

17 Dynamic Routing Protocols – Lab Exercise

Lab Topology

The image displays two screenshots from a Cisco Packet Tracer lab environment.

Left Screenshot (R1 CLI): Shows the configuration of Router R1. The commands entered are:

```
Router(config-if)#ip address 192.168.20.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-S-CHANGED: Interface Serial0/3/0, changed state to up
%LINEPROTO-S-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up
Router(config-if)#exit
% Invalid input detected at '' marker.
Router(config-if)#interface Se0/3/0
Router(config-if)#ip address 192.168.50.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#exit interface fa0/0
% Invalid input detected at '' marker.
Router(config-if)#exit
Router(config)#interface fa0/0
Router(config-if)#ip address 192.168.10.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-S-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-S-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
Router(config-if)#
%LINEPROTO-S-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to down
%LINEPROTO-S-UPDOWN: Line protocol on Interface Serial0/3/0, changed state to up
Router(config-if)#exit
Router(config)#copy ru
Router(config)#copy runh
Router(config)#do wr
Building configuration...
[OK]
Router(config)#
```

Right Screenshot (Network Topology): Shows the network topology. Two routers (R1 and R2) are connected via their Serial0/0/0 interfaces. Each router is connected to a switch (S1 and S2) via its Fa0/1 interface. The switches are connected to PCs (PC0 and PC1) via their Fa0/2 interfaces. The IP addresses for the interfaces are: R1 Fa0/0 (192.168.50.1/24), R1 Fa0/1 (192.168.10.1/24), R2 Fa0/0 (192.168.50.2/24), R2 Fa0/1 (192.168.20.1/24).

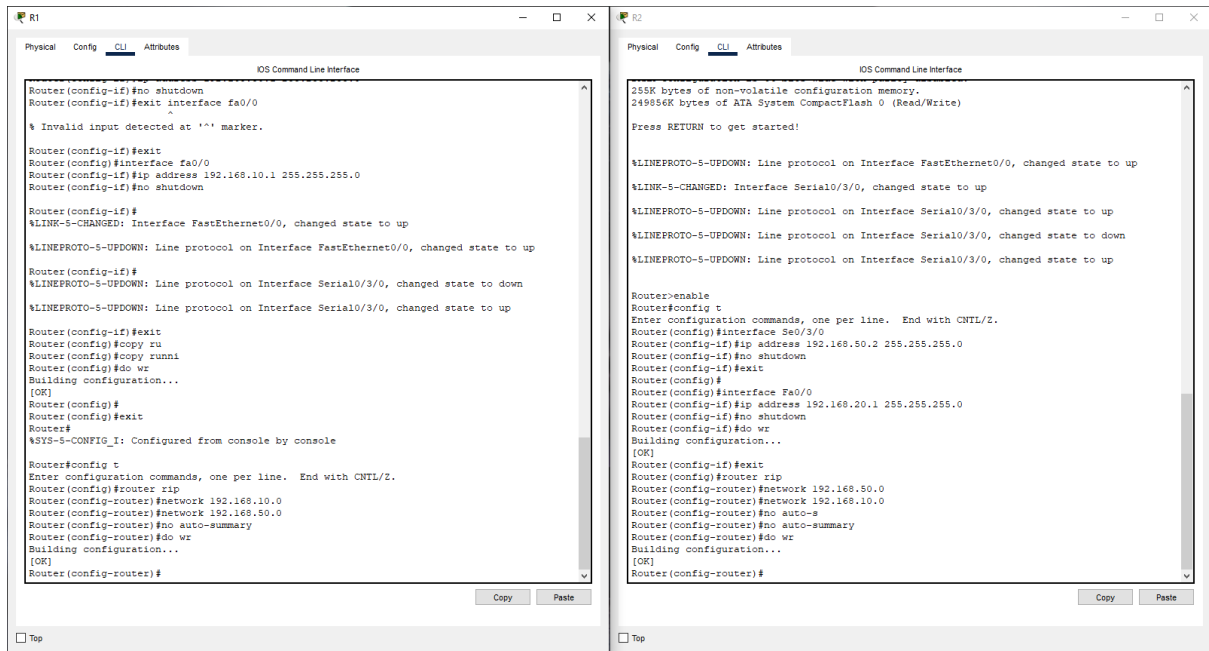
Enter the commands below on each router to provision a basic RIPv1 configuration and enable RIP on every interface.

```
router rip
```

