

FAI.me

A Build Service for Installation and Cloud Images

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finger Mrfai@localhost

▶ whoami

- ▶ Sysadmin for more than two and a half decades
- ▶ Debian developer since 2000
- ▶ Diploma in computer science, University of Bonn, Germany
- ▶ SunOS 4.1.1 on SPARC hardware, then Solaris Jumpstart
- ▶ Started FAI in 1999 for my first cluster (16× Dual PII 400 MHz)
- ▶ Several talks and tutorials:
Linux Kongress, Linuxtag, DebConf, SANE, LCA, FOSDEM,
CeBit, OSDC, UKUUG, FrOSCon, Chemnitzer Linuxtag
- ▶ FAI trainings

Motivation

- ▶ Debian installer is not that easy for beginners
- ▶ Also FAI is not for beginners
- ▶ How to make FAI usable for beginners?

The idea

- ▶ An installer should cover the most usual installations
- ▶ Ignore the special cases
- ▶ Do only ask the really important questions
- ▶ Ask everything at the beginning
- ▶ Create a customized installation media
- ▶ Boot this installation media and get yourself a coffee
- ▶ Ready!

- ▶ FAI = Fully Automatic Installation
- ▶ FAI is a tool for experienced sysadmins
- ▶ You have to adjust the config files to your local needs
- ▶ How to make FAI usable for beginners?

FAI.me

FAI - Fully Automatic Installation

- Home
 - References
 - Features
 - Poster / Flyer
 - Case studies
 - Mailing Lists / IRC / Wiki
 - Clusters built with FAI

- **FAI.me / Build your own**

- **Videos / Screenshots**

- Download
 - FAI CD
 - Packages
 - FAI questionnaire

- **Documentation**

- FAI Guide
- Manual pages
- Other documentation
- Talk slides and videos

- **Developers**

- Sources / Bugs
- Roadmap
- Team

- **Contact / Support**

- Site search

FAI.me. Build your own installation media

This installation image will automatically install the OS and applications onto the computer. No network connection is needed, since all packages are on the installation media. You can burn this image onto a CDDVD or write it to an USB stick.

All data on the first disk will be overridden without any further confirmation.

Root password: if not set, sudo will be configured for the user account

SSH key for the root account: No file selected. Upload id*,pub file for login without a password

User name: Not the full name

User password: if not set, a password will be generated

Language and keyboard layout

Disk partitioning scheme

Select a distribution Enable backports including newer kernel

Which desktop to install

- | | |
|---|---|
| <input type="checkbox"/> Debian developer tools | <input checked="" type="checkbox"/> Openssh server |
| <input type="checkbox"/> Web server | <input checked="" type="checkbox"/> Standard system tools |
| <input type="checkbox"/> Print server | <input checked="" type="checkbox"/> Non-free Linux firmware |

Additional packages to be installed:

Separate with spaces, multiple names on one line are fine

Email (optional): You will be informed when the image generation is finished

- For the keyboard layout we assume Generic 105-key PC
- To change the keyboard layout call `dpkg-reconfigure keyboard-configuration`
- The timezone will be set to UTC. To change the timezone call `dpkg-reconfigure tzdata`
- You should change the user and root password after installation

Any feedback is welcome. Send an email to FAI.me-at-fai-project.org

- ▶ Easy creation of the installation media (CD/USB stick)
- ▶ Customizations are easy to do (clicks on a web page)
- ▶ Language, user name and pw, root pw
- ▶ Select one of the common desktops
- ▶ Additional packages
- ▶ Distributions: stable, stable+backports, testing

Some more advanced features

- ▶ Different disk partitioning schemes
- ▶ SSH key for root login
- ▶ Use your github account (ssh pub key) for the root login
- ▶ Add one public available repository

FAI.me for the cloud

- ▶ **Cloud Images**
- ▶ Get your customized cloud image by just a few clicks
- ▶ Disk size
- ▶ Disk image format (raw.xz, raw.zst, qcow2, vmdk,...)
- ▶ Hostname

FAI.me more ideas

- ▶ Make web page dynamic: easy mode **Thanks Juri!**
- ▶ Images for non-amd64
- ▶ Other distributions (e.g. Ubuntu, CentOS)
- ▶ Ready-to-go cloud images for GCE, EC2,....
- ▶ A generic FAI.me media, without packages
- ▶ Live images
- ▶ If you want more customization, set up your own FAI server

How does FAI.me work

- ▶ Web server \neq build server
- ▶ A Perl CGI validates the input
- ▶ and writes a config and a meta file
- ▶ Each job has its own subdirectory
- ▶ The status is written to status.html (waiting, processing, done, error)
- ▶ Shell script on the build server deals with new jobs
- ▶ Misc: parse logs for errors, new nfsroot, monitoring, cleanup of old images

