

MEedia Server

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1 Background

I bought an *Asus Eee-PC 701 4G* in spring 2008 but I realised after some time it was too small to not be used "painfully", at least compared to my MacBook. Since noone is interested of buying that computer I wanted to create a media server of it. The disk space inside is only 4 gigabytes as well as the SD card, i.e. totally 8 gigabytes. However, that's not enough if you want to store music and films. So I bought a *Western Digital Extern HDD My Passport Essential 500GB* since it is small, quiet and does not require an external power source (it is USB-powered). The downside is that it is a bit more expensive than those larger in dimension.

As base system I went for Ubuntu Server since I am familiar with Ubuntu and I know how to set up most needed software.

2 Objective

Following the steps below will do mainly this:

- Allow connection to the server remotely using SSH and NFS.
- Install a terminal music player which will play through the soundcard of the Eee PC, i.e. locally, preferably connected to amplifier and speaker.
- Install OneSwarm so you can listen to streamed music via your browser and share files to your friends.

Since we create a server, we'll use the command line. Therefore lots of commands are given here, most often preceded by a dollar sign (\$). It is not meant to be typed, but indicates what has to be written in the console. Yeah, I guess you already knew that!

Also, my username is hans. Change where appropriate.

3 Hardware and System Setup

3.1 Install Ubuntu server

I installed using netboot installer and GRUB, since I had already a Linux distribution installed. Find appropriate version and look for files named `linux` and `initrd.gz` at this location: <http://cdimage.ubuntu.com/netboot/>

Install to harddrive (SSD). Just answer all questions, at the end I only checked the "Ubuntu Base Server" (or something like that, the first option in list).

I didn't have the external harddrive connected during install so I afterwards added it to `fstab` as `/media/Titan`. If unsure how it is done, the best way is to connect it before install and let the installer take care of it. The way I mounted it physically is shown in figure 1.



Figure 1: Front and backside of the Eee Pc with the external drive fixed with adhesive tape! Be careful to have good tape that will not let the drive fall off (which happened to me once!).

3.2 Sound

Install ALSA:

```
$ sudo apt-get install alsa-base alsa-utils alsa-tools libasound2
```

Running `lspci` gives:

```
Audio device: Intel Corporation 82801FB/FBM/FR/FW/FRW (ICH6 Family)
              High Definition Audio Controller (rev 04)
```

To make it work run

```
$ modprobe snd-hda-intel
```

```
$ asoundconf list
```

Names of available sound cards:

```
Intel
```

```
$ asoundconf set-default-card Intel
```

Test if sound does work with:

```
$ aplay -l
```

```
aplay: device_list:217: no soundcards found...
```

In this case it is not and may be solved by adding the user to the same group as those listed in `/dev/snd/`, probably `audio`. Fix with

```
$ sudo usermod -a -G audio hans
```

then logout and relogin. You should now be able to set volume with `alsamixer`.

4 Software

4.1 X Window Manager

OneSwarm currently requires *X* to run. *Fluxbox* is a small window manager.

```
$ sudo apt-get install xorg fluxbox
```

Start *X* with `startx`.

4.2 SSH (Remote Access)

Install the *SSH server* with:

```
$ sudo apt-get install openssh-server
```

If you do not want to be logged out automatically after inactivity, add the following to `/etc/ssh/sshd_config`:

```
KeepAlive yes
ClientAliveInterval 60
```

4.2.1 Automatic Login

Based on guide at <https://help.ubuntu.com/8.10/serverguide/C/openssh-server.html>. Generate the keys on remote machine (not server), from a terminal prompt enter:

```
ssh-keygen -t dsa
```

This will generate the keys using a DSA authentication identity of the user. During the process you will be prompted for a password. Simply hit Enter when prompted to create the key.

By default the public key is saved in the file `~/.ssh/id_dsa.pub`, while `~/.ssh/id_dsa` is the private key. Now copy the `id_dsa.pub` file to the remote host and appended it to `~/.ssh/authorized_key`:

```
cat id_dsa.pub >> .ssh/authorized_key
```

Finally, double check the permissions on the `authorized_key` file, only the authenticated user should have read and write permissions.

