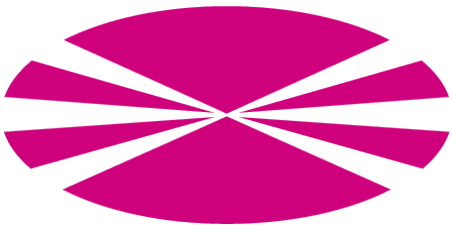

UNIVERSIDADE DA CORUÑA

# COMPUTER NETWORKS LAB

## Practice 2: Subnetting using Packet Tracer

This practice consists of four scenarios. The main purpose is to apply in the network simulator those concepts acquired during the master classes about subnetting.

## *Scenario p2-0*

This scenario is based on the Subnetworks Exercise 2 (Lesson 7). Students are asked to configure all computers and the required router interfaces according to the exercise.

The scenario can be auto-validated and does not compute in the evaluation.

## *Scenario p2-1a*

This scenario represents an organization consisting in a building with 4 departments. The employees are distributed in these departments.

Students are asked to configure the addressing using subnetting and to obtain full connectivity between devices, taking into account these considerations:

- The organization has contracted a class C address: 200.0.0.1/30.
- Since there are many devices in this organization, that class C address (assigned to Se2/0 interface in the router called “Interno”) is not enough. So, a new private network address is used (10.10.X.0/24) and subnets are created without modifying the IP for Se2/0 interface in the router already mentioned.
- Every student will start with an address where the third octet is formed by the last two numbers in her/his document identifier (DNI in case of being a Spanish student). For example: if my DNI is 69.111.3**33**-T, the IP for the organization will be 10.10.**33**.0/24.
- The number of employees in every department will not increase. So new departments can be added but new employees will not be hired for the already existing departments. Therefore, **the number of host bits must be minimized**.
- The number of IP addresses needed for the devices in the different departments are already fixed. These numbers take into account the IP for the router interfaces:
- The number of IP addresses needed for the devices in the different departments (including the interfaces of the routers) are:
    - Ventas: 5 addresses
    - Leyes: 11 addresses
    - I+D: 13 addresses
    - Contabilidad: 18 addresses

- **All subnets must have the same size**.
- The web server must be reachable from all the devices in the organization.

## *Scenario p2-1b*

Using the same scenario as in the previous section, students are asked to configure the addressing again considering that **the subnets can have different sizes and that the number of host bits must be minimized**.

## *Scenario p2-2*

This second scenario consists in an organization formed by 5 offices where a set of employees work.

Students are asked to configure the addressing for the **all the interfaces** in the organization considering **variable length subnet masks** and to obtain **full connectivity between devices**, taking into account these considerations:

- The address for **all the organization** is private and class C. In particular it is 192.168.X.0/24. Every student will start with a class C address where the third octet is formed by the last two numbers in her/his document identifier (DNI in case of being a Spanish student). For example: if my DNI is 69.111.3**33**-T, the IP for the organization will be 192.168.**33**.0.
- The addressing must be adapted to the fact that the **host addresses should not be wasted**.
- The subnet identifiers should be assigned in an ordered manner. This way, subnet identifier for Office 1 will be less than that for Office 2, and the latter will be less than the subnet identifier for Office 3, and so on. Moreover, identifiers for subnets communicating routers should be assigned from left to right (from lowest to hightest), and they will be the highest ones.
- The number of IP **addresses needed** in the offices are the following:
  - Office 1: 80 addresses
  - Office 2: 28 addresses
  - Office 3: 24 addresses
  - Office 4: 18 addresses
  - Office 5: 11 addresses
- **The (dynamic) routing is already configured and it should not be modified.** It should be taken into account that the protocol employed (OSPF) needs a period of time to converge, so it is convenient to click on Fast Forward Time (see Figure 1) every time the scenario is open.

