Debian - LocalAreaNetwork

Deploy Debian in your Network the Easy and Flexible Way

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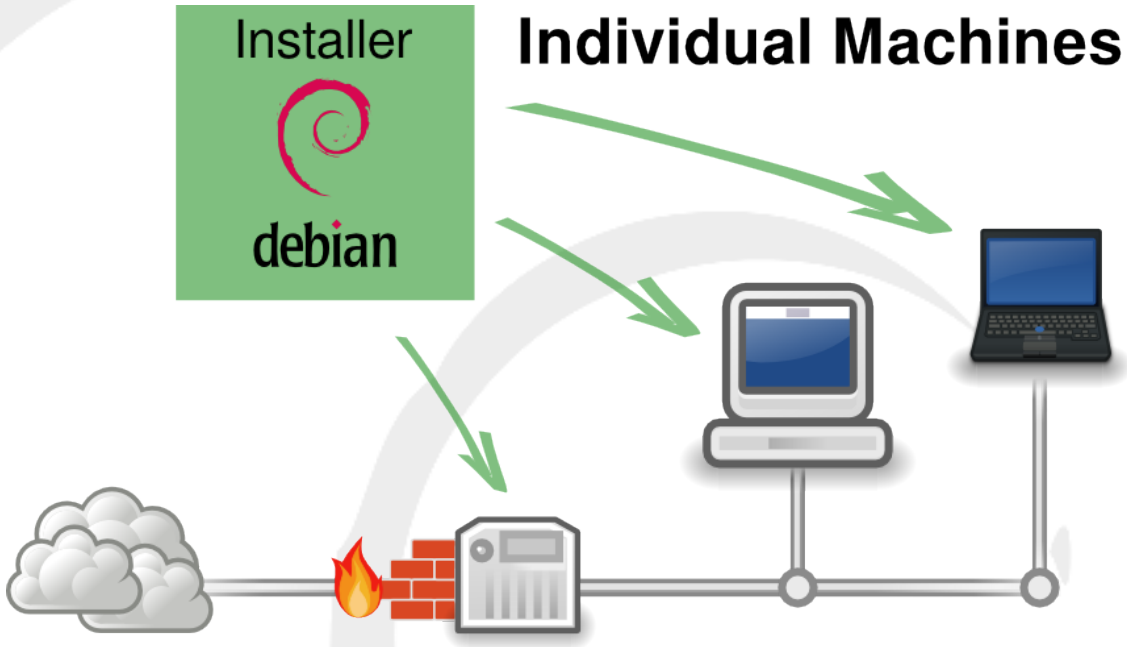
Debian, the Universal Operating System

debian

The Universal Operating System ??!!

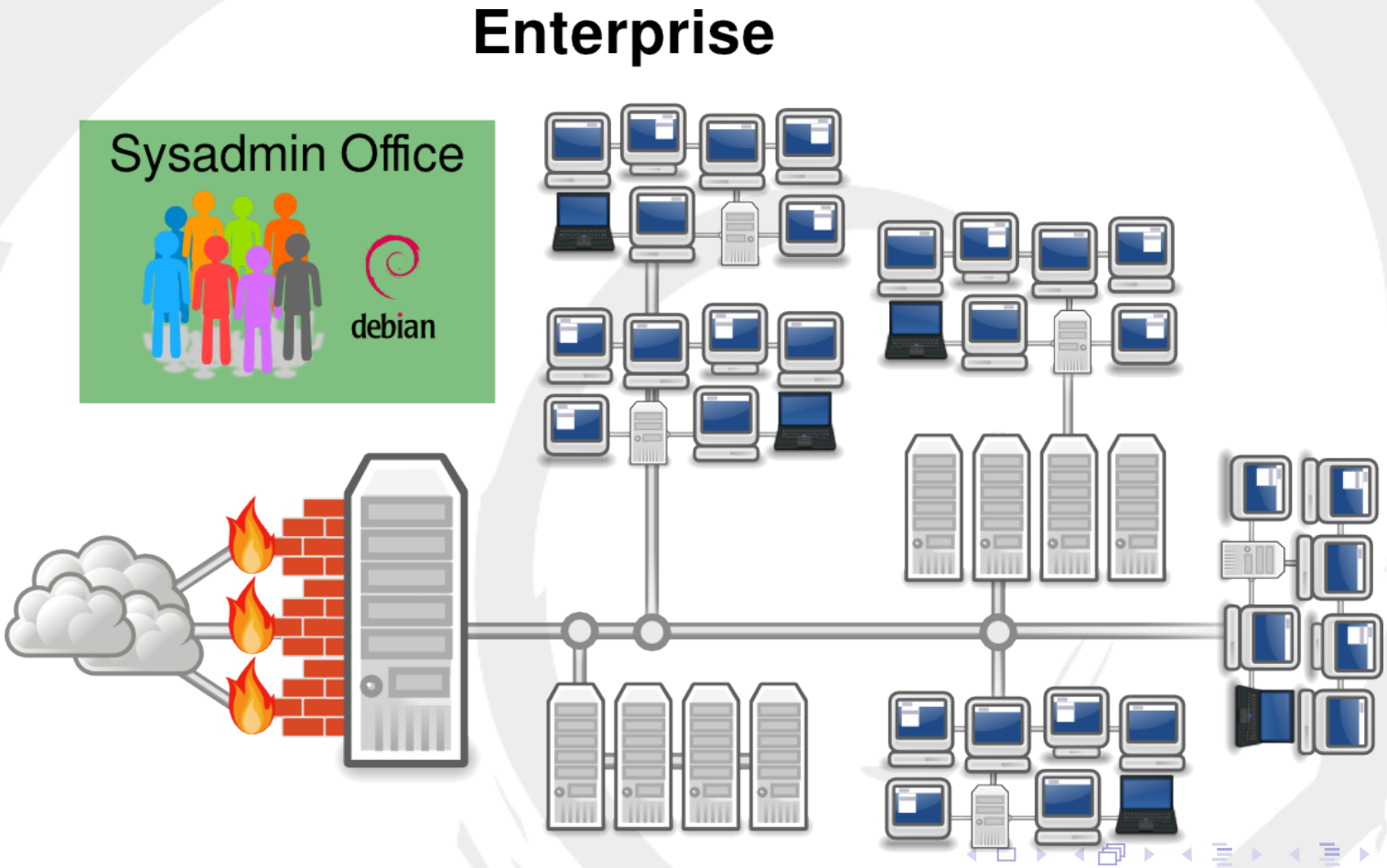
Installing Individual Machines with the Debian Installer

The installation and configuration of a single, individual machine has been made easy by the Debian-Installer:



Debian in Enterprises

The deployment of a whole system environment with centralized user and machine management, intranet, etc. is more involved. It is usually the realm of professional full-time system administration:



What, if you need something in between?

A system setup for:

- schools
- work groups
- small enterprises
- NGOs
- associations
- home network
- test environments
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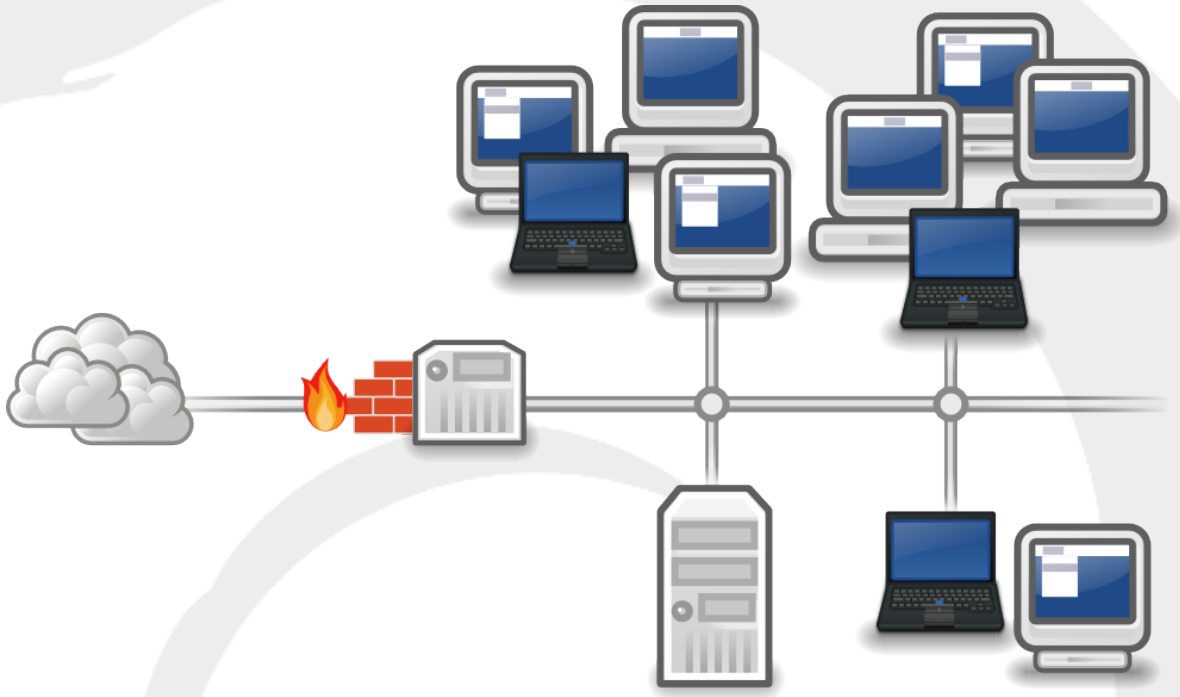

