

Xen on SD card
Installing Xen Utils
apt-get install qemu-system-aarch64

Logfile produced at:
/var/log/xen-tools/XenGuest1.log

Installation Summary

Hostname : XenGuest1
Distribution : jessie
MAC Address : 00:16:3E:0F:D2:C9
IP Address(es) : dynamic
SSH Fingerprint : c8:97:d5:d0:24:39:0f:36:ca:12:53:77:c6:1c:a0:56 (DSA)
SSH Fingerprint : 0b:55:05:f0:0c:ab:62:89:61:47:a7:22:e6:b5:8c:25 (ECDSA)
SSH Fingerprint : 24:4a:2a:ca:48:f3:7c:45:51:87:07:f9:32:ff:7c:d4 (ED25519)
SSH Fingerprint : 04:51:32:38:6e:47:a9:dd:e3:20:b1:c6:e3:bf:0a:ba (RSA)
Root Password : WfjNDCjxEsLZHMvedhgEBbs

Guest Kernel
CONFIG_PARAVIRT_GUEST=y
CONFIG_XEN=y
CONFIG_XEN_BLKDEV_FRONTEND=y
CONFIG_XEN_NETDEV_FRONTEND=y
CONFIG_HVC_XEN=y

For routing
xen tools /etc/xen/xl.conf
vif.default.gatewaydev="wlan0"
vif.default.script="vif-route"

/etc/xen/xend-config.sxp
(network-script network-route)
(vif-script vif-route)

Phidias Linux 4.11rc3
<https://www.kernel.org/pub/linux/kernel/v4.x/>

Logfile produced at:
/var/log/xen-tools/XenGuest1.log

Installation Summary

Hostname : XenGuest1
Distribution : jessie
MAC Address : 00:16:3E:0F:D2:C9
IP Address(es) : dynamic
SSH Fingerprint : de:0a:c6:2b:58:31:39:4b:02:d5:65:0c:e0:db:68:43 (DSA)
SSH Fingerprint : c2:b5:f3:89:37:c8:ca:81:33:89:22:e3:08:dd:ee:f5 (ECDSA)
SSH Fingerprint : 91:f6:96:44:ff:8c:ba:d2:c9:77:2e:55:a6:98:d0:e1 (ED25519)
SSH Fingerprint : 47:43:73:a2:99:c9:67:1b:ac:8f:31:be:a1:79:1b:e6 (RSA)
Root Password : UH3sAg7yKEFM2Agb3z7BpNy

```
service xen stop
service xen start Ctl+c
service xen restart
```

```
Data.LOAD.ELf /home/amna/Thesis/96board_linux_checkout/linux/vmlinux /nocode
```

```
Data.LOAD.ElF /home/amna/Thesis/xen/xen/xen/xen-syms /nocode /noclear
```

```
DO /home/opt/t32/demo/arm64/hardware/hikey/start_a53_m.cmm
```

For ping problem
apt-get install inetutils-ping

Add this to the kernel boot line - dom0_max_vcpus=1.

To force dom0 to also run on a single pcpu also add dom0_vcpus_pin.

To try on an active system without a Reboot, use the following commands -

```
# xl vcpu-set 0 1
# xl vcpu-pin 0 0 0
in xen.cfg
dom0_max_vcpus=1 dom0_vcpus_pin
```

Buiding Phidias

```
linux-4.11-rc2 # make ARCH=arm64 CROSS_COMPILE=aarch64-linux-gnu- Image
hisilicon/hi6220-hikey.dtb
```

For making initrd image, follow the commands:

```
cd source_folder/
```

```
find . | cpio -H newc -o > ../initramfs.cpio
```

```
cd ..
```

```
cat initramfs.cpio | gzip > initramfs.igz
```

Don't forget to adjust the size of the new initramfs file in the dtb.

```
du -b initramfs.igz
```

```
148865075
```

