

75.43 Introducción a los Sistemas Distribuidos
Trabajo Práctico Grupal
Facultad de Ingeniería, Universidad de Buenos Aires

Grupo 2

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1. Subnetting

1.1. Asignación de direcciones IP a las redes

| Subnet | Nombre | Hosts | Direcciones | Dirección | Máscara |
|------------|------------------|--------|-------------|--------------|-----------------|
| A | Aguila | 125 | 128 | 201.158.15.0 | 255.255.255.128 |
| B | Buitre | 17 | 32 | 20.86.15.0 | 255.255.255.224 |
| C | Cuervo | 12 | 16 | 10.31.25.128 | 255.255.255.240 |
| D | Dodo | 223 | 256 | 20.64.73.0 | 255.255.255.0 |
| E | Espatula | 69 | 128 | 10.31.25.0 | 255.255.255.128 |
| F | Faisan | 19 | 32 | 20.86.15.32 | 255.255.255.224 |
| G | Golondrina | 2 | 4 | 10.31.25.152 | 255.255.255.252 |
| H | Hornero | 2 | 4 | 10.31.25.156 | 255.255.255.252 |
| I | Ibis | 10 PPP | | | |
| I1 | Ibis1 | 2 | 4 | 151.40.3.192 | 255.255.255.252 |
| I2 | Ibis2 | 2 | 4 | 151.40.3.196 | 255.255.255.252 |
| I3 | Ibis3 | 2 | 4 | 151.40.3.200 | 255.255.255.252 |
| I4 | Ibis4 | 2 | 4 | 151.40.3.204 | 255.255.255.252 |
| I5 | Ibis5 | 2 | 4 | 151.40.3.208 | 255.255.255.252 |
| I6 | Ibis6 | 2 | 4 | 151.40.3.212 | 255.255.255.252 |
| I7 | Ibis7 | 2 | 4 | 151.40.3.216 | 255.255.255.252 |
| I8 | Ibis8 | 2 | 4 | 151.40.3.220 | 255.255.255.252 |
| I9 | Ibis9 | 2 | 4 | 151.40.3.224 | 255.255.255.252 |
| I10 | Ibis10 | 2 | 4 | 151.40.3.228 | 255.255.255.252 |
| J | Jilguero | 43 | 64 | 20.86.15.64 | 255.255.255.192 |
| K | Kiwi | 6 | 8 | 10.31.25.144 | 255.255.255.248 |
| L | Lechuza | 240 | 256 | 20.26.29.0 | 255.255.255.0 |
| M1 | Mero1 | 68 | 128 | 20.86.15.128 | 255.255.255.128 |
| M2 | Mero2 | 18 | 32 | 10.31.25.160 | 255.255.255.224 |
| N privada | Negron | 2 | 4 | 10.31.25.160 | 255.255.255.252 |
| O privada | Ortega | 2 | 4 | 10.31.25.164 | 255.255.255.252 |
| P privada | Paloma | 2 | 4 | 10.31.25.168 | 255.255.255.252 |
| Q1 Publica | Quebrantahuesos1 | 2 | 4 | 150.38.27.0 | 255.255.255.252 |
| Q2 Publica | Quebrantahuesos2 | 2 | 4 | 150.38.27.4 | 255.255.255.252 |
| Q3 Publica | Quebrantahuesos3 | 2 | 4 | 150.38.27.8 | 255.255.255.252 |

1.1.1. Asignación IP a routers, servers, hosts

| Subred | Dispositivo | Interfaz | Dirección | Máscara |
|--------|-------------|----------|--------------|-----------------|
| A | | | | |
| | WebServer | | 201.158.15.1 | 255.255.255.128 |
| | Host A | | 201.158.15.2 | 255.255.255.128 |
| | R4 | e0/0 | 201.158.15.3 | 255.255.255.128 |
| | R5 | e0/0 | 201.158.15.4 | 255.255.255.128 |
| | R2 | e0/0 | 201.158.15.5 | 255.255.255.128 |
| | R3 | e0/2 | 201.158.15.6 | 255.255.255.128 |
| | Virtual A | | 201.158.15.7 | 255.255.255.128 |
| B | | | | |
| | R1 | e0/0 | 20.86.15.1 | 255.255.255.224 |
| | R3 | e0/0 | 20.86.15.2 | 255.255.255.224 |
| C | | | | |
| | R1 | e0/1 | 10.31.25.129 | 255.255.255.240 |
| | R3 | e0/1 | 10.31.25.130 | 255.255.255.240 |
| D | | | | |
| | R5 | e0/1 | 20.64.73.1 | 255.255.255.0 |
| | R4 | e0/1 | 20.64.73.2 | 255.255.255.0 |
| | DNS-ROOT | | 20.64.73.3 | 255.255.255.0 |
| | R8 | e0/0 | 20.64.73.4 | 255.255.255.0 |
| | Virtual D | | 20.64.73.5 | 255.255.255.0 |
| E | | | | |
| | FTP-Server | | 10.31.25.1 | 255.255.255.128 |
| | R12 | e0/0 | 10.31.25.2 | 255.255.255.128 |
| | DNS1 | | 10.31.25.3 | 255.255.255.128 |
| | R15 | e0/2 | 10.31.25.4 | 255.255.255.128 |
| | R13 | e0/1 | 10.31.25.5 | 255.255.255.128 |
| F | | | | |
| | R13 | e0/0 | 20.86.15.33 | 255.255.255.224 |
| | Host C | | 20.86.15.34 | 255.255.255.224 |
| | R14 | e0/1 | 20.86.15.35 | 255.255.255.224 |
| G | | | | |
| | R10 | e1/2 | 10.31.25.153 | 255.255.255.252 |
| | R13 | e0/2 | 10.31.25.154 | 255.255.255.252 |
| H | | | | |
| | R8 | e0/1 | 10.31.25.157 | 255.255.255.252 |
| | R7 | e1/1 | 10.31.25.158 | 255.255.255.252 |
| I1 | | | | |
| | R2 | s1/0.1 | 151.40.3.193 | 255.255.255.252 |
| | R17 | s1/0.1 | 151.40.3.194 | 255.255.255.252 |
| I2 | | | | |
| | R2 | s1/0.2 | 151.40.3.197 | 255.255.255.252 |
| | R16 | s1/0.1 | 151.40.3.198 | 255.255.255.252 |
| I3 | | | | |
| | R2 | s1/0.3 | 151.40.3.201 | 255.255.255.252 |
| | R9 | s1/0.1 | 151.40.3.202 | 255.255.255.252 |

| Subred | Dispositivo | Interfaz | Dirección | Máscara |
|--------|-------------|----------|--------------|-----------------|
| I4 | | | | |
| | R2 | s1/0.4 | 151.40.3.205 | 255.255.255.252 |
| | R6 | s1/0.1 | 151.40.3.206 | 255.255.255.252 |
| I5 | | | | |
| | R17 | s1/0.2 | 151.40.3.209 | 255.255.255.252 |
| | R16 | s1/0.2 | 151.40.3.210 | 255.255.255.252 |
| I6 | | | | |
| | R17 | s1/0.3 | 151.40.3.213 | 255.255.255.252 |
| | R9 | s1/0.2 | 151.40.3.214 | 255.255.255.252 |
| I7 | | | | |
| | R17 | s1/0.4 | 151.40.3.217 | 255.255.255.252 |
| | R6 | s1/0.2 | 151.40.3.218 | 255.255.255.252 |
| I8 | | | | |
| | R16 | s1/0.3 | 151.40.3.221 | 255.255.255.252 |
| | R9 | s1/0.3 | 151.40.3.222 | 255.255.255.252 |
| I9 | | | | |
| | R16 | s1/0.4 | 151.40.3.225 | 255.255.255.252 |
| | R6 | s1/0.3 | 151.40.3.226 | 255.255.255.252 |
| I10 | | | | |
| | R9 | s1/0.4 | 151.40.3.229 | 255.255.255.252 |
| | R6 | s1/0.4 | 151.40.3.230 | 255.255.255.252 |
| J | | | | |
| | R17 | e0/0 | 20.86.15.65 | 255.255.255.192 |
| | R16 | e0/0 | 20.86.15.66 | 255.255.255.192 |
| | R14 | e0/0 | 20.86.15.67 | 255.255.255.192 |
| | R15 | e0/0 | 20.86.15.68 | 255.255.255.192 |
| K | | | | |
| | R15 | e0/1 | 10.31.25.145 | 255.255.255.248 |
| L | | | | |
| | R7 | e1/0 | 20.26.29.1 | 255.255.255.0 |
| | R6 | e0/0 | 20.26.29.2 | 255.255.255.0 |
| | R9 | e0/0 | 20.26.29.3 | 255.255.255.0 |
| | Tel-Server | | 20.26.29.129 | 255.255.255.0 |
| M1 | | | | |
| | Host B | | 20.86.15.129 | 255.255.255.128 |
| | Tel-Server | | 20.86.15.130 | 255.255.255.128 |
| | R11 | e0/0 | 20.86.15.132 | 255.255.255.128 |
| | R10 | e1/1 | 20.86.15.133 | 255.255.255.128 |
| M2 | | | | |
| | R10 | e1/0 | 10.31.25.193 | 255.255.255.224 |
| | DNS2 | | 10.31.25.194 | 255.255.255.224 |
| N | | | | |
| | R8 | Tunnel10 | 10.31.25.161 | 255.255.255.252 |
| | R11 | Tunnel10 | 10.31.25.162 | 255.255.255.252 |

| Subred | Dispositivo | Interfaz | Dirección | Máscara |
|--------|-------------|----------|--------------|-----------------|
| O | | | | |
| | R8 | Tunnel20 | 10.31.25.165 | 255.255.255.252 |
| | R12 | Tunnel20 | 10.31.25.166 | 255.255.255.252 |
| P | | | | |
| | R12 | Tunnel30 | 10.31.25.169 | 255.255.255.252 |
| | R11 | Tunnel30 | 10.31.25.170 | 255.255.255.252 |
| Q1 | | | | |
| | R8 | e0/2 | 150.38.27.1 | 255.255.255.252 |
| | INTERNET | e1/0 | 150.38.27.2 | 255.255.255.252 |
| Q2 | | | | |
| | R11 | e0/1 | 150.38.27.5 | 255.255.255.252 |
| | INTERNET | e1/1 | 150.38.27.6 | 255.255.255.252 |
| Q3 | | | | |
| | R12 | e0/1 | 150.38.27.9 | 255.255.255.252 |
| | INTERNET | e1/2 | 150.38.27.10 | 255.255.255.252 |