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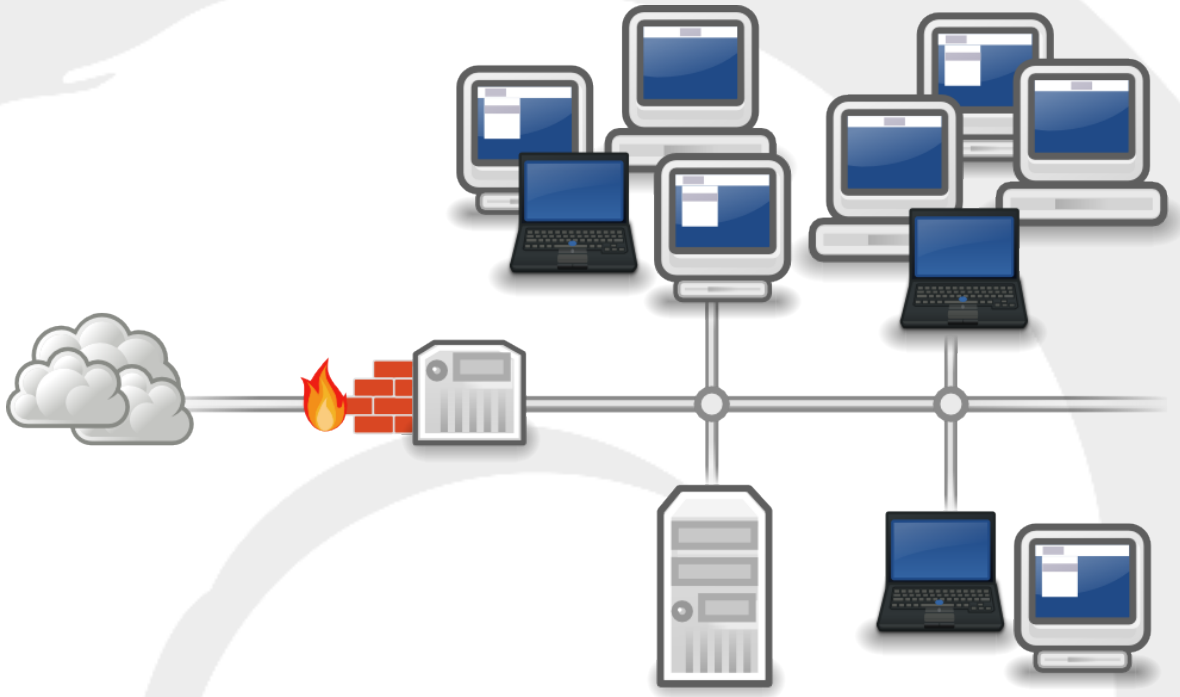

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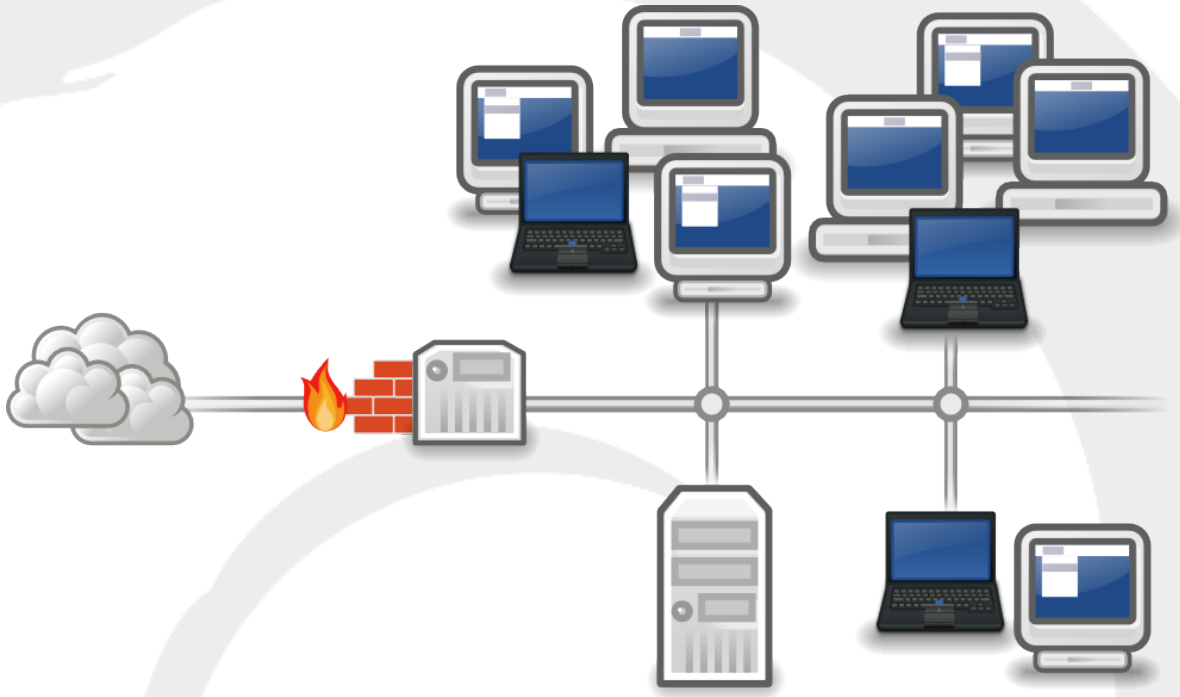

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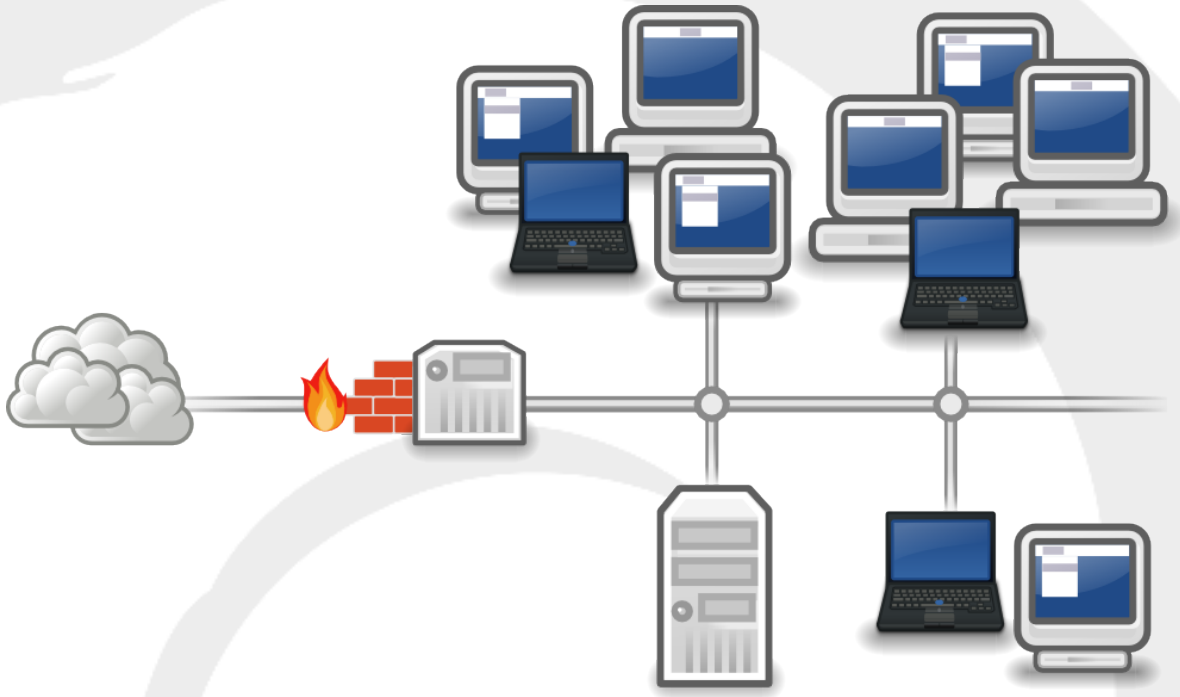

