

# 浙江大学实验报告

专业：计算机科学与技术

姓名：卢心远

学号：3120103842

日期：2015/3/20

地点：略

课程名称：嵌入式系统 指导老师：翁恺

实验名称：assignment 3: NAS

## 一、实验目的和要求（必填）

本实验要求把我们的 Acacia 或 RPi 或 WRTnode 变成一台 NAS 服务器，能接一个 SATA 或 USB 硬盘，实现 Samba、DLNA 和 sftp 访问。

## 二、实验内容和原理（必填）

我们分别安装 samba，minidlna，然后从 pc 进行连接。

## 三、主要仪器设备（必填）

Macbook Pro, Mac OS X 10.10 1 台

树莓派 1 台

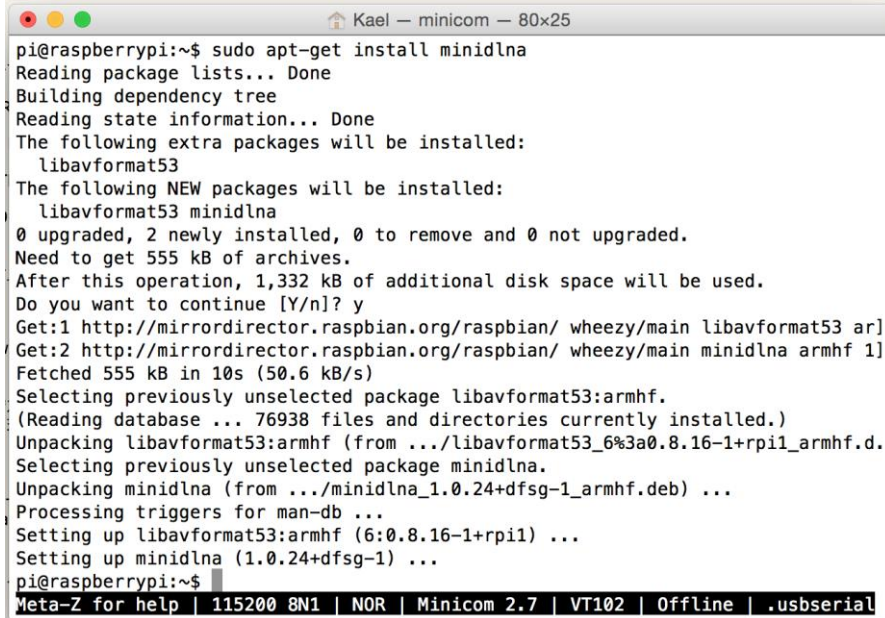
无线网卡 1 个

## 四、操作方法和实验步骤

1. 连接树莓派；
2. 执行配置安装；
3. 进行 pc 连接测试；
4. 撰写实验报告。

## 五、实验数据记录和处理

首先，我们安装需要的 minidlina:



```
pi@raspberrypi:~$ sudo apt-get install minidlina
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  libavformat53
The following NEW packages will be installed:
  libavformat53 minidlina
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 555 kB of archives.
After this operation, 1,332 kB of additional disk space will be used.
Do you want to continue [Y/n]? y
Get:1 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libavformat53 ar]
Get:2 http://mirrordirector.raspbian.org/raspbian/ wheezy/main minidlina armhf 1]
Fetched 555 kB in 10s (50.6 kB/s)
Selecting previously unselected package libavformat53:armhf.
(Reading database ... 76938 files and directories currently installed.)
Unpacking libavformat53:armhf (from .../libavformat53_6%3a0.8.16-1+rpil_armhf.d.
Selecting previously unselected package minidlina.
Unpacking minidlina (from .../minidlina_1.0.24+dfsg-1_armhf.deb) ...
Processing triggers for man-db ...
Setting up libavformat53:armhf (6:0.8.16-1+rpil) ...
Setting up minidlina (1.0.24+dfsg-1) ...
pi@raspberrypi:~$
```