You can decompile a dtb with: dtc -I dtb -O dts -o source.dts binary.dtb

To compile the source again into a dtb, use: dtc -I dts -O dtb -o
binary.dtb source.dts

```
root@amna-ThinkPad-E460:/home/amna/Thesis/Phidias_access# dtc -I dtb -O dts -o hi6220new.dts
hi6220new.dtb
```

```
linux,initrd-end = <0x0 0x12DF8033>; old linux,initrd-end = <0x0 0xa199000
```

make ARCH=arm64 CROSS_COMPILE=aarch64-linux-gnu- Image hisilicon/hi6220-hikey.dtb

```
setenv ipaddr 130.149.39.61
setenv serverip 130.149.39.71
setenv netmask 255.255.255.0
tftp 0x10008000 image
go 0x10008000
```

```
Home
setenv ipaddr 192.168.2.110
setenv serverip 192.168.2.105
setenv netmask 255.255.255.0
tftp 0x10008000 image
go 0x10008000
```

Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/vmlinux /nocode

Data.LOAD.Elf /home/amna/Thesis/phidias/build_amna/phidias.elf /nocode /noclear

Data.LOAD.Elf /home/amna/Thesis/phidias/lwip/build/lwip /nocode /noclear

9709709 is 0x94288D

```
linux,initrd-start = <0x0 0xa000000>;
linux,initrd-end = <0x0 0xa94288D>;
```

Then recompile the dtb

dtc -I dts -O dtb -o hi6220new.dtb hi6220new.dts

Build4 for one guest

Build5 for lwip

SYStem.Option MMUSPACES ON

print "initializing debugger MMU..."

MMU.FORMAT LINUX swapper_pg_dir 0xFFFFF00000000000--0xFFFFF00000000000
0x0000000080000000

; prepare debugger translation

TRANSLATION.COMMON 0xFFFFF00000000000--0xffffffffffffffff ; common area for
kernel and processes

TRANSLATION.TableWalk ON ; debugger uses a table walk to decode virtual addresses

TRANSLation.ON

Extract ramdisk

gzip -d file.cpio.gz

cpio -idm < file.cpio

Make ramdisk

```
cd source_folder/
```

```
find . | cpio -H newc -o > ../initramfs.cpio
```

```
cd ..
```

```
cat initramfs.cpio | gzip > initramfs-debug.gz  
dtc -I dts -O dtb -o hi6220new1.dtb hi6220new1.dts
```

```
setenv ipaddr 130.149.39.61  
setenv serverip 130.149.39.71  
setenv netmask 255.255.255.0  
tftp 0x10008000 image  
go 0x10008000
```

```
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/vmlinux /nocode  
Data.LOAD.Elf /home/amna/Thesis/initrd/trigger/testinit.o /nocode /noclear  
Data.LOAD.Elf /home/amna/Thesis/phidias/build_amna/phidias.elf /nocode /noclear
```

```
Data.LOAD.Elf /home/amna/Thesis/phidias/build_amna/image /nocode /noclear
```

```
Data.LOAD.Elf /home/amna/Thesis/phidias/lwip/build/lwip /nocode /noclear
```

```
Data.LOAD.Elf /home/amna/Thesis/xen/xen/tools/xenstore/xenstored /nocode  
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/vmlinux1 /nocode /noclear  
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/vmlinux2 /nocode /noclear  
Data.LOAD.Elf /home/amna/Thesis/phidias/build_amna/phidias.elf /nocode /noclear  
9709709 is 0x94288D
```

```
cp arch/arm64/boot/Image arch/arm64/boot/Image2
```

```
Then recompile the dtb  
dtc -I dts -O dtb -o hi6220new1.dtb hi6220new1.dts
```

```
make ARCH=arm64 CROSS_COMPILE=aarch64-linux-gnu- Image
```

Cross compiling Xen store

```
./configure CC=aarch64-linux-gnu-gcc --host=aarch64-linux-gnu  
Error for uuid.h  
manually ftp://ftp.ossdp.org/pkg/lib/  
Change prefix to /usr in Makefile  
./configure  
make  
make install  
Now error incurs
```

```
/etc/apt/sources.list
```

```
deb http://de.archive.ubuntu.com/ubuntu xenial main restricted universe  
multiverse
```

```
deb http://de.archive.ubuntu.com/ubuntu xenial-updates main restricted universe  
multiverse
```

```
deb http://de.archive.ubuntu.com/ubuntu xenial-security main restricted universe  
multiverse
```

```
deb http://de.archive.ubuntu.com/ubuntu xenial-backports main restricted  
universe multiverse
```

```
sudo apt-get install libperl-dev  
sudo apt-get install libgtk2.0-dev  
apt-get install glib-2.0
```

```
mkdir /lib/modules/4.11.0-rc2
```

```
For initrd.img  
zcat /boot/initrd-2.6.18-164.6.1.el5.img | cpio -idmv  
•Edit the contents (if needed)  
•Finally repack and compress the initrd image:
```

