<http://raspberrypi.stackexchange.com/questions/628/how-do-i-configure-the-raspberry-pi-to-boot-with-an-nfs-root/629#629>

<http://webcache.googleusercontent.com/search?q=cache:mlyEOA2fW20J:youresuchageek.blogspot.com/2013/01/raspberrypi-root-over-nfs-share.html+&cd=15&hl=en&ct=clnk>

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| **The short version**   1. You need to prepare a root and export it from the NFS machine 2. You need to configure the early stage booting to use that   You'll still need a SD card for the early stage booting, but after that nothing except /boot will need the SD card.  **Details**  I've only done this on a Linux machine. In theory it's possible on any machine that can export NFS filesystems though.   1. The easiest way to prepare a root filesystem is to copy the one provided by the existing images. I used the [official Debian 6 image](http://downloads.raspberrypi.org/images/debian/6/debian6-19-04-2012/debian6-19-04-2012.zip) as my starting point:    1. Download the image, extract the .zip file. You should now have debian6-19-04-2012.img somewhere    2. Mount the root partition from that image using a loopback device. You'll need the offset into the image for the start of the root partition, in this instance it's the second partition in the image:    3. fdisk -l debian6-19-04-2012.img    4. Disk debian6-19-04-2012.img: 1949 MB, 1949999616 bytes    5. 4 heads, 32 sectors/track, 29754 cylinders, total 3808593 sectors    6. Units = sectors of 1 \* 512 = 512 bytes    7. Sector size (logical/physical): 512 bytes / 512 bytes    8. I/O size (minimum/optimal): 512 bytes / 512 bytes    9. Disk identifier: 0x000ee283    10. Device Boot Start End Blocks Id System    11. debian6-19-04-2012.img1 2048 155647 76800 c W95 FAT32 (LBA)    12. debian6-19-04-2012.img2 157696 3414015 1628160 83 Linux    13. debian6-19-04-2012.img3 3416064 3807231 195584 82 Linux swap / Solaris    14. root@rapunzel:/tmp/debian6-19-04-2012#   The second partition starts at block (or sector) 157696 so the offset is (512\*157696) = 80740352:  root@rapunzel:/tmp/debian6-19-04-2012# mkdir /mnt/pi-root-loop  root@rapunzel:/tmp/debian6-19-04-2012# mount -o loop,offset=80740352 /tmp/debian6-19-04-2012/debian6-19-04-2012.img /mnt/pi-root-loop  root@rapunzel:/tmp/debian6-19-04-2012# ls /mnt/pi-root-loop  bin Desktop etc lib mnt proc sbin selinux sys usr  boot dev home media opt root sd srv tmp var  root@rapunzel:/tmp/debian6-19-04-2012#   * 1. With the image mounted you probably want to copy this somewhere more permanent to avoid using the loopback device forever. I made an LVM2 volume and mounted it at /mnt/rpi-root, so I did:   2. cp -rav /mnt/pi-root-loop/\* /mnt/rpi-root/   3. We need to export the filesystem now, so we need to add a line like:   4. /mnt/rpi-root 192.168.1.2(rw,no\_root\_squash)   into /etc/exports on the NFS server, where 192.168.1.2 is the address of the Raspberry Pi. After adding that run exportfs -rv to re-read the list of exports. (See [exports(5)](http://linux.die.net/man/5/exports) for more advanced options including wildcards/subnets rather than individual hosts)   1. You could alternatively skip this step and build a root filesystem from scratch using something like [multistrap](http://www.emdebian.org/emdebian/rootfs.html). 2. Now we need to build an SD card that does the early stage booting and boots using this NFS share. I did this by taking the first partition of the official image and copying that to an SD card, where the SD card is /dev/sdx: 3. dd if=/tmp/debian6-19-04-2012/debian6-19-04-2012.img of=/dev/sdx bs=512 count=155647   and then since this only copied the first partition editing the partition table with fdisk to delete the two partitions we didn't copy.  After that I mounted the partition from the SD card and edited the file cmdline.txt from it to read:  dwc\_otg.lpm\_enable=0 console=ttyAMA0,115200 kgdboc=ttyAMA0,115200 console=tty1 root=/dev/nfs nfsroot=192.168.1.1:/mnt/rpi-root ip=dhcp rootfstype=nfs  where 192.168.1.1 is the address of the NFS server. If you don't want to use DHCP you can set the IP address alternative ways, see [this document](https://www.kernel.org/pub/linux/kernel/people/marcelo/linux-2.4/Documentation/nfsroot.txt) for further details.  