

# ARQUITETURA DE REDES

## LABORATORY GUIDE

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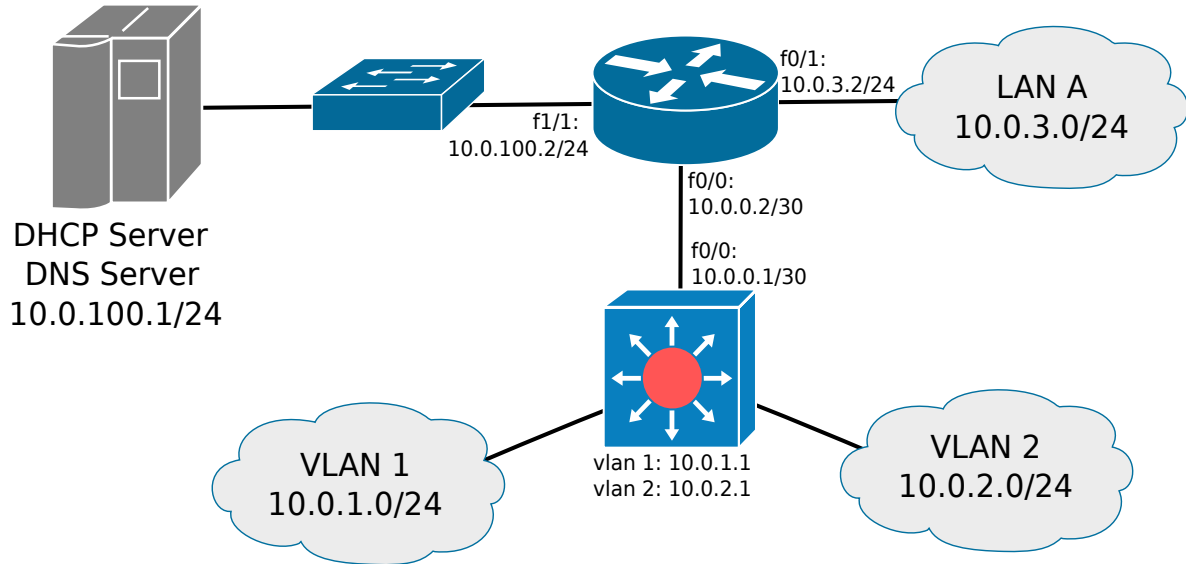
### Objectives

- Deployment of a DHCP server
- Deployment of a DNS server

## DHCP

1. Construct the network below, using as DHCP server a Debian server. Configure all static IPv4 addresses (Servers, Router and SWL3 interfaces) and deploy a routing mechanism. Test full connectivity between devices before proceeding.

**Important: A wrongly (or forgotten) active DHCP server in a network can create severe connection issues to users. After this guide, disable or uninstall the DHCP server.**



2. At the DHCP server, install package isc-dhcp-server: `apt-get install isc-dhcp-server`  
Edit file `/etc/default/isc-dhcp-server` to define the interfaces where DHCP messages are received:  
`INTERFACES="eth0"`

Edit file `/etc/dhcp/dhcpd.conf` to create IPv4 address pools to all (V)LAN:

```
option domain-name-servers 10.0.100.1;
subnet 10.0.1.0 netmask 255.255.255.0 {
    range 10.0.1.10 10.0.1.200;
    option routers 10.0.1.1;
}
subnet 10.0.2.0 netmask 255.255.255.0 {
    range 10.0.2.10 10.0.2.200;
    option routers 10.0.2.1;
}
subnet 10.0.3.0 netmask 255.255.255.0 {
    range 10.0.3.10 10.0.3.200;
    option routers 10.0.3.2;
}
subnet 10.0.100.0 netmask 255.255.255.0 {
    range 10.0.100.10 10.0.100.200;
    option routers 10.0.100.2;
}
```

(Re)Start the DHCP server: `sudo service isc-dhcp-server restart`

Check the file `/var/log/syslog` to inspect and solve possible errors.

3. At all L3 interfaces of Routers/SWL3 (with terminals) configure the DHCP relay agent to send DHCP requests to the central DHCP server:

```
Router(config)# service dhcp
Router(config)# interface vlan 1
Router(config-if)# ip helper-address 10.0.100.1
```

4. Activate DHCP in interfaces of all (V)LAN terminal devices. Check the obtained IPv4 addresses.

5. Repeat steps 1 to 4 for IPv6.

## DNS

6. At the DNS server, install package bind9: `apt-get install bind9`

Assuming that you own the domain **ar.com** configure your DNS server to act as a master server (zone) for that domain. Start by creating the definition of the zone with the associated *statements* (zone specific parameters), edit the file `/etc/bind/named.conf.local` (with root privileges) and add the following definition:

```
zone "ar.com" in{
    type master;                //statement to define the zone as master
    file "/etc/bind/db.ar.com"; //location of the zone file with the records
};
```

Create the file `/etc/bind/db.ar.com` (with root privileges) and add the following contents:

```
$TTL 604800
$ORIGIN ar.com.
@      IN      SOA      ns1.ar.com. adm.ar.com. (
                        2          ; Serial
                        604800     ; Refresh
                        86400      ; Retry
                        2419200    ; Expire
                        604800 )   ; Negative Cache TTL
;
      IN      NS       ns1.ar.com.
      IN      A        10.0.100.1
v1sw1  IN      A        10.0.1.1
v1sw1  IN      AAAA     2001:0:1::1
      IN      MX       10      server1
ns1     IN      A        10.0.100.1
server1 IN      A        10.0.100.1
server2 IN      CNAME   server1
```

Verify if your zone file it is correctly defined:

```
named-checkzone ar.com db.ar.com
```

Restart your DNS server:

```
service bind9 restart
```

Using a Linux terminal, test the configuration of your DNS by performing the following DNS queries:

```
dig @10.0.100.1 ar.com
dig @10.0.100.1 v1sw1.ar.com
dig @10.0.100.1 v1sw1.ar.com AAAA
dig @10.0.100.1 server1.ar.com
dig @10.0.100.1 server2.ar.com
dig @10.0.100.1 ar.com MX
```

Analyze the output of the dig commands.

7. Add a zone to configure the IPv4 reverse DNS mapping of your domain. Add to `/etc/bind/named.conf.local` the following zone definition:

```
zone "1.0.10.in-addr.arpa" in{
    type master;
    file "/etc/bind/db.10.0.1.rev"; };
```

Create the file `/etc/bind/db.10.0.1.rev` (with root privileges) and add the following contents:

```
$TTL 604800
$ORIGIN 1.0.10.in-addr.arpa.
@      IN      SOA      ns1.ar.com. adm.ar.com. (
                        2          ; Serial
                        604800     ; Refresh
                        86400      ; Retry
                        2419200    ; Expire
                        604800 )   ; Negative Cache TTL
;
      IN      NS       ns1.ar.com.
1      IN      PTR      v1sw1.ar.com. ; qualified name
11     IN      PTR      vlan1-11.ar.com.
12     IN      PTR      vlan1-12.ar.com.
```

**Restart your DNS server:**

```
service bind9 restart
```

**Using your PC, test your configuration with the commands:**

```
host 10.0.1.1 10.0.100.1
```

```
host 10.0.1.2 10.0.100.1
```

```
host 10.0.1.11 10.0.100.1
```

```
host 10.0.1.12 10.0.100.1
```