Домашнее задание к занятию "3.8. Компьютерные сети, лекция 3"

1. Подключитесь к публичному маршрутизатору в интернет. Найдите маршрут к вашему публичному IP

   вывод с терминала:

```
   ~  telnet route-views.routeviews.org                    ✔
Trying 128.223.51.103...
Connected to route-views.routeviews.org.
Escape character is '^]'.
C
**************************************************************************

                RouteViews BGP Route Viewer
                route-views.routeviews.org

 route views data is archived on http://archive.routeviews.org

 This hardware is part of a grant by the NSF.
 Please contact help@routeviews.org if you have questions, or
 if you wish to contribute your view.

 This router has views of full routing tables from several ASes.
 The list of peers is located at http://www.routeviews.org/peers
 in route-views.oregon-ix.net.txt

 NOTE: The hardware was upgraded in August 2014.  If you are seeing
 the error message, "no default Kerberos realm", you may want to
 in Mac OS X add "default unset autologin" to your ~/.telnetrc

 To login, use the username "rviews".

 **************************************************************************


 User Access Verification

 Username: rviews

 route-views>show ip route 45.150.xx.67
 Routing entry for 45.150.xx.0/24
   Known via "bgp 6447", distance 20, metric 0
   Tag 6939, type external
   Last update from 64.71.137.241 5d01h ago
```

```
  Routing Descriptor Blocks:
  * 64.71.137.241, from 64.71.137.241, 5d01h ago
      Route metric is 0, traffic share count is 1
      AS Hops 2
      Route tag 6939
      MPLS label: none
route-views>

route-views>show bgp 45.150.xx.67
BGP routing table entry for 45.150.xx.0/24, version 2421294777
Paths: (22 available, best #18, table default)
  Not advertised to any peer
  Refresh Epoch 1
  4901 6079 1299 20485 60840
    162.250.137.254 from 162.250.137.254 (162.250.137.254)
      Origin IGP, localpref 100, valid, external
      Community: 65000:10100 65000:10300 65000:10400
      path 7FE0461D1678 RPKI State valid
      rx pathid: 0, tx pathid: 0
  Refresh Epoch 1
  3267 20485 60840
    194.85.40.15 from 194.85.40.15 (185.141.126.1)
      Origin IGP, metric 0, localpref 100, valid, external
      path 7FE029F0F698 RPKI State valid
      rx pathid: 0, tx pathid: 0
  Refresh Epoch 1
  8283 1299 20485 60840
    94.142.247.3 from 94.142.247.3 (94.142.247.3)
      Origin IGP, metric 0, localpref 100, valid, external
      Community: 1299:30000 8283:1 8283:101 8283:102
      unknown transitive attribute: flag 0xE0 type 0x20 length 0x24
        value 0000 205B 0000 0000 0000 0001 0000 205B
              0000 0005 0000 0001 0000 205B 0000 0005
              0000 0002
      path 7FE017C47D18 RPKI State valid
      rx pathid: 0, tx pathid: 0
  Refresh Epoch 1
  20130 6939 60840
    140.192.8.16 from 140.192.8.16 (140.192.8.16)
      Origin IGP, localpref 100, valid, external
      path 7FE042091F90 RPKI State valid
      rx pathid: 0, tx pathid: 0
  Refresh Epoch 1
  20912 3257 6453 20485 60840
    212.66.96.126 from 212.66.96.126 (212.66.96.126)
      Origin IGP, localpref 100, valid, external
      Community: 3257:8070 3257:30114 3257:50001 3257:53900 3257:53902
20912:65004……
```

2. Создайте dummy0 интерфейс в Ubuntu. Добавьте несколько статических маршрутов. Проверьте таблицу маршрутизации
   создадим 3 интерфейса dummy
   вывод с терминала:

