is that this version will only support Ogg Vorbis format and not MP3.

Getting your Audio ready for streaming

You need to make sure that you have some audio in Ogg format for the test. You probably won't have but if you have a music track in MP3 or Wav format then you can convert it using Audacity. If you only have music on audio CD then you need to rip it using Sound Juicer.

Audacity

Assuming that you have an MP3 track, open Audacity from the Applications, Sound and Video section. If you get a message saying that there is a problem with audio i/o then you probably still have the system sounds enabled. Go to System, Preferences, Sound and take the tick out of play system sounds. While you are there, ensure that you have the correct sound card selected. Some systems have an onboard sound card which is fairly low quality and a separate better quality card (like a Soundblaster Audigy). You may need to reboot after this in order for the changes to be recognised.

Once you have Audacity sorted, go to File, Open and choose your MP3 track from wherever you have stored it (CD, USB Stick, Home folder etc.). Once it has opened, go back to File and choose “Export as Ogg Vorbis”. If you have multiple tracks to convert, you can import additional tracks before doing the conversion by going to “Project, Import Audio”. You can then use “File, Export Multiple” to convert them all.

An alternative is to install mp32ogg

Sound Juicer

On my system Soundjuicer popped up as soon as I inserted an audio CD and after setting my profile to CD quality Ogg Vorbis (again there is no MP3 option) I had the choice of playing or extracting.

Of course you don't have to do all this audio stuff on your Linux system, you may already have the tools on your Windows system (the Windows Media Player v10 onwards does most of this and Cool Edit Pro or Adobe Audition will easily handle batch conversion) but that is using software that you have to pay for.

So, where are we up to? We have our broadband connection, we have our streaming server, we have our Streaming Engine and we have our Audio source. We are almost ready to go, but one thing that we are going to need is our Broadband IP address and also port forwarding if you have a router. I covered Port Forwarding in the earlier part of the paper “Streaming with dynebolic”. However here's a quick resumé.

When using a router like mine, you need to forward port 8000 to the machine that is doing the streaming or the router will block the connection. On my router the procedure is to set up a virtual server under NAT (Network Address Translation). This involves linking port 8000 to the internal IP address of the server machine for both UDP and TCP. In my case the server IP was 192.168.2.165. To find your machines internal IP address open a terminal in Linux and type ifconfig, in windows type ipconfig. You will have to check your own server documentation or search the web for help if you are in this situation as different manufacturers call this by different names. If however you use downloading programmes such as DC++ or various multiplayer gaming programmes then you will be familiar with this problem and will hopefully have already learned the process.

To find out your Broadband IP address, open a browser and go to <http://www.dslreports.com/whois>

Lets Get Streaming

Start the Icecast2 server by going to a terminal and typing:

```
sudo icecast2 -c ~/.icecast2/icecast2_config.xml
```

in the terminal window you should see

Changed groupid to 120.

Changed userid to 110.

or something similar

If you want further proof that the server is up and running open a browser and go to

<http://localhost:8000>

You should see a black ICECAST2 status screen.

Now to start MuSE, start a new terminal by going to “File, Open Tab” and in the new terminal tab, type “muse-streamer”. You should now have MuSE open.

- a) To add audio, rclick in the centre of this new window and choose “add file”, navigate to location of your audio files and choose one.
- b) Change single play to loop, highlight the track by clicking on it and click the > play button. You should now hear the music coming out of your PC speakers.
- c) Click the icon towards the top left of the streamtime window (looks a bit like a plug waiting to be inserted in the wall) – it's on the left of a bank of six icons. This should open a further window called icecast configuration. Unfortunately one of the limitations of this setup is that MuSE also only

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supports Ogg format. Type “[your password]” i.e. the one you set in the icecast2 config file, in the password box. Click “connect” in bottom left.

- d) If you are successful you should see “started streaming on <http://localhost:8000/live> “ or similar at the bottom of the STREAMTIME window. You are now streaming.

This is as much as you can do to check if things are working with only the one machine due to the limitations of the Linux sound architecture. However if you have more than one PC at home you can use a music player such as winamp or windows media player (on a windows machine) or XMMS on another Linux machine to open a location (or URL).

To check if you are up and running, you can go to a second PC and open Winamp (or on Linux XMMS) and open (play) a location (or URL).

add the location in the following format –

`http://{ip address of streaming computer on local network}:8000/live.ogg`

To find your ip address open a terminal and in windows type ipconfig or in Linux ifconfig.