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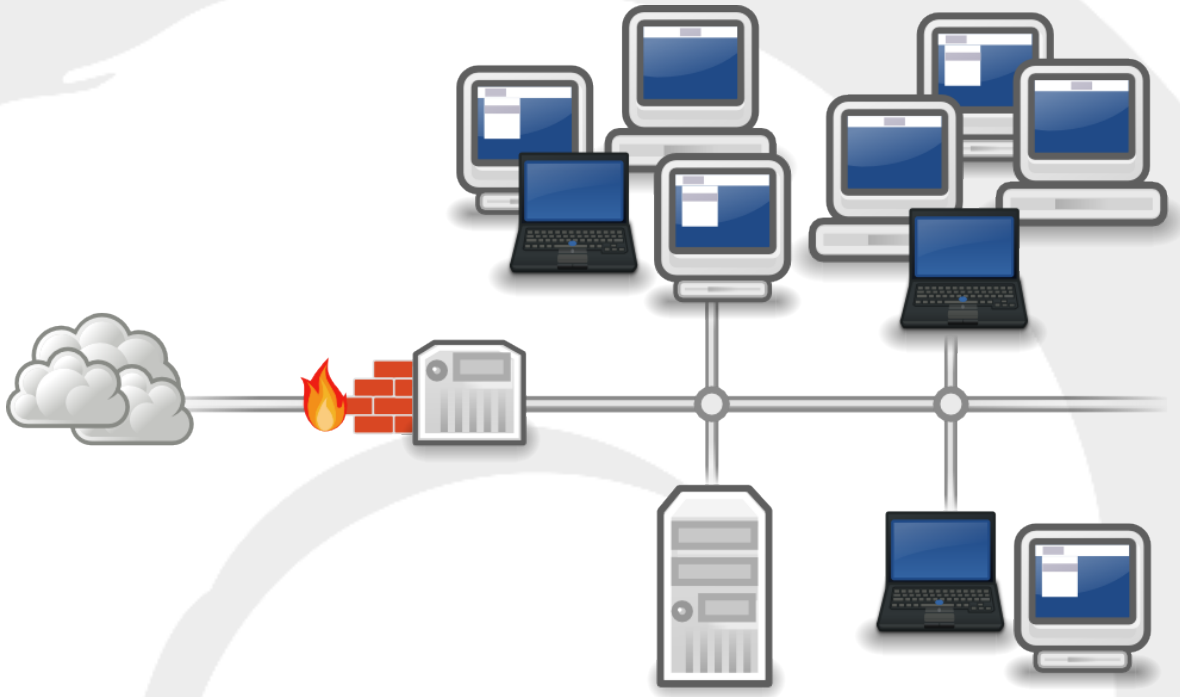

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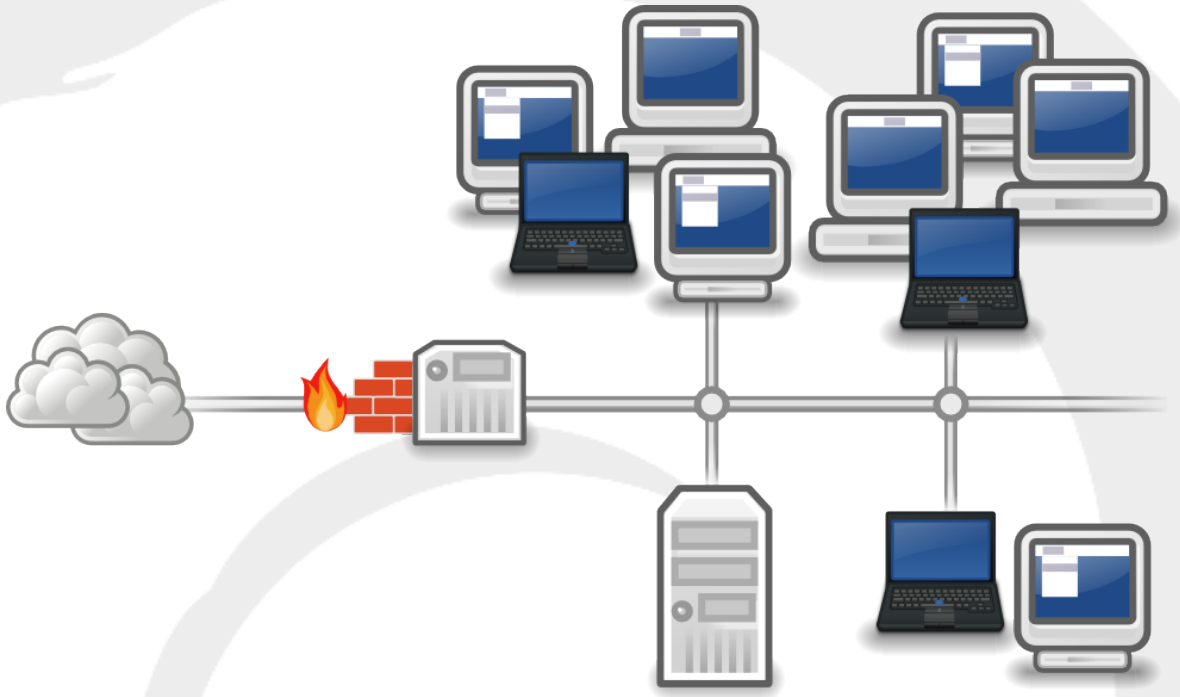

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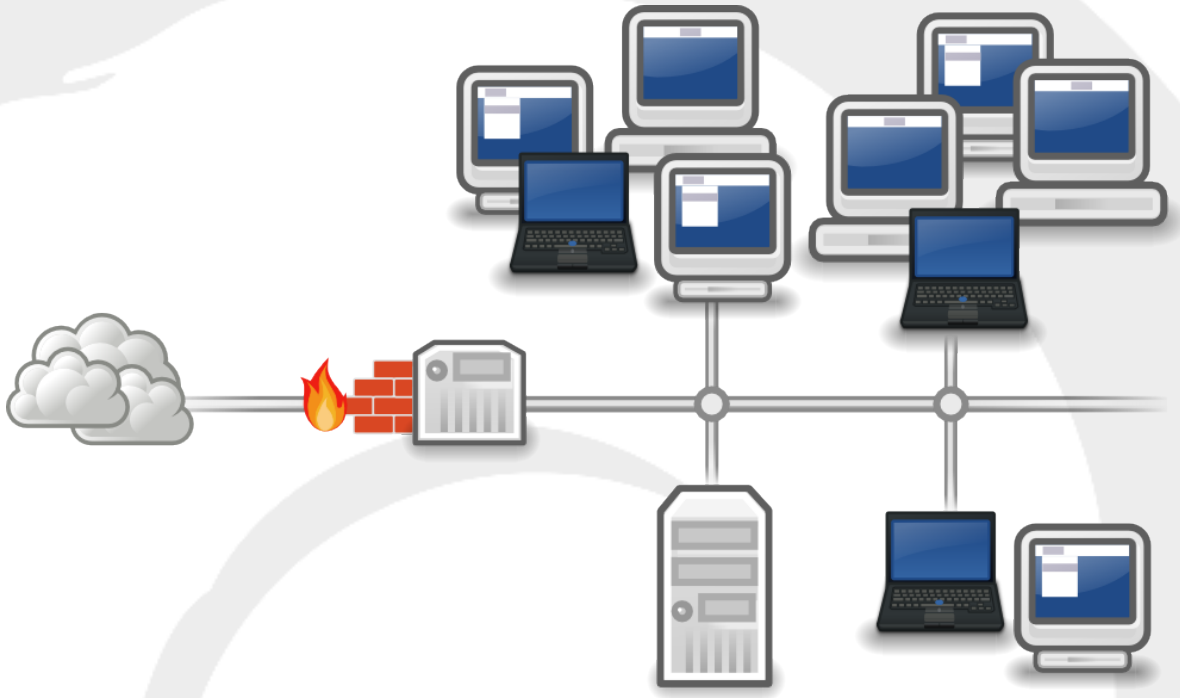

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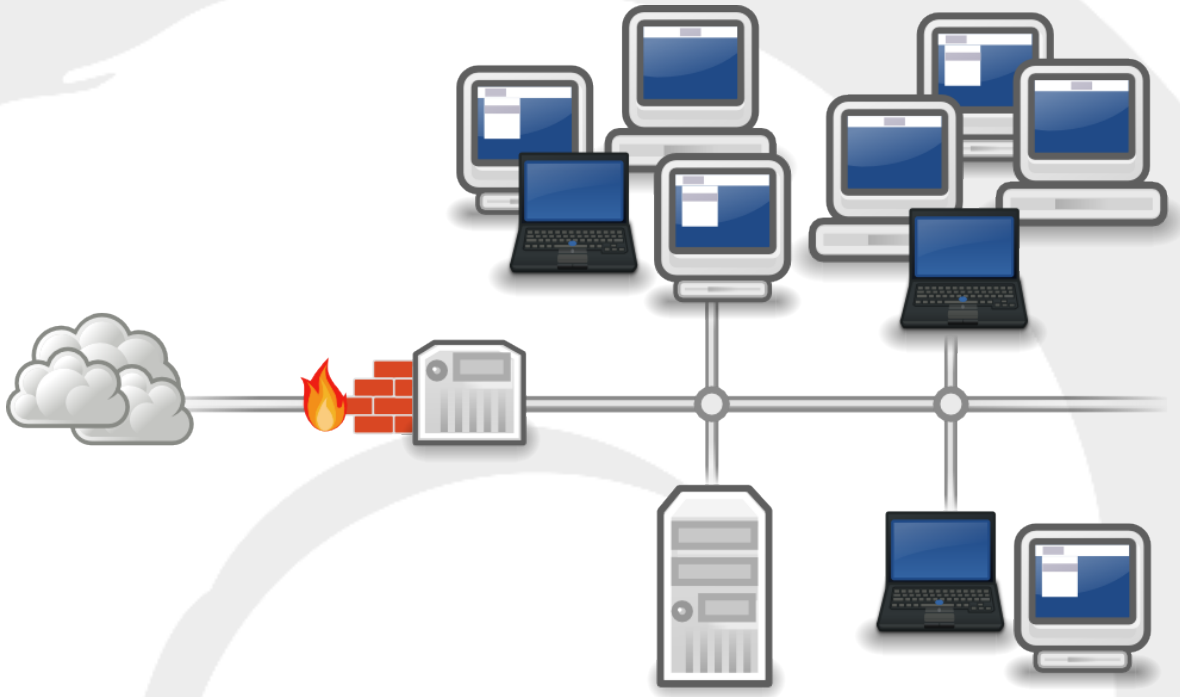

