

FAI – The Universal Deployment Tool

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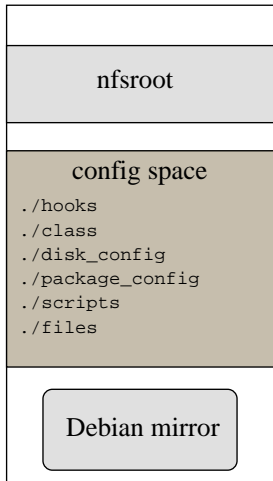
FOSDEM, January 2016

What is FAI?

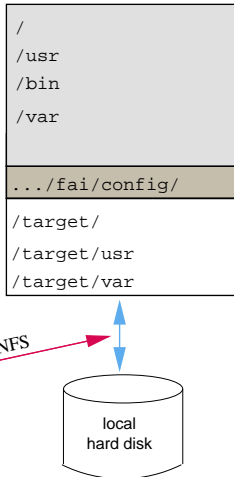
- ▶ FAI = Fully Automatic Installation
- ▶ Unattended mass deployment
- ▶ From “**empty disk**“ to “**user can use the computer**“
- ▶ Installation and configuration of the OS and all applications
- ▶ Do your own customization with FAI

FAI overview

install server



install client



mounted by kernel

NFS, svn, git, HTTP

provided via HTTP, FTP or NFS

The config space

```
|-- class/  
|   |-- 10-base-classes  
|   |-- 50-host-classes  
|   |-- FAIBASE.var  
|   '-- GERMAN.var
```

```
|-- disk_config/  
|   |-- FAIBASE  
|   |-- LVM  
|   '-- foobar04
```

```
|-- basefiles/
```

```
|-- package_config/  
|   |-- FAIBASE  
|   |-- GERMAN  
|   |-- XORG  
|   |-- XFCE  
|   '-- server07
```

Customization scripts and files

```
|-- scripts/
|   |-- FAIBASE/
|   |   |-- 10-misc                Bourne shell script
|   |   |-- 30-interface          Bourne shell script
|   |   |-- 40-misc                Cfengine script
|   |-- DEMO/
|   |   |-- 10-misc                Perl script
|   |   |-- 30-demo                Cfengine script
|
|-- files/
    |-- etc/
        |-- X11/
            |-- xorg.xonf/          fcopy /etc/X11/xorg.conf
                |-- FAIBASE
                |-- MATROX
                |-- CAD
                |-- demohost
```

Disk partitioning

Example: .../disk_config/FAIBASE:

```
disk_config disk1      preserve_always:8 fstabkey:uuid

primary /              4G-10G      ext4  rw,noatime,errors=remount-ro
logical swap           1G          swap  rw
logical /var           1G-2G      ext4  rw
logical /tmp           1G-2%      ext4  rw
logical /home          5G-        ext4  defaults
```

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

RAID, LVM

```
disk_config disk1
primary - 50-100 - -
primary swap 1G swap SW
primary - 2G-10G - -
logical - 0- - -
logical - 0- - -
```

```
disk_config disk2 sameas:disk1
```

```
disk_config raid
raid1 /boot disk1.1,disk2.1 ext4 rw
raid1 / disk1.3,disk2.3 ext4 rw,acl,user_xattr
raid1 - disk1.5,disk2.5 - -
raid1 - disk1.6,disk2.6 - -
```

```
disk_config lvm
vg volg1 md2,md3
volg1-usr /usr 8G-15G ext4 rw createopts="-0 dir_index,resize_inode"
volg1-var /var 2G-8G ext4 rw createopts="-0 dir_index,resize_inode"
volg1-hl /home/local 10G ext4 rw,acl,user_xattr,noexec,nosuid,nodev
```

The universal tool



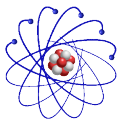
debian



ubuntu



CentOS



Scientific Linux

Installing different distributions

- ▶ Use Debian nfsroot when installing Ubuntu, CentOS, SLC,...
- ▶ No modification needed for: booting FAI, disk partitioning, software installation
- ▶ Each distribution needs a different base file (rinse)
- ▶ `sources.list` vs. `yum.repos.d` (easy)
- ▶ Adjust package names (easy)
- ▶ Adjust customization scripts (more changes)

```
|-- basefiles/  
  |-- CENTOS6_32.tar.xz  
  |-- CENTOS6_64.tar.xz  
  |-- CENTOS7_64.tar.xz  
  |-- SLC6_64.tar.xz  
  '-- UBUNTU_1410.tar.xz
```

The universal tool

Installation part	bare metal	VM	chroot	LiveCD	image inst.
boot the client	X	X			X
partition disks	X	X			X
create file systems	X	X			X
install software	X	X	X	X	
install kernel + grub	X	X		X	MBR
customization scripts	X	X	X	X	opt.
create bootable ISO				X	

TODO: cloud image installation: use dd, loopback mount, kpartx

FAI users

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

FAI - Fully Automatic Installation

Home

- Features
- Poster / Flyer
- User reports
- Mailing Lists / IRC / Wiki
- Clusters built with FAI

Screenshots

Download

- FAI-CD
- Packages
- FAI questionnaire

Documentation

- FAI Guide
- Manual pages
- Other documentation

Developers

- Sources / Bugs
- Roadmap
- Team

Contact / Support

Site search

Go

FAI is a non-interactive system to install, customize and manage Linux systems and software configurations on computers as well as virtual machines and chroot environments, from small networks to large-scale infrastructures like clusters and cloud environments.

It's a tool for unattended mass deployment of Linux. You can take one or more virgin PC's, turn on the power, and after a few minutes, the systems are installed, and completely configured to your exact needs, without any interaction necessary.

Motto: Plan your installation, and FAI installs your plan.

NEWS

- [26 Nov 2014] **New FAI CD image available, FAI 4.3.1 +wheezy1**
- [19 Nov 2014] **FAI 4.3.1 released, bug fixes**
- [24 Oct 2014] **FAI 4.3 released, btrfs support added**
- [3 Jun 2014] **FAI 4.2 released, new ISO images created**
- [15 September 2011] **CENTOS and Scientific Linux Cern support [more...](#)**
- [21 Dec 2009] The FAI project celebrates its [10th anniversary](#).

Features

- Installs and updates Debian, Ubuntu, CENTOS, RHEL, SUSE, ...
- Centralized deployment and configuration management
- Installs virtual machines using KVM, XEN or VirtualBox and Vserver
- Easy set up of software PAID and LVM
- Full remote control via ssh during installation
- Integrated disaster recovery system
- Every stage can be customized via hooks

Download FAI CD



Plan your installation and FAI installs your plan! :-)

Demo time

- ▶ KVM with disk image in RAM
- ▶ Xfce installation via network (PXE boot)
- ▶ Building our own ISO image (+ gimp)
- ▶ Youtube search for: **FAI 5.0**