Meta-Z for help | 115200 8N1 | NOR | Minicom 2.7 | VT102 | Offline | .usbserial

然后是 samba:

```
Kael — minicom — 80x34
Fetched 7,120 kB in 6min 50s (17.4 kB/s)
Reading package lists... Done
pi@raspberrypi:~$ sudo apt-get install samba
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  libwbclient0 samba-common smbclient tdb-tools
Suggested packages:
  openbsd-inetd inet-superserver smbldap-tools ldb-tools ctdb
Recommended packages:
  samba-common-bin
The following NEW packages will be installed:
  samba tdb-tools
The following packages will be upgraded:
  libwbclient0 samba-common smbclient
3 upgraded, 2 newly installed, 0 to remove and 33 not upgraded.
Need to get 8,153 kB/8,179 kB of archives.
After this operation, 20.2 MB of additional disk space will be used.
Do you want to continue [Y/n]? y
Get:1 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libwbclient0 arm]
Get:2 http://mirrordirector.raspbian.org/raspbian/ wheezy/main smbclient armhf ]
Get:3 http://mirrordirector.raspbian.org/raspbian/ wheezy/main samba-common all]
Get:4 http://mirrordirector.raspbian.org/raspbian/ wheezy/main samba armhf 2:3.]
Fetched 8,153 kB in 2min 31s (53.8 kB/s)
Preconfiguring packages ...
(Reading database ... 76960 files and directories currently installed.)
Preparing to replace libwbclient0:armhf 2:3.6.6-6+deb7u4 (using ../libwbclient.
Unpacking replacement libwbclient0:armhf ...
Preparing to replace smbclient 2:3.6.6-6+deb7u4 (using ../smbclient_2%3a3.6.6-.
Unpacking replacement smbclient ...
Preparing to replace samba-common 2:3.6.6-6+deb7u4 (using ../samba-common_2%3a.
Unpacking replacement samba-common ...
Selecting previously unselected package samba.
```

结果发现 samba 很多命令行的命令不能用，我安装了以下两个 common-bin 库：

```
Kael — minicom — 110x34
a-common-binpi:/usr/share/bash-completion/completions$ sudo apt-get install samb
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  samba-common-bin
0 upgraded, 1 newly installed, 0 to remove and 33 not upgraded.
Need to get 2,737 kB of archives.
After this operation, 15.9 MB of additional disk space will be used.
Get:1 http://mirrordirector.raspbian.org/raspbian/ wheezy/main samba-common-bin armhf 2:3.6.6-6+deb7u5 [2,737]
14% [1 samba-common-bin 390 kB/2,737 kB 14%] 46.4 kB/s 50s
```