1.1.2. Asignación IP a routers en Frame Relay

| Subnet | Device | Interface | Address | Mask | DLCI |
|--------|--------|-----------|--------------|-----------------|------|
| I1 | R2 | s1/0.1 | 151.40.3.193 | 255.255.255.252 | 217 |
| | R17 | s1/0.1 | 151.40.3.194 | 255.255.255.252 | 172 |
| I2 | R2 | s1/0.2 | 151.40.3.197 | 255.255.255.252 | 216 |
| | R16 | s1/0.1 | 151.40.3.198 | 255.255.255.252 | 162 |
| I3 | R2 | s1/0.3 | 151.40.3.201 | 255.255.255.252 | 209 |
| | R9 | s2/0.1 | 151.40.3.202 | 255.255.255.252 | 902 |
| I4 | R2 | s1/0.4 | 151.40.3.205 | 255.255.255.252 | 206 |
| | R6 | s1/0.1 | 151.40.3.206 | 255.255.255.252 | 602 |
| I5 | R17 | s1/0.2 | 151.40.3.209 | 255.255.255.252 | 807 |
| | R16 | s1/0.2 | 151.40.3.210 | 255.255.255.252 | 708 |
| I6 | R17 | s1/0.3 | 151.40.3.213 | 255.255.255.252 | 179 |
| | R9 | s2/0.2 | 151.40.3.214 | 255.255.255.252 | 917 |
| I7 | R17 | s1/0.4 | 151.40.3.217 | 255.255.255.252 | 176 |
| | R6 | s1/0.2 | 151.40.3.218 | 255.255.255.252 | 617 |
| I8 | R16 | s1/0.3 | 151.40.3.221 | 255.255.255.252 | 169 |
| | R9 | s2/0.3 | 151.40.3.222 | 255.255.255.252 | 916 |
| I9 | R16 | s1/0.4 | 151.40.3.225 | 255.255.255.252 | 166 |
| | R6 | s1/0.3 | 151.40.3.226 | 255.255.255.252 | 616 |
| I10 | R9 | s2/0.4 | 151.40.3.229 | 255.255.255.252 | 906 |
| | R6 | s1/0.4 | 151.40.3.230 | 255.255.255.252 | 609 |

1.2. Tablas de Ruteo de Córdoba

1.2.1. R1

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------|---------|------------|-----------------|---------|
| | 0.0.0.0 | 0.0.0.0 | R3 | 20.86.15.2 | 1 |

1.2.2. R2

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | Directamente conectado | | | | |
| B | 20.86.15.0 | 255.255.255.224 | R3 | 201.158.15.6 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R3 | 201.158.15.6 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | Virtual-A | 201.158.15.7 | 1 |
| E | 10.31.25.0 | 255.255.255.128 | R17 | 151.40.3.194 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R17 | 151.40.3.194 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R17 | 151.40.3.194 | 1 |
| H | 10.31.25.156 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |
| I | Directamente conectado | | | | |
| I1 | | | | | |
| I2 | | | | | |
| I3 | | | | | |
| I4 | | | | | |
| I5 | | | R17 | 151.40.3.194 | 1 |
| | | | R16 | 151.40.3.198 | 10 |
| I6 | | | R17 | 151.40.3.194 | 1 |
| | | | R9 | 151.40.3.202 | 10 |
| I7 | | | R17 | 151.40.3.194 | 1 |
| | | | R6 | 151.40.3.206 | 10 |
| I8 | | | R16 | 151.40.3.198 | 1 |
| | | | R9 | 151.40.3.202 | 10 |
| I9 | | | R16 | 151.40.3.198 | 1 |
| | | | R6 | 151.40.3.206 | 10 |
| I10 | | | R9 | 151.40.3.202 | 1 |
| | | | R6 | 151.40.3.206 | 10 |
| J | 20.86.15.64 | 255.255.255.192 | R17 | 151.40.3.194 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R17 | 151.40.3.194 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R9 | 151.40.3.202 | 1 |
| | | | R6 | 151.40.3.206 | 10 |
| M1 | 20.86.15.128 | 255.255.255.128 | Virtual-A | 201.158.15.7 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | Virtual-A | 201.158.15.7 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |

1.2.3. R3

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|-----------------|------------------------------|----------|
| A | Directamente conectado | | | | |
| B | Directamente conectado | | | | |
| C | Directamente conectado | | | | |
| D | 20.64.73.0 | 255.255.255.0 | Virtual-A | 201.158.15.7 | 1 |
| E | 10.31.25.0 | 255.255.255.128 | R2 | 201.158.15.5 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R2 | 201.158.15.5 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| H | 10.31.25.156 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R2 | 201.158.15.5 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R2 | 201.158.15.5 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R2 Virtual-A | 201.158.15.5 201.158.15.7 | 1 100 |
| M1 | 20.86.15.128 | 255.255.255.128 | Virtual-A | 201.158.15.7 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | Virtual-A | 201.158.15.7 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |

1.2.4. R4 y R5 (routers VRRP)

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|----------------------------|----------|
| A | Directamente conectado | | | | |
| B | 20.86.15.0 | 255.255.255.224 | R3 | 201.158.15.6 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R3 | 201.158.15.6 | 1 |
| D | Directamente conectado | | | | |
| E | 10.31.25.0 | 255.255.255.128 | R2 R8 | 201.158.15.5 20.64.73.4 | 1 100 |
| F | 20.86.15.32 | 255.255.255.224 | R2 R8 | 201.158.15.5 20.64.73.4 | 1 100 |
| G | 10.31.25.152 | 255.255.255.252 | R2 R8 | 201.158.15.5 20.64.73.4 | 1 100 |
| H | 10.31.25.156 | 255.255.255.252 | R8 | 20.64.73.4 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R2 R8 | 201.158.15.5 20.64.73.4 | 1 100 |
| K | 10.31.25.144 | 255.255.255.248 | R2 R8 | 201.158.15.5 20.64.73.4 | 1 100 |
| L | 20.26.29.0 | 255.255.255.0 | R8 | 20.64.73.4 | 1 |
| M1 | 20.86.15.128 | 255.255.255.128 | R8 | 20.64.73.4 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | R8 | 20.64.73.4 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R8 | 20.64.73.4 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R8 | 20.64.73.4 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R8 | 20.64.73.4 | 1 |

1.2.5. R8

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | Virtual-D | 20.64.73.5 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | Virtual-D | 20.64.73.5 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | Virtual-D | 20.64.73.5 | 1 |
| D | Directamente conectado | | | | |
| E | 10.31.25.0 | 255.255.255.128 | R12 | 10.31.25.166 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R12 | 10.31.25.166 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R12 | 10.31.25.166 | 1 |
| H | Directamente conectado | | | | |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R12 | 10.31.25.166 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R12 | 10.31.25.166 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R7 | 10.31.25.158 | 1 |
| M1 | 20.86.15.128 | 255.255.255.128 | R11 | 10.31.25.162 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | R11 | 10.31.25.162 | 1 |
| N | Directamente conectada | | | | |
| O | Directamente conectada | | | | |
| P | 10.31.25.168 | 255.255.255.252 | R12 | 10.31.25.166 | 1 |