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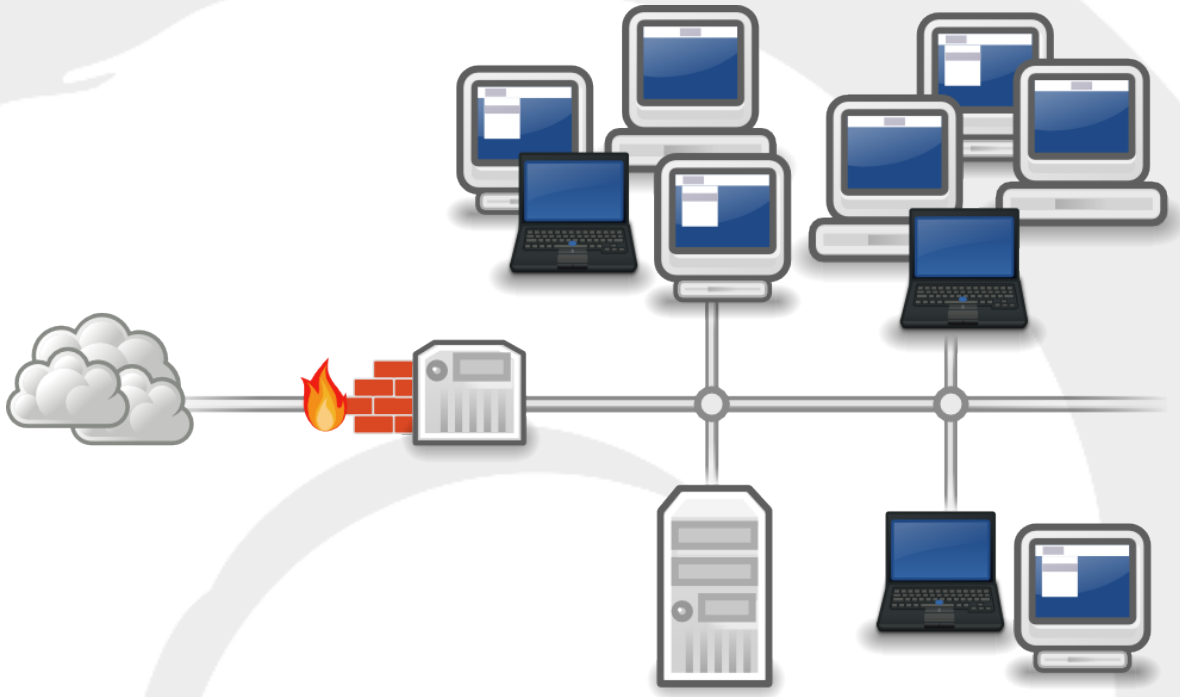

$\Rightarrow$ Debian Local Area Network

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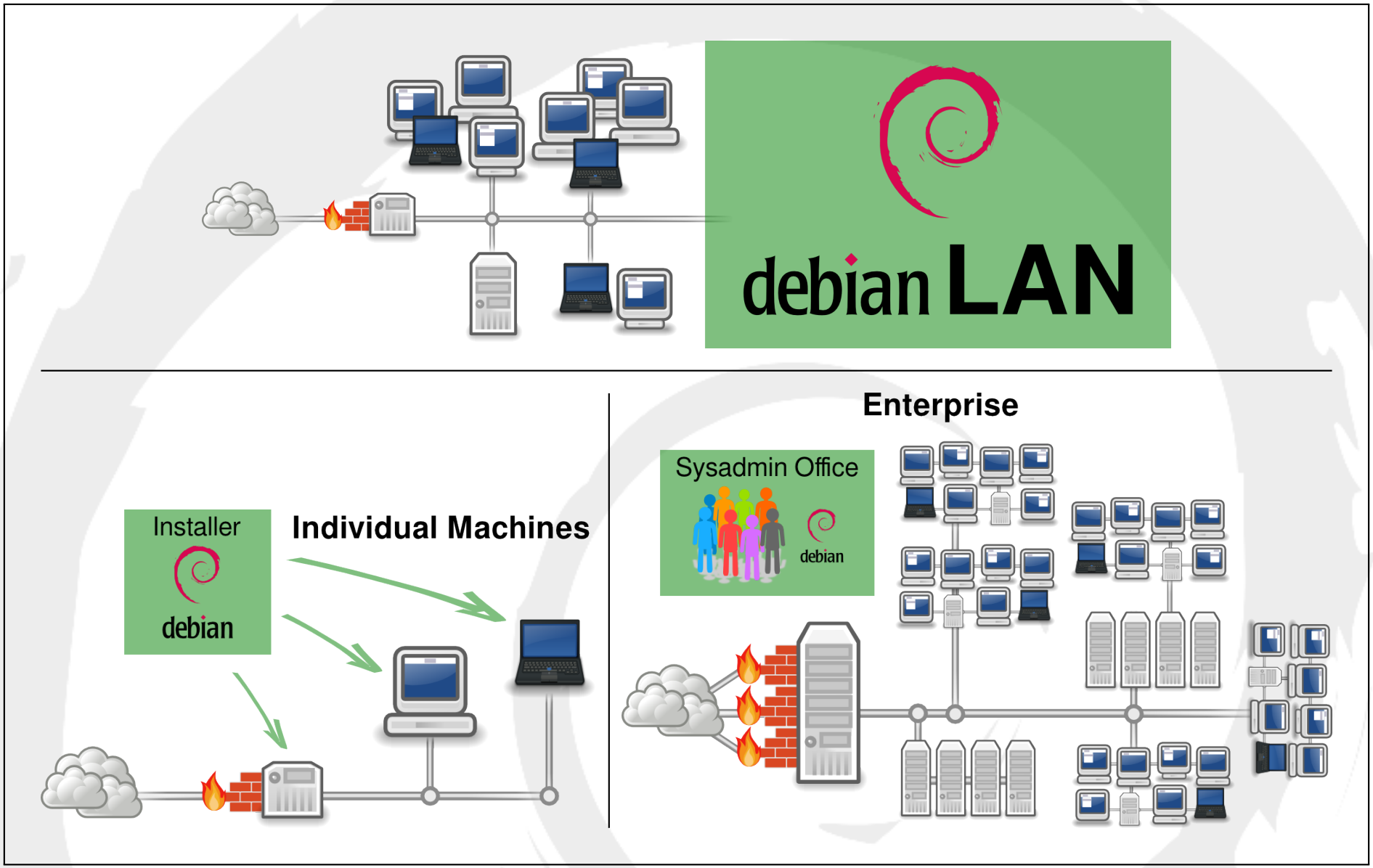

Outline

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Overview

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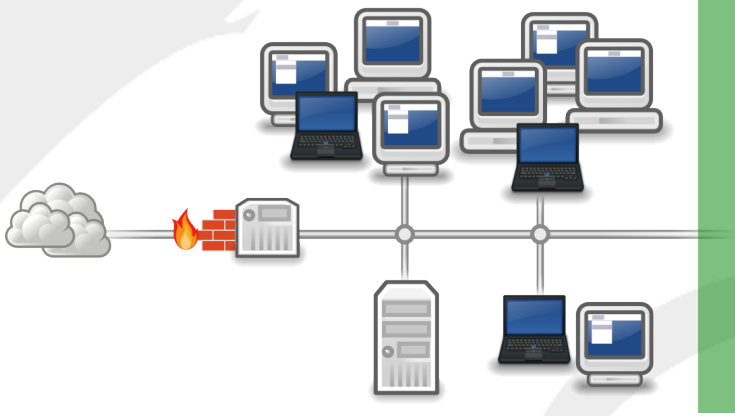

debian LAN

Challenges:

- simple installation/setup, maintenance and upgrade
- flexibility to implement local modifications and extensions
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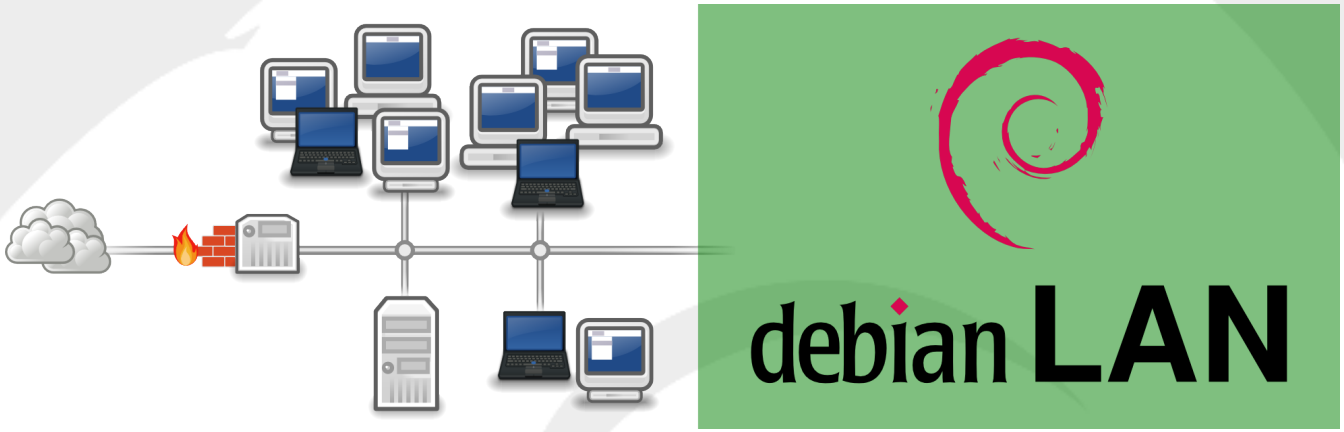