和

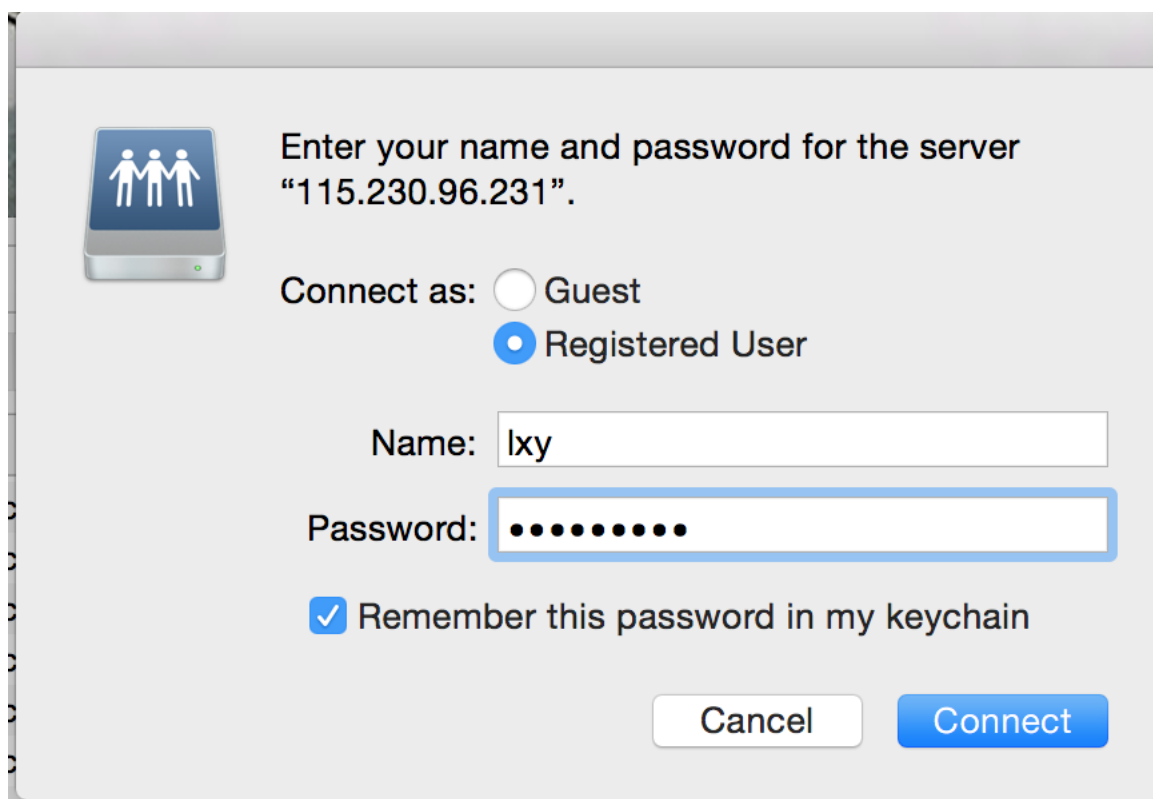
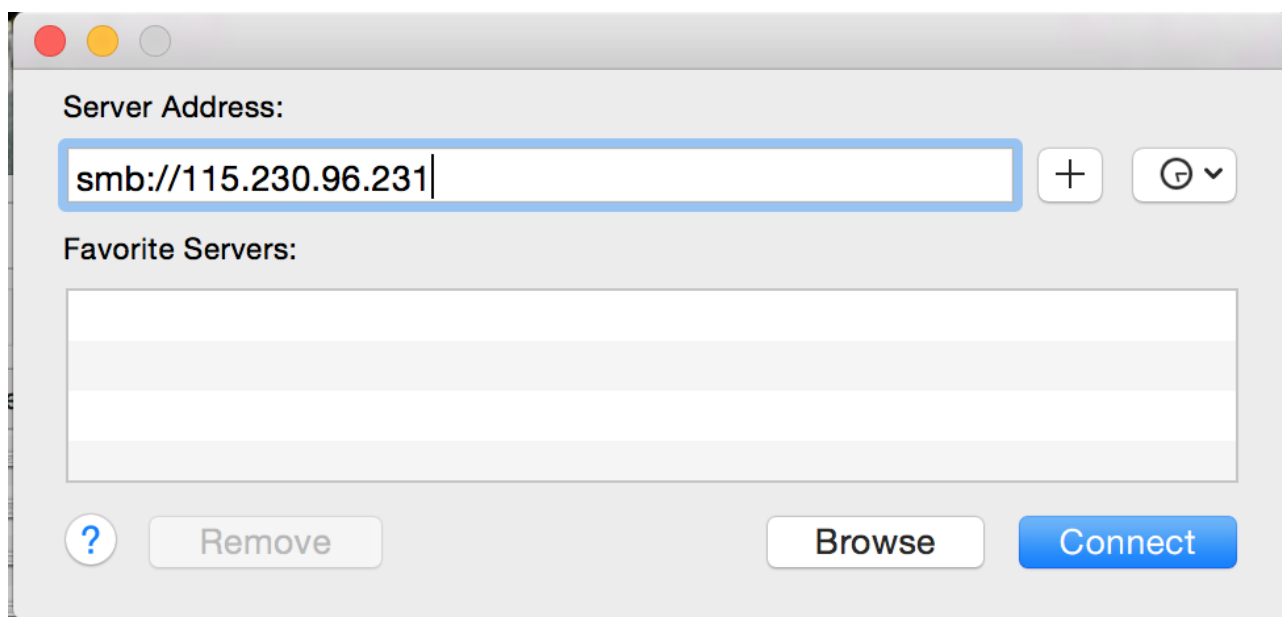
```
pi@raspberrypi:/etc/samba$ sudo apt-get install samba4-common-bin
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following extra packages will be installed:
  libasn1-8-heimdal libdcerpc0 libgensec0 libgssapi3-heimdal
  libhcrypto4-heimdal libhdb9-heimdal libheimbase1-heimdal
  libheimntlm0-heimdal libhx509-5-heimdal libkrb5-26-heimdal libldb1
  libndr-standard0 libndr0 libregistry0 libroken18-heimdal
  libsamba-credentials0 libsamba-hostconfig0 libsamba-policy0 libsamba-util0
  libsamdb0 libsmbclient-raw0 libtevent0 libwind0-heimdal python-ldb
  python-samba python-talloc python-tdb samba-dsdb-modules
The following NEW packages will be installed:
  libasn1-8-heimdal libdcerpc0 libgensec0 libgssapi3-heimdal
  libhcrypto4-heimdal libhdb9-heimdal libheimbase1-heimdal
  libheimntlm0-heimdal libhx509-5-heimdal libkrb5-26-heimdal libldb1
  libndr-standard0 libndr0 libregistry0 libroken18-heimdal
  libsamba-credentials0 libsamba-hostconfig0 libsamba-policy0 libsamba-util0
  libsamdb0 libsmbclient-raw0 libtevent0 libwind0-heimdal python-ldb
  python-samba python-talloc python-tdb samba-dsdb-modules samba4-common-bin
0 upgraded, 29 newly installed, 0 to remove and 33 not upgraded.
Need to get 7,547 kB of archives.
After this operation, 24.0 MB of additional disk space will be used.
Do you want to continue [Y/n]? y
Get:1 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libroken18-heimd]
Get:2 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libasn1-8-heimda]
Get:3 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libhcrypto4-heim]
Get:4 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libheimbase1-hei]
Get:5 http://mirrordirector.raspbian.org/raspbian/ wheezy/main libwind0-heimdal]
```