1.3. Tablas de Ruteo de Calamuchita

1.3.1. R6

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------|
| A | 201.158.15.0 | 255.255.255.128 | R2 R9 | 151.40.3.205 20.26.29.3 | 1 10 |
| B | 20.86.15.0 | 255.255.255.224 | R2 R9 | 151.40.3.205 20.26.29.3 | 1 10 |
| C | 10.31.25.128 | 255.255.255.240 | R2 R9 | 151.40.3.205 20.26.29.3 | 1 10 |
| D | 20.64.73.0 | 255.255.255.0 | R7 R2 | 20.26.29.1 151.40.3.205 | 1 10 |
| E | 10.31.25.0 | 255.255.255.128 | R17 R9 | 151.40.3.217 20.26.29.3 | 1 10 |
| F | 20.86.15.32 | 255.255.255.224 | R17 R9 | 151.40.3.217 20.26.29.3 | 1 10 |
| G | 10.31.25.152 | 255.255.255.252 | R17 R9 | 151.40.3.217 20.26.29.3 | 1 10 |
| H | 10.31.25.156 | 255.255.255.252 | R7 | 20.26.29.1 | 1 |
| I | Directamente conectado | 255.255.255.252 | R2 R17 R2 R16 R2 R9 | 151.40.3.205 151.40.3.217 151.40.3.205 151.40.3.225 151.40.3.205 151.40.3.229 | 1 10 1 10 1 10 |
| I1 | | | | | |
| I2 | | | | | |
| I3 | | | | | |
| I4 | | | | | |
| I5 | | | | | |
| I6 | | | | | |
| I7 | | | | | |
| I8 | | | | | |
| I9 | | | | | |
| I10 | | | | | |
| J | 20.86.15.64 | 255.255.255.192 | R17 | 151.40.3.217 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R17 | 151.40.3.217 | 1 |
| L | Directamente conectado | | | | |
| M1 | 20.86.15.128 | 255.255.255.128 | R7 | 20.26.29.1 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | R7 | 20.26.29.1 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R7 | 20.26.29.1 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R7 | 20.26.29.1 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R7 | 20.26.29.1 | 1 |

1.3.2. R7

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|----------------------------|----------|
| A | 201.158.15.0 | 255.255.255.128 | R6 R8 | 20.26.29.2 10.31.25.157 | 1 100 |
| B | 20.86.15.0 | 255.255.255.224 | R6 R8 | 20.26.29.2 10.31.25.157 | 1 100 |
| C | 10.31.25.128 | 255.255.255.240 | R6 R8 | 20.26.29.2 10.31.25.157 | 1 100 |
| D | 20.64.73.0 | 255.255.255.0 | R8 R6 | 10.31.25.157 20.26.29.2 | 1 10 |
| E | 10.31.25.0 | 255.255.255.128 | R6 | 20.26.29.2 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R6 | 20.26.29.2 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| H | Directamente conectado | | | | |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R6 | 20.26.29.2 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R6 | 20.26.29.2 | 1 |
| L | Directamente conectada | | | | |
| M1 | 20.86.15.128 | 255.255.255.128 | R8 | 10.31.25.157 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | R8 | 10.31.25.157 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R8 | 10.31.25.157 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R8 | 10.31.25.157 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R8 | 10.31.25.157 | 1 |

1.3.3. R9

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|------------------------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R2 | 151.40.3.201 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R2 | 151.40.3.201 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R2 | 151.40.3.201 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R2 | 151.40.3.201 | 1 |
| E | 10.31.25.0 | 255.255.255.128 | R17 R16 | 151.40.3.213 151.40.3.221 | 1 10 |
| F | 20.86.15.32 | 255.255.255.224 | R17 R16 | 151.40.3.213 151.40.3.221 | 1 10 |
| G | 10.31.25.152 | 255.255.255.252 | R17 R16 | 151.40.3.213 151.40.3.221 | 1 10 |
| H | 10.31.25.156 | 255.255.255.252 | R7 | 20.26.29.1 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R2 R17 | 151.40.3.201 151.40.3.213 | 1 10 |
| I2 | 151.40.3.196 | 255.255.255.252 | R2 R16 | 151.40.3.201 151.40.3.221 | 1 10 |
| I3 | Directamente conectada | | | | |
| I4 | 151.40.3.204 | 255.255.255.252 | R2 R6 | 151.40.3.201 151.40.3.230 | 1 10 |
| I5 | 151.40.3.208 | 255.255.255.252 | R17 R16 | 151.40.3.213 151.40.3.221 | 1 10 |
| I6 | Directamente conectada | | | | |
| I7 | 151.40.3.216 | 255.255.255.252 | R17 R6 | 151.40.3.213 151.40.3.230 | 1 10 |
| I8 | Directamente conectada | | | | |
| I9 | 151.40.3.224 | 255.255.255.252 | R6 R16 | 20.86.15.2 151.40.3.221 | 1 10 |
| I10 | Directamente conectada | | | | |
| J | 20.86.15.64 | 255.255.255.192 | R17 R16 | 151.40.3.213 151.40.3.221 | 1 10 |
| K | 10.31.25.144 | 255.255.255.248 | R17 R16 | 151.40.3.213 151.40.3.221 | 1 10 |
| L | Directamente conectada | | | | |
| M1 | 20.86.15.128 | 255.255.255.128 | R7 | 20.26.29.1 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | R7 | 20.26.29.1 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R7 | 20.26.29.1 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R7 | 20.26.29.1 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R7 | 20.26.29.1 | 1 |

1.3.4. R10

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R11 | 20.86.15.132 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R11 | 20.86.15.132 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R11 | 20.86.15.132 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R11 | 20.86.15.132 | 1 |
| E | 10.31.25.0 | 255.255.255.128 | R13 | 10.31.25.154 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R13 | 10.31.25.154 | 1 |
| G | Directamente conectada | | | | |
| H | 10.31.25.156 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R13 | 10.31.25.154 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R13 | 10.31.25.154 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R13 | 10.31.25.154 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R11 | 20.86.15.132 | 1 |
| M1 | Directamente conectada | | | | |
| M2 | Directamente conectada | | | | |
| N | 10.31.25.160 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |

1.3.5. R11

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R8 | 10.31.25.161 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R8 | 10.31.25.161 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R8 | 10.31.25.161 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R8 | 10.31.25.161 | 1 |
| E | 10.31.25.0 | 255.255.255.128 | R12 | 10.31.25.169 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R10 | 20.86.15.133 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| H | 10.31.25.156 | 255.255.255.252 | R8 | 10.31.25.161 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R12 | 10.31.25.169 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R12 | 10.31.25.169 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R8 | 10.31.25.161 | 1 |
| M1 | Directamente conectada | | | | |
| M2 | 10.31.25.192 | 255.255.255.224 | R10 | 20.86.15.133 | 1 |
| N | Directamente conectada | | | | |
| O | 10.31.25.164 | 255.255.255.252 | R8 | 10.31.25.161 | 1 |
| P | Directamente conectada | | | | |

1.4. Tablas de Ruteo de La Falda

Para los siguientes routers será necesario tener en cuenta que se implementará OSPF de manera interna, por lo tanto el ruteo estático necesario será para conectar con las otras zonas, siendo únicamente configurado en los routers frontera. Por lo tanto, las redes que no aparezcan en las siguientes tablas serán aquellas para las cuales se aprenderán las rutas por medio del protocolo de enrutamiento dinámico.

1.4.1. R12

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R8 | 10.31.25.165 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R8 | 10.31.25.165 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R8 | 10.31.25.165 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R8 | 10.31.25.165 | 1 |
| E | Directamente conectada | | | | |
| H | 10.31.25.156 | 255.255.255.252 | R8 | 10.31.25.165 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R8 | 10.31.25.165 | 1 |
| M1 | 20.86.15.128 | 255.255.255.128 | R11 | 10.31.25.170 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R11 | 10.31.25.170 | 1 |
| O | Directamente conectada | | | | |
| P | Directamente conectada | | | | |

1.4.2. R13

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------|-----------------|------------|-----------------|---------|
| L | 20.26.29.0 | 255.255.255.0 | R10 | 10.31.25.153 | 1 |
| M1 | 20.86.15.128 | 255.255.255.128 | R10 | 10.31.25.153 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | R10 | 10.31.25.153 | 1 |

1.4.3. R14 y R15

Al ser R14 y R15 routers internos (i.e. sin conexiones a subredes externas a la zona de La Falda), aprenderán de todas las rutas por el protocolo OSPF, sin publicar rutas estáticas.

1.4.4. R16

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R2 | 151.40.3.197 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R2 | 151.40.3.197 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R2 | 151.40.3.197 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R2 | 151.40.3.197 | 1 |
| I | Directamente conectada | 255.255.255.252 | R2 | 151.40.3.197 | 1 |
| I2 | | | | | |
| I3 | | | | | |
| I4 | | | | | |
| I5 | Directamente conectada | 255.255.255.252 | R2 | 151.40.3.197 | 1 |
| I8 | Directamente conectada | | | | |
| I9 | Directamente conectada | | | | |
| I10 | 151.40.3.228 | | | | |
| L | 20.26.29.0 | 255.255.255.0 | R6 | 151.40.3.226 | 1 |

1.4.5. R17

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R2 | 151.40.3.193 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R2 | 151.40.3.193 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R2 | 151.40.3.193 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R2 | 151.40.3.193 | 1 |
| I | Directamente conectada | 255.255.255.252 | R2 | 151.40.3.193 | 1 |
| I1 | | | | | |
| I2 | | | | | |
| I3 | | | | | |
| I4 | | | | | |
| I5 | | | | | |
| I6 | | | | | |
| I7 | Directamente conectada | 255.255.255.252 | R9 | 151.40.3.214 | 1 |
| I10 | Directamente conectada | | | | |
| L | 20.26.29.0 | 255.255.255.0 | R6 | 151.40.3.218 | 1 |

1.5. Tablas de Ruteo de Hosts y servicios

A continuación se detallan las tablas de ruteo de los distintos hosts y servicios a implementar en el trabajo práctico.

1.5.1. Host A y Webserver

Dado que el host A y el webserver se encuentran dentro de la misma red (Red A), no hay ninguna razón para que no tengan la misma tabla de ruteo (lo cual permite que tengamos un único script, simplificando el trabajo).

