
From PmWiki

Main: PowerPMAC

Setting up Network and NTP and adding packages

Setup network interface and PMAC hostname:

```
mount -o remount,rw /
mount -o remount,rw /opt
```

```
### Setup network interface (replace with your PowerPMAC IP address/gateway/netmask as needed):
nano /etc/network/interfaces
```

```
auto eth0
iface eth0 inet static
address 192.168.1.64
netmask 255.255.255.0
gateway 192.168.1.9
```

```
### Setup DNS resolution (replace with your domain data and DNS server as needed):
nano /etc/resolv.conf
```

```
domain gmca.aps.anl.gov
search gmca.aps.anl.gov
nameserver 164.54.103.240
```

```
### Provide name of your PMAC instead of pmac1
nano /etc/hostname
pmac1
```

Setup ntp (use your NTP servers instead of the ones below):

```
nano /etc/ntp.conf
server 192.168.1.9 iburst dynamic
#server s23dserv-vm.gmca.aps.anl.gov iburst dynamic
#server ntp1.xray.aps.anl.gov iburst dynamic
#server ntp2.xray.aps.anl.gov iburst dynamic
```

For the above to work, enable NTP broadcasting on 192.168.1.9 (on the blXupper servers):

```
broadcast 192.168.1.0 mask 255.255.255.0
```

Set timezone (use your timezone if differs from US Central):

```
mv /etc/localtime /etc/localtime.orig
ln -s /usr/share/zoneinfo/US/Central /etc/localtime
cp -p /.readonly/etc-tmpfs-mirror/localtime.orig /.readonly/etc/
cp -pP /.readonly/etc-tmpfs-mirror/localtime /.readonly/etc/
```

Set locale:

```
nano /etc/default/locale
LC_ALL=C.UTF-8

cp -p /.readonly/etc-tmpfs-mirror/default/locale /.readonly/etc/default/
```

Add the "ll" alias for convenience:

```
nano /etc/bash.bashrc
alias ll='ls -alF --group-directories-first'

cp -p /.readonly/etc-tmpfs-mirror/bash.bashrc          /.readonly/etc/
```

Download and install some needed packages:

```
cd /; mkdir .deb; cd .deb
wget http://archive.debian.org/debian/pool/main/d/debian-archive-keyring/debian-archive-keyring_2017.5~deb8u1_all.deb

dpkg --install ./debian-archive-keyring_2017.5~deb8u1_all.deb
cp -p /.readonly/etc-tmpfs-mirror/apt/trusted.gpg.d/*      /.readonly/etc/apt/trusted.gpg.d/
```

Setup apt-get:

