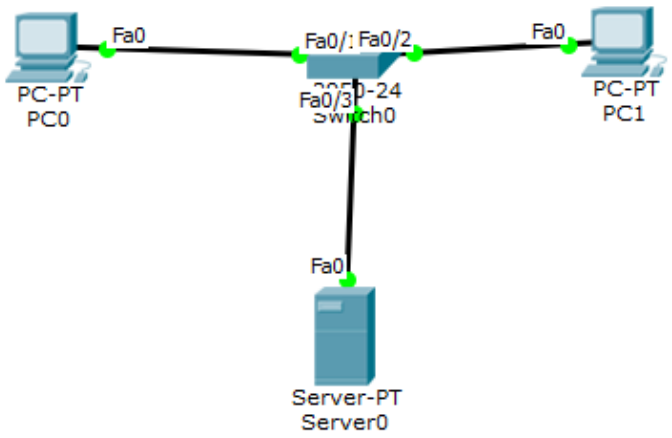
Лабораторная работа №2. Простая сеть на маршрутизаторах

Используемые команды:

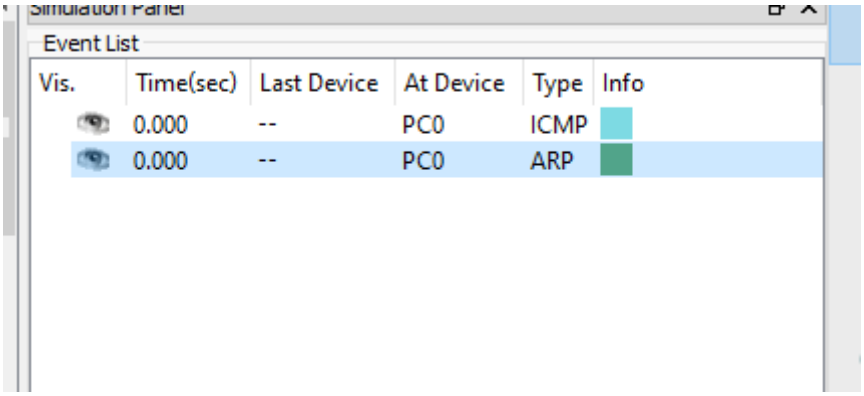
1) **Arp – A – просмотр ARP таблицы ПК**
2) **show interface– просмотр данных интерфейса**
3) **show ip interface– просмотр IP интерфейса**
4) **show ip interface brief – просмотр краткой информации интерфейса в виде таблицы**

Задание №1. ARP таблицы

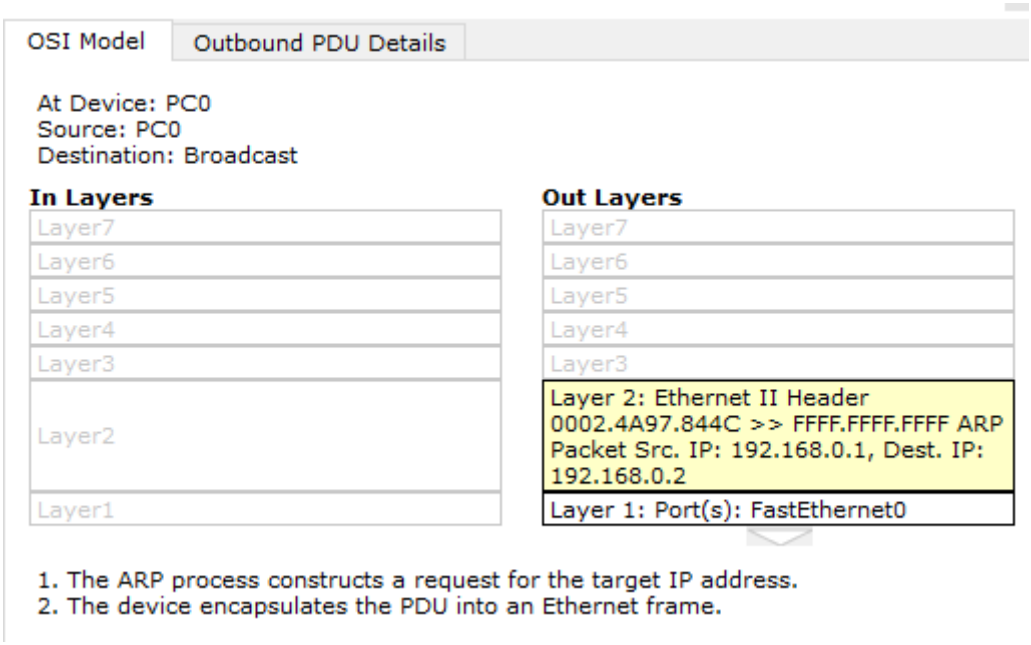
Создаем данную сеть:



