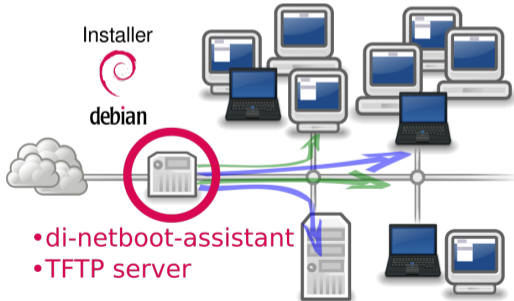


di-netboot-assistant: Install Debian in your LAN

Automatic Installation of Debian GNU/Linux

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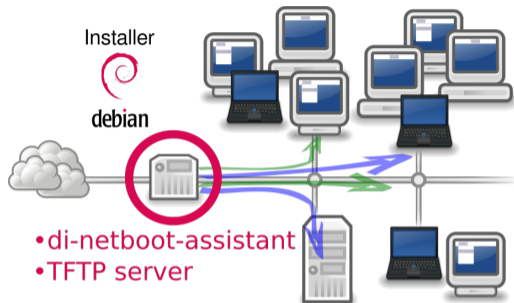


Overview

- 1 TFTP/PXE Boot Install
- 2 `di-netboot-assistant`
- 3 Customization
 - Preseeding the Installation
 - Combining `debian-installer`/preseeding and `ansible`
 - Playbook Examples
- 4 Latest Developments and Ideas
- 5 Summary and Questions



TFTP/PXE Boot Install



- Configure client to boot over the network with PXE
- Configure DHCP server to send TFTP server address
- Client fetches Kernel from TFTP server ... \implies Install!



PXE: Legacy BIOS – UEFI

- Legacy BIOS

- ▶ PXE Linux (pxelinux.0)
- ▶ isc-dhcp: `option arch = 00:00`
- ▶ dnsmasq: `dhcp-match=set:bios,option:client-arch,0`

- UEFI

- ▶ GRUB (grubx64.efi, bootnetx64.efi)
- ▶ isc-dhcpd: `option arch = 00:07`
- ▶ dnsmasq: `dhcp-match=set:efi-x86_64,option:client-arch,7`



Debian-Installer netboot assistant package (created by Franklin PIAT):

- Simplify the preparation of files for TFTP net booting.
- Download and extract files needed and take care of organizing them.
- Prepare a top level menu for PXELinux and grub-efi.

“News” from the `di-netboot-assistant` changelog:

- Implement the inclusion of debian-installer packages.
- Implement signature verification for images.
- Implement EFI boot with grub EFI image.
- Add download date and time to PXE-menu entries.
- Implement autopkgtest.
- Updates, improvements and new/more examples.
- Add u-boot pxe menu for arm systems.



... what images are available? ...

Let's run di-netboot-assistant!

```
$ di-netboot-assistant install
```

```
E: No repository name was passed for 'install'.
```

```
I: Declared repositories are:
```

```
bullseye bullseye-gtk buster buster-gtk daily daily-gtk  
jessie jessie-gtk oldstable oldstable-gtk precise stable  
stable-gtk stretch stretch-gtk testing testing-gtk trusty  
vivid wheezy wheezy-gtk wily xenial yakkety zesty
```



...install some images ...

```
# di-netboot-assistant install stable testing
```

```
I: Processing stable/amd64.
```

```
I: Downloading 'SHA256SUMS'.
```

```
I: Good signature from "Debian Archive Automatic Signing Key
```

```
[...]
```

```
I: Building menu entries for the netboot-images.
```

```
I: • stable-amd64
```

```
I: Using splash screen from 'stable' image.
```

```
[...]
```

```
I: Building menu entries for the netboot-images.
```

```
I: • stable-amd64
```

```
I: • testing-amd64
```

```
I: Building menu entries for debian-installer-*-netboot-* packages.
```

```
[...]
```



... boot the client ...

Debian-Installer Netboot Menu

Boot from local disk..

Debian buster (amd64)	20170908	09:48	>
Debian jessie (amd64)	20170907	15:17	>
Debian stable (amd64)	20170910	14:12	>
Debian stable (i386)	20170914	21:03	>
Debian stretch-gtk (amd64)	20170907	15:18	>
Debian wheezy (amd64)	20170913	15:37	>
Ubuntu zesty (amd64)	20170908	11:22	>

Debian 9 (stretch) 20170615+deb9u1 amd64/gtk
Debian 9 (stretch) 20170615+deb9u1 amd64/text



... enjoy the sub menus:

The collage consists of six screenshots arranged in a 2x3 grid, illustrating the Debian GNU/Linux installer boot menu and its sub-menus.

