

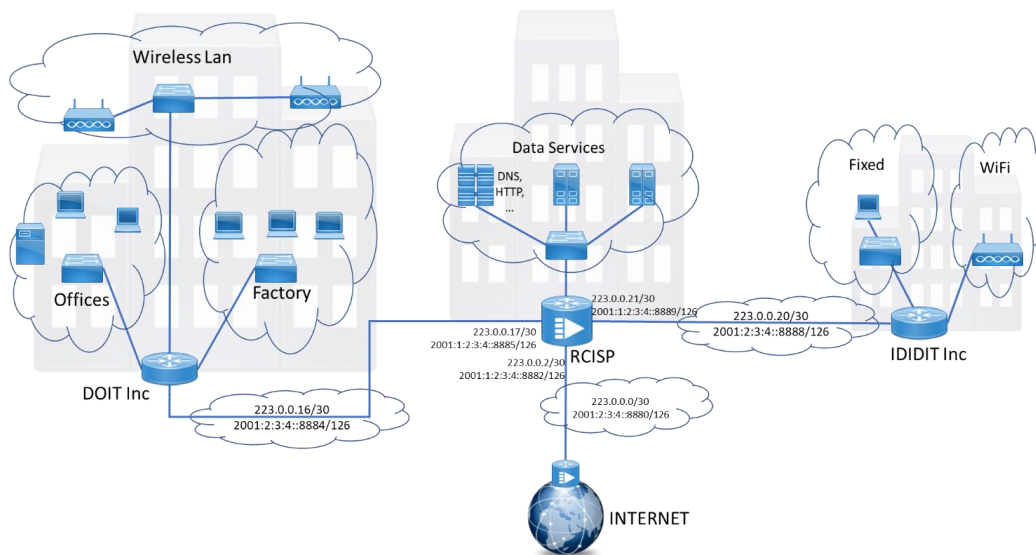
Redes de Comunicações 1

Project Recurso

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Num. Mec.: =0/1x₁x₂x₃x₄x₅



Description:

On one small village, there is an ISP (Internet Service Provider), the RCISP, that is currently providing service to two companies: DOIT Inc and IDIDIT Inc.

The RCISP, besides providing Internet connectivity to the companies; it also hosts services like DNS and HTTP on its Data Services center.

The RCISP is responsible to manage some IPv4 and IPv6 networks, providing address space to its customers, according to their needs.

Currently, the RCISP is allocating addresses for the following networks:

IPv4: 212.1x₁x₂.0x₃x₄.0/24

IPv6: 2002:8888:x₅x₄x₃::/48

The RCISP has the need for addresses for its Data Services network:

- 120 servers using public IPv4 addresses
- A /64 IPv6 network to provide addresses to all its servers.
- The RCISP delegates /56 IPv6 address space to both DOIT and IDIDIT.

The IDIDIT Inc has its network split in two parts:

- The Fixed network for PCs, Laptops, printers and other servers that connect through Ethernet cables. This network uses 5 public IPv4 address fixed servers/PCs and it uses private IPv4 addresses for the remaining machines. All machines have global IPv6 addresses.
- The WiFi network only uses private IPv4 and global IPv6 addresses (there are no public IPv4 addresses on the WiFi).

Additionally, the IDIDIT Inc uses 6 public IPv4 addresses for NAT/PAT to enable all machines with private IPv4 to have Internet access.

The IDIDIT Inc uses 192.168.32.0/23 for the private addressing. One /24 for the Fixed network and a second /24 to the WiFi network.

The DOIT Inc has its network split in three parts:

- The Offices network for PCs, Laptops, printers and other servers that connect through Ethernet cables. This network uses 25 public IPv4 address fixed servers/PCs, and it uses private IPv4 addresses for the remaining machines. All machines have global IPv6 addresses.
- The WiFi network only uses private IPv4 and global IPv6 addresses (there are no public IPv4 addresses on the WiFi).
- The Factory network only uses private IPv4 (no public IPv4, neither global IPv6).

Additionally, the IDIDIT Inc uses 16 public IPv4 addresses for NAT/PAT to enable machines with private IPv4 from the Offices and from the WiFi to have Internet access. The Factory PCs/machines are NOT allowed to access the Internet.

The IDIDIT Inc uses 172.21.0.0/16 for the private addressing. The Factory network needs at least 1000 private IPv4 addresses. The WiFi needs 400 and the Offices network needs 200.

Objectives:

- 1 – Distribute the addresses (Public and private IPv4 and IPv6) according to the specifications provided.
- 2 – Configure the 3 several interfaces of the routers (DOIT, RCISP and IDIDIT) to comply with the requirements.
- 3 – Enable public IPv4 and global IPv6 routing between the routers (e.g., configure static routing), using default Gateways (default routes) when justifiable.
- 4 – Configure NAT/PAT on the DOIT and IDIDIT routers, according to the requirements.
- 5 – Configure DHCP on the DOIT and IDIDIT routers for the private IPv4 addressing.
- 6 – Place at least on VPC on each network to cover all connectivity possibilities
 - Public IPv4 + Global IPv6 (where applicable)
 - Private IPv4 + Global IPv6 (where applicable)
 - Private IPv4 only (where applicable)
 - Public IPv4 only (where applicable)

⇒ For the WiFi/Wireless Lan networks, instead of putting access points (that do not exist in GNS3), place a VPC instead.
- 7 – Configure a DNS server on the RCISP Data Services network. Use different sub-domains to each of the companies (DOIT and IDIDIT), and also for the Data Services network.
- 8 – Provide address resolution on the DNS server to ALL VPCs/Servers with public addresses.
- 9 – Configure a Web/HTTP Server on the RCIPS Data Services network (you may use the same VM that runs the DNS).
- 10 – Create a Web page for the IDIDIT Inc and one for the RCISP.
- 11 – Place a second VM on the “Offices” network and provide it with a public IPv4 address. Register this machine name and IP address on the RCISP DNS server.
- 12 – Enable a Web site for the DOIT Inc on this VM.
- 13 – Develop a client-server application (in python using sockets) that allows a client to contact the server to get information about the server HTTP (name, IP address) and company information, such as name and services available.

Deadline: 08/02/2022 for the final demonstration.