[Raw](#)

```
# find . | cpio -o -c | gzip -9 > /boot/test.img
```

Dumping FDT

```
Linux Guest while  
> booting Domain 0.
```

```
>
```

```
>
```

```
> I want to see flattened device tree created by Xen by remapping I/O and  
> IRQs for Guest.
```

```
>
```

```
>
```

```
> Is there a simple API to dump the flattened device?
```

I am not sure there is a facility in the Linux kernel to dump the device-tree. However, you can do it from the user space with:

```
dtc -I fs /proc/device-tree -O dts
```

Cheers,

Xen Tools

https://wiki.xenproject.org/wiki/Xen_ARM_with_Virtualization_Extensions/CrossCompiling

```
sbuid-adduser $USER
```

```
sbuid-createtroot --components=main,universe trusty /srv/chroots/trusty-arm64-cross  
http://archive.ubuntu.com/ubuntu/  
gedit /etc/schroot/chroot.d/trusty-arm64-cross
```

```
[trusty-arm64-cross]
```

```
type=directory
```

```
union-type=overlay
```

```
description=Debian trusty/arm64 crossbuilder
```

```
directory=/srv/chroots/trusty-arm64-cross
```

```
groups=root,sbuild
```

```
root-groups=root,sbuild
```

```
profile=default
```

```
schroot -c trusty-arm64-cross
```

```
apt-get install vim-tiny wget sudo less pkgbinarymangler nano
```

```
nano /etc/apt/sources.list
```

```
deb [arch=amd64] http://archive.ubuntu.com/ubuntu/ trusty main universe
```

```
deb-src [arch=amd64] http://archive.ubuntu.com/ubuntu/ trusty main universe
```

```
deb [arch=arm64] http://ports.ubuntu.com/ trusty main universe
```

```
dpkg --add-architecture arm64
```

```
apt-get update
```

```
apt-get install crossbuild-essential-arm64
```

```
apt-get install libc6-dev:arm64 libncurses-dev:arm64 uuid-dev:arm64 libglib2.0-dev:arm64 libssl-dev:arm64 libssl-dev:arm64 libaio-dev:arm64 libyajl-dev:arm64 python gettext gcc git libpython2.7-dev:arm64 libfdt-dev:arm64
```

```
apt-get install libpixman*
```

```
apt-get install autotools-dev
```

```
xen/xen/xen/# cp /usr/share/misc/config.{sub,guess} .
```

```
Xen/xen/xen #CONFIG_SITE=/etc/dpkg-cross/cross-config.arm64
```

```
./configure --build=x86_64-unknown-linux-gnu --host=aarch64-linux-gnu
```

```
cd ..
```

```
make dist-tools CROSS_COMPILE=aarch64-linux-gnu- XEN_TARGET_ARCH=arm64
```

https://wiki.xen.org/wiki/Xen_ARM_with_Virtualization_Extensions#error:_.22PSR_MODE_EL3h.22_redefined

```
donot exit the chroot after install packages
```

```
find . | cpio -H newc -o > ../initramfs.cpio
```

```
cd ..
```

```
cat initramfs.cpio | gzip > initramfs-debug.gz
```

```
dtc -I dts -O dtb -o hi6220new1.dtb hi6220new1.dts
```

```
make ARCH=arm64 CROSS_COMPILE=aarch64-linux-gnu- Image
```

```
In lauterbach, set source path to xenstore tools
```

```
// T32 Thu Jul 27 11:10:15 2017
```

```
B::
```

```
SYMBOL.SPATH.RESET
```

```
SYMBOL.SPATH.SET "/home/amna/Thesis/xen/xen/tools/xenstore"
```

```
ENDDO
```

```
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/vmlinux1 /nocode /noclear
```

```
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/vmlinux2 /nocode /noclear
```

```
Data.LOAD.Elf /home/amna/Thesis/xen/xen/tools/xenstore/xenstored /nocode
```

```
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/vmlinux /nocode
Data.LOAD.Elf /home/amna/Thesis/phidias/build_amna/phidias.elf /nocode /noclear
```