My machine was 192.169.2.182, so I typed <http://192.168.2.182:8000/live.ogg>.

After a few seconds the stream should start playing albeit slightly delayed from the original. If this is all OK, then you can substitute your local ip address with the ip address of your broadband connection (to find this, open a browser and go to <http://www.dslreports.com/whois>) and you should again hear the stream. If so, then you can access your audio from any web connected machine anywhere in the world as long as they have a suitable player. If you have a friend handy, give them a ring and ask them to try.

If you have a microphone connected you can also add this to the live mix by clicking on the microphone icon in MuSE.

PROBLEMS

Well you still have some of the problems that we had with dynebolic. Mainly though the stream doesn't show up in the Icecast directories so no-one will be able to find your web radio unless they know your IP address. This setup is fine however if you want to for example listen to your music yourself while you are away from home. You can set a playlist going and then access it from a remote location. An enhancement to this is to access your home machine over the web using VNC and then you can change the selection remotely. This setup will make up one of my Practical Uses in a later paper. Also you are limited to Ogg Vorbis although it may be possible to overcome this as the dynebolic system obviously has. That will have to wait for my “advanced user guide”

Using ICES2 to access icecast Streaming Server

We don't have to use MuSE as our streaming engine. The writers of icecast2 have given us their own streaming engine called ices2. Lets have a look at this. We need two additional packages: aumix-gtk and ices2. Go and install them using synaptic and then come back here.

One benefit of Ices2 is that it lets us publish our radio station in the icecast online directory. So that we know what we are dealing with, lets go and have a look at this. Open a browser and go to

<http://dir.xiph.org/index.php>

You should see a list of radio stations that are advertising in this particular directory (these are known as Yellow Pages or YP). When I just checked there were 264 stations to choose from but this varies as stations go on and off line. There is nothing to stop you broadcasting 24 hours a day, but you must be aware of copyright and performing standards issues. I don't propose to cover these here.

You'll see the term “now playing on /****.***” on each entry. This is where you click and is also the name that you have given to your stream or to be technical the “mount point”. In MuSE it is set by default as live.ogg but you can change this. You can also set your own station name and genre in the ices2 config file. Let's see how we use ices2.

Setting up ICES2

Unlike MuSE, ices2 doesn't have a graphical interface, it runs off another config file. You set your PC up so that ices2 automatically forwards anything that you can hear from your machine. The way it does this is by you setting your soundcard to record. To do this we use aumix (or audio mixer). If you installed it correctly then when you type aumix in a terminal you should get a graphical representation of your soundcard settings. Now this is where some complications might occur. Try it for yourself and lets see what happens. If you get a graphical display and you have a button under the record column next to record then you will probably be OK. When I first tried it, I didn't have this button as the graphics card was an old one and didn't support this function. If you have the button click on it and close aumix.

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Next make a directory for ices2

```
mkdir ~/.ices2
```

Copy the default ices2 configuration file to the new folder

```
sudo cp /usr/share/doc/ices2/examples/ices-alsa.xml ~/.ices2/ices2_config.xml
```

Now edit the config file

```
sudo gedit ~/.ices2/ices2_config.xml
```

Under metadata change the name genre and description to what you want for your station i.e.

```
<metadata>
  <name>Nicks Radio</name>
  <genre>Northern Soul</genre>
  <description>24 hours a day Northern Soul Standards</description>
  <url>http://mysite.org</url>
</metadata>
```

Don't worry about url at this stage.

Change the logpath to “/home/[your user name]/.ices2

Under the Input section change the Rate parameter to 44100

Under Instances change

password = the password you chose for icecast2

mount point = whatever you want in the format “/*****.ogg” i.e. /music.ogg or /live.ogg

samplerate = 44100

channels = 2

downmix = 0

in-rate = 44100

out-rate = 44100

Save the changes and close the config file.

Now change the permissions:

```
sudo chmod -R 0777 ~/.ices2
```

And finally start ices2 by typing

```
sudo ices2 ~/.ices2/ices2_config.xml
```

To see if you are up and running initially navigate to ~/.ices2/ices.log either from the command line with gedit or by going to your /home/[user name]/.ices2/ices.log and double clicking on it. The last line should say “stream /ices_instance_stream Connected to server:localhost:8000/*****.ogg”

You should now be able to find your radio station in the icecast yellow pages.

