Base Setup

OS installation

Download PI OS image and follow the image installation steps.

Enable ssh

In order to be able to remote ssh into the server edit the sshd configuration file. And set the following parameters:

```
# nano /etc/ssh/sshd_config
--------------------------

# Authentication:

LoginGraceTime 2m
AllowUsers root pi
PermitRootLogin yes
StrictModes yes
#MaxAuthTries 6
#MaxSessions 10


--------------------------
# systemctl restart ssh
```

SSD optimization

See chapter [SSD Optimization](#)

Locale

For setting up locales see section [Locale](#). On our Home server the configuration should be as follows:

```
# locale -a
--------------
C
C.UTF-8
dutch
en_US.utf8
nl_NL
```

```
nl_NL@euro
nl_NL.iso88591
nl_NL.iso885915@euro
nl_NL.utf8
POSIX

# cat /etc/default/locale
-------------------------

#  File generated by update-locale
LANG=en_US.UTF-8
LANGUAGE="en_US:en"
LC_TIME="nl_NL.UTF-8"
LC_NUMERIC="nl_NL.UTF-8"
LC_MONETARY="nl_NL.UTF-8"
LC_PAPER="nl_NL.UTF-8"
```

Missing Firmware

Not all needed device drivers might be included in the standard installation packages. After booting the new system check the syslog and look for errors and warnings.

```
# cat /var/log/syslog
```

Error loading i915 Firmware

```
[2.115280] i915 0000:00:02.0: firmware: failed to load
i915/kbl_dmc_ver1_04.bin (-2)
[2.115284] firmware_class: See https://wiki.debian.org/Firmware for
information about missing firmware
[2.115286] i915 0000:00:02.0: Direct firmware load for
i915/kbl_dmc_ver1_04.bin failed with error -2
[2.115288] i915 0000:00:02.0: Failed to load DMC firmware
i915/kbl_dmc_ver1_04.bin. Disabling runtime power management.
[2.115289] i915 0000:00:02.0: DMC firmware homepage:
https://git.kernel.org/pub/scm/linux/kernel/git/firmware/linux-firmware.git/
tree/i915
```

kbl_dmc_ver1_04.bin is part of Package: firmware-misc-nonfree. In order to avoid downloading package with all the firmwares. You can download tar.gz from https://git.kernel.org/pub/scm/linux/kernel/git/firmware/linux-firmware.git. Extract the kbl_dmc_ver1_04.bin from the correct version of the installation.

```
# cp kbl_dmc_ver1_04.bin /lib/firmware/i915
# reboot
```

```
After rebooting the result should look like:
```

```
[2.234768] i915 0000:00:02.0: vgaarb: changed VGA decodes:
olddecodes=io+mem,decodes=io+mem:owns=io+mem
[2.237413] i915 0000:00:02.0: firmware: direct-loading firmware
i915/kbl_dmc_ver1_04.bin
[2.237688] [drm] Finished loading DMC firmware i915/kbl_dmc_ver1_04.bin
(v1.4)
```

Error loading tl8168h-2 Firmware

```
[2.316705] r8169 0000:01:00.0: firmware: failed to load
rtl_nic/rtl8168h-2.fw (-2)
[2.316710] r8169 0000:01:00.0: Direct firmware load for
rtl_nic/rtl8168h-2.fw failed with error -2
[2.316711] r8169 0000:01:00.0 enp1s0: unable to load firmware patch
rtl_nic/rtl8168h-2.fw (-2)
[2.316884] Generic PHY r8169-100:00: attached PHY driver [Generic PHY]
(mii_bus:phy_addr=r8169-100:00, irq=IGNORE)
```

rtl8168h-2.fw is part of Package: firmware-misc-nonfree. In order to avoid downloading package with all the firmwares. You can download tar.gz from https://git.kernel.org/pub/scm/linux/kernel/git/firmware/linux-firmware.git. Extract the kbl_dmc_ver1_04.bin from the correct version of the installation.

```
 # cp rtl8168h-2.fw /lib/firmware/rtl_nic
 # reboot
```