可以使用各项命令了之后，我们开始配置 samba，新建 conf 文件，并且将映射文件夹设置为 /tmp:

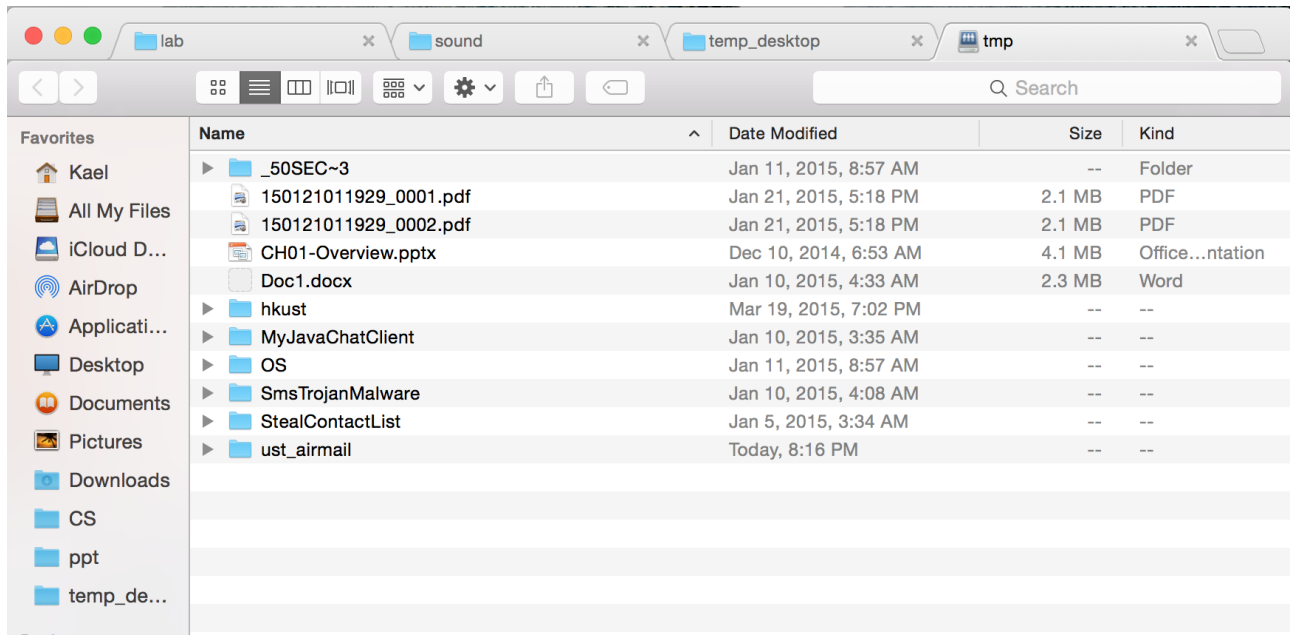
```
pi@raspberrypi:/etc/samba$ sudo mv smb.conf smb.conf.backup
pi@raspberrypi:/etc/samba$ sudo vi smb.conf
```



然后在 pc 上面访问，这里我用了 finder 中的访问站点的工具：



然后就可以看到 U 盘里面的文件了：



然后我们使用 sftp 进行访问，这个非常简单，在终端直接访问就好：

```
Kael — bash — 80x25
Last login: Wed Mar 25 12:27:09 on ttys000
Xinyuans-MacBook-Pro:~ Kael$ sftp lxy@115.230.96.231
The authenticity of host '115.230.96.231 (115.230.96.231)' can't be established.
RSA key fingerprint is b4:71:ad:7c:05:f6:ef:f9:92:23:50:1d:1f:ec:d1:0b.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '115.230.96.231' (RSA) to the list of known hosts.
lxy@115.230.96.231's password:
Permission denied, please try again.
lxy@115.230.96.231's password:
Permission denied, please try again.
lxy@115.230.96.231's password:
Connected to 115.230.96.231.
sftp> cd /tmp
sftp> ls
150121011929_0001.pdf      150121011929_0002.pdf      ??????
CH01-Overview.pptx      Doc1.docx                  MyJavaChatClient
OS                        SmsTrojanMalware           StealContactList
hkust                    ust_airmail
sftp> exit
Xinyuans-MacBook-Pro:~ Kael$
```