PROBLEMS with Ices2

1. As I've already mentioned, if your sound card is too old, you won't have the facility to record "what you hear".
2. As ices2 isn't graphical, it is more difficult to change things as they all have to be done in the config file, unlike MuSE. However I haven't found how to make MuSE connect to the Yellow Pages.
3. It is likely to take more messing with sound card settings to get a live audio feed mixed in with the music that is playing. There are at least three different graphical mixing displays and they don't always seem to give the same settings. You know about aumix. There is also double clicking on the loudspeaker icon at top right. A third way is to install "alsamixergui" and have a look at that. Unfortunately as I have already mentioned, the Linux sound system can sometimes be a problem and you may have to scour the user groups for more obscure problems. I have tried to cover the common ones however in this guide.
4. There are alternative source clients you can use such as [DarkIce](#), the [Oddcast plugin](#) or if your processing power is limited, [IceGenerator](#) which streams already encoded files. There are also other options for streaming audio servers, including [SHOUTcast](#), the [Darwin Streaming Server](#) and [VideoLAN](#). I don't propose to cover these in this article, but given what you have learned, you should be able give these alternatives a look.

Some Useful Resources

<http://www.gnuware.com/icecast/>

<http://www.icecast.org/docs/icecast-2.3.1/>

http://gentoo-wiki.com/HOWTO_Icecast_OGG_and_MP3_streaming

http://www.linuxdevcenter.com/pub/a/linux/2001/03/23/streaming_media.html?page=1

<http://forum.icecast.org/viewforum.php?f=8>

<http://yolinux.com/TUTORIALS/LinuxTutorialAudioStreaming.html>

<http://www.gnuware.com/icecast/unofficial/>

<http://www.daniweb.com/techtalkforums/thread6875.html>

<http://www.linux.ie/articles/streamingaudio.php>

<http://www.netsoc.ucd.ie/ldp/HOWTO/MP3-HOWTO-11.html>

<http://www.streaming suitcase.com/frame.html>

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Introduction to Streaming with Windows

In my earlier sections “Audio streaming with Dynebolic” and “Audio streaming with Ubuntu” I have shown how to set up a web radio using Free Open Source Software (FOSS) on a FOSS Operating system – namely dynebolic Linux and Ubuntu Linux. You may not be ready to go down this route or you may already have a working windows system and simply require the streaming software to work on windows. This can be done in a number of ways. Firstly I will summarise the ways that we have already covered in earlier guides. The actual process isn't a lot different in windows.

The process of streaming audio onto the internet needs two separate components. The part that actually serves the stream onto the internet is called the server and so far we have looked at Icecast2. There is an alternative called Shoutcast which is supplied by Nulsoft to work in conjunction with their media player Winamp. I purposely haven't given any instructions for setting up Shoutcast as I felt that Icecast gave all the functionality that we needed. Shoutcast is available for windows and Linux from <http://www.shoutcast.com/download/serve.phtml> and a comprehensive guide to installing and configuring Shoutcast is also included at that location. If you have followed my guides for setting up Icecast, then you won't have any difficulty with Shoutcast – it follows more or less the same steps. You may have noticed while we were configuring MuSE that there was an option to set the server type. We left it at Icecast2 but if you were using the Shoutcast server, this is where you would change it.

The second component is the Player/encoder. This feeds a coded stream to the server. So far we have seen:

- MuSE which can play audio tracks off the PC or take a live input from the sound card – or both, in either MP3 or OGG Vorbis format and send the stream to either Icecast2 or Shoutcast, but doesn't seem to be able to add the broadcast to the Yellow Pages streaming Directories.
- Ices2 which can handle MP3 or OGG Vorbis, does add the broadcast to the directories but will only work with Icecast2.

We are now going to install Icecast2 on windows and use two different methods to send the coded stream to Icecast2.

- Winamp with an Oddcast plug-in. This is similar to the second method above.
- Oddcast stand alone version. This is similar to the first method above.

All the software is freely available and free to download and use. If you wanted to use Shoutcast in place of Icecast2 this would also work

A Review of Icecast2

Icecast2 is a FOSS streaming server. This means that it takes a feed from a player/coder such as MuSE or Oddcast and forwards it out onto the internet for others to connect to and listen to. The actual installation is relatively simple in the windows tradition and the configuration is controlled from a config file which is virtually identical to the one used in Linux, also called Icecast.xml. Lets install Icecast2 now.

Download the file icecast2_win32_v2.3.1_setup.exe from www.icecast.org and install in using default settings.

This should give you an icon on your desktop called “Icecast Win32”.

Double click the icon and the icecast window should appear, with a red “stopped” sign.

You can access the configuration file from the menu bar.