1) Включаем режим симуляции и пингуем PC1 от PC0, где сформируются два пакета ICMP и ARP сообщение

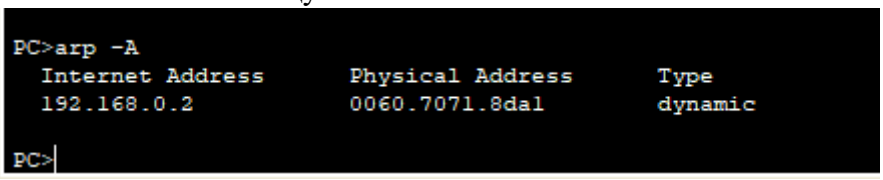


2) Кликаем по ARP и видим:

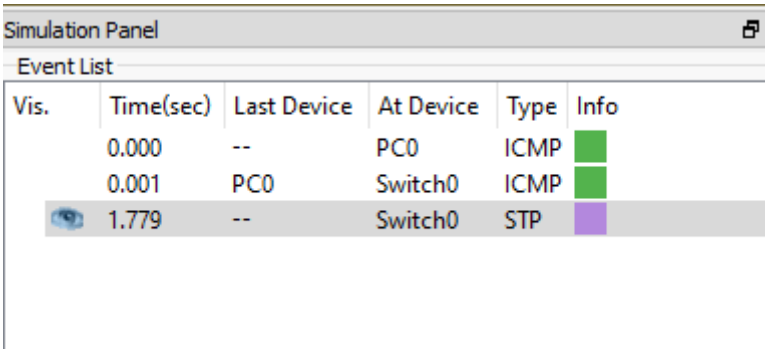


Дождавшись заполнения ARP-таблицы, повторно начали отправляться пакеты ICMP.

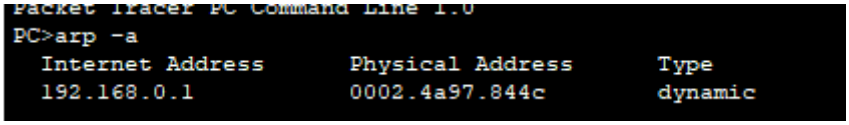
3) Вызываем ARP таблицу:



4) Снова пингуем PC1 от PC0, обмен ARP сообщениями не происходит:

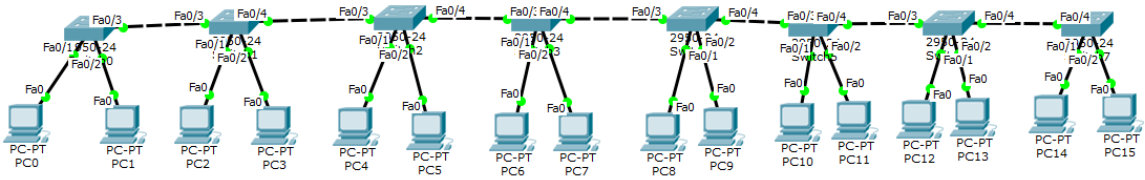


5) Пропингуем сервер, ARP сообщения не пошли, конечно, однако в таблице PC1 мы видим. Что там появился IP и MAC адрес