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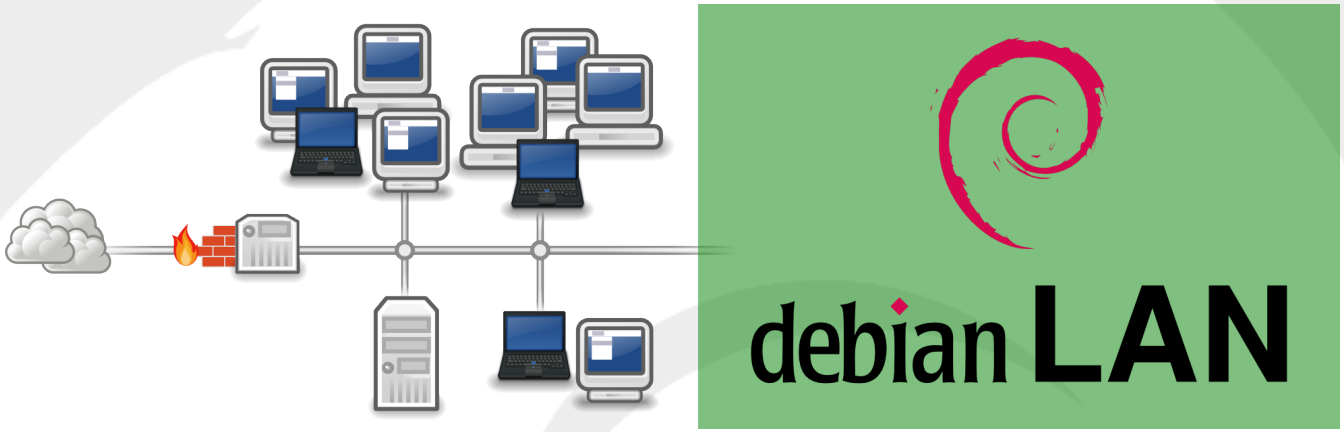

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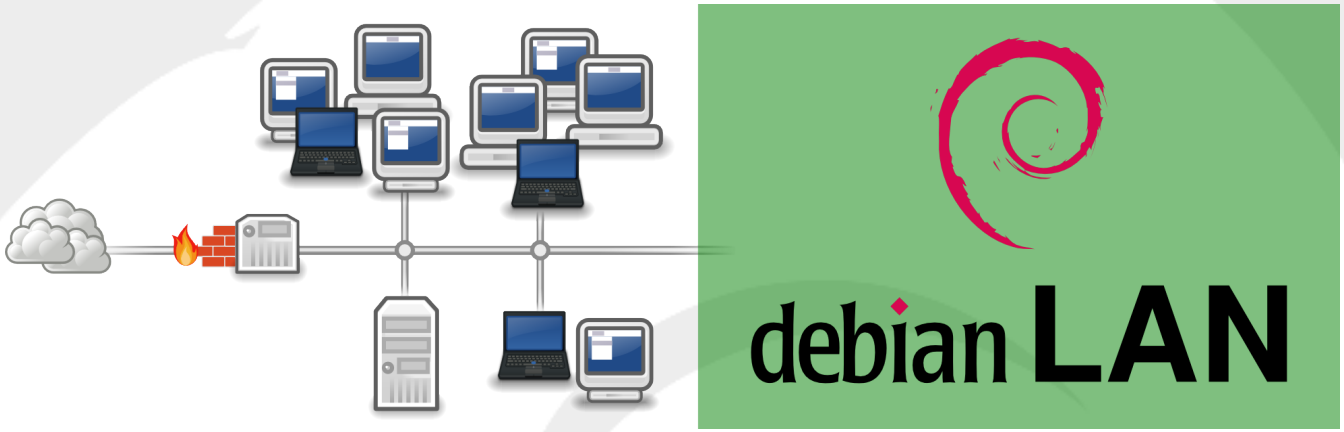

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System Flavors and Machine Types

- **gateway:**
  - firewall, masquerading
- **mainserver** (provides all services):
  - authentication (Kerberos)
  - directory service (LDAP)
  - kerberized NFSv4 homes
  - email: SMTP/IMAP Server
  - ...
- **workstation** (desktop):
  - Gnome, KDE, Xfce, LXDE, ...
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- **diskless** (workstation):
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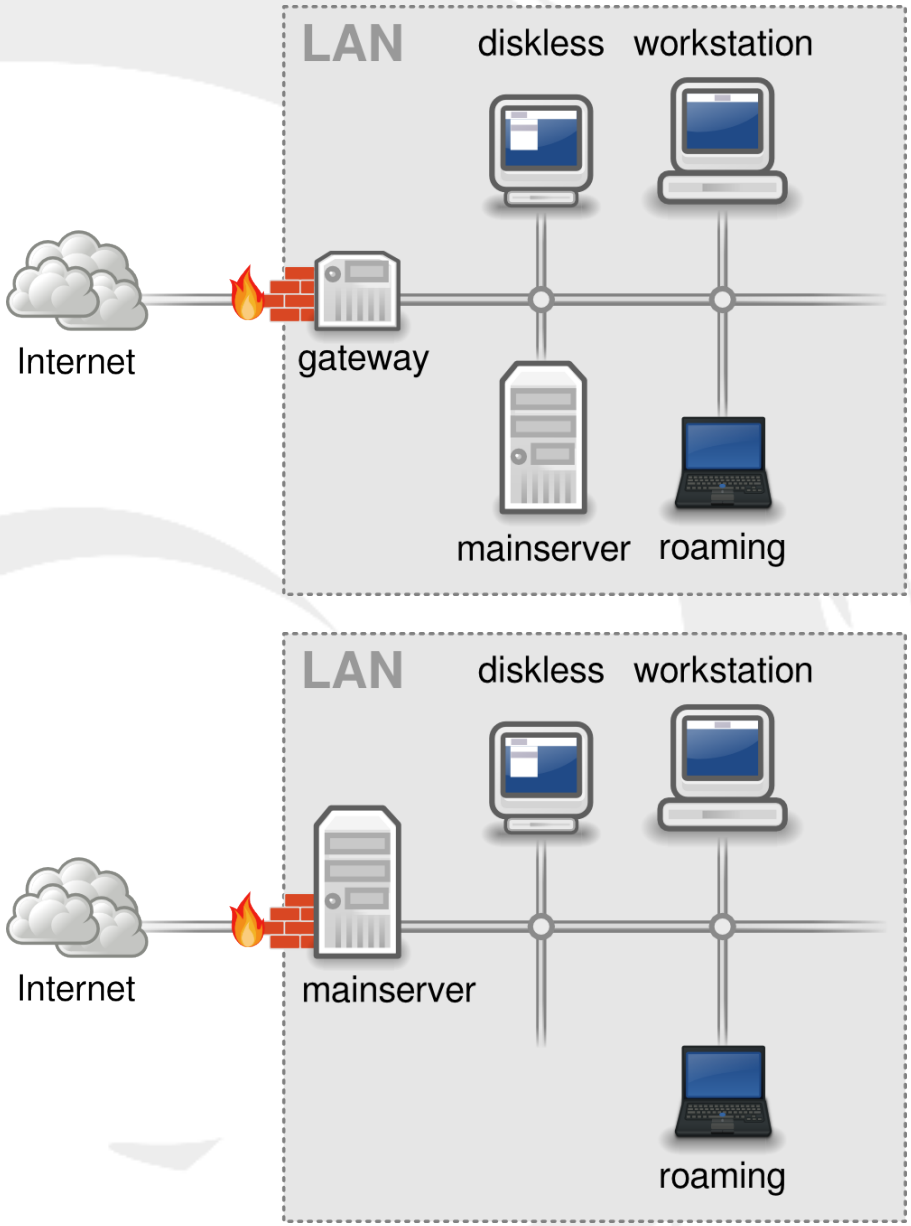