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | Directamente conectada | | | | |
| B | 20.86.15.0 | 255.255.255.224 | R3 | 201.158.15.6 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R3 | 201.158.15.6 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | Virtual-A | 201.158.15.7 | 1 |
| E | 10.31.25.0 | 255.255.255.128 | Virtual-A | 201.158.15.5 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R2 | 201.158.15.5 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| H | 10.31.25.156 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R2 | 201.158.15.5 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R2 | 201.158.15.5 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R2 | 201.158.15.5 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R2 | 201.158.15.5 | 1 |
| M1 | 20.86.15.128 | 255.255.255.128 | Virtual-A | 201.158.15.7 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | Virtual-A | 201.158.15.7 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | Virtual-A | 201.158.15.7 | 1 |

1.5.2. Host B

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R11 | 20.86.15.132 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R11 | 20.86.15.132 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R11 | 20.86.15.132 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R11 | 20.86.15.132 | 1 |
| E | 10.31.25.0 | 255.255.255.128 | R10 | 20.86.15.133 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R10 | 20.86.15.133 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| H | 10.31.25.156 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R10 | 20.86.15.133 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R10 | 20.86.15.133 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R11 | 20.86.15.132 | 1 |
| M1 | Directamente conectada | | | | |
| M2 | 10.31.25.192 | 255.255.255.224 | R10 | 20.86.15.133 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |

1.5.3. Host C

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R14 | 20.86.15.34 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R14 | 20.86.15.34 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R14 | 20.86.15.34 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R13 | 20.86.15.33 | 1 |
| E | 10.31.25.0 | 255.255.255.128 | R13 | 20.86.15.33 | 1 |
| F | Directamente conectada | | | | |
| G | 10.31.25.152 | 255.255.255.252 | R13 | 20.86.15.33 | 1 |
| H | 10.31.25.156 | 255.255.255.252 | R13 | 20.86.15.33 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R14 | 20.86.15.34 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R14 | 20.86.15.34 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R13 | 20.86.15.33 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R14 | 20.86.15.34 | 1 |
| M1 | 20.86.15.128 | 255.255.255.128 | R13 | 20.86.15.33 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | R13 | 20.86.15.33 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R13 | 20.86.15.33 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R13 | 20.86.15.33 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R13 | 20.86.15.33 | 1 |

1.5.4. Telserv 1

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R6 | 20.26.29.2 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R6 | 20.26.29.2 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R6 | 20.26.29.2 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R7 | 20.26.29.1 | 1 |
| E | 10.31.25.0 | 255.255.255.128 | R7 | 20.26.29.1 | 10 |
| F | 20.86.15.32 | 255.255.255.224 | R9 | 20.26.29.3 | 10 |
| G | 10.31.25.152 | 255.255.255.252 | R9 | 20.26.29.3 | 10 |
| H | 10.31.25.156 | 255.255.255.252 | R7 | 20.26.29.1 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R6 | 20.26.29.2 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R9 | 20.26.29.3 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R9 | 20.26.29.3 | 10 |
| M1 | Directamente conectada | | | | |
| M1 | 20.86.15.128 | 255.255.255.128 | R7 | 20.26.29.1 | 10 |
| M2 | 10.31.25.192 | 255.255.255.224 | R7 | 20.26.29.1 | 10 |
| N | 10.31.25.160 | 255.255.255.252 | R7 | 20.26.29.1 | 10 |
| O | 10.31.25.164 | 255.255.255.252 | R7 | 20.26.29.1 | 10 |
| P | 10.31.25.168 | 255.255.255.252 | R7 | 20.26.29.1 | 10 |

1.5.5. Telserver 2

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R11 | 20.86.15.132 | 10 |
| B | 20.86.15.0 | 255.255.255.224 | R11 | 20.86.15.132 | 10 |
| C | 10.31.25.128 | 255.255.255.240 | R11 | 20.86.15.132 | 10 |
| D | 20.64.73.0 | 255.255.255.0 | R11 | 20.86.15.132 | 10 |
| E | 10.31.25.0 | 255.255.255.128 | R10 | 20.86.15.133 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R10 | 20.86.15.133 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R10 | 20.86.15.133 | 1 |
| H | 10.31.25.156 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I2 | 151.40.3.196 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I3 | 151.40.3.200 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I4 | 151.40.3.204 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I5 | 151.40.3.208 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I6 | 151.40.3.212 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I7 | 151.40.3.216 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I8 | 151.40.3.220 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I9 | 151.40.3.224 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| I10 | 151.40.3.228 | 255.255.255.252 | R11 | 20.86.15.132 | 10 |
| J | 20.86.15.64 | 255.255.255.192 | R10 | 20.86.15.133 | 10 |
| K | 10.31.25.144 | 255.255.255.248 | R10 | 20.86.15.133 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R11 | 20.86.15.132 | 10 |
| M1 | Directamente conectada | | | | |
| M2 | 10.31.25.192 | 255.255.255.224 | R10 | 20.86.15.133 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R11 | 20.86.15.132 | 1 |

1.5.6. DNS1 - FTP server

Al igual que el caso entre Host A y el Webserver, en este caso ambos servicios se encuentran en la misma red, por lo que se utiliza la misma tabla de ruteo para ambos casos.

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | R12 | 10.31.25.2 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | R12 | 10.31.25.2 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | R12 | 10.31.25.2 | 1 |
| D | 20.64.73.0 | 255.255.255.0 | R12 | 10.31.25.2 | 1 |
| E | Directamente conectada | | | | |
| F | 20.86.15.32 | 255.255.255.224 | R13 | 10.31.25.5 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R13 | 10.31.25.5 | 1 |
| H | 10.31.25.156 | 255.255.255.252 | R12 | 10.31.25.2 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | R15 | 10.31.25.4 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | R15 | 10.31.25.4 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | R15 | 10.31.25.4 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R15 | 10.31.25.4 | 1 |
| M1 | 20.86.15.128 | 255.255.255.128 | R13 | 10.31.25.5 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | R13 | 10.31.25.5 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R12 | 10.31.25.2 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R12 | 10.31.25.2 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R12 | 10.31.25.2 | 1 |

1.5.7. DNS2

Dado que el DNS2 sólo está conectado al router R10, éste deberá ser su Default Gateway.

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------|---------|------------|-----------------|---------|
| | 0.0.0.0 | 0.0.0.0 | R10 | 10.31.25.193 | 1 |

1.5.8. DNS Root

| Red | Dirección de Red | Máscara | Sig. Salto | Dir. Sig. Salto | Métrica |
|-----|------------------------|-----------------|------------|-----------------|---------|
| A | 201.158.15.0 | 255.255.255.128 | Virtual-D | 20.64.73.5 | 1 |
| B | 20.86.15.0 | 255.255.255.224 | Virtual-D | 20.64.73.5 | 1 |
| C | 10.31.25.128 | 255.255.255.240 | Virtual-D | 20.64.73.5 | 1 |
| D | Directamente conectada | | | | |
| E | 10.31.25.0 | 255.255.255.128 | R8 | 20.64.73.4 | 1 |
| F | 20.86.15.32 | 255.255.255.224 | R8 | 20.64.73.4 | 1 |
| G | 10.31.25.152 | 255.255.255.252 | R8 | 20.64.73.4 | 1 |
| H | 10.31.25.156 | 255.255.255.252 | R8 | 20.64.73.4 | 1 |
| I | | | | | |
| I1 | 151.40.3.192 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I2 | 151.40.3.196 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I3 | 151.40.3.200 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I4 | 151.40.3.204 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I5 | 151.40.3.208 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I6 | 151.40.3.212 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I7 | 151.40.3.216 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I8 | 151.40.3.220 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I9 | 151.40.3.224 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| I10 | 151.40.3.228 | 255.255.255.252 | Virtual-D | 20.64.73.5 | 1 |
| J | 20.86.15.64 | 255.255.255.192 | Virtual-D | 20.64.73.5 | 1 |
| K | 10.31.25.144 | 255.255.255.248 | Virtual-D | 20.64.73.5 | 1 |
| L | 20.26.29.0 | 255.255.255.0 | R8 | 20.64.73.4 | 1 |
| M1 | 20.86.15.128 | 255.255.255.128 | R8 | 20.64.73.4 | 1 |
| M2 | 10.31.25.192 | 255.255.255.224 | R8 | 20.64.73.4 | 1 |
| N | 10.31.25.160 | 255.255.255.252 | R8 | 20.64.73.4 | 1 |
| O | 10.31.25.164 | 255.255.255.252 | R8 | 20.64.73.4 | 1 |
| P | 10.31.25.168 | 255.255.255.252 | R8 | 20.64.73.4 | 1 |

2. Frame Relay

Para el armado de la red Frame Relay se uso un dispositivo *Frame Relay* genérico con las siguientes configuraciones de DLCI.