As it happens though, this configuration will work as is, with the password “hackme” but you could change the password if you felt the need.

If you want the stream to appear in the Yellow Pages, you also need to delete the arrow symbols and dashes from before and after the <directory> entries under “<!-- uncomment this if you want directory listings -->”

This is basically all we need to do for a simple setup. **If you need more detailed setup information, there is a full set of instructions in the “icecast2 win32” folder within program files, in the “doc” folder.**

To start the server you simply click on “Start Server”. Once started you can hide the window down in the system tray.

Next we need to install either Winamp with the Oddcast plug in, or the Oddcast stand alone. The difference is that Oddcast stand alone requires an audio input from your sound card – and so is ideal for someone using a live mixing desk as you would find in a real Radio station. An input from an MP3 player or some other pre-recorded device would also be suitable. Conversely the Winamp setup will play music that you already have on your PC. Lets look at Oddcast standalone first.

Installing Oddcast Standalone

Oddcast standalone is available from www.orbitalgrooves.com/help?d=b&article=10 . This site also contains a comprehensive guide to installing and using Oddcast standalone. Download the file oddcatsv3 standalone 3.1.6 and also if you are going to use MP3 fromat the file lame_enc.dll. Double click on the install file and agree to the license. If you want MP3, put an extra tick in the lame for MP3 box. If you haven't already downloaded lame_enc.dll, you could do it now by clicking on yes. If you already have lame_enc.dll, click no and then close. You should now have an Oddcastv3 icon on your desktop. Copy the lame_enc.dll file into the Oddcastv3 folder in the programme files folder (go to My Computer, C: drive, Programme Files and it should be there).

Getting your Audio Input for streaming

For the purposes of testing, I simply connected a personal CD player to the audio input of my test PC. In my case it was a laptop which only has one input – the microphone input. A full PC will almost certainly have a mic and a line input so you have to ensure that you have the correct one selected in your PC mixing panel. Unfortunately I can't give explicit instructions on how to do this as there are many different types of sound card with different ways of managing the inputs, but basically it will be a case of going to Control Panel, Sounds and Audio devices, Audio tab and selecting “Sound Recording”. In alive setup, you would connect the output from your mixing desk and use the mixing desk to mix any music and voice signals.

Starting Oddcast

Now we are ready to start Oddcast. Double click on the desktop icon and you should get your oddcast window. Leave the metadata section empty and click on the Peak Meter section to enable it. If you have your recording input set up correctly you should now see left and right meter levels corresponding to your music. If the levels are constantly in the red, you need to reduce the input levels. Below the level meters are the soundcard and input choices. These have to match the choices that you made in windows i.e. microphone input.

The default password for the icecast2 server will need setting in Oddcast, so highlight the line under Encoder settings “Vorbis: Quality 0/Stereo/44100 etc” and right click on it to open up a menu with configure. Set the password to the same as your icecast2 server i.e. hackme. At this stage you shouldn't need to change anything else

Now click on Connect. You should be up and running.

Check it by going to another PC on your network and using a media player such as winamp for windows or XMMS for linux access a URL <http://192.168.2.182:8000/stream.ogg> where 192.168.2.182 is the local IP address of the streaming PC (this is found by opening a DOS terminal and typing ipconfig). If this works try replacing the local IP address with you external IP address. This can be found by opening an explorer window and going to <http://www.dslreports.com/ip> . If this works, fine. If not, you probably have a firewall problem or router port forwarding problem.

To find out your Broadband IP address, open a browser and go to <http://www.dslreports.com/whois>

To see if you are appearing in the Icecast yellow pages, go to the main icecast site and click on directory. You should find your stream listed. It may take a few minutes before the stream is added to the directory.