(ATTENTION: may not work on the APS network; use the Video network behind a proxy server)

```
nano /etc/apt/sources.list
deb http://archive.debian.org/debian/          jessie          main non-free contrib
deb http://archive.debian.org/debian-security/ jessie/updates main non-free contrib

### This is for bypassing the firewall proxy which may block old user agents:
nano /etc/apt/apt.conf.d/30proxy
### Note the Mozilla version keeps changing and needs to be updated to match current/recent Firefox
### by searching for "show my useragent"
Acquire::http::User-Agent "Mozilla/5.0 (X11; Ubuntu; Linux x86; rv:123.0) Gecko/20100101 Firefox/123.0";

cp -p /.readonly/etc-tmpfs-mirror/apt/sources.list      /.readonly/etc/apt/
cp -p /.readonly/etc-tmpfs-mirror/apt/apt.conf.d/30proxy /.readonly/etc/apt/apt.conf.d/

### Even the latest 2017.5 keyring which we setup above manually has expired and
### there is no newer one available. So, we need to use one of these two options
### (we chose option-2):
1. Manual installation. Download and unpack:
http://archive.debian.org/debian/dists/jessie/main/binary-armhf/Packages.gz
Then, look for the download path to needed package in Packages.
2. Temporarily change the date to the time when the 2017.5 keyring was valid:
service ntp stop
date --set 2020-01-01
### Udev is not upgradable (fails to upgrade with current kernel
apt-mark hold udev
### The hold command is not preserved after rebooting, better use pin:
nano /etc/apt/preferences.d/10-hold-udev
Package: udev
Pin: origin ""
Pin-Priority: -1
cp -p /.readonly/etc-tmpfs-mirror/apt/preferences.d/10-hold-udev /.readonly/etc/apt/preferences.d/
### Now run the upgrade:
apt-get update
apt-get upgrade
### Upgrade installs gcc-4.9. Keep old gcc-4.6 just in case it is needed by PPMAC:
### (the autoremove option is offered; the command below forces manual install)
apt-get install cpp-4.6 gcc-4.6 libmpc2
### Install some packages kept back:
apt-get install wget openssh-client openssh-server
apt-get install aptitude aptitude-common rsyslog
### Install additional packages which we need:
apt-get install ntp screen less libopts25 mc re2c bind9-host

mv /var/cache/apt/archives/*.deb /.deb/

cp -p /.readonly/etc-tmpfs-mirror/screenrc          /.readonly/etc/
cp -p /.readonly/etc-tmpfs-mirror/init.d/screen-cleanup /.readonly/etc/init.d/
cp -pP /.readonly/etc-tmpfs-mirror/rcS.d/S14screen-cleanup /.readonly/etc/rcS.d/
cp -rp /.readonly/etc-tmpfs-mirror/mc                /.readonly/etc/
cp -rp /.readonly/var-tmpfs-mirror/lib/dpkg/status*    /.readonly/var/lib/dpkg/
cp -rp /.readonly/var-tmpfs-mirror/lib/dpkg/info       /.readonly/var/lib/dpkg/

service ntp start
```

Start ntp and check the date:

```
service ntp restart
date
```

Since ntp fails to autostart at Debian boot, add it to crontab:

```
nano /etc/crontab
@reboot    root    sleep 30 && /usr/sbin/service ntp restart

cp -p /.readonly/etc-tmpfs-mirror/crontab          /.readonly/etc/
```

Allow Cron to run at Debian boot for current runlevel:

```
cd /etc/rc3.d
ln -s ../init.d/cron ./S89cron
cp -pP /.readonly/etc-tmpfs-mirror/rc3.d/S89cron /.readonly/etc/rc3.d/
```

Setup rsyslog (optional)

```
nano /etc/default/rsyslog

### Sergey: this version of rsyslog does not support the -c5 option
# RSYSLOGD_OPTIONS="-c5"
RSYSLOGD_OPTIONS="-x"
^X

cp -p /.readonly/etc-tmpfs-mirror/default/rsyslog /.readonly/etc/default/
```

Setup hosts (optional, for convenience)

```
nano /etc/hosts

192.168.1.9      upper
192.168.1.10    keithley
192.168.1.12    ws2
192.168.1.13    ws3
192.168.1.16    ws6
192.168.1.30    bkp
192.168.1.63    pmac1
192.168.1.64    pmac2
164.54.103.25   px0
164.54.103.18   sergey
```

Copy the changed files to the master location:

```
cp -p /.readonly/etc-tmpfs-mirror/network/interfaces /.readonly/etc/network/
cp -p /.readonly/etc-tmpfs-mirror/resolv.conf         /.readonly/etc/
cp -p /.readonly/etc-tmpfs-mirror/hostname            /.readonly/etc/
cp -p /.readonly/etc-tmpfs-mirror/hosts               /.readonly/etc/
```

NOTE: If the above files also exist in opt/etc/ (/opt/vfat/etc/), they may override the above settings. Therefore, delete them:

```
mount -o remount,rw /opt/vfat
rm /opt/vfat/etc/hostname
rm /opt/vfat/etc/network/interfaces
mount -o remount,ro /opt/vfat
```