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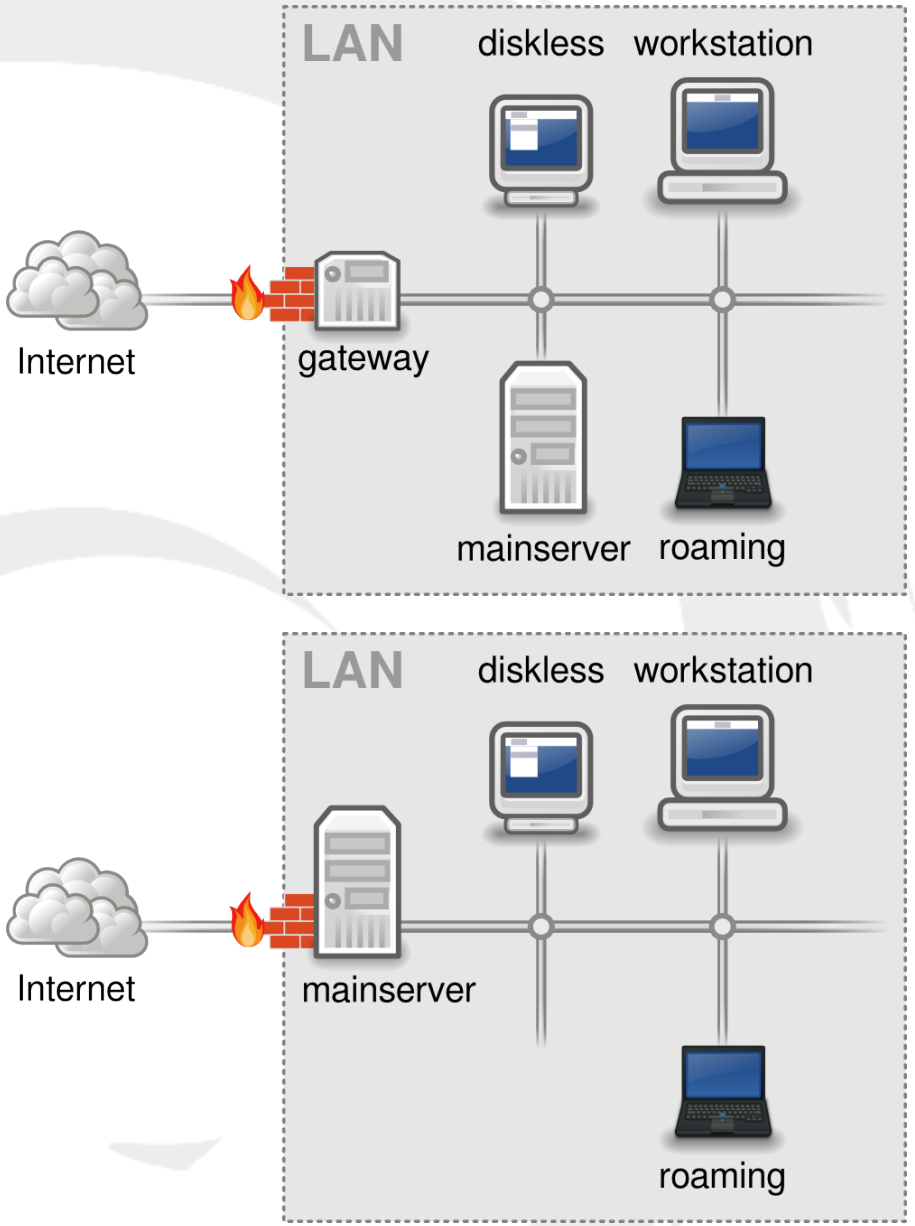

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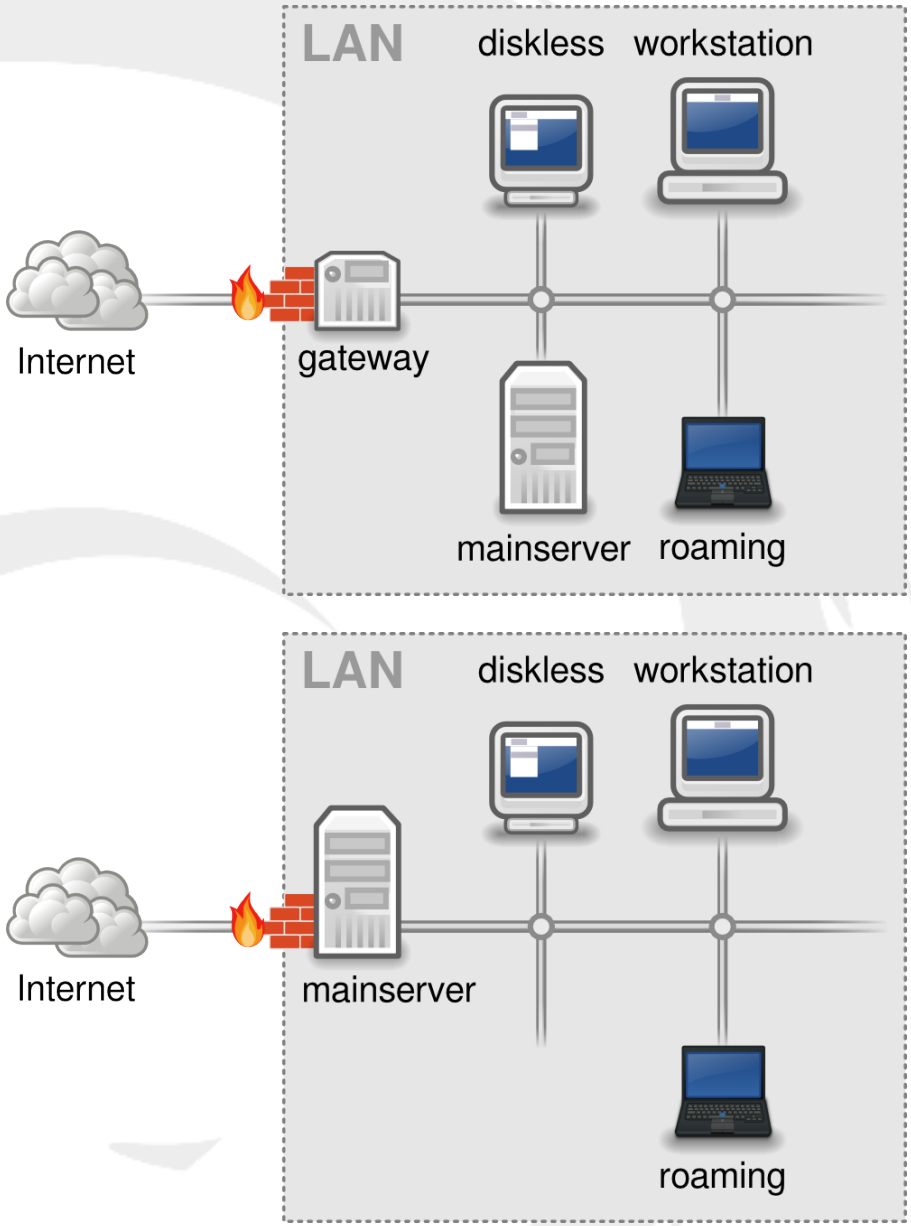

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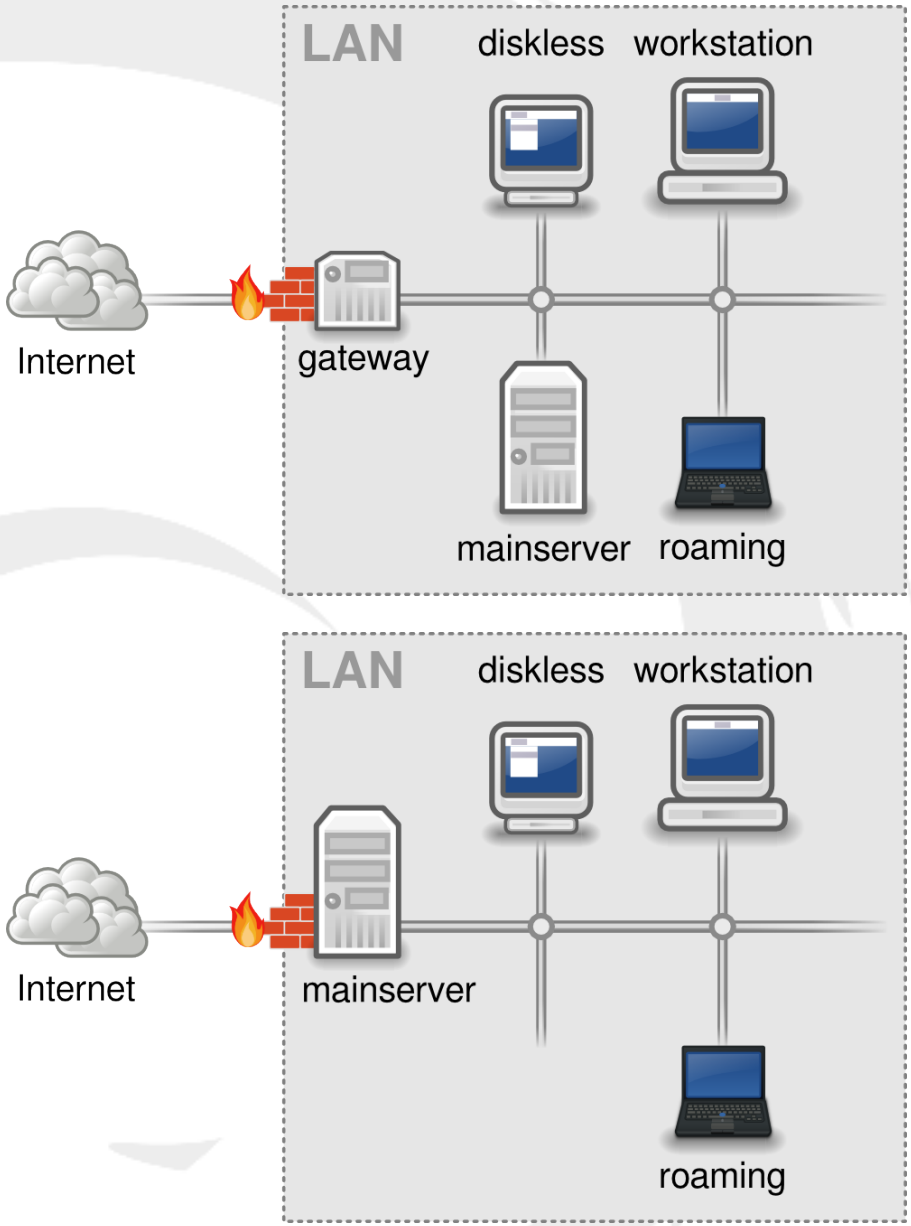

