Running Debian on Inexpensive Network Attached Storage Devices

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DebConf

Caceres, Extremadura

- Explain what Network Attached Storage devices (NAS) are
- Show some interesting hardware
- Explain how Debian can be installed on them
- Say what still needs to be done and encourage volunteers
- Mention some web resources and answer questions

- For most people, a Network Attached Storage device (NAS) is an external hard drive on steroids
- For geeks, a NAS is a complete computer

- Power efficient
- Quiet
- Cheap

- Makes a nice home server

- Intel IXP42x, 133 or 266 MHz
- 32 MB RAM
- 8 MB flash
- no internal disk
- 1 10/100 Ethernet
- 2 USB

Linksys NSLU2

Advantages:

- Cheap
- Quiet (no fan)
- Firmware can be upgraded via the network
- It can run on flash only

Disadvantages:

- Ethernet needs proprietary microcode
- It's slooow and doesn't have much memory

Linksys NSLU2

- Feature complete, maintenance mode
- Packages nslu2-utils and ixp4xx-microcode
- Support for LEDs, beeper, Ethernet
- Ethernet driver: Krzysztof Halasa
- Some new ideas about improving d-i support (example: mounting ext3 as ext2)
- Gordon Farquharson, Joey Hess, NSLU2-Linux team

- Kirkwood 1.2 GHz
- 512 MB RAM
- 512 MB flash
- no internal disk
- 1 GBit Ethernet
- 1 USB
- 1 SD/MMC
- 1 mini-USB with serial and JTAG

Advantages:

- Cheap
- Quiet (no fan)
- Enough flash to run Debian
- The company supports our porting effort
- Serial and JTAG

Disadvantages:

- Only one USB port
- Only available in the US at the moment

- Currently in development
- Kernel support integrated
- Tar ball of lenny
- Installer support mostly integrated
- No support for installations to flash

- GLAN Tank
- Intel SS4000-E
- Thecus N2100

- D-Link DNS-323 / Conceptronic CH3SNAS
- HP Media Vault mv2120
- Kurobox Pro
- QNAP TS-109, TS-209, TS-409

- QNAP TS-119, TS-219 and TS-219P

Prerequisites (for developers)

- Have serial console access (and ideally JTAG)
- Have working kernel support in mainline!
- Ideally, have a good relationship with the hardware vendor

- A working SSH client (openssh, putty)
- An Internet connection
- No serial console, no JTAG, etc
- No manual work

- We provide a 'firmware' image that really is debian-installer
- We read values from the existing system to start SSH
- Users can do a normal installation via SSH
- At the end, a Debian kernel and ramdisk will be written to flash or a bootable image to disk
- Philosophy: don't touch boot loader or config if possible; and don't require manual steps

- Reads values from an existing system or firmware
- Preseeds debian-installer so SSH will be started
- Parses Unix tree, reads value from flash, etc

- Writes kernel and ramdisk to flash or bootable image to disk
- Supports 15 devices – easy to extend
- ramdisk (initramfs) hooks: for example to set root partition

- Kernel image in linux-2.6
- packages/kernel/linux-kernel-di-armel-2.6
- packages/base-installer/kernel/armel.sh
- packages/partman/partman-partitioning/lib/disk-label.sh
- packages/partman/partman-auto (recipes)
- installer/build/pkg-lists
- installer/build/config

debian-installer: Adding a new device

- packages/libdebian-installer/src/system/subarch-armel-linux.c
- oldsys-preseed (optional)
- flash-kernel
- installer/build/config

- Incomplete network configuration (e.g. missing DNS)
- Users assume different network configuration
- Doesn't boot with more than one disk
- Non-working kernel or ramdisk flashed
- "doesn't boot" – no idea why
- Big lesson learned: manual instructions don't work!

- Persistent disk naming with udev
- Put a rescue filesystem in flash (Debian or Openembedded)
- Put a SSH server in the ramdisk
- Support installations to MTD flash
- Port Debian to more devices
    - Freescale i.MX515
    - Marvell Kirkwood
    - TI OMAP (Gumstix and Beagleboard)
    - Non-ARM devices

More information

- Linksys NSLU2
  - http://www.cyrius.com/debian/nslu2/
  - http://www.nslu2-linux.org/
- Marvell Orion and Kirkwood
  - http://www.cyrius.com/debian/orion/
  - http://www.cyrius.com/debian/kirkwood/