Finally copy everything to the master location in order to preserve your changes:

```
cp -p /.readonly/etc-tmpfs-mirror/crontab          /.readonly/etc/
cp -p /.readonly/etc-tmpfs-mirror/passwd           /.readonly/etc/
cp -p /.readonly/etc-tmpfs-mirror/shadow           /.readonly/etc/
cp -p /.readonly/etc-tmpfs-mirror/ntp.conf          /.readonly/etc/
cp -p /.readonly/etc-tmpfs-mirror/init.d/ntp        /.readonly/etc/init.d/

ln -s /.readonly/etc-tmpfs-mirror/init.d/ntp        /.readonly/etc-tmpfs-mirror/rcS.d/S23ntp
mv /.readonly/etc-tmpfs-mirror/rc2.d/S12ntp         /.readonly/etc-tmpfs-mirror/rc2.d/S23ntp
mv /.readonly/etc-tmpfs-mirror/rc3.d/S12ntp         /.readonly/etc-tmpfs-mirror/rc3.d/S23ntp
mv /.readonly/etc-tmpfs-mirror/rc4.d/S12ntp         /.readonly/etc-tmpfs-mirror/rc4.d/S23ntp
```

```
mv /.readonly/etc-tmpfs-mirror/rc5.d/S12ntp /.readonly/etc-tmpfs-mirror/rc5.d/S23ntp

cp -pP /.readonly/etc-tmpfs-mirror/rc5.d/S23ntp /.readonly/etc/rc5.d/
cp -pP /.readonly/etc-tmpfs-mirror/rc2.d/S23ntp /.readonly/etc/rc2.d/
cp -pP /.readonly/etc-tmpfs-mirror/rc3.d/S23ntp /.readonly/etc/rc3.d/
cp -pP /.readonly/etc-tmpfs-mirror/rc4.d/S23ntp /.readonly/etc/rc4.d/
cp -pP /.readonly/etc-tmpfs-mirror/rc5.d/S23ntp /.readonly/etc/rc5.d/

cp -p /.readonly/etc-tmpfs-mirror/default/ntp /.readonly/etc/default/
cp -p /.readonly/etc-tmpfs-mirror/cron.daily/ntp /.readonly/etc/cron.daily/
cp -p /.readonly/etc-tmpfs-mirror/dhcp/dhclient-exit-hooks.d/ntp /.readonly/etc/dhcp/dhclient-exit-hooks.d/
```

Disable rw on the root filesystem:

```
mount -o remount,ro /
```

Setting up passwordless ssh access

```
ssh root@pmac1
cd /root/.ssh
mount -o remount,rw /
scp -p gmca@192.168.1.12:.ssh/id_rsa.pub /root/.ssh/authorized_keys
chmod go-rw /root/.ssh/authorized_keys
cp -p /.readonly/root-tmpfs-mirror/.ssh/authorized_keys /.readonly/root/.ssh/
cp -p /.readonly/root-tmpfs-mirror/.Xauthority /.readonly/root/
chmod go-w /root
nano /etc/crontab
@reboot root sleep 10 && chmod go-w /root
cp -p /.readonly/etc-tmpfs-mirror/crontab /.readonly/etc/
mount -o remount,ro /
```

You may also need to enable ssh-rsa for public keys in /etc/ssh/ssh_config.d/rsa_enable.conf on ws2 or another client:

```
nano /etc/ssh/ssh_config.d/rsa_enable.conf
HostKeyAlgorithms +ssh-rsa,ssh-dss
PubkeyAcceptedKeyTypes +ssh-rsa
```

Setting EPICS path and environment

Edit /usr/local/epics/base/startup/Site.profile and set there EPICS_HOST_ARCH and add EPICS base to the system path. Then make a link to this file from /etc/profile.d:

```
nano /etc/bash.bashrc
if [ -e /usr/local/epics/base/startup/Site.profile ]; then
    source /usr/local/epics/base/startup/Site.profile
fi
cp -p /.readonly/etc-tmpfs-mirror/bash.bashrc /.readonly/etc/
```

Setting up PPMAC IOC autostart in screen

```
mount -o remount,rw /opt
nano /opt/epics/start_ppmac_ioc.sh
```