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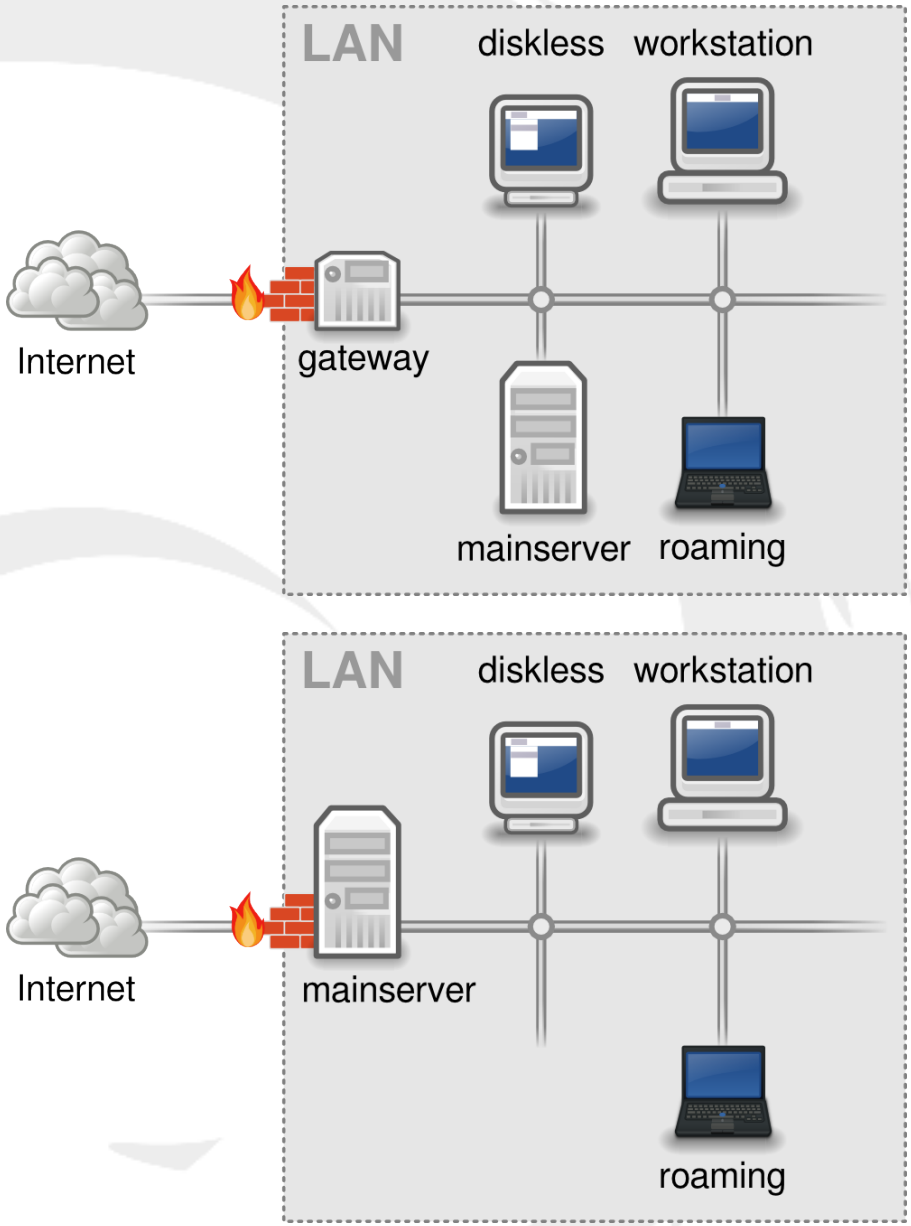

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- LDAP
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- GOsa for user management
- kerberized local email: exim, dovecot
- intranet (users' homepages)
- ICINGA and Munin system monitoring
- disk quota
- proxy (Squid)
- apt-cacher-ng
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Overview

What Information is needed to install a machine?

What is the information needed to install any arbitrary machine?

1. set up software storage media $\longrightarrow$ disk partitions
2. package selection
3. configure system:
   - debconf preseeding
   - edit/manipulate configurations

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Fully Automatic Installation (FAI): Class Concept

FAI's class concept:

- every hostname is mapped on a set of classes
- classes define the complete setup:
  - actions (partitioning, package selection, ...)
  - configuration (debconf, scripts, ...)
- classes are defined in the FAI config space

FAI config space[1] (top level):

```
-- config
   |-- class/          (map hostname to classes, define variables)
   |-- debconf/        (populate debconf database, preseeding)
   |-- disk_config/    (define the hard disk setup)
   |-- files/          (files to be copied to the target machine)
   |-- hooks/          (hooks to be run during installation)
   |-- package_config/ (package selection to be installed)
   |-- scripts/        (scripts to be run after installation)
   `-- tests/          (final test, verbose logging of actions)
```

[1] The config space is a certain directory structure with text files.

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```
-- config
    |-- class/           (map hostname to classes, define variables)
    |-- debconf/         (populate debconf database, preseeding)
    |-- disk_config/     (define the hard disk setup)
    |-- files/           (files to be copied to the target machine)
    |-- hooks/           (hooks to be run during installation)
    |-- package_config/  (package selection to be installed)
    |-- scripts/         (scripts to be run after installation)
    `-- tests/           (final test, verbose logging of actions)
```

[1] The config space is a certain directory structure with text files.

Fully Automatic Installation (FAI): Examples

Example: The host 'gateway' is associated with the following classes:

```
FAIBASE DEBIAN DHCPC FIREWALL GATEWAY_A
```

All packages defined in these classes will be installed and configured accordingly.

Example: What happens to hosts associated with the `FIREWALL` class?

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$ find config/ -name FIREWALL
        config/package_config/FIREWALL
        config/scripts/FIREWALL
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- package 'shorewall' will be installed
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FAI: `install` and `softupdate` Procedure

FAI install

- boot FAI live system (CD/USB or PXE) on the target machine
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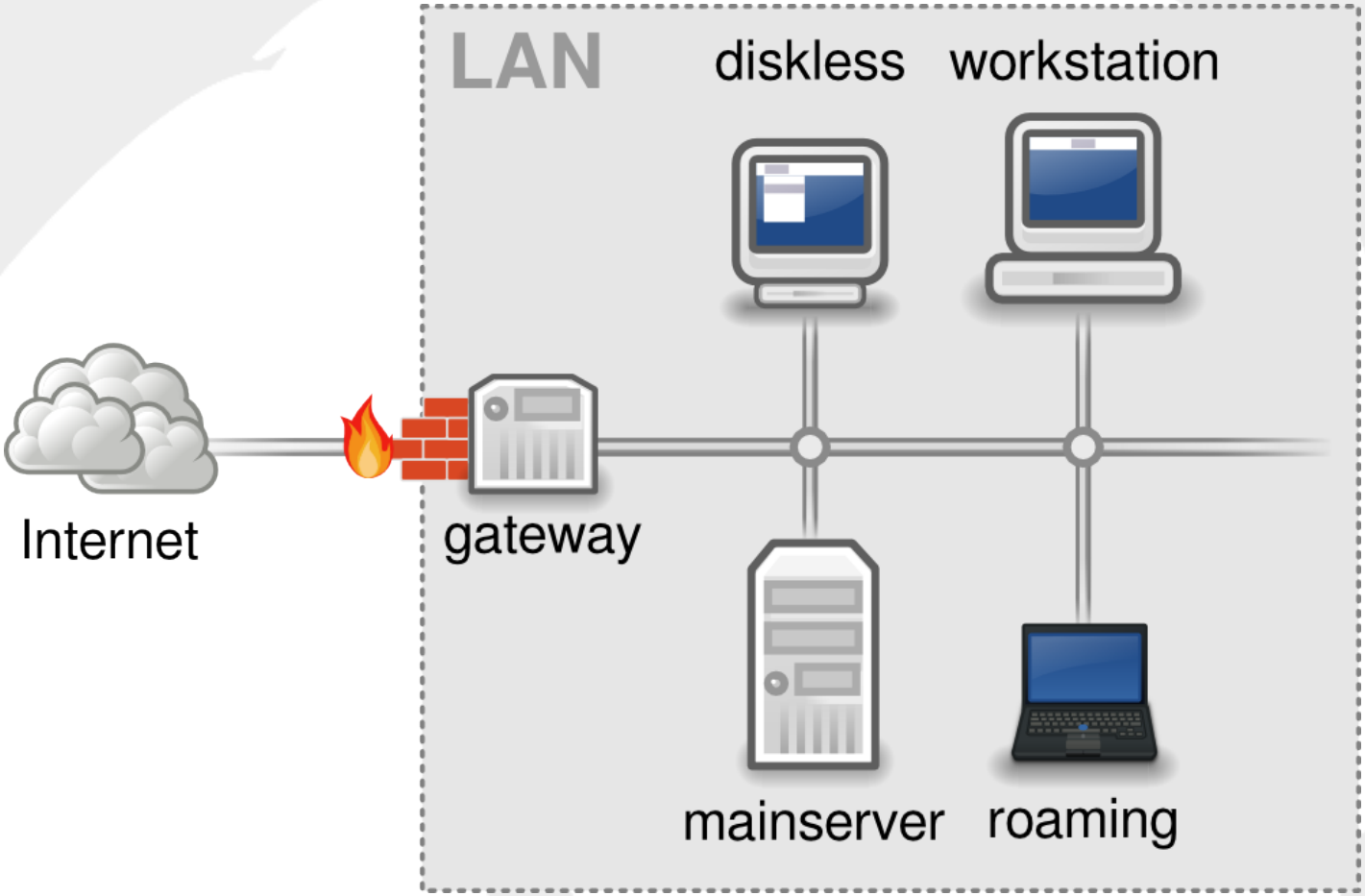
FAI softupdate (already installed machine)

- mount FAI config space on the system
- map hostname to set of classes
- dependent on the associated classes:
  - configure packages (debconf database)
  - install packages
  - configure target system (run scripts)

Overview

Using FAI to Install the Debian-LAN System

The `debian-lan-config` package provides the **complete FAI config space**[2] and instructions on how to deploy all machines of the system:



[2] `http://sources.debian.net/src/debian-lan-config`

Installing the Debian-LAN from its config space

To get started (cf. Debian-LAN Wiki[3]):

1. Prepare/install the mainserver (and optionally the gateway):
   - Prepare or download a Debian-LAN net-install FAI CD and install the mainserver.
   - Alternatively, install a minimal Debian system and convert it to the Debian-LAN mainserver with FAI softupdate.
2. Deploy all other machines by PXE-booting in the network:

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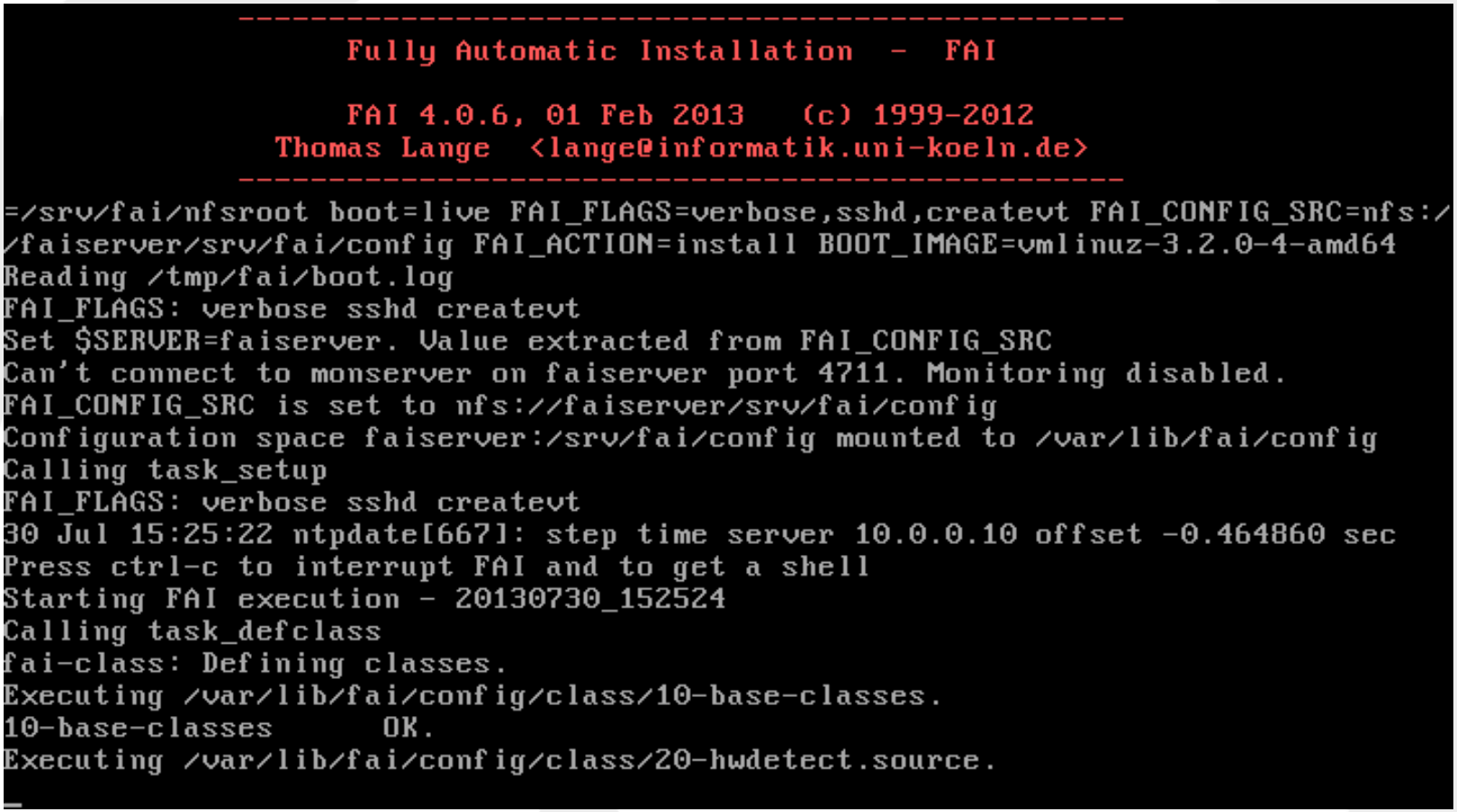
Using FAI to Install the Debian-LAN System

Machines known to the DHCP server will be installed unattended:

...



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Overview

The Debian-LAN FAI Classes

The `mainserver` maps onto the following classes[4]:

1. FAIBASE
2. DEBIAN
3. FAISERVER
4. LVM8_A
5. DISKLESS_SERVER
6. FIREWALL
7. CUPS_SERVER
8. LOG_SERVER
9. PROXY
10. NTP_SERVER
11. DNS_SERVER
12. NFS_SERVER
13. MAIL_SERVER
14. LDAP_CLIENT
15. LDAP_SERVER
16. KERBEROS_CLIENT
17. KERBEROS_KDC
18. KDC_LDAP
19. SERVER_A
20. GOSA

`workstations` map onto:

1. FAIBASE
2. DEBIAN
3. DHCPC
4. LVM5_A
5. CUPS_CLIENT
6. LOG_CLIENT
7. LDAP_CLIENT
8. NFS_CLIENT
9. KERBEROS_CLIENT
10. CLIENT_A
11. XORG
12. DESKTOP

[4] Cf. `class/50-host-classes` in the Debian-LAN FAI config space.

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Philosophy of the Debian-LAN FAI Classes

The Debian-LAN config space has been set up with the following in mind:

- For every service and/or feature, use a separate class.
- Try to make every class as general as possible: Use `SERVER_A` and `CLIENT_A` for setup-specific stuff.
- Use extra classes for local and site-specific modifications, i.e. the classes: `EDU`, `DEVEL`, `GERMAN`, `FR_BELGIAN`, `MYCLASS`, ...

This leads to **very nice development and maintenance** features:

- If a service and/or a feature fails, it is clear where to look in the config space[5].
- Reusable classes lead to a modular system: New setups may be composed of available modules.
- Users can provide extra classes to implement special features.

[5] In addition, the FAI built-in log- and debug-features help a great deal.

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Classes Reuse Example

Example: You prefer to have a gateway including the proxy.

$\Longrightarrow$

1. Move the association of the `PROXY`-class to the gateway.
2. Check the classes `SERVER_A` and `GATEWAY_A` for necessary adaptions.

Example: You would like to split services onto two servers.

$\Longrightarrow$

1. Add a new hostname for the second server to the config space.
2. Move all associations to classes you want to serve on that machine to the host.
3. Implement the setup-specific classes `SERVER_B` and `CLIENT_B`.

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Resources

- Debian-LAN Wiki:

  `https://wiki.debian.org/DebianLAN`
- Debian-LAN package `debian-lan-config`:

  `http://packages.debian.org/debian-lan-config`
- Debian-LAN Git-Repository:

  `http://anonscm.debian.org/gitweb/?p=collab-maint/debian-lan.git`
- Debian-LAN mailing list:

  `http://lists.alioth.debian.org/mailman/listinfo/debian-lan-devel/`

Illustrations remixed from: `https://openclipart.org/`

Summary and Conclusions

- Debian-LAN provides a way to install a complete Debian based network out of the box including kerberized services, central user management, diskless clients and roaming machines.
- The whole system is defined in the structured FAI configuration space. FAI is used to install the machines.
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