2.1. FR

| Interface In | DLCI In | Interface Out | DLCI Out |
|--------------|---------|---------------|----------|
| s0/0 | 217 | Serial0/1 | 172 |
| s0/0 | 216 | Serial0/2 | 162 |
| s0/0 | 209 | Serial0/3 | 902 |
| s0/0 | 206 | Serial0/4 | 602 |
| s0/1 | 172 | Serial0/0 | 217 |
| s0/1 | 1716 | Serial0/2 | 1617 |
| s0/1 | 179 | Serial0/3 | 917 |
| s0/1 | 176 | Serial0/4 | 617 |
| s0/2 | 162 | Serial0/0 | 216 |
| s0/2 | 708 | Serial0/1 | 807 |
| s0/2 | 169 | Serial0/3 | 916 |
| s0/2 | 166 | Serial0/4 | 616 |
| s0/3 | 902 | Serial0/0 | 209 |
| s0/3 | 917 | Serial0/1 | 179 |
| s0/3 | 916 | Serial0/2 | 169 |
| s0/3 | 906 | Serial0/4 | 609 |
| s0/4 | 602 | Serial0/0 | 206 |
| s0/4 | 617 | Serial0/1 | 176 |
| s0/4 | 616 | Serial0/2 | 166 |
| s0/4 | 609 | Serial0/3 | 906 |

3. Túneles GRE

3.1. Configuración

A continuación se detallan las instrucciones de configuraciones de los Routers utilizados para la comunicación hacia Internet.

En todos los casos, al configurar el ruteo estático en cada uno de ellos, fuera necesario *pasar por Internet*, la interfaz a la cual se hace referencia será la respectiva al tunel creado. Por ejemplo, se tiene la configuración de ruteo estático de R8 a la red E:

```
ip route 10.31.25.0 255.255.255.128 Tunnel20 10.31.25.166 100
```

Además, debemos indicar cual es el siguiente salto para llegar al destino del tunel, el cual no esta conectado en forma directa a ninguna de las interfaces del router configurado.

3.1.1. R8

```
interface Ethernet0/2
description Conexion a INTERNET Q1
ip address 150.38.27.1 255.255.255.252
full-duplex
```

```

interface Tunnel10 !a R11
  tunnel mode ipip
  ip address 10.31.25.161 255.255.255.252
  tunnel source Ethernet0/2
  tunnel destination 150.38.27.5
!
interface Tunnel20 !a R12
  tunnel mode ipip
  ip address 10.31.25.165 255.255.255.252
  tunnel source Ethernet0/2
  tunnel destination 150.38.27.9
!

```

Configuración de ruteo necesaria:

```

ip route 150.38.27.4 255.255.255.252 150.38.27.2 1
ip route 150.38.27.8 255.255.255.252 150.38.27.2 1

```

3.1.2. R11

```

interface Ethernet0/1
  description Conexion a INTERNET Q2
  ip address 150.38.27.5 255.255.255.252
  full-duplex
!
interface Tunnel10 !a R8
  tunnel mode ipip
  ip address 10.31.25.162 255.255.255.252
  tunnel source Ethernet0/1
  tunnel destination 150.38.27.1
!
interface Tunnel30 !a R12
  tunnel mode ipip
  ip address 10.31.25.170 255.255.255.252
  tunnel source Ethernet0/1
  tunnel destination 150.38.27.9
!

```

Configuración de ruteo necesaria:

```

ip route 150.38.27.0 255.255.255.252 150.38.27.6 1
ip route 150.38.27.8 255.255.255.252 150.38.27.6 1

```

3.1.3. R12

```

interface Ethernet0/1
  description Conexion a INTERNET Q3
  ip address 150.38.27.9 255.255.255.252
  full-duplex
!
interface Tunnel20 !a R8

```

```

tunnel mode ipip
ip address 10.31.25.166 255.255.255.252
tunnel source Ethernet0/1
tunnel destination 150.38.27.1
!
interface Tunnel30 !a R11
tunnel mode ipip
ip address 10.31.25.169 255.255.255.252
tunnel source Ethernet0/1
tunnel destination 150.38.27.5
!

```

Configuración de ruteo necesaria:

```

ip route 150.38.27.0 255.255.255.252 150.38.27.10 1
ip route 150.38.27.4 255.255.255.252 150.38.27.10 1

```

3.1.4. Internet y Router-Internet

Para la simulación del servicio de Internet se utilizó un Router C3600, para luego utilizar túneles GRE y permitir el enrutamiento de direcciones privadas, entre distintos routers que se encuentren conectados por medio de Internet. Para realizar la configuración se basó en el apunte de la materia.

Para cada conexión hacia Internet (de los Routers antes mencionados), se destinaron 3 subredes de máscara /30, para luego asignar una subred /30 a cada par de conexiones posibles entre los distintos routers.

Lo que finalmente se obtiene, es un encapsulamiento de un paquete IP que tiene como destino una dirección privada dentro de otro paquete IP con direccionamiento público, más la existencia de un encabezado GRE. Los routers donde se configura el túnel son los encargados de manipular estos paquetes, armándolos y desarmándolos según corresponda.

La configuración del Router de Internet únicamente consiste en sus interfaces por las cuales se encuentra conectado a los 3 routers mencionados antes. No es necesario (ni debe hacerse) la configuración de ningún tipo de ruteo, puesto que lo único que necesita hacer es mandar los paquetes que recibe hacia routers que se encuentran directamente conectados a él.

```

interface Ethernet1/0
description Conexion INTERNET Q1 con R8
ip address 150.38.27.2 255.255.255.252
full-duplex
!
interface Ethernet1/1
description Conexion INTERNET Q2 con R11
ip address 150.38.27.6 255.255.255.252
full-duplex
!
interface Ethernet1/2
description Conexion INTERNET Q3 con R12
ip address 150.38.27.10 255.255.255.252
full-duplex

```

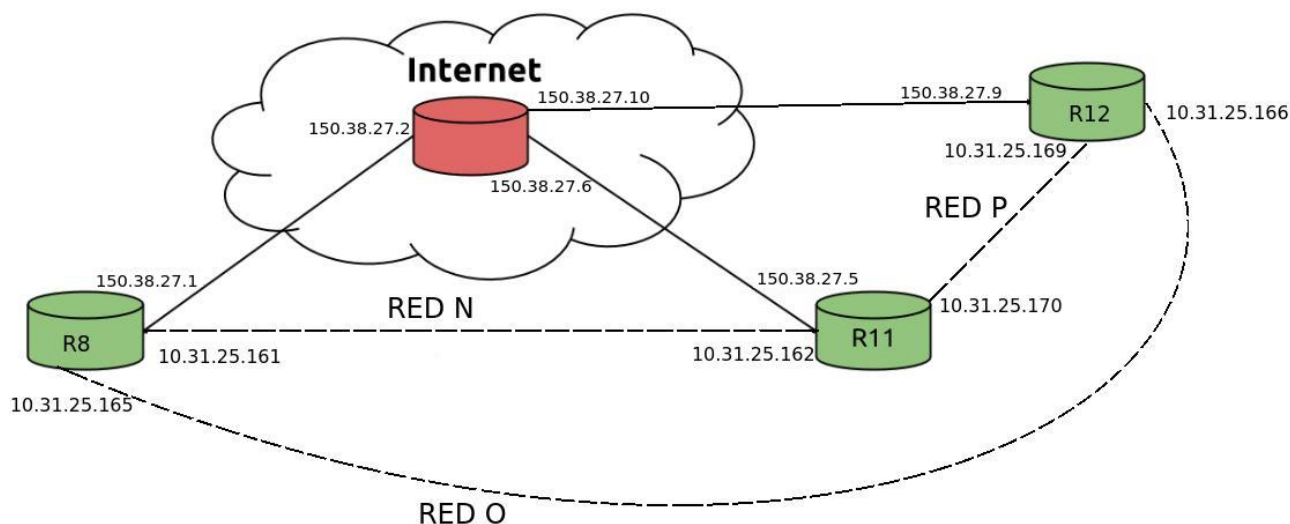


Figura 1: Esquema de Túnel GRE

4. VRRP

Para la realización del trabajo práctico es necesario implementar VRRP en un determinado par de routers para permitir la redundancia (en nuestro caso, entre los routers R4 y R5). Para esto, también es necesario configurar el Object Tracking correspondiente, para poder seleccionar el router Master (de acuerdo a la caída de alguno de sus enlaces).

En la topología dada, los routers se encuentran entre dos switches, por lo tanto cualquier caída externa a dichos switches no puede ser recuperada mediante VRRP. Por lo tanto, se hace Object Tracking sobre las propias interfaces, de modo tal que, si ocurriera la caída de uno de estos, se disminuya la prioridad. De esta manera se seleccionará (en caso de existencia) el router sin enlaces caídos.

Por decisión de diseño se le da una prioridad mayor a R4, tal que se asegure que este sea Master si todos sus enlaces están funcionando.