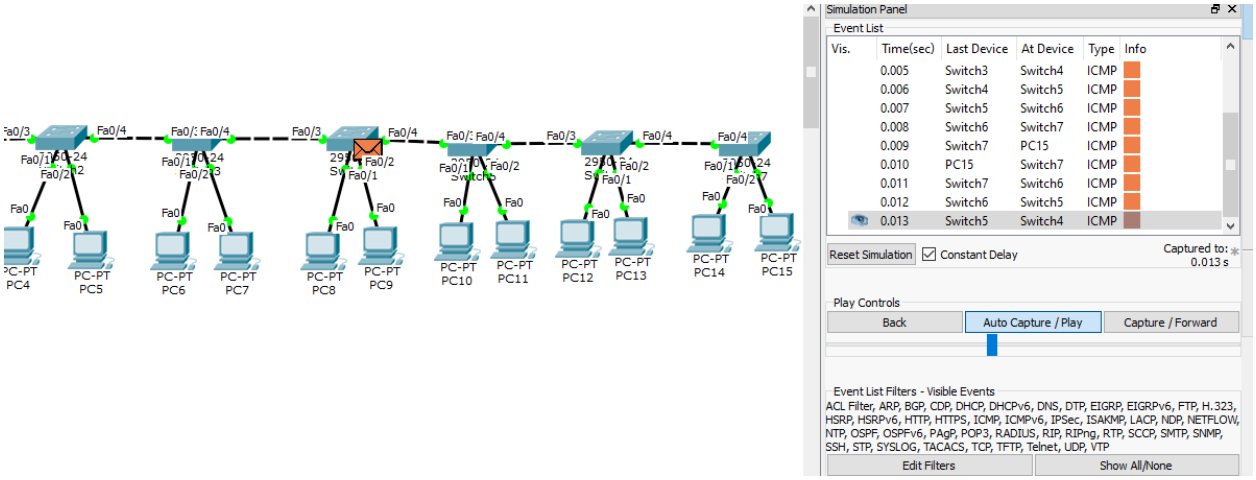


Задание №2. Сложная сеть на свичах и роутере

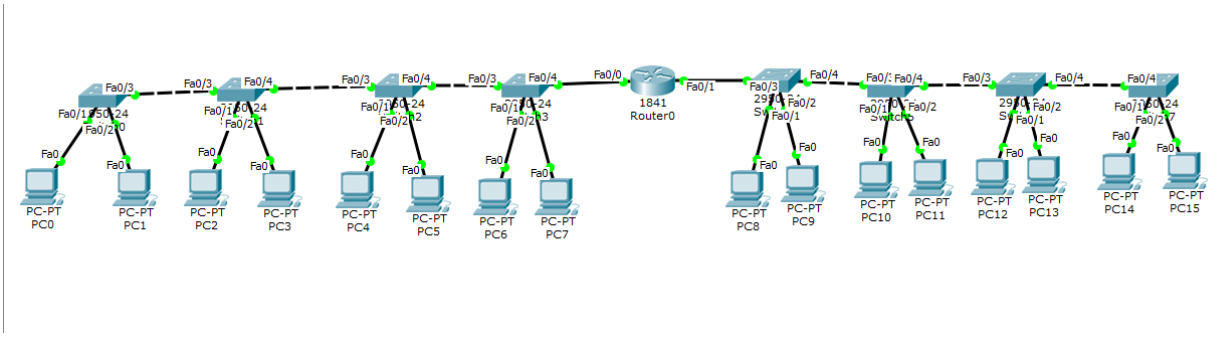
1) Создаем подобную огромную сеть:



2) Пингуем PC15 от PC0. Видим, что пакет один за другим проходит все свичи, попадает на PC15, обрабатывается и ответ опять идет на PC0 через все свичи. Что очень **долго** и **перегружает** сеть.