Uncomment line in `/etc/ssh/sshd_config`:

```
AuthorizedKeysFile      %h/.ssh/authorized_key
```

To disable login without this key, also change to this:

```
PasswordAuthentication no
```

It will now not be possible to login with a password as before, but only with these keys. Don't forget to restart the SSH server:

```
$ sudo /etc/init.d/ssh restart
```

4.2.2 Desktop-like Access

If you have *X* installed you can run it from another computer (similar to VNC) using

```
$ Xnest -geometry 800x600 :1 & DISPLAY=:1 ssh -X -Y -p 22
  USER@REMOTEIP /usr/bin/fluxbox
```

4.3 NFS

Based on <http://ubuntuforums.org/showthread.php?t=249889>, this will install an NFS server which gives better transfer speeds than mounting as SSH. In this case I'll use unfs3 since it can handle mappings of user id's, good if your user on local machine has different UID than that on the server. Install with:

```
$ sudo apt-get install unfs3 portmap
```

Add share to `/etc/exports`:

```
# Read-only for 192.168.1.1-255:
/media/Titan 192.168.1.0/24(ro,async,insecure,map_static=/etc/nfs/
  hikari.map)

# ro = read-only, rw = read-write (however, it does not seem to work
  from my Mac)
# 'insecure' for use with Mac OS X.
# static mapping of UID/GID from http://ubuntuforums.org/showthread.php?p=4387032#post4387032
```

Use `id username` to see username's UID and GID. Then set up file `/etc/nfs/hikari.map` with mappings:

```
# NFS UID and GID mapping for Hikari
#      remote  server
uid    501     1000
gid    20      1000
```

Restart server:

```
$ sudo /etc/init.d/unfs3 restart
```

5 Media Software

5.1 Music On Console

Install *Music On Console Player*:

```
$ sudo apt-get install moc
```

To start the player (including the server), run `mocp`.

This program plays the sound locally, i.e. through the speakers of the *Eee PC* or connect it to an amplifier. It plays FLAC, MP3, OGG and Wave. Information on how to convert AAC to playable format, read 7.3.

5.2 Stream Music

Enable "remote access" in *OneSwarm*, see section 6.2.

5.3 Streaming Video

Due to hardware limitations this may not work flawlessly.

Install VLC, FFMPEG and some codecs using

```
$ sudo apt-get install vlc ffmpeg libavcodec-unstripped-52
```

On server terminal, write

```
vlc --sout '#transcode{vcodec=mp4v,acodec=mpga,vb=800,ab=128,
deinterlace}:rtp{mux=ts,dst=192.168.1.2,sap,name=Video}' -I dummy
video.avi
```

On client machine (IP: 192.168.1.2), start VLC check the SAP announcements setting. Name "Video" will show up, click to start playing. However, it is streamed and pausing is not possible.

6 Sharing Software

6.1 Torrent

A small and text-based torrent software is *rTorrent*. Install by

```
$ sudo apt-get install rtorrent
```

User guide found at <http://libtorrent.rakshasa.no/wiki/RTorrentUserGuide>. When logged in to the server by SSH it is very convenient to use the program `screen`. It is then possible to initiate an rtorrent session, then log off (or perform other tasks) and let it continue. The command to use is

```
$ screen rtorrent
```

Hiding the "screen" is done by `Ctrl+a+d`. You may now disconnect the SSH session and resume it another time from any other computer. To resume the screen again, use

```
$ screen -r
```

6.2 OneSwarm

Download *OneSwarm*, current version is 0.6, from <http://oneswarm.cs.washington.edu/>. It requires *Java* and a browser, for example:

```
$ sudo apt-get install sun-java6-bin firefox
```

Set it up from within *X*, see 4.1.

It is possible to use the *X virtual frame buffer* which doesn't need to run *X.org*. The downside is that you can currently not add swarms manually (only automatically). But if you've set up remote access you can as always access your swarms. To install the *X virtual frame buffer*, run

```
$ sudo apt-get install xvfb
```

It is then possible to run OneSwarm from the terminal using

```
Xvfb :1 & env DISPLAY=:1 OneSwarm
```

Using *Xvfb* saves resources compared to using normal *X*. But if you need to manually add files, stop OneSwarm, start normal *X* with `startx`, open *Firefox* and then add files. Hopefully *OneSwarm* developers will implement functionality for adding files remotely soon.

7 Other Useful Information/Tools

7.1 Screen Backlight

Turn the backlight of the LCD on or off (NB: it will not turn on automatically by keyboard or mouse use!!):

```
$ sudo vbetool dpms on
$ sudo vbetool dpms off
```

7.2 Reduce Disk Writes

Make files written to `/tmp` only be in RAM instead, hence these will be lost when computer shutdowns or reboots. Add this line to `/etc/fstab`:

```
tmpfs      /tmp          tmpfs          defaults      0      0
```

7.2.1 Reduce writing of log-files

Reduce disk writes by putting the `/var/log` directory into RAM, and save it to disk only on halt or reboot, and eventually every n:th hour or so.

Add this line to `/etc/fstab`:

```
tmpfs      /var/log      tmpfs          defaults      0      0
```

Create the Upstart jobs `logsave` and `logload`, save to `/etc/event.d/`. `logsave` reads:

```
start on runlevel [06]
start on logsave
```

```
script
```

```
FILE=/var/log.tar.gz
cd /
if [ -f $FILE ]; then
    rm $FILE
fi
tar czf $FILE /var/log
```

```
end script
```

And `logload` reads:

```
start on runlevel 2
```

```
script
```

```
FILE=/var/log.tar.gz
cd /
tar xzf $FILE
```

```
end script
```

Eventually add command `initctl emit logsave` to `crontab` (see section 7.4 for information).
Reduce what is logged by editing `/etc/syslog.conf`.