Using Winamp and the Oddcast Plugin

This configuration takes a little more setting up than the previous but allows music files to be played from the PC. We still use the existing Icecast2 server so there are no changes to be made here. Download and install the free winamp version from www.winamp.com and the oddcastv2 DSP for Winamp plugin from either browsing the winamp plugin section using search-word “streaming” or directly from www.oddsock.org/tools/oddcastv2_wa2/ . I used the Winamp lite version to avoid all the additional advertising etc. that comes with the larger versions. Once you have installed Winamp, you can install the plugin. You will be asked to download the windows media format distribution and the lame encoder. I said yes to both of these. The first went to a non-existent site and the second went to a German site. You will have to manually add the lame_enc.dll file that you downloaded earlier into the winamp folder in programme files in order to be able to use MP3 and I wouldn't bother with windows media but if you really feel the need, search for wmfdist.exe and install it. Next you open Winamp. I have had a glitch on a number of PC's where the main winamp window doesn't open. If this happens click on the desktop icon a second time. To add the plugin, go to the little icon at the top left of the winamp window that looks like a sine wave with a horizontal line – this is the winamp menu. Come down to Options and preferences, click on DSP/Effect – you should see the oddcast plugin. Click on it to select it and close the preferences window. You should now have the Oddcast DSP window with Connect, VU on/off and Config. Starting to look familiar? Click on Config. Choose Lame or Ogg for encoder type. Go to Server and change password to “hackme” or what ever you set in your icecast2 config. Change server type to Icecast2 (or shoutcast if you are testing that server). set the mountpoint to /live.mp3 or something similar. Start some music playing in winamp. start icecast2 server and finally click on “Connect” to connect oddcast. Simple isn't it?

If you are wanting to record from your sound card input, check the box in the server config section “Record from Windows Recording Device”

Review

We have now looked at a number of ways of getting audio to stream over the internet.

<i>Method</i>	<i>Pros</i>	<i>Cons</i>
Dynebolic version 1.4.1	Simple and works “out of the box”, no changes to hard drive, could be used for broadcasting Music from PC or from a Live mixing desk.	Doesn't transmit stream information to Yellow Pages (YP)
Ubuntu with MuSE	Enables the use of remote connection for picking your own tracks remotely	Involves the installation of a whole new operating system. Still no YP
Ubuntu with Ices2	As above but also transmits to YP streaming Directories.	Same problem with whole new operating system.
Windows with Oddcast standalone	Very easy to set up. Uses existing operating system. transmits YP	Only accepts input from sound card
Windows with Winamp and Oddcast plugin	Winamp is a very versatile media player with lots of support and additional plugins	Will only use Icecast YP if transmitting Ogg Vorbis format.

Which method you use may be dictated by your particular requirements for example I have decided on a number of test scenarios and each may need a different method – see chart

<i>scenario</i>	<i>method</i>
Set up a web radio with remote access so that I can change tracks remotely. This is for my personal use so doesn't require YP	Icecast2 on Ubuntu with Ices2
Set up a web radio to transmit local news for visually impaired people. Required YP and to run under windows as the person setting it up uses a screen magnification programme which is	Icecast2 on Windows with Winamp and Oddcast Plugin

<i>scenario</i>	<i>method</i>
only available under windows.	
Set up a web radio to transmit the output from the GYOML in a field project so that others can listen. YP not necessarily required	Dynebolic or Windows with Oddcast standalone
Set up a community web radio with Live broadcasting from an external mixer. Funds are limited and an Open Source solution would be preferred. Requires YP.	Ubuntu with Ices2 or if windows PC already available then Oddcast standalone

There will be a limit on the number of people who can simultaneously access a particular broadcast depending on the bandwidth of the server. In a situation where many are expected – as in a community radio – it may not be possible to cater for the required number from a home server. In this situation it may be necessary to pay a professional site to host your broadcast on their own Icecast2 server. This isn't covered in these guides, but once you have mastered the techniques shown here, it should be easy to see that all you need is the first component – the player/encoder on our local machine and enough bandwidth to send your stream to the professional icecast server. The connection details of the server are supplied by the server providers and are input to the player/encoder in place of the local server details.

Some Useful Resources

<http://forums.winamp.com/showthread.php?threadid=35635>

<http://www.orbitalgrooves.com/help.php?d=b&article=10>

<http://www.oddsock.org>

<http://www.gnuware.com/icecast/unofficial/>

<http://www.commedia.org.uk/about-cma/cmas-projects/ims/>

<http://www.devshed.com/c/a/Multimedia/Network-Radio-With-Icecast/>

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SUMMARY

This guide isn't definitive. There is much more to streaming audio than I have been able to cover. I have set out to initially get a simple setup working and then to look at some enhancements. Some of the things that I haven't covered but may be useful to someone are:

- Multiple streams – many of the player/encoders are capable of transmitting multiple streams at different rates or with different encoders.
 - Different Yellow Pages – I have concentrated primarily on the Icecast YP. This is limited in that it only hosts Ogg Vorbis transmissions not MP3. There are other yellow pages such as oddcast and these can all be set up in the icecast.xml file.
 - Shoutcast – this is an alternative to Icecast that may bear investigation. The setup process is very similar to Icecast.
 - Darkice – this is another alternative to Icecast.
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