4.1. Configuración de los Routers

R4

```
track 1 interface Ethernet0/0 ip routing
track 2 interface Ethernet0/1 ip routing
```

```
interface Ethernet0/0
description Conexion LAN Red A
ip address 201.158.15.3 255.255.255.128
full-duplex
vrrp 10 ip 201.158.15.7
vrrp 10 timers advertise 15
vrrp 10 timers learn
vrrp 10 priority 110
vrrp 10 track 1 decrement 20
vrrp 10 track 2 decrement 20
```

```
interface Ethernet0/1
description Conexion LAN Red D
```

```

ip address 20.64.73.2 255.255.255.0
full-duplex
vrrp 11 ip 20.64.73.5
vrrp 11 timers advertise 15
vrrp 11 timers learn
vrrp 11 priority 110
vrrp 11 track 1 decrement 20
vrrp 11 track 2 decrement 20

```

R5

```

track 1 interface Ethernet0/0 ip routing
track 2 interface Ethernet0/1 ip routing

```

```

interface Ethernet0/0
description Conexion LAN Red A
ip address 201.158.15.4 255.255.255.128
full-duplex
vrrp 10 ip 201.158.15.7
vrrp 10 timers advertise 15
vrrp 10 timers learn
vrrp 10 priority 100
vrrp 10 track 1 decrement 20
vrrp 10 track 2 decrement 20

```

```

interface Ethernet0/1
description Conexion LAN Red D
ip address 20.64.73.1 255.255.255.0
full-duplex
vrrp 11 ip 20.64.73.5
vrrp 11 timers advertise 15
vrrp 11 timers learn
vrrp 11 priority 100
vrrp 11 track 1 decrement 20
vrrp 11 track 2 decrement 20

```

5. DNS

5.1. Niveles de servidores DNS

Para la realización del trabajo práctico es necesario implementar el servicio de DNS, dividido en las distintas sedes de la topología, para así poder traducir nombres a direcciones IP (para permitir la comunicación) o viceversa (por ejemplo, para el uso de traceroute).

Se dispone de tres servidores DNS, uno de primer nivel (DNS root) y dos de segundo nivel (llamados DNS 1 y DNS 2). El DNS 1 tiene autoridad sobre la sede La Falda y el DNS 2 sobre el resto de la red (sedes Calamuchita y Córdoba Capital). Los hosts que deseen traducir un nombre o una IP deben consultar al servidor DNS de segundo nivel que corresponda a su zona. En caso de que dicho servidor no pueda realizar la traducción, transmite la consulta hacia el DNS Root.

5.2. Nombres de dominio de redes

| Subnet | Nombre | Nombre de dominio | Sede |
|--------|-------------------|---------------------------------------------------|-------------|
| A | Águila | aguila.capital.cordoba.dc.fi.uba.ar | Capital |
| B | Buitre | buitre.capital.cordoba.dc.fi.uba.ar | Capital |
| C | Cuervo | cuervo.capital.cordoba.dc.fi.uba.ar | Capital |
| D | Dodo | dodo.capital.cordoba.dc.fi.uba.ar | Capital |
| E | Espátula | espatula.lafalda.cordoba.dc.fi.uba.ar | La Falda |
| F | Faisán | faisan.lafalda.cordoba.dc.fi.uba.ar | La Falda |
| G | Golondrina | golondrina.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| H | Hornero | hornero.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I1 | Ibis 1 | ibis1.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I2 | Ibis 2 | ibis2.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I3 | Ibis 3 | ibis3.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I4 | Ibis 4 | ibis4.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I5 | Ibis 5 | ibis5.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I6 | Ibis 6 | ibis6.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I7 | Ibis 7 | ibis7.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I8 | Ibis 8 | ibis8.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I9 | Ibis 9 | ibis9.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| I10 | Ibis 10 | ibis10.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| J | Jilguero | jilguero.lafalda.cordoba.dc.fi.uba.ar | La Falda |
| K | Kiwi | kiwi.lafalda.cordoba.dc.fi.uba.ar | La Falda |
| L | Lechuza | lechuza.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| M1 | Mero 1 | mero1.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| M2 | Mero 2 | mero2.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| N | Negrón | negron.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| O | Ortega | ortega.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| P | Paloma | paloma.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| Q1 | Quebrantahuesos 1 | quebrantahuesos1.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| Q2 | Quebrantahuesos 2 | quebrantahuesos2.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |
| Q3 | Quebrantahuesos 3 | quebrantahuesos3.calamuchita.cordoba.dc.fi.uba.ar | Calamuchita |

5.3. Nombres relativos a los numeros de subred

| Nombre de dominio | Direccion | Sede |
|---------------------------------------------------|-----------------|-------------|
| aguila.capital.cordoba.dc.fi.uba.ar | 201.158.15.0/25 | Capital |
| buitre.capital.cordoba.dc.fi.uba.ar | 20.86.15.0/27 | Capital |
| cuervo.capital.cordoba.dc.fi.uba.ar | 10.31.25.128/28 | Capital |
| dodo.capital.cordoba.dc.fi.uba.ar | 20.64.73.0/24 | Capital |
| espatula.lafalda.cordoba.dc.fi.uba.ar | 10.31.25.0/25 | La Falda |
| faisan.lafalda.cordoba.dc.fi.uba.ar | 20.86.15.32/27 | La Falda |
| golondrina.calamuchita.cordoba.dc.fi.uba.ar | 10.31.25.152/30 | Calamuchita |
| hornero.calamuchita.cordoba.dc.fi.uba.ar | 10.31.25.156/30 | Calamuchita |
| ibis1.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.192/30 | Calamuchita |
| ibis2.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.196/30 | Calamuchita |
| ibis3.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.200/30 | Calamuchita |
| ibis4.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.204/30 | Calamuchita |
| ibis5.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.208/30 | Calamuchita |
| ibis6.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.212/30 | Calamuchita |
| ibis7.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.216/30 | Calamuchita |
| ibis8.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.220/30 | Calamuchita |
| ibis9.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.224/30 | Calamuchita |
| ibis10.calamuchita.cordoba.dc.fi.uba.ar | 151.40.3.228/30 | Calamuchita |
| jilguero.lafalda.cordoba.dc.fi.uba.ar | 20.86.15.64/26 | La Falda |
| kiwi.lafalda.cordoba.dc.fi.uba.ar | 10.31.25.144/29 | La Falda |
| lechuza.calamuchita.cordoba.dc.fi.uba.ar | 20.26.29.0/24 | Calamuchita |
| mero1.calamuchita.cordoba.dc.fi.uba.ar | 20.86.15.128/25 | Calamuchita |
| mero2.calamuchita.cordoba.dc.fi.uba.ar | 10.31.25.160/27 | Calamuchita |
| negron.calamuchita.cordoba.dc.fi.uba.ar | 10.31.25.160/30 | Calamuchita |
| ortega.calamuchita.cordoba.dc.fi.uba.ar | 10.31.25.164/30 | Calamuchita |
| paloma.calamuchita.cordoba.dc.fi.uba.ar | 10.31.25.168/30 | Calamuchita |
| quebrantahuesos1.calamuchita.cordoba.dc.fi.uba.ar | 150.38.27.0/30 | Calamuchita |
| quebrantahuesos2.calamuchita.cordoba.dc.fi.uba.ar | 150.38.27.4/30 | Calamuchita |
| quebrantahuesos3.calamuchita.cordoba.dc.fi.uba.ar | 150.38.27.8/30 | Calamuchita |

5.3.1. Asignación de Nombres a routers, servers, hosts

| Nombre | Dispositivo | Interfaz | Dirección |
|----------------------------|-------------|----------|--------------|
| web.aguila.capital | WebServer | | 201.158.15.1 |
| a.aguila.capital | Host A | | 201.158.15.2 |
| r4.aguila.capital | R4 | e0/0 | 201.158.15.3 |
| r5.aguila.capital | R5 | e0/0 | 201.158.15.4 |
| r2.aguila.capital | R2 | e0/0 | 201.158.15.5 |
| r3.aguila.capital | R3 | e0/2 | 201.158.15.6 |
| virtual.aguila.capital | Virtual A | | 201.158.15.7 |
| r1.buitre.capital | R1 | e0/0 | 20.86.15.1 |
| r3.buitre.capital | R3 | e0/0 | 20.86.15.2 |
| r1.cuervo.capital | R1 | e0/1 | 10.31.25.129 |
| r3.cuervo.capital | R3 | e0/1 | 10.31.25.130 |
| r5.dodo.capital | R5 | e0/1 | 20.64.73.1 |
| r4.dodo.capital | R4 | e0/1 | 20.64.73.2 |
| nsroot.dodo.capital | DNS-ROOT | | 20.64.73.3 |
| r8.dodo.capital | R8 | e0/0 | 20.64.73.4 |
| virtual.dodo.capital | Virtual D | | 20.64.73.5 |
| ftp.espatula.lafalda | FTP-Server | | 10.31.25.1 |
| r12.espatula.lafalda | R12 | e0/0 | 10.31.25.2 |
| ns1.espatula.lafalda | DNS1 | | 10.31.25.3 |
| r15.espatula.lafalda | R15 | e0/2 | 10.31.25.4 |
| r13.espatula.lafalda | R13 | e0/1 | 10.31.25.5 |
| r13.faisan.lafalda | R13 | e0/0 | 20.86.15.33 |
| c.faisan.lafalda | Host C | | 20.86.15.34 |
| r14.faisan.lafalda | R14 | e0/1 | 20.86.15.35 |
| r10.golondrina.calamuchita | R10 | e1/2 | 10.31.25.153 |
| r13.golondrina.calamuchita | R13 | e0/2 | 10.31.25.154 |
| r8.hornero.calamuchita | R8 | e0/1 | 10.31.25.157 |
| r7.hornero.calamuchita | R7 | e1/1 | 10.31.25.158 |
| r2.ibis1.calamuchita | R2 | s1/0.1 | 151.40.3.193 |
| r17.ibis1.calamuchita | R17 | s1/0.1 | 151.40.3.194 |
| r2.ibis2.calamuchita | R2 | s1/0.2 | 151.40.3.197 |
| r16.ibis2.calamuchita | R16 | s1/0.1 | 151.40.3.198 |
| r2.ibis3.calamuchita | R2 | s1/0.3 | 151.40.3.201 |
| r9.ibis3.calamuchita | R9 | s1/0.1 | 151.40.3.202 |
| r2.ibis4.calamuchita | R2 | s1/0.4 | 151.40.3.205 |
| r6.ibis4.calamuchita | R6 | s1/0.1 | 151.40.3.206 |
| r17.ibis5.calamuchita | R17 | s1/0.2 | 151.40.3.209 |
| r16.ibis5.calamuchita | R16 | s1/0.2 | 151.40.3.210 |
| r17.ibis6.calamuchita | R17 | s1/0.3 | 151.40.3.213 |
| r9.ibis6.calamuchita | R9 | s1/0.2 | 151.40.3.214 |