To get a warning when the `/var/log` memory is full, put these lines in `/etc/bash.bashrc` which is run every time you log in:

```
PROCENT=$(df -h | grep /var/log | awk '{print $5}' | cut -d "%" -f1 -
)
WARNLEVEL=80
if [ $PROCENT -gt $WARNLEVEL ]; then
echo "WARNING: /var/log is $PROCENT % full!!!"
fi
```

7.3 Convert Music

Following based on information from http://gimpel.gi.funpic.de/wiki/index.php?title=Howto:convert_aac/mp4_to_wav/mp3/ogg_on_Linux.

7.3.1 AAC/M4A to MP3

Install `faad` (read AAC-files) and `lame` (MP3-converter) with the following command:

```
$ sudo apt-get install faad lame
```

Now convert files with

```
$ faad --quiet -o - inputfile.m4a | lame --quiet - outputfile.mp3
```

To convert many files at once, use this script:

```
#!/bin/bash
# Script to convert AAC/M4A to MP3-files since my version of MOC
# cannot
# play those files. It uses 'faad' to read the music stream and 'lame'
# to convert to MP3.
#
# Created by Hans, 2009-08-11.

# Define temporary file:
INFOFILE=infofile.tmp
REMOVE=true      # If true, remove after conversion

# Function to extract music information from a file:
function extract()
{
    grep $1 $INFOFILE | cut --delimiter=: -f2 | sed -e 's/^ //'
}

if [ $# -eq 0 ]; then
    echo "Usage: $0 file(s)"
    echo " -- or with 'find' --"
```



```

        echo " find -H . -name '*.m4a' -print0 | xargs -0 $0"
        exit 1
fi

# Loop through all files.
for FILE; do
    # Remove the extension:
    DIR=$(dirname "$FILE")
    F=$(basename "$FILE" .m4a)
    F=$(basename "$F" .aac)
    F=$DIR/$F

    # Write track information to the infofile (2&> redirects both
        stdout and stderr to file):
    faad -i "$FILE" 2&> $INFOFILE
    # Extract titles etc:
    TITLE=$(extract title)
    ARTIST=$(extract artist)
    #WRITER=$(extract writer)
    ALBUM=$(extract album)
    DATE=$(extract date)
    GENRE=$(extract genre)
    TRACK=$(extract track)

    echo "$FILE..."
    # Convert the song using faad and lame:
    faad --quiet -o - "$FILE" | lame --quiet -h --tt "$TITLE" --ta
        "$ARTIST" --tl "$ALBUM" --ty "$DATE" --tn "$TRACK" --tg "
        $GENRE" - "$F.mp3";

    # Remove the AAC-file:
    $REMOVE && rm "$FILE"
done

# Remove the temporary info file:
rm $INFOFILE

exit 0

```

7.4 Backup Script

The external disk is also used as backup of important files. Backups should according to Linux Standard Base (LSB) be stored at `/mnt/backup`. Therefore I made a soft link to the external disk. The following script is based on script found at <https://help.ubuntu.com/8.10/serverguide/C/backup-shellscripts.html> and is run once a day (in my case below at 23:45). Put

```
# m h dom mon dow    command
```

```
45 23 * * * /usr/local/bin/sysbackup.sh
```

in the crontab file (edit it by running `sudo crontab -e`). The script, `sysbackup.sh` follows below and the filename of the backup file will contain the name of the day, hence only the last 7 days will be stored.

```
#!/bin/sh
#####
#
# Backup to NFS mount script.
#
#####
# Script hämtat från https://help.ubuntu.com/8.10/serverguide/C/backup-shellscripts.html

# What to backup.
backup_files="/etc /boot /home /root /usr/local"

# Where to backup to.
dest="/mnt/backup"

# Create archive filename.
day=$(date +%A)
hostname=$(hostname -s)
archive_file="$hostname-$day.tgz"

# Print start status message.
echo "Backing up $backup_files to $dest/$archive_file"
date
echo

# Backup the files using tar.
tar czf $dest/$archive_file $backup_files

echo
echo "Done"
date

ls -lhL $dest

#####
## Testa arkiv med:
# tar -tzvf /mnt/backup/eee-chan-Monday.tgz
## Återställ filen /etc/hosts till /tmp:
# tar -xzvf /mnt/backup/eee-chan-Monday.tgz -C /tmp etc/hosts
## Återställ allt:
```

```
# cd /; sudo tar -xzvf /mnt/backup/eee-chan-Monday.tgz
```

7.5 Miscellaneous

lltag Music Tag Editor for console.