Once this is done you can unmount the SD card and boot your Rapsberry Pi with an NFS root. You can also manipulate the filesystem from the server side, or other NFS clients as you see fit (e.g. [QEMU+binfmt\_misc](http://wiki.debian.org/QemuUserEmulation), LVM snapshots, backup systems etc.)  **Optional things**   * Setting RAMRUN and RAMLOCK to yes in /etc/default/rcS causes /var/run and /var/lock respectively to be mounted as tmpfs (i.e. ramdisk) - this is probably worthwhile, even if you only have the one device booting from the NFS filesystem. * If you're using ip=dhcp you'll probably need to comment out the line: * #iface eth0 inet dhcp   in /etc/network/interfaces (/mnt/rpi-root/etc/network/interfaces) in order to avoid a situation where swapping between the early boot DHCP and the usual later one causes a message like:  nfs: server 192.168.1.1 not responding, still trying   * If you want to boot lots of devices from the same root you'll need to take care of providing a "local" /tmp (probably tmpfs) and other subtleties to avoid problems with multiple machines trying to write to the same files.  |  |  |  | | --- | --- | --- | | [share](http://raspberrypi.stackexchange.com/a/629)|[improve this answer](http://raspberrypi.stackexchange.com/posts/629/edit) | [edited Jun 26 '12 at 8:17](http://raspberrypi.stackexchange.com/posts/629/revisions)  [mlp](http://raspberrypi.stackexchange.com/users/76/mlp)  **301**26 | answered Jun 23 '12 at 12:53  [[https://i.stack.imgur.com/qxeUf.jpg?s=32&g=1](http://raspberrypi.stackexchange.com/users/317/flexo)](http://raspberrypi.stackexchange.com/users/317/flexo)  [Flexo](http://raspberrypi.stackexchange.com/users/317/flexo)  **818**1619 | |
|  | |  |  |  |  | | --- | --- | --- | --- | | |  |  | | --- | --- | |  |  | | thanks for this detailed tutorial. I was working perfectly with the last image. Now when I tried to follow exactly the same steps for the new image released two days ago I came across the error. Checking the root file system fails with the following error: fsck.ext4: No such device or address while trying to open /run/rootdev Possibly non-existent or swap device? fsck died with exit status 8 Any suggestions? Klaus – user1557 [Sep 20 '12 at 17:47](http://raspberrypi.stackexchange.com/questions/628/how-do-i-configure-the-raspberry-pi-to-boot-with-an-nfs-root/629#comment3982_629) | | |  |  | | --- | --- | |  |  | | I don't have access to a device to check right now. Sounds like the kernel might be built without nfs root support. – [Flexo](http://raspberrypi.stackexchange.com/users/317/flexo" \o "818 reputation) [Sep 20 '12 at 18:21](http://raspberrypi.stackexchange.com/questions/628/how-do-i-configure-the-raspberry-pi-to-boot-with-an-nfs-root/629#comment3983_629) | | |  |  | | --- | --- | | 1 |  | | Seems that I've found the solution. I have altered fstab: proc /proc proc defaults 0 0 /dev/mmcblk0p1 /boot vfat defaults 0 2 #/dev/mmcblk0p2 / ext4 defaults,noatime 0 1 The question is why it used to work with the previous image. It just failed executing: S05checkroot.sh. BTW: Do you have any idea how to manage the swap partition. Do we need it? – user1557 [Sep 20 '12 at 18:36](http://raspberrypi.stackexchange.com/questions/628/how-do-i-configure-the-raspberry-pi-to-boot-with-an-nfs-root/629#comment3984_629) | | |  |  | | --- | --- | |  |  | | Is it possible to *half ass* it and just NFS the whole thing? ie. host exports /home/user/Documents/raspisRootFolder and client's fstab just mounts the entire thing at /? – [puk](http://raspberrypi.stackexchange.com/users/9518/puk" \o "375 reputation) [Oct 24 '13 at 19:29](http://raspberrypi.stackexchange.com/questions/628/how-do-i-configure-the-raspberry-pi-to-boot-with-an-nfs-root/629#comment15156_629) | | |  |  | | --- | --- | |  |  | | Great answer, bailed me out of a failing SD card; moved the whole thing onto my NAS server. I also commented out /dev/mmcblk0p2 / ext4 defaults,noatime 0 1 from /etc/fstab, although I think it would fail without causing any issues if you leave it in. – [TomG](http://raspberrypi.stackexchange.com/users/1006/tomg" \o "506 reputation) [Jan 19 '14 at 20:31](http://raspberrypi.stackexchange.com/questions/628/how-do-i-configure-the-raspberry-pi-to-boot-with-an-nfs-root/629#comment17586_629) | |