FAI.me architecture

- ▶ `/etc/fai-{stretch,stretch-bpo,buster}`
- ▶ A different `nfsroot` for each distribution
- ▶ The config space is shared between all
- ▶ Read config of new job (NFS)
- ▶ Make copy of CS, customize it mostly via classes (ssh key, lang, packages, user, root pw)
 - ▶ Make package mirror, make installation ISO
 - ▶ Create disk image
- ▶ Update status on web page, write log file, send email
- ▶ Copy ISO or disk image to web server (NFS)
- ▶ All temporary files are stored in RAM (`tmpfs`)

FAI.me architecture

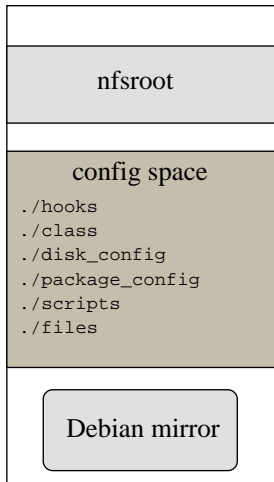
- ▶ FAI nfsroot (only installation ISO)
- ▶ FAI config space
- ▶ FAI classes
- ▶ AMD64 DEBIAN STRETCH HOME_LVM BACKPORTS SSH_SERVER
NONFREE GNOME FAIME
- ▶ For installation images

```
fai-mirror -c$classes /tmp/mirror  
fai-cd -m /tmp/mirror ABC123.iso
```
- ▶ Cloud images

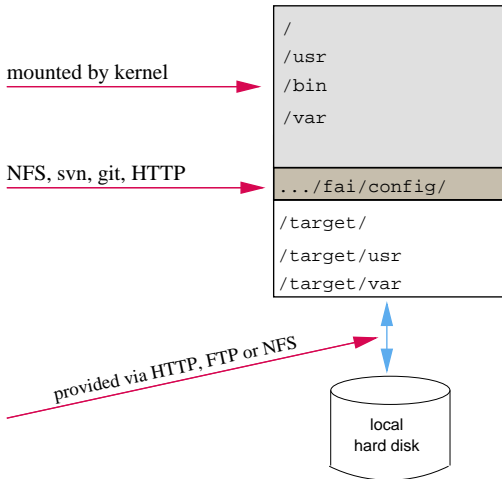
```
fai-diskimage -S5G -c$classes AB12.raw.zst
```

FAI architecture

install server



install client



Disk partitioning

Example: .../disk_config/HOME_LVM:

```
# entire disk with LVM, separate /home
disk_config disk1 fstabkey:uuid align-at:1M
```

```
primary /boot    200      ext2     rw,noatime
primary -        4G-      -        -
```

```
disk_config lvm
vg vg1 disk1.2
vg1-root    /          3G-50G  ext4     noatime,rw
vg1-swap    swap      200-4G  swap     sw
vg1-home    /home    600-    ext4     noatime,nosuid,nodev,rw
```

- ▶ File systems: ext[2,3,4], vfat, xfs, ReiserFS, NTFS, btrfs

Software installation

Example: .../package_config/DEBIAN:

```
PACKAGES install-norec  
apt-transport-https # is only needed for stretch  
sudo debconf-utils  
file less linuxlogo rsync openssh-client  
time procinfo  
nullmailer  
console-setup kbd pciutils usbutils  
unattended-upgrades
```

```
PACKAGES install NONFREE  
firmware-bnx2 firmware-bnx2x firmware-realtek  
firmware-linux-nonfree
```

```
PACKAGES install AMD64  
linux-image-amd64  
mementest86+
```


FAI references



FAI users

- ▶ Anonymous, financial industry, 32.000 hosts
- ▶ LVM insurance, 10.000 hosts
- ▶ City of Munich, 16.000 hosts
- ▶ Albert Einstein Institute, 1725 hosts
- ▶ Mobile.de, ~600 hosts
- ▶ StayFriends, 700+ hosts
- ▶ XING AG, 300-400 hosts
- ▶ Opera Software, ~300 hosts
- ▶ Stanford University, 450 hosts
- ▶ MIT Computer science research lab, 200 hosts
- ▶ The Wellcome Trust Sanger Institute, 540 hosts
- ▶ Deutsches Elektronen-Synchrotron, 273 hosts
- ▶ Archive.org, 200+ hosts
- ▶ Electricité de France (EDF), 1500 hosts
- ▶ BUF, digital visual effects company, 1000 hosts
- ▶ Zivit, 260 hosts on two IBM z10 EC mainframes
- ▶ ETH Zurich, systems group, ~300 hosts
- ▶ Grml, creating eight different ISOs, daily builds

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Questions?