

# **Linux Administration**

## **Network services**

Xavier Belanger

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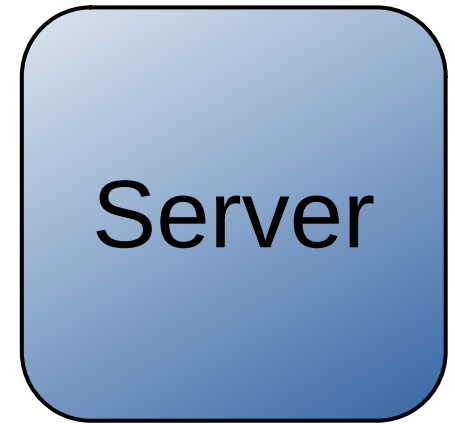
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# DHCP

- Dynamic Host Configuration Protocol
- Used to provide IP configuration to computers connecting to a network.
- Also used for extra configuration for specific devices (IP phones, ...).
- Using port UDP/67 and UDP/68.



# ISC DHCPD

- Historically ISC DHCPD has been the main DHCP server used on Linux and UNIX systems.
- The configuration file is usually `/etc/dhcpd.conf`.

```
# 24 hours lease (24*3600)
default-lease-time 86400;

# 48 hours maximum lease
max-lease-time 172800;

# Local network
subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.60 192.168.1.90;
    option routers 192.168.1.1;
    option domain-name-servers 192.168.1.10;
    option domain-name "example.net";
}
```

# SSH

- Secure Shell
- Used to remotely connect to a system, execute commands and transfer files.
- Using port TCP/22.

# OpenSSH

- Initially developed for the OpenBSD system, OpenSSH has been ported to various other systems.
- It's highly configurable, and can be fine-tuned for specific usages.
- The default configuration file for the service is `/etc/ssh/sshd_config`.



# DNS

- Domain Name System
- Used to convert names to IP addresses and IP addresses to names.
- DNS actually provide much more than addresses and names resolution. This service is essential for almost all other services. Email relies heavily on DNS.
- Using port UDP/53 and TCP/53.

# DNS server roles

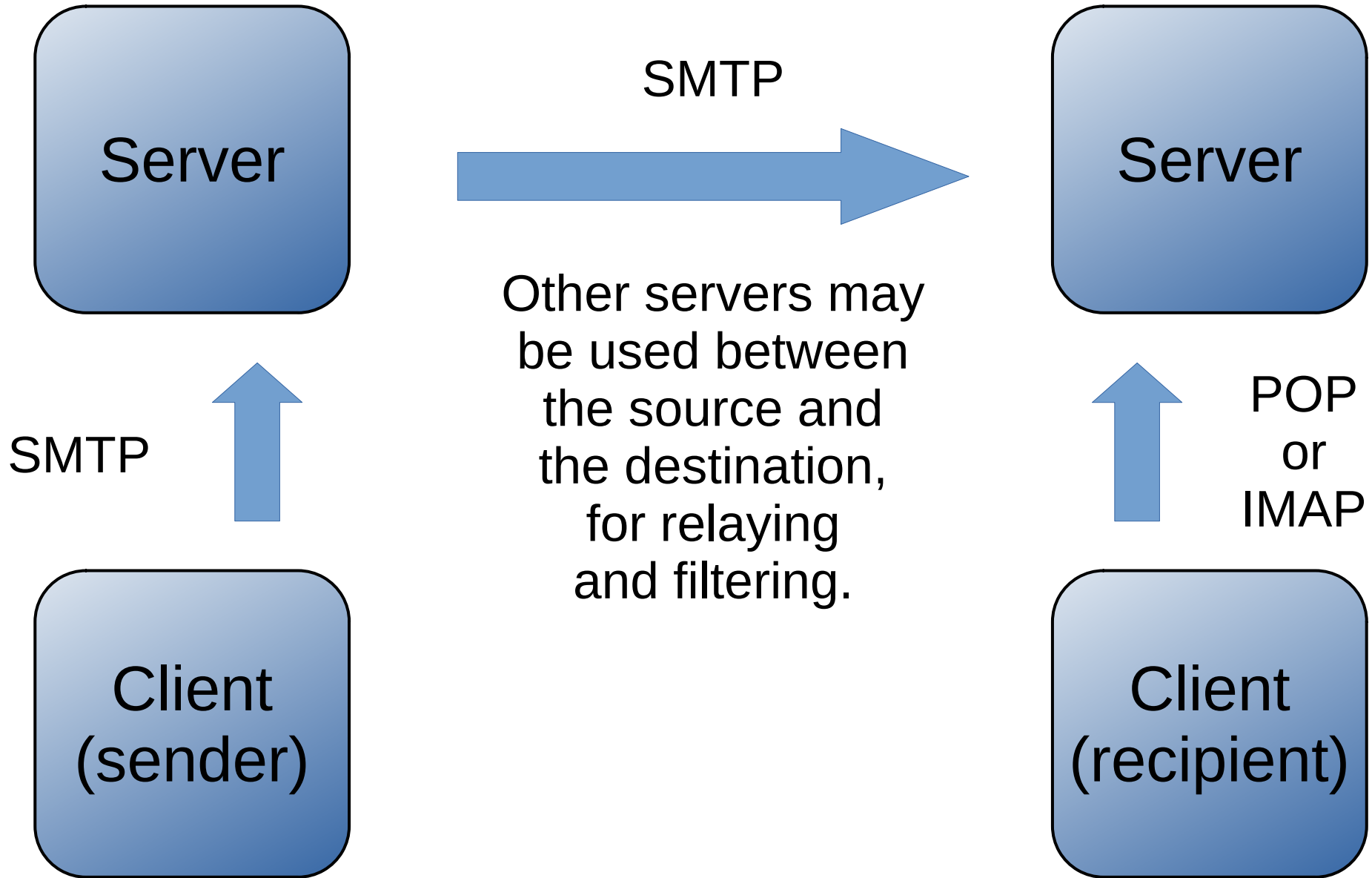
- A DNS server can be configured in two different modes:
  - authoritative mode, where the server is the authority for one or more networks.
  - recursive mode, where the server will relay the queries from the clients to another server.
- It's possible to use both modes on the same system, but this is against good practices.