| Nombre | Dispositivo | Interfaz | Dirección |
|---------------------------------------|-------------|----------|--------------|
| r17.ibis7.calamuchita | R17 | s1/0.4 | 151.40.3.217 |
| r6.ibis7.calamuchita | R6 | s1/0.2 | 151.40.3.218 |
| r16.ibis8.calamuchita | R16 | s1/0.3 | 151.40.3.221 |
| r9.ibis8.calamuchita | R9 | s1/0.3 | 151.40.3.222 |
| r16.ibis9.calamuchita | R16 | s1/0.4 | 151.40.3.225 |
| r6.ibis9.calamuchita | R6 | s1/0.3 | 151.40.3.226 |
| r9.ibis10.calamuchita | R9 | s1/0.4 | 151.40.3.229 |
| r6.ibis10.calamuchita | R6 | s1/0.4 | 151.40.3.230 |
| r17.jilguero.lafalda | R17 | e0/0 | 20.86.15.65 |
| r16.jilguero.lafalda | R16 | e0/0 | 20.86.15.66 |
| r14.jilguero.lafalda | R14 | e0/0 | 20.86.15.67 |
| r15.jilguero.lafalda | R15 | e0/0 | 20.86.15.68 |
| r15.kiwi.lafalda | R15 | e0/1 | 10.31.25.145 |
| r7.lechuza.calamuchita | R7 | e1/0 | 20.26.29.1 |
| r6.lechuza.calamuchita | R6 | e0/0 | 20.26.29.2 |
| r9.lechuza.calamuchita | R9 | e0/0 | 20.26.29.3 |
| telnet.lechuza.calamuchita | Tel-Server | | 20.26.29.129 |
| b.mero1.calamuchita | Host B | | 20.86.15.129 |
| telnet.mero1.calamuchita | Tel-Server | | 20.86.15.130 |
| r11.mero1.calamuchita | R11 | e0/0 | 20.86.15.132 |
| r10.mero1.calamuchita | R10 | e1/1 | 20.86.15.133 |
| r10.mero2.calamuchita | R10 | e1/0 | 10.31.25.193 |
| ns2.mero2.calamuchita | DNS2 | | 10.31.25.194 |
| r8.negron.calamuchita | R8 | Tunnel10 | 10.31.25.161 |
| r11.negron.calamuchita | R11 | Tunnel10 | 10.31.25.162 |
| Nombre | Dispositivo | Interfaz | Dirección |
| r8.ortega.calamuchita | R8 | Tunnel20 | 10.31.25.165 |
| r12.ortega.calamuchita | R12 | Tunnel20 | 10.31.25.166 |
| r12.paloma.calamuchita | R12 | Tunnel30 | 10.31.25.169 |
| r11.paloma.calamuchita | R11 | Tunnel30 | 10.31.25.170 |
| r8.quebrantahuesos1.calamuchita | R8 | e0/2 | 150.38.27.1 |
| internet.quebrantahuesos1.calamuchita | INTERNET | e1/0 | 150.38.27.2 |
| r11.quebrantahuesos2.calamuchita | R11 | e0/1 | 150.38.27.5 |
| internet.quebrantahuesos2.calamuchita | INTERNET | e1/1 | 150.38.27.6 |
| r12.quebrantahuesos3.calamuchita | R12 | e0/1 | 150.38.27.9 |
| internet.quebrantahuesos3.calamuchita | INTERNET | e1/2 | 150.38.27.10 |

6. OpenVPN

Para realizar el trabajo práctico fue necesario la creación de 10 VPNs¹, para poder conectar los distintos dispositivos físicos a la red simulada en GNS3. Notamos que, aunque sólo 5 de éstos servicios estarían en simultáneo utilizándose (los DNSs, alguno de los 3 hosts, y alguno de los servicios), es necesario tener todo configurado para poder cambiar a otro dispositivo (siendo mucho más fácil configurando distintas VPNs).

¹Los 10 dispositivos son: Host A, Host B, Host C, DNS1, DNS2, DNS Root, WebServer, FTPServer y Telserver, que cuenta con dos interfaces tap

6.1. Servidores

Dentro de la PC que corre la topología en GNS3 se tiene a los 10 VPNs ejecutándose en paralelo (en 10 puertos diferentes). Para cada uno de estos se configura la interfaz tap correspondiente.

6.2. Clientes

Para cada uno de los clientes se crearon los scripts correspondientes para poder conectar al servidor, el cual cuenta con la dirección IP con la que deberá conectarse, el puerto al que debe conectarse (para conectarse a una determinada interfaz tap del servidor), máscara de subred, y otros parámetros. Es de particular importancia la asignación de la dirección IP que le corresponde, dentro del ambiente de la topología GNS3. Además, es necesario configurar la tabla de ruteo para tal cliente (como ya fue determinada en la sección de Tablas de Ruteo Estático).

7. Scripts de configuración

Para realizar la simulación de la topología, y poder utilizar los distintos dispositivos físicos, comunicados por las interfaces taps (como ya fue explicado en secciones anteriores), se crearon scripts para automatizar la ejecución de los mismos. A continuación se detallan los distintos tipos de scripts:

- **Servicios.sh**: Permite levantar los servicios de telnet, apache o ftp.
- **pings.sh**: Realiza una secuencia de pings a dispositivos a lo largo de toda la topología. Lo utilizamos para corroborar la correcta conexión entre los dispositivos físicos con el servidor que ejecuta al GNS3, así como asegurar la correcta configuración del ruteo estático.
- **levantarHostA.sh**: Se configura la interfaz tap correspondiente; se configura el ruteo estático para tal host; se copia el archivo **resolv.conf** al directorio local para dejar configurado el DNS de nuestra topología (para el caso del host A, el DNS2). Para los Hosts B y C se tienen análogos archivos de configuración (con los parámetros correspondientes).
- **levantarWebserver.sh**: similar al caso anterior, pero en este caso además copia los archivos de configuración necesarios al directorio local correspondiente. Tanto para el FTPserver como para el TelServer se cuenta con sus semejantes archivos de configuración.
- **finalizarVPNs.sh**: cierra todas las conexiones taps utilizadas (del 0 al 9) en el dispositivo local.