最后是 minidlna, 先配置:

```
pi@raspberrypi:~$ cd /etc/  
pi@raspberrypi:/etc$ sudo vi minidlna.conf
```

为了方便, 同样设置到了/tmp 下面:

```
# This option can be specified more than once if you want multiple directories  
# scanned.  
#  
# If you want to restrict a media_dir to a specific content type, you can  
# prepend the directory name with a letter representing the type (A, P or V),  
# followed by a comma, as so:  
# * "A" for audio      (eg. media_dir=A,/var/lib/minidlna/music)  
# * "P" for pictures  (eg. media_dir=P,/var/lib/minidlna/pictures)  
# * "V" for video     (eg. media_dir=V,/var/lib/minidlna/videos)  
#  
# WARNING: After changing this option, you need to rebuild the database. Either  
#           run minidlna with the '-R' option, or delete the 'files.db' file  
#           from the db_dir directory (see below).  
#           On Debian, you can run, as root, 'service minidlna force-reload' instt  
ead.  
media_dir=/tmp  
  
# Path to the directory that should hold the database and album art cache.  
#db_dir=/var/lib/minidlna  
  
# Path to the directory that should hold the log file.  
#log_dir=/var/log
```

然后更新:

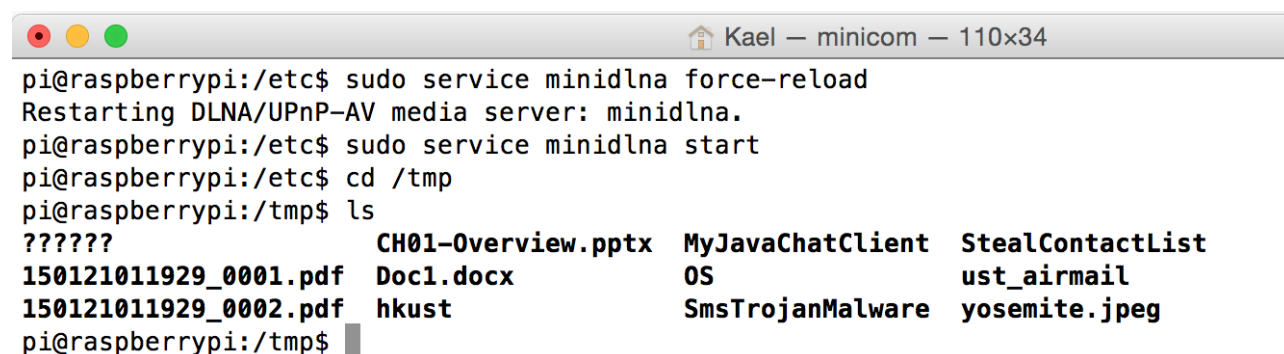
```
pi@raspberrypi:/etc$ sudo /etc/init.d/minidlna force-reload  
Restarting DLNA/UPnP-AV media server: minidlna.  
pi@raspberrypi:/etc$
```



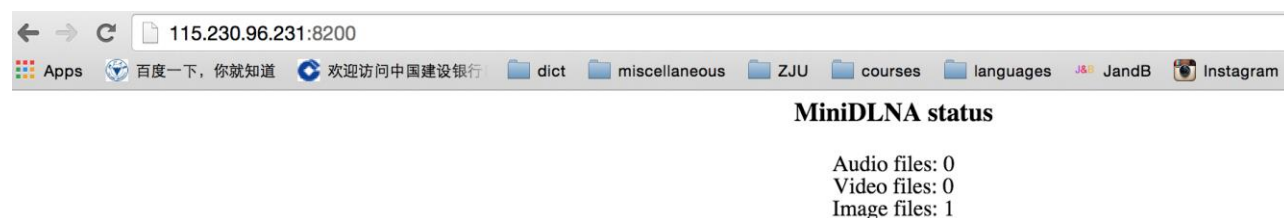
然后启动，访问（由于现在 U 盘没有放入任何图像视频，所以都是 0）：



然后我们在 U 盘里面拷入一个图片文件 `yosemite.jpeg` 并重新挂载：



再次访问就有了一个图像文件：



值得说明的是，由于 mac 和 iphone 使用的是自家的封闭 itunes 服务，不能使用原生应用直接更进一步的文件管理，不过，现在我们至少完成了“访问”这个要求，虽有些遗憾但也还差强人意了。

## 六、实验结果与分析（必填）

从实验过程的记录可以看出，按照实验要求完成了本次实验。

## 七、讨论、心得

本次实验让我了解到嵌入式设备有多么的强大，使用它可以做终端，服务器，还可以做硬盘。给我留下了很深刻的印象。