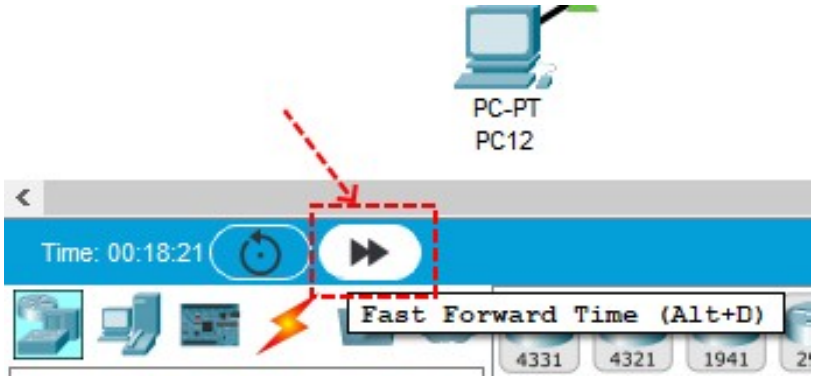


*Figura 1: Fast Forward Time button*

## *Useful hints*

- As mentioned in tutorial, interfaces to configure in routers can be disabled. In this case, it is enough if the *port status* checkbox is marked. This checkbox appears in the interface configuration window for the router (see Figure 10 in tutorial).
- If an intermediate router does not have an entry in the ARP cache for one of its next hops and a packet arrives, it can occur that this packet has to be forwarded to that particular next hop. In this case, an ARP request will be sent (in order to obtain the corresponding MAC address), and the packet will be discarded. This fact provokes that the first time (or times) that a ping packet is sent to a remote device, this ping can fail. Therefore, it is recommended to send the ping several times before concluding that a particular destination is unreachable. For these successive tries, it is useful to click on the Fire button (see Figure 2).

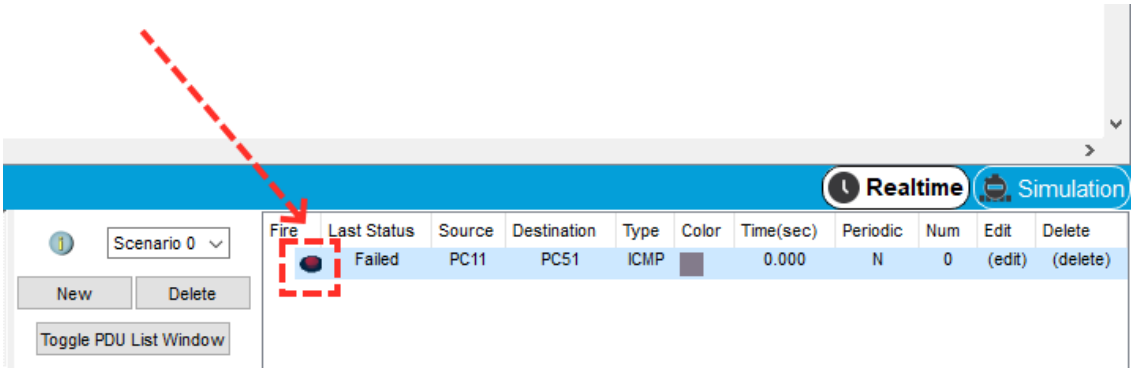


*Figura 2: Fire button*

## *Delivery instructions*

In the evaluation we will employ those files uploaded by the student to Moodle using the task called “Packet Tracer – p2”. Three files will be uploaded: p2-1a.pkt, p2-1b.pkt y p2-2.pkt.

**The deadline for the submission is on April 26, at 20:00.**

In order to receive a grade, once the delivery is done, students will evaluate other students’ deliveries following the rubric provided in the Moodle task created. **The deadline for this evaluation is May 3 at 20:00.**

The network must be according to the document identifier. Otherwise, the final grade will be 0.

The maximum grades will be 0.15 for scenario p2-1a and 0.25 for each of the scenarios p2-1b and p2-2.