8. Anexos

8.1. Topología de la Red

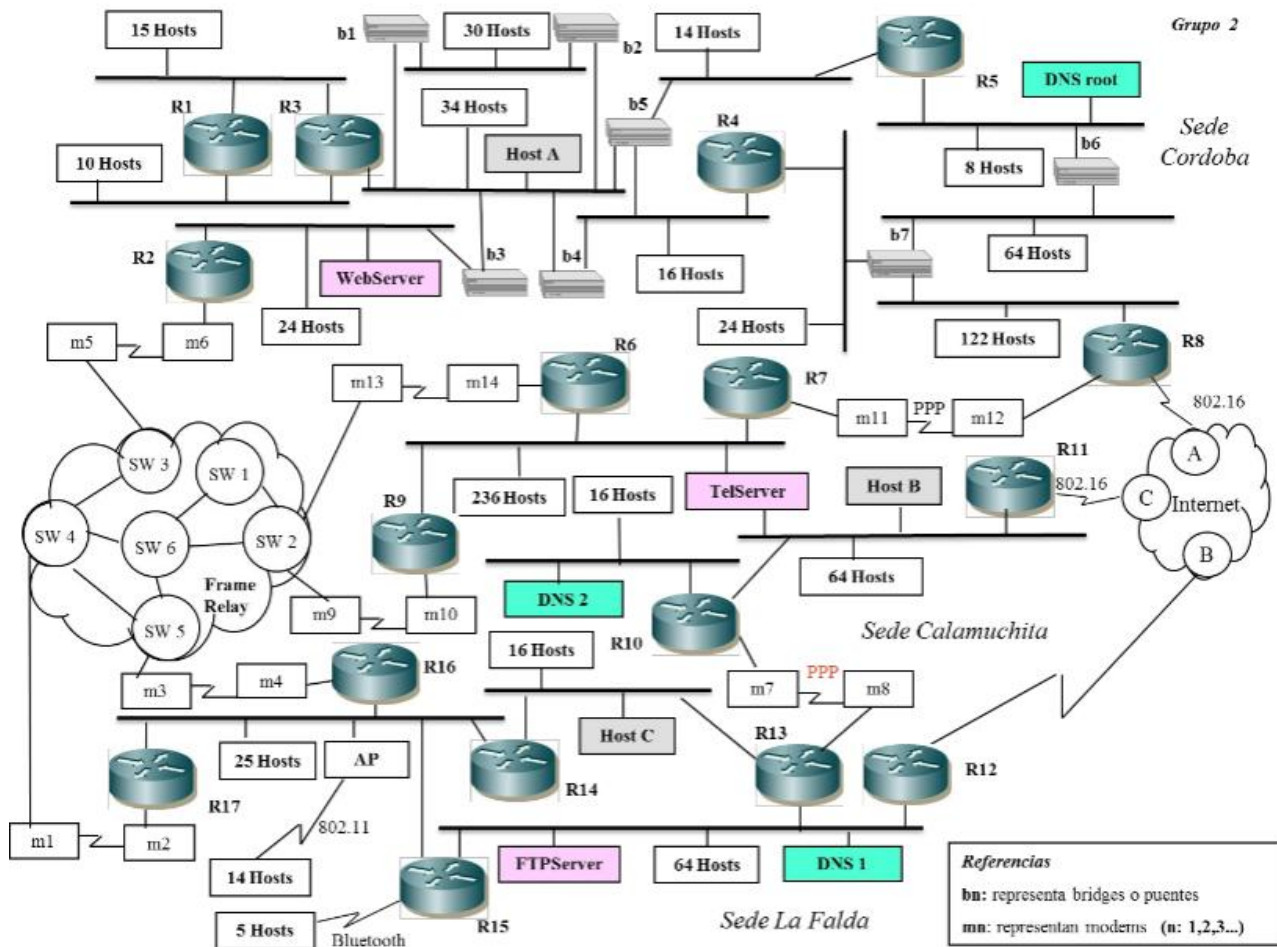


Figura 2: Topología de la Red

8.2. Topología de la Red, con división de Subredes

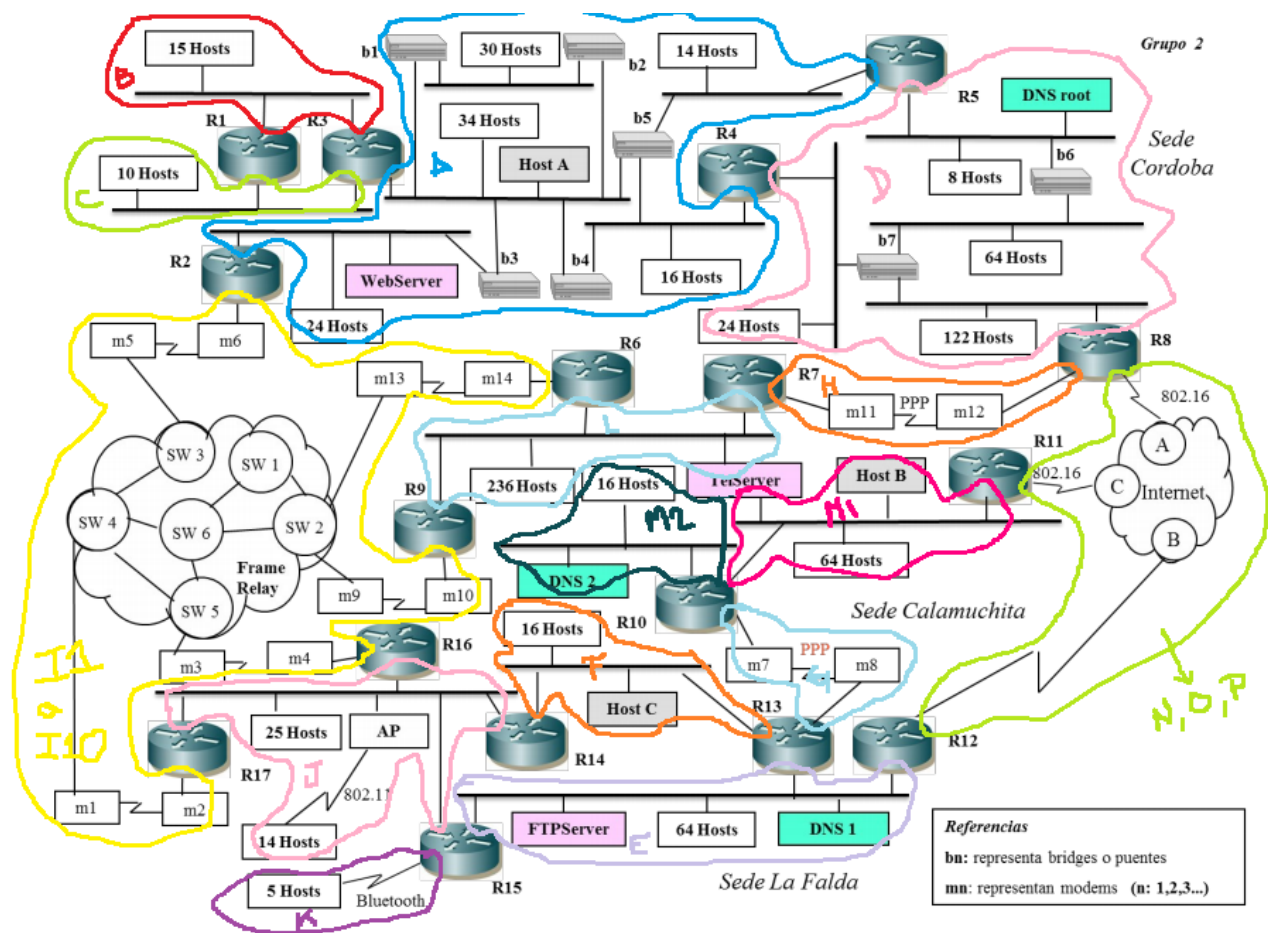


Figura 3: Topología de la Red

8.3. Diagrama de Capa 3, con direcciones IP

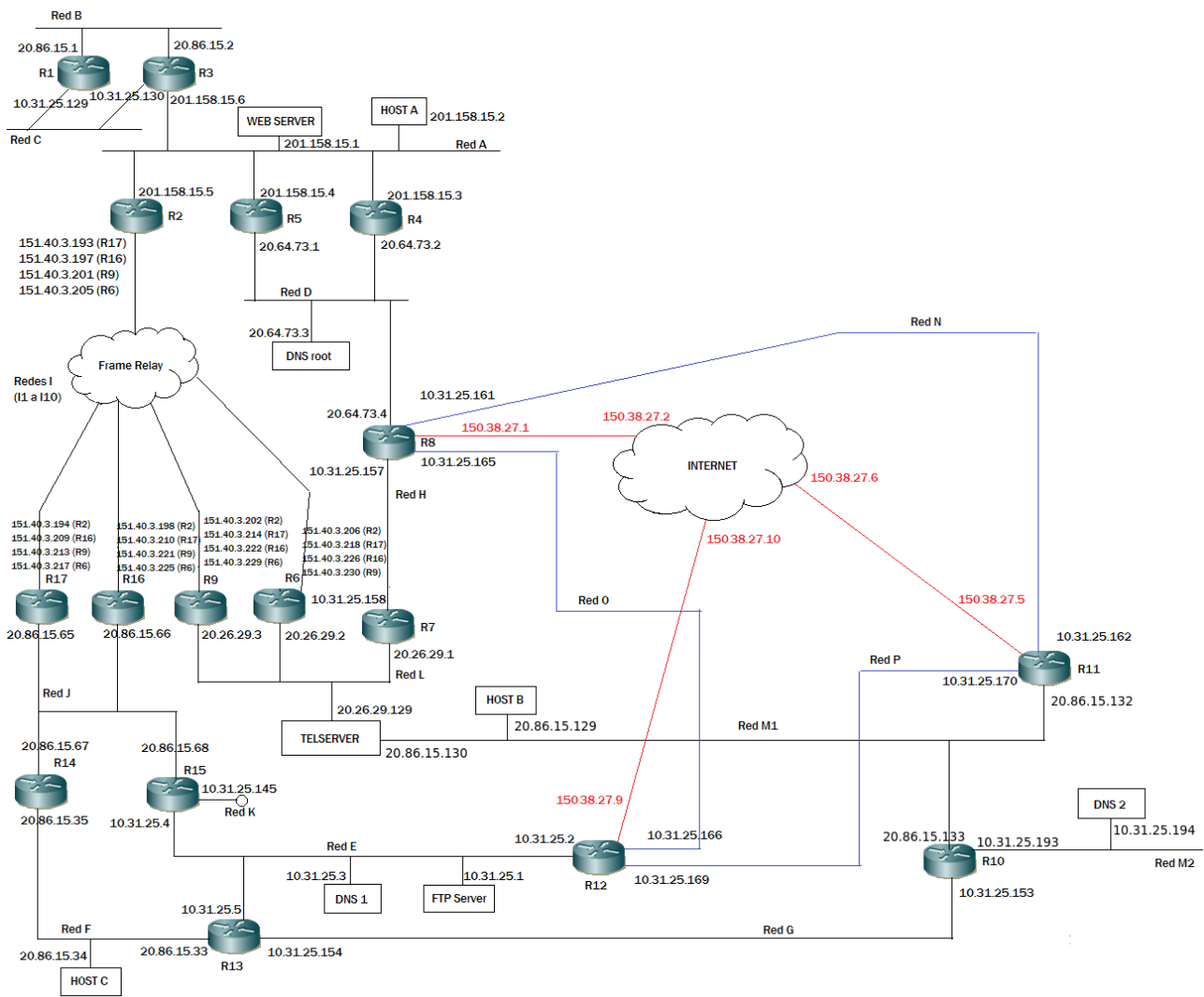


Figura 4: Topología de la Red