- Top Left:** "Debian-Installer Netboot Menu" showing a list of boot options for local disk. The first option is highlighted: "Boot from local disk..". Below the list, it says "Press [Tab] to edit options".
- Top Right:** "Debian GNU/Linux installer boot menu" with "Back" highlighted.
- Middle Right:** "Debian GNU/Linux installer boot menu" with "Advanced options" highlighted. The Debian logo is visible on the right.
- Bottom Left:** "GNU GRUB version 2.02-2" showing a list of boot options for local disk. The first option is highlighted: "Debian Installer (amd64)". Below the list, it says "Use the [] and [j] keys to select which entry is highlighted. Press enter to boot the selected OS, 'a' to edit the commands before booting or 'c' for a command-line".
- Bottom Middle:** "Installer boot menu" with "Back" highlighted.
- Bottom Right:** "Debian GNU/Linux installer boot menu" with "Advanced options" highlighted. The Debian logo is visible on the right.

Customization

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Preseeding the Installation

Customized boot options (pxelinux.HHEAD/grub.cfg.HHEAD):

```
/etc/di-netboot-assistant/pxelinux.HHEAD
```

```
DEFAULT bootlocal
TIMEOUT 10
# #####
# Install stable automatically.
# For details consult
#           '/usr/share/doc/di-netboot-assistant/README.preseed'.
#
LABEL autoinstall
    MENU LABEL Debian stable (amd64) + preseed
    kernel ../d-i/n-a/stable/amd64/linux
    append initrd=../d-i/n-a/stable/amd64/initrd.gz --- \
        auto=true priority=critical url=tftp://installbox
#
# #####
```

Preparing the Preseed File

- Example preseed file:
`/usr/share/doc/di-netboot-assistant/examples/preseed.cfg`
- Use TFTP server:

Prepare `$TFTP_ROOT/d-i/stretch/`:

```
# mkdir -p /var/lib/tftpboot/d-i/stretch/  
# cp /usr/share/doc/di-netboot-assistant/examples/preseed.cfg \  
    /var/lib/tftpboot/d-i/stretch/
```

- Modify the preseed file to your needs:
 - ▶ localization
 - ▶ partitioning
 - ▶ ssh public key
- Make sure the TFTP server is found (DNS or use IP address)



Combining debian-installer/preseeding and ansible

Preseeding is rather complicated and hard to maintain.

Idea:

- Only preseed the minimal necessary options.
- Set up the system from ansible playbooks.

Advantages:

- Configuration management system's advantages (roles, logging, ...).
- Same source of configuration during and after installation.
- Installation to the final system state is done in one step.



Implementation with ansible-pull

Export ansible playbook:

```
git daemon --verbose --export-all
  --base-path=/dir/of/playbook -- /dir/of/playbook
```

Preseed file:

```
### Individual additional packages to install
d-i pkgsel/include string firmware-linux ansible git
[...]
### This command is run just before the install finishes:
d-i preseed/late_command string \
  mkdir -p /target/home/ansible/.ssh && \
  echo "ssh-rsa YOURSSHPUBLICKEYHERE ansible@installbox" \
    >> /target/home/ansible/.ssh/authorized_keys ; \
in-target chown -R ansible:ansible /home/ansible/.ssh/ ; \
in-target chmod -R og= /home/ansible/.ssh/ ; \
in-target ansible-pull --verbose --purge \
  --extra-vars="run_in_installer=true" --url=git://installbox/.git
```

Playbook Examples

A few ansible playbook examples are provided here:

<https://salsa.debian.org/andi/debian-lan-ansible>

```
git clone https://salsa.debian.org/andi/debian-lan-ansible.git
ansible-pull [...] \
  --url=https://salsa.debian.org/andi/debian-lan-ansible.git
```

Contributions like patches, suggestions, pull requests and/or further profiles are highly appreciated!



Playbook Examples

- Installbox:

- ▶ set up as gateway to some external network (WAN)
- ▶ providing TFTP installation on the LAN interface
- ▶ automatic installs: preseeding and ansible playbooks
- ▶ squid package cache

use case: orchestration of automatic installs in the LAN

- Kiosk:

- ▶ auto login user
- ▶ reasonable defaults
- ▶ temporary home directory on tmpfs, reset at boot

use case: school's computer, hackerspace, ...