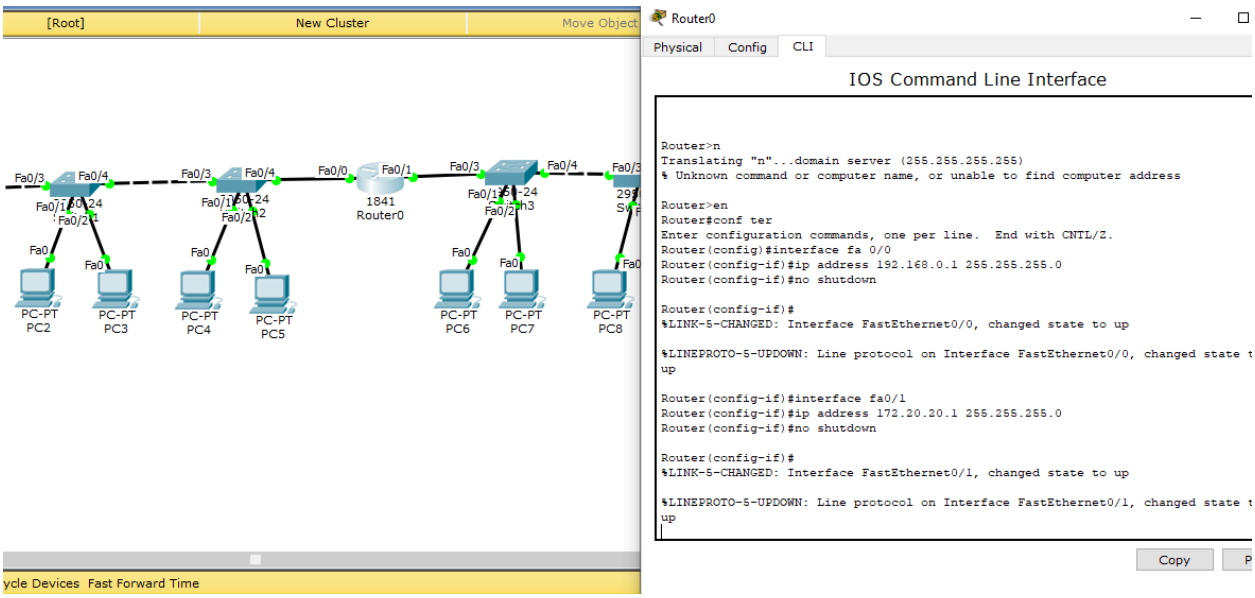
3) Установим **роутер**



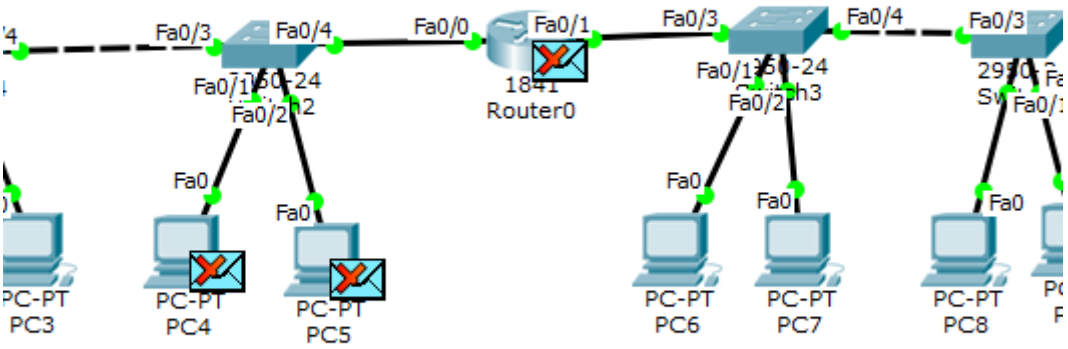
4) Идем в консоль роутера, чтобы в ручную настроить его. Выполняем последовательность указанных команд:

```
Router>en
Router#conf ter
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface fa 0/0
Router(config-if)#ip address 192.168.0.1 255.255.255.0
Router(config-if)#no shutdown
```

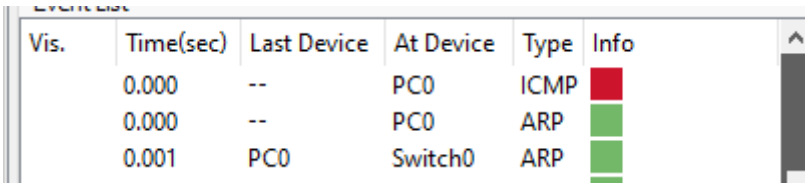
Все настраиваем и получаем следующее:



5) Выдаем всем ПК IP адреса
6) Попытаемся пропинговать PC15, но у нас ничего не получается:



7) Задаем Gateway на PC0 и PC15, пингуем еще раз:



Vis.	Time(sec)	Last Device	At Device	Type	Info
	0.000	--	PC0	ICMP	
	0.000	--	PC0	ARP	
	0.001	PC0	Switch0	ARP	

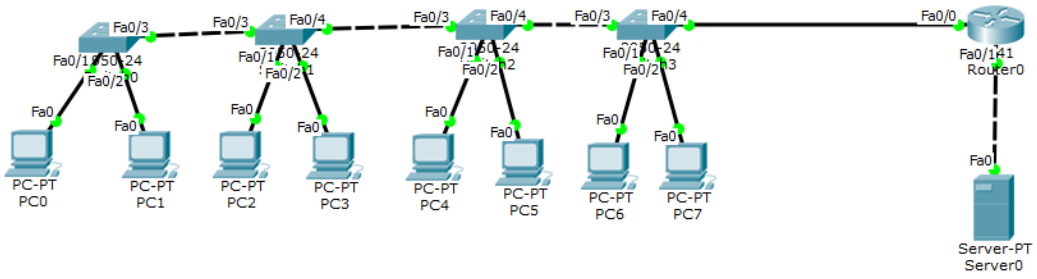
В описании MAC адрес отсутствует:

Layer4	Layer4
Layer3	Layer 3: IP Header Src. IP: 192.168.0.17, Dest. IP: 192.168.0.16 ICMP Message Type: 8
Layer2	Layer 2:
Layer1	Layer1

