# Revision and Information Gathering

Network

Create a simple network with two switches, each connected to one computer. Add one router and interconnect it with one of the switches. Use the correct cable types.

You can work with real devices or in Packet Tracer. As for Packet Tracer, place devices in the „Physical" interface, then correct their location in the „Logical" interface. You can make connections in the „Logical" or „Physical" interface.
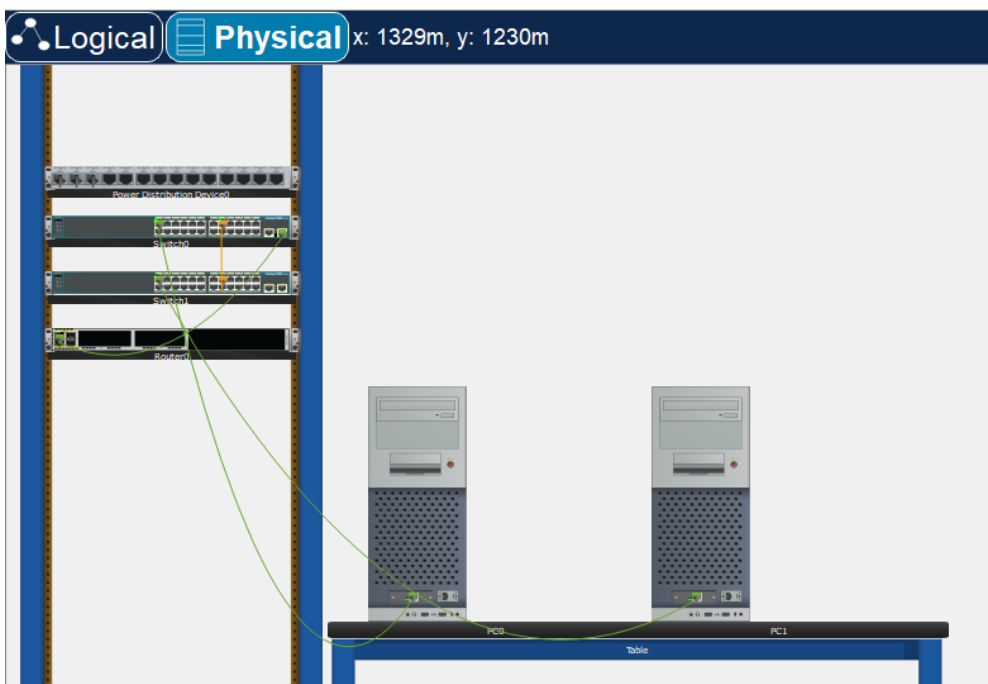
Explore physical properties of the router. Is it possible to add any new module?

System Exploration

How to quickly find out which image was booted from:

```
show boot
```

More detailed information:

```
show version
```

Files in various memory chips:

```
show flash        … flash PROM, there is a system image and basic configuration
dir flash:        … the same, or „dir" only, or dir flash0:
dir nvram:        … NVRAM, for the startup-config file
dir usbflash0:    … if USB flash stick is connected (alternatively „dir ?")
```

Working with files:

```
delete, erase, copy
```

Content can be displayed using more, e.g.:

```
more flash:config.text
```

It works for flash and usbflash, for files in RAM (running-config) and NVRAM (startup-config) we use the show command.

If we want to return to a command, we can either use the arrows (keyboard) or view the history of commands used:

```
show history
```

Users:

```
show users   … makes sense when using a local database
show login   … information about problems with logged-in users and parameters
```

syslog information:

```
show logging
```

Physical parameters (temperature, fans, power supply, etc.) - does not work in Packet Tracer:

```
show env all       … everything that can be monitored on the components is displayed
show env fan       … fans only
show env power all … everything to power supply (to one or two PSUs, if there are)
show env ?         … list of options, we choose what we need
show int g0/1 status
show interfaces status          … possibly other keywords: flowcontrol,…
show int g0/1 capabilities      … port properties, does not work in Packet Tracer
show interfaces accounting      … statistics for various protocols on interfaces
```

Output Filtering

For show commands it is possible to filter the output by pipe (does not work for `more` and other commands).

How to find out which filters can be used:

```
show run | ?
```

(the pipe symbol should be surrounded by spaces).

```
show run | begin line con 0          … from this line down
show run | section line vty          … sections (parts) beginning as follows
show run | section spanning-tree
sh ip int br | include up            … lines containing the given word (here "up")
sh ip int br | exclude down          … lines not containing the word
show run | include service           … lines from running-config about services
```

MAC address table

This means a dynamically updated switching table (also CAM = Content-Addresable Memory).

Assign the IP addres 10.0.0.1/8 to the router's interface and 10.0.0.2/8 and 10.0.0.3/8 to the switches. Assign each computer an IP address in the range 10.0.0.4/8 and 10.0.0.5/8. The gateway for the whole network is 10.0.0.1.

Ping the computers to populate the switch tables.

Viewing content:

```
sh mac address-table            OR:
sh mac-address-table
```

Deleting table:

```
clear mac address-table         OR:
clear mac-address-table
clear mac-address-table dynamic
```

The last one is practical if there are static records in the table, we will delete only the dynamically learned ones.

ARP table

What is the difference between MAC address table and ARP table on a switch?

Show the ARP table on one of the switches. Ping this switch from the connected PC and show the ARP table again.

```
show arp          OR:
show ip arp
```

Configuration of port parameters

We will display the parameters of a specific port, we are interested in (among other things) the following information: whether the link is active (1), what is the MAC address of the port (2), in what duplex and at what speed the port operates (3):

```
Switch#sh int g0/1
GigabitEthernet0/1 is up, line protocol is up (connected)      <= 1
  Hardware is Lance, address is 00d0.bc48.a019 (bia 00d0.bc48.a019)   <= 
 BW 1000000 Kbit, DLY 1000 usec,                                          2
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 1000Mb/s      <= 3
  input flow-control is off, output flow-control is off
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:08, output 00:00:05, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
```

If the duplex or speed is not right:

```
int g0/1
      duplex full         OR           duplex auto
      speed 1000          OR           speed auto
```

(for full duplex at 1 Gb/s, but if the port can).

To detect MDIX (crossover detection) error - does not work in Packet Tracer:

```
show controllers ethernet g0/1 phy
show controllers ethernet g0/1 phy | include auto-mdix
```

If the row looks like this:

```
Auto-MDIX : On [AdminState=1 …]
```

- AdminState=1 means that this function is enabled, =0 would mean it's disabled
- On means that the port is currently providing crossover, Off means that the port is not currently providing crossover

If Auto-MDIX is disabled, we turn it on on the port as follows:

```
int g0/1
      mdix auto
```

Basic Configuration

Provide basic security for the router and one switch. Set device names (R1, S1). Set the privileged exec mode password (ciscoen), console password (ciscocon), and VTY line passwords (ciscovty). Ensure that all passwords are encrypted. Set a banner on the router ("Unauthorized entry prohibited").

Create an admin user on the router, password of your choice. Set up SSH here with a key length of 1024. Ensure that it is only possible to log in via VTY using SSH, as admin user. Try SSH access from both the computer and the switch.