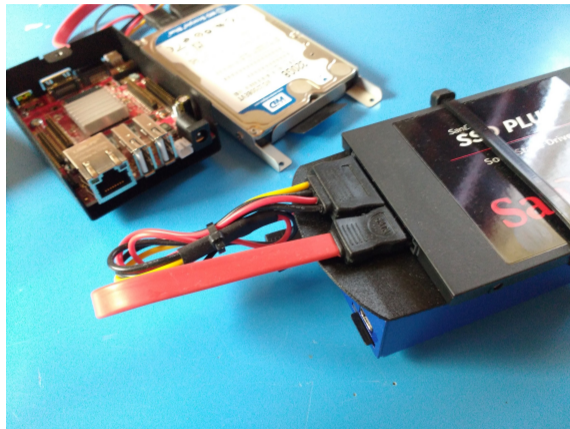
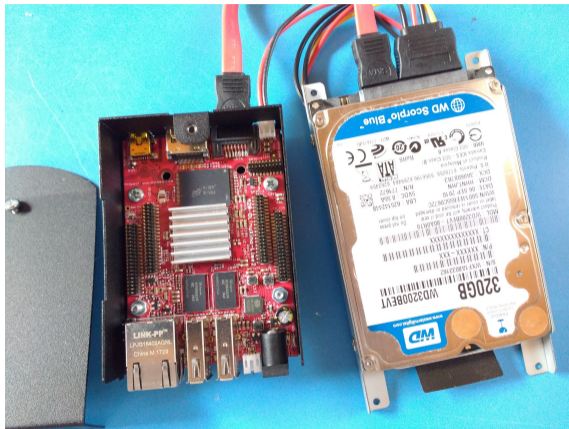
- Cloudbox:

- ▶ setup of a home cloud server
- ▶ dynamic DNS name
- ▶ ...

use case: nextcloud server in the basement



Latest Developments



...ARM, u-boot: partial support for PXE menus ...

Can we add support to di-netboot-assistant?



Latest Developments

Can we add support to di-netboot-assistant?

YES!

Add `pxelinux.cfg/default-arm` which is picked up by u-boot and contains the boot menu of all installed images:

```
dnsmasq-tftp:
```

```
...
```

```
sent d-i/n-a/pxelinux.cfg/default-arm to 192.168.0.97
```

```
sent d-i/n-a/n-pkg/.../armhf/initrd.gz to 192.168.0.97
```

```
sent d-i/n-a/n-pkg/.../armhf/vmlinuz to 192.168.0.97
```

```
sent d-i/n-a/n-pkg/.../armhf/dtbs/sun7i-a20-olinuxino-lime2.dtb \  
to 192.168.0.97
```



Can we add firmware to boot images?

Debian Wiki:

```
# cd to the directory where you have your initrd
cd /tftpboot/debian-installer/i386
[ -f initrd.gz.orig ] || cp -p initrd.gz initrd.gz.orig
[ -f firmware.cpio.gz ] || wget \
    http://cdimage.debian.org/cdimage/unofficial/non-free/\
firmware/stable/current/firmware.cpio.gz
cat initrd.gz.orig firmware.cpio.gz > initrd.gz
```



Latest Ideas: implemented yesterday!

```
di-netboot-assistant fw-toggle stable
```

```
I: Processing non-free firmware for stable/amd64.  
I: Downloading 'SHA256SUMS'.  
[...]  
I: Downloading 'firmware.cpio.gz'.  
I: Adding non-free firmware.
```

```
ls -l /var/lib/tftp/d-i/n-a/stable/amd64/
```

```
[...]  
-rw-r--r-- 1 root root 62185766 Jul 28 21:21 initrd.gz  
-rw-r--r-- 1 root root 24752572 Jul 11 03:19 initrd.gz.orig  
[...]
```

```
di-netboot-assistant fw-toggle stable
```

```
I: Processing non-free firmware for stable/amd64.  
I: Removing non-free firmware.
```

Summary and Questions

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Thank you very much!



Further Reading and Resources

- `di-netboot-assistant` package:
<https://packages.debian.org/di-netboot-assistant>
- Debian Documentation “Preseeding”:
<https://www.debian.org/releases/stretch/amd64/apb.html.en>
- Debian Wiki:
<https://wiki.debian.org/DebianInstaller/NetbootAssistant> <https://wiki.debian.org/DebianLAN>
- Debian-LAN presentations:
<https://people.debian.org/~andi/>

Illustrations remixed from: <https://openclipart.org/>