After rebooting the result should look like:

```
[2.429213] r8169 0000:01:00.0: firmware: direct-loading firmware
rtl_nic/rtl8168h-2.fw
[2.429385] Generic PHY r8169-100:00: attached PHY driver [Generic PHY]
(mii_bus:phy_addr=r8169-100:00, irq=IGNORE)
```

SMART

Install smartmon tools and check the status:

```
# apt-get install smartmontools
# smartctl -a /dev/sda
```

Power Saving

- Disable the blinking cursor:Cursor blink off
- Configure PowerTop: Powertop
- Tune ASPM: ASPM on Linux

For ASPM enabling the following lines are added to the powersave service. However no noticable difference are measured:

```
# Enable L1 and L0s on PCIe Intel Bridge and Realtek network adapter
# Does not seem to differ anything
setpci -s 00:1c.0 0x50.B=0x43
setpci -s 01:00.0 0x80.B=0x43
```

Sensors

```
# apt-get install lm-sensors
```

The following NEW packages will be installed: libsensors4 lm-sensors

```
# sensors-detect


--------------------------------------------------------------------
    Trying family `VIA/Winbond/Nuvoton/Fintek'... Yes
    Found unknown chip with ID 0xd352
```

The chip is an exclusive for MSI, and Nuvoton can not give me the datasheet because of an NDA with MSI. The chip looks pretty similar to NCT6793D.

```
modprobe nct6775 force_id=0xd120
```

Now "sensors" will show more info.

To load everything that is needed, add this to /etc/modules:

```
# nano /etc/modules

#----cut here----
# Chip drivers
coretemp
#----cut here----
```

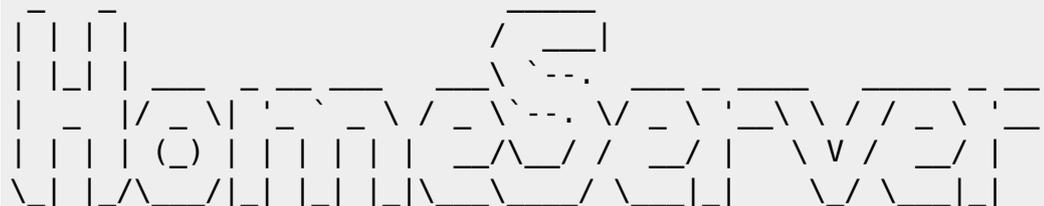Now "sensors" will show more info:

```
# sensors
acpitz-virtual-0
Adapter: Virtual device
temp1:         +27.8°C  (crit = +119.0°C)
temp2:         +29.8°C  (crit = +119.0°C)


coretemp-isa-0000
Adapter: ISA adapter
Physical id 0:  +40.0°C  (high = +80.0°C, crit = +100.0°C)
Core 0:        +40.0°C  (high = +80.0°C, crit = +100.0°C)
```

```
Core 1:          +37.0°C  (high = +80.0°C, crit = +100.0°C)
```

Set the Welcome Text

```
# nano /etc/motd

  _   _                          _____
 | | | |                        / ___|
 | |_| |___  _ __ ___    ___\ `--.  ___ _ __   _____ _ __
 |  _  |/ _ \| '_ ` _ \ / _ \`--. \/ _ \ '_\ \ / / _ \ '_|
 | | | | (_) | | | | | |  __/\__/ / _/ |   \ V / _/ |
 \_| |_/\___/|_| |_| |_|_____/ \___|_|    \_/ \___|_|
```

Install frequently used packages

```
# apt-get install sudo
# apt-get install iputils-ping
# apt-get install nano
# apt-get install less
```

Container prerequisites

Be aware of the following prerequistes for some containers:

- Mailserver - Redis
- Prerequisited for Fileserver
- Prerequisited for Webserver

lxc-menu

Create the lxc-menu in /usr/local/bin

- LXC-Menu