# ISC BIND

- Historically ISC BIND has been the main DNS server used on Linux and UNIX systems.
- The configuration file is usually `/etc/named.conf`, plus some additional files for zones if required.

# SMTP, POP, IMAP

- On the server side:
  - Simple Mail Transfer Protocol (TCP/25, TCP/465 SMTPS, TCP/587 - Submission)
- On the client side:
  - Post Office Protocol (TCP/110, TCP/995 - POPS)
  - Internet Message Access Protocol (TCP/143, TCP/993 - IMAPS).



# Postfix

- Postfix is one of the most well-known email server application on Linux (Exim is another known solution).
- The configuration can vary greatly depending on the purpose of the server itself (relay, mailbox hosting, filtering, ...).
- In itself Postfix only sends and receives email; it doesn't provide access to the recipient mailboxes.

# Courier, Dovecot

- Specific services can be deployed to manage mailboxes and provide POP and IMAP access; Courier and Dovecot at some of the most well-known applications for this.
- Webmails are only interfaces to a regular IMAP server.

# HTTP

- HyperText Transfer Protocol
- Initially developed and used for the World Wide Web, nowadays used for plenty of other applications.
- Using port TCP/80 and TCP/443 (HTTPS) by default.



# Apache HTTPD

- Apache HTTPD is one of most-used web servers (Nginx is the closest competitor).
- That application has been around for a long time and has a large community, with plenty of documentation available.

```
# This is the main Apache HTTP server configuration file.
# It contains the configuration directives that give
# the server its instructions.
# See <URL:http://httpd.apache.org/docs/2.4/> for detailed
# information.
# In particular, see
# <URL:http://httpd.apache.org/docs/2.4/mod/directives.html>
# for a discussion of each configuration directive.
#
# Do NOT simply read the instructions in here without
# understanding what they do. They're here only as hints
# or reminders. If you are unsure consult the online docs.
# You have been warned.
```

# Debian/Ubuntu specifics

- On any Debian-based Linux distribution, the Apache HTTPD configuration is splitted across various files and sub-directories.
- Additional commands are also available to perform common operations.

# LDAP

- Lightweight Directory Access Protocol
- Used as a directory to authenticate users, can store various type of information for each entity.
- Using port TCP/389 and TCP/636 (LDAPS).

# OpenLDAP

- OpenLDAP is the most popular free and open-source directory application.
- Fact: many organizations are using Microsoft Active Directory. Active Directory is based on LDAP and can be used as such.

# About SSL/TLS

- Secure Socket Layer
- Transport Layer Security
- SSL is obsolete and insecure, but the acronym is still very much in use.
- TLS is used to encrypt and authenticate network traffic for various applications.

# OpenSSL

- On Linux systems, OpenSSL is the mostly commonly used cryptographic library and toolset.
- OpenSSL can be used to generate security certificates, data encryption and help for troubleshooting.