   root@vagrant:/home/vagrant# **modprobe -v dummy numdummies=3**
   insmod /lib/modules/5.4.0-110-generic/kernel/drivers/net/dummy.ko numdummies=2
   numdummies=0 numdummies=3
   root@vagrant:/home/vagrant# ip a
   1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
   group default qlen 1000
   link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
   inet 127.0.0.1/8 scope host lo
   valid_lft forever preferred_lft forever
   inet6 ::1/128 scope host
   valid_lft forever preferred_lft forever
   2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state
   UP group default qlen 1000
   link/ether 08:00:27:a2:6b:fd brd ff:ff:ff:ff:ff:ff
   inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic eth0
   valid_lft 83589sec preferred_lft 83589sec
   inet6 fe80::a00:27ff:fea2:6bfd/64 scope link
   valid_lft forever preferred_lft forever
   3: **dummy0**: <BROADCAST,NOARP> mtu 1500 qdisc noop state DOWN group
   default qlen 1000
   link/ether 6e:e2:10:74:cf:05 brd ff:ff:ff:ff:ff:ff
   4: **dummy1**: <BROADCAST,NOARP> mtu 1500 qdisc noop state DOWN group
   default qlen 1000
   link/ether 82:99:33:fa:51:97 brd ff:ff:ff:ff:ff:ff
   5: **dummy2**: <BROADCAST,NOARP> mtu 1500 qdisc noop state DOWN group
   default qlen 1000
   link/ether 6e:cf:4e:8b:c4:03 brd ff:ff:ff:ff:ff:ff
   root@vagrant:/home/vagrant#

   добавим статический маршрут

вывод с терминала:

```
root@vagrant:/home/vagrant# ip route add 10.0.4.0/24 via 10.0.2.1
root@vagrant:/home/vagrant# ip route add 10.0.6.0/24 dev eth0
root@vagrant:/home/vagrant# routel
         target         gateway         source    proto    scope    dev tbl
        default         10.0.2.2        10.0.2.15     dhcp           eth0
     10.0.2.0/ 24                     10.0.2.15   kernel     link   eth0
      10.0.2.2                       10.0.2.15     dhcp     link   eth0
     10.0.4.0/ 24       10.0.2.1                                    eth0
/usr/bin/routel: 48: shift: can't shift that many
     10.0.6.0/ 24                                          link   eth0
      10.0.2.0         broadcast       10.0.2.15   kernel     link   eth0 local
     10.0.2.15           local        10.0.2.15   kernel     host   eth0 local
    10.0.2.255         broadcast       10.0.2.15   kernel     link   eth0 local
     127.0.0.0         broadcast       127.0.0.1   kernel     link     lo local
    127.0.0.0/ 8         local        127.0.0.1   kernel     host     lo local
     127.0.0.1           local        127.0.0.1   kernel     host     lo local
127.255.255.255         broadcast       127.0.0.1   kernel     link     lo local
          ::1                                 kernel           lo
       fe80::/ 64                               kernel          eth0
          ::1           local                  kernel           lo local
fe80::a00:27ff:fea2:6bfd           local                  kernel          eth0 local
root@vagrant:/home/vagrant#
```

3. Проверьте открытые TCP порты в Ubuntu, какие протоколы и приложения используют эти порты? Приведите несколько примеров

вывод с терминала:

```
root@vagrant:/home/vagrant# ss -tnlp
State              Recv-Q             Send-Q                         Local Address:Port
Peer Address:Port             Process
LISTEN             0                  4096                       127.0.0.53%lo:53
0.0.0.0:*                 users:(("systemd-resolve",pid=626,fd=13))
LISTEN             0                  128                          0.0.0.0:22
0.0.0.0:*                 users:(("sshd",pid=712,fd=3))
LISTEN             0                  128                             [::]:22
[::]:*                users:(("sshd",pid=712,fd=4))
root@vagrant:/home/vagrant#
```

53 порт использует DNS
22 порт использует ssh

4. Проверьте используемые UDP сокеты в Ubuntu, какие протоколы и приложения используют эти порты?

   вывод с терминала:

   root@vagrant:/home/vagrant# **ss -unap**
   State Recv-Q Send-Q Local Address:Port
   Peer Address:Port Process
   UNCONN 0 0 **127.0.0.53%lo:53**
   0.0.0.0:* users:(("systemd-resolve",pid=626,fd=12))
   UNCONN 0 0 **10.0.2.15%eth0:68**
   0.0.0.0:* users:(("systemd-network",pid=624,fd=19))
   root@vagrant:/home/vagrant#

   UDP-**порт 53** использует DNS
   UDP-**порт 68** используется DHCP-сервером для назначения динамических IP-адресов

5. Используя diagrams.net, создайте L3 диаграмму вашей домашней сети или любой другой сети, с которой вы работали

Диаграмма сети на работе