Content:

```
#!/bin/bash
IOCDIR=/opt/epics/ppmac-1-0/iocBoot/iocppmac
if [ -z "$(ps -ef | grep '/st.cmd' | grep -v grep)" ]; then
    echo "Starting PPMAC IOC in $IOCDIR"
    /usr/bin/screen -d -m -h 5120 -S ppmac_ioc bash -c "cd $IOCDIR; ./st.cmd; \
        read -rsp '$Press any key to close...\n' -n1 key"
else
    echo "PPMAC IOC is already running."
    LIST=$(screen -list | grep -v " Socket\|^There \|^[:space:]]*$")
    if [ -n "$LIST" ]; then echo -e "$LIST"; screen -R; fi
fi

chmod a+x /opt/epics/start_ppmac_ioc.sh
mount -o remount,ro /opt
mount -o remount,rw /
```

```
nano /etc/crontab
@reboot    root    sleep 35 && /opt/epics/start_ppmac_ioc.sh

cp -p /.readonly/etc-tmpfs-mirror/crontab      /.readonly/etc/
cd /usr/local/bin
ln -s /opt/epics/start_ppmac_ioc.sh .
ln -s start_ppmac_ioc.sh ioc
mount -o remount,ro /
```

Using external flash drive as /opt/epics

```
fdisk -l
fdisk /dev/sda
# Change the partition-1 (sda1) to Linux (83) and write to exit
mkfs -t ext4 /dev/sda1
nano /etc/fstab
/dev/sda1      /opt/epics      ext4      rw,noatime      0      1
^X
cp -p /.readonly/etc-tmpfs-mirror/fstab      /.readonly/etc/
cd /opt
mkdir epics2
mount /dev/sda1 /opt/epics2
cp -rpP /opt/epics/* /opt/epics2
umount /opt/epics2
rmdir /opt/epics2
mount /opt/epics
ssh-keygen -t rsa -b 4096
```

Setting up passwordless access to upper for uploading autosettings.sav

```
mount -o remount,rw /
# Make first-time connection to the host computer to add it to known hosts:
ssh gmca@upper
Are you sure you want to continue connecting (yes/no)? yes
^C
cp -p /.readonly/root-tmpfs-mirror/.ssh/known_hosts /.readonly/root/.ssh/

cd /root/.ssh
ssh-keygen -t ecdsa -b 384
cp -p /.readonly/root-tmpfs-mirror/.ssh/id_ecdsa* /.readonly/root/.ssh/
# If ssh-keygen fails to write the key, then first reboot pmac
# Copy the generated id_ecdsa.pub file to a host computer:
scp -p /root/.ssh/id_ecdsa.pub gmca@upper:./ssh/pmac_id_ecdsa.pub

# Setup cron job (uncomment depending on using pmac1 or pmac2)
nano /etc/crontab
# ---
### Run daily at 23:45 a backup of autosettings.sav
#45 23 * * * root scp -o StrictHostKeychecking=no -p \
/opt/epics/synApps/ppmac-1-0/iocBoot/iocppmac/autosave/auto_settings.sav \
gmca@upper:/mnt/software/pmac1_backup/.AUTOSAVE/auto_settings_$(date +"%Y-%m-%d_%H:%M:%S").sav
#45 23 * * * root scp -o StrictHostKeychecking=no -p \
/opt/epics/synApps/ppmac-1-0/iocBoot/iocppmac/autosave/auto_settings.sav \
gmca@upper:/mnt/software/pmac2_backup/.AUTOSAVE/auto_settings_$(date +"%Y-%m-%d_%H:%M:%S").sav
# ---
cp -p /.readonly/etc-tmpfs-mirror/crontab      /.readonly/etc/
service cron restart
mount -o remount,ro /

# Do corresponding changes on the host computer:
ssh gmca@upper
cd .ssh
cat pmac_id_ecdsa.pub >> authorized_keys
rm pmac_id_ecdsa.pub
```

Checking and repairing root filesystem

Contrary to a common sense, you can unmount the root filesystem and still run fsck:

```
cd /
umount /
```

```
fsck -p /  
reboot
```

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