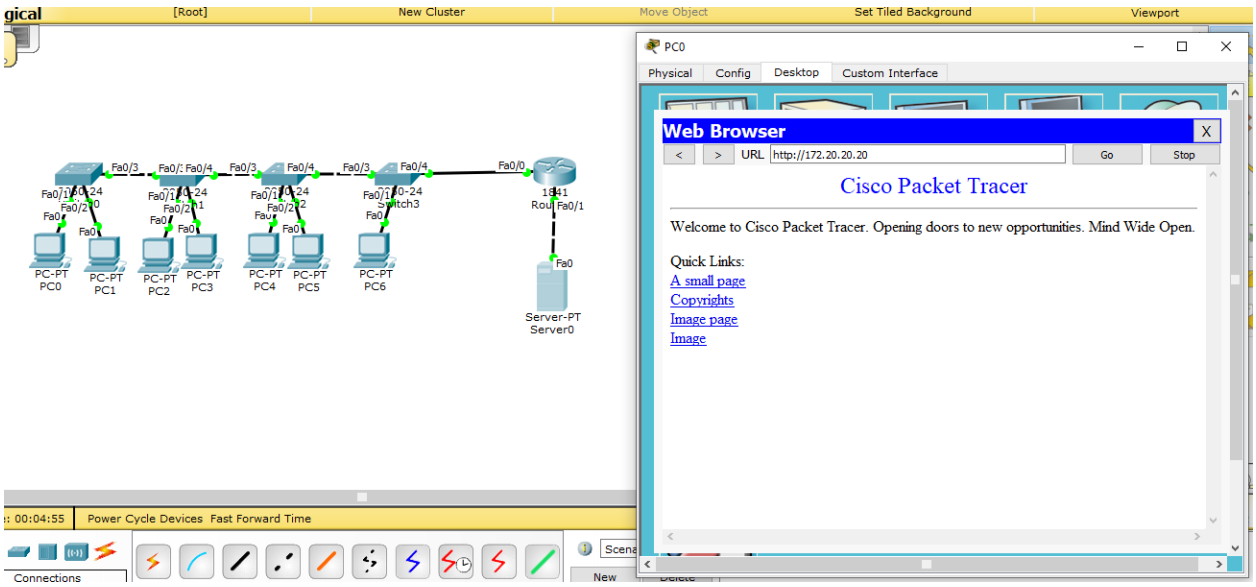
1. The Ping process starts the next ping request.
2. The Ping process creates an ICMP Echo Request message and sends it to the lower process.
3. The source IP address is not specified. The device sets it to the port's IP address.
4. The destination IP address is in the same subnet. The device sets the next-hop to destination.

Задание №3. Роутер для выхода в интернет

1) Создаем есть



И пытаемся попасть на сервер с любого ПК — успешно!



2) Посмотрим статистику роутера:
   1) **show interface fa0/0**

```
Router#show interface fa0/0
FastEthernet0/0 is up, line protocol is up (connected)
  Hardware is Lance, address is 00e0.8fdb.9901 (bia 00e0.8fdb.9901)
  Internet address is 192.168.0.1/24
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  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 (size/max/drops); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 14 bits/sec, 0 packets/sec
  5 minute output rate 18 bits/sec, 0 packets/sec
     25 packets input, 1376 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 input packets with dribble condition detected
     20 packets output, 1192 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
Router#
```

2) **show ip interface fa0/0**

```
Router#show ip interface fa0/0
FastEthernet0/0 is up, line protocol is up (connected)
  Internet address is 192.168.0.1/24
  Broadcast address is 255.255.255.255
  Address determined by setup command
  MTU is 1500 bytes
  Helper address is not set
  Directed broadcast forwarding is disabled
  Outgoing access list is not set
  Inbound  access list is not set
  Proxy ARP is enabled
  Security level is default
  Split horizon is enabled
  ICMP redirects are always sent
  ICMP unreachables are always sent
  ICMP mask replies are never sent
  IP fast switching is disabled
  IP fast switching on the same interface is disabled
  IP Flow switching is disabled
  IP Fast switching turbo vector
  IP multicast fast switching is disabled
  IP multicast distributed fast switching is disabled
  Router Discovery is disabled
  IP output packet accounting is disabled
  IP access violation accounting is disabled
  TCP/IP header compression is disabled
  RTP/IP header compression is disabled
  Probe proxy name replies are disabled
  Policy routing is disabled
  Network address translation is disabled
  BGP Policy Mapping is disabled
  Input features: MCI Check
  WCCP Redirect outbound is disabled
  WCCP Redirect inbound is disabled
  WCCP Redirect exclude is disabled
```

3) **show ip interface brief**

```
Router#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol

FastEthernet0/0        192.168.0.1     YES manual up                    up

FastEthernet0/1        172.20.20.1     YES manual up                    up

Vlan1                  unassigned      YES unset  administratively down down
Router#
```