Enable xenfs and privcmd in .config for Linux Kernel

GIT large files

```
git filter-branch -f --index-filter 'git rm --cached --ignore-unmatch YOUR-FILE'
```

```
# remove the temporary history git-filter-branch otherwise leaves behind for a long time
rm -rf .git/refs/original/ && git reflog expire --all && git gc --aggressive --prune
```

```
git filter-branch --index-filter "git rm -rf --cached --ignore-unmatch $files" HEAD
```

```
Data.LOAD.Elf /home/amna/Thesis/xen/xen/tools/xenstore/xenstored /nocode
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/vmlinux1 /nocode /noclear
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/vmlinux2 /nocode /noclear
Data.LOAD.Elf /home/amna/Thesis/phidias/build_amna/phidias.elf /nocode /noclear
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-rc2/drivers/net/xen-
netfront.o /nocode /noclear
Data.LOAD.Elf /home/amna/Thesis/Linux_4.11/linux-4.11-
rc2/drivers/xen/xenbus/xenbus_probe_frontend.o /nocode /noclear
```

Initramfs

(Issue commands in dom0 with id = 0 in config file)

```
mount -t xenfs xenfs /proc/xen
cp -r /usr/local/lib/* /lib
mkdir /var/run
touch /var/run/xenstored.pid
touch /var/lib/xenstored/tdb
chmod +x /usr/local/sbin/xenstored
./usr/local/sbin/xenstored --pid-file /var/run/xenstored.pid --priv-domid 1
```

```
cd /usr/local/bin/
```

```
chmod +x *
```

```
./xenstore-ls
```

```
After insmode xen-netfront.ko b.s __xenbus_register_frontend V %sp
xenstored_ready = 1
```

Now we need to debug xenstore dom0_init

After mounting xenfs

(initramfs) /proc/xen/

capabilities	privilcmd	xenbus	xsd_kva	xsd_port
--------------	-----------	--------	---------	----------

```
#!/bin/bash
```

```
cd /usr/local/bin/
```

```
chmod +x *
```

```
./xenstore-write /local/domain/0/domid 0
./xenstore-write /local/domain/0/name Domain-0
./xenstore-write /local/domain/0/control/shutdown ""
./xenstore-write /local/domain/0/control/feature-poweroff 0
./xenstore-write /local/domain/0/control/feature-halt 0
./xenstore-write /local/domain/0/control/feature-suspend 0
./xenstore-write /local/domain/0/control/feature-reboot "0"
./xenstore-write /local/domain/1/device/ ""
./xenstore-write /local/domain/1/device/vif/0/backend-id 0
./xenstore-write /local/domain/1/device/vif/0/backend "/local/domain/0/backend/vif/1/0"
./xenstore-write /local/domain/0/backend/vif/1/0/frontend-id 1
./xenstore-write /local/domain/0/backend/vif/1/0/frontend "/local/domain/1/device/vif/0"
./xenstore-write /local/domain/0/backend/vif/1/0/script "/etc/xen/scripts/vif-route"
./xenstore-write /local/domain/0/backend/vif/1/0/handle 0
./xenstore-chmod /local/domain/0/backend/vif/1/0 r
./xenstore-write /local/domain/1/device/vif/0/mac "D2:A3:CD:27:4A:53"
```

```
./xenstore-write /local/domain/1/device/vif/0/state 1  
./xenstore-write /local/domain/0/backend/vif/1/0/state 2
```

Changed .config for domU blkdev = n and netdev =y and xenbus_probe in enlighten and
comment xenbus probe in netif init

<https://github.com/soarpenguin/kernel-module/blob/master/vma2phy.c>

mount -t debugfs nodev /sys/kernel/debug

For fake ethernet

<https://unix.stackexchange.com/questions/86720/can-i-create-a-virtual-ethernet-interface-named-eth0>

<http://clfs.org/view/clfs-embedded/mips/bootscripts/network.html>

<http://finallyjustice.github.io/xen-networking.pdf>

<https://www.question-defense.com/2012/11/26/linux-create-fake-ethernet-interface>

(initramfs) ifconfig dummy0 down

(initramfs) ip link set name eth0 dev dummy0