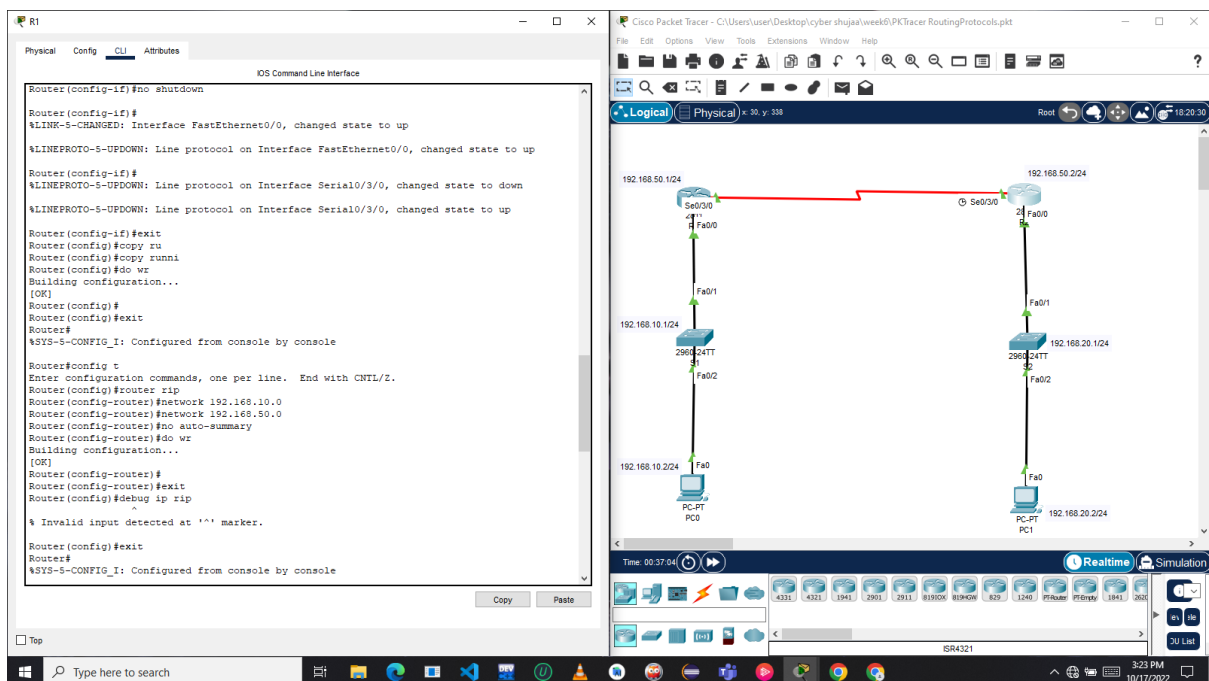
```
network 192.168.10.0
```

network 192.168.50.0

no auto-summary



Debug the routing protocol updates on R1. Observe the updates being sent and received. What kind of traffic is used (unicast, broadcast or multicast)?

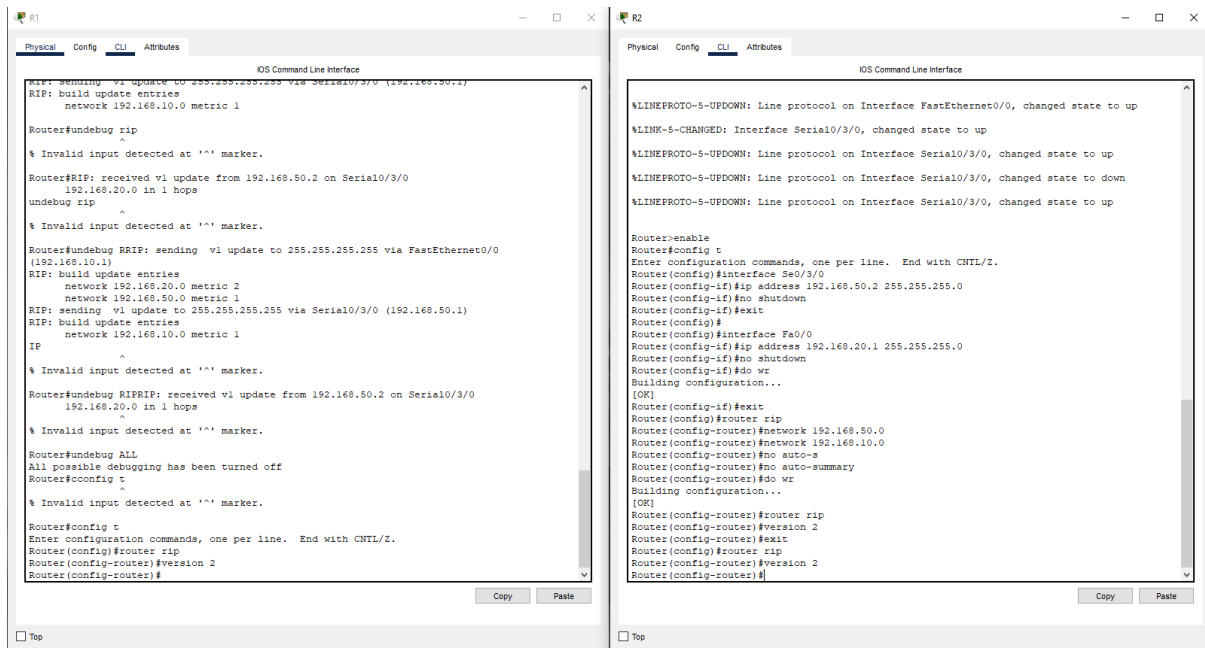


The updates are being sent on the broadcast address 255.255.255.255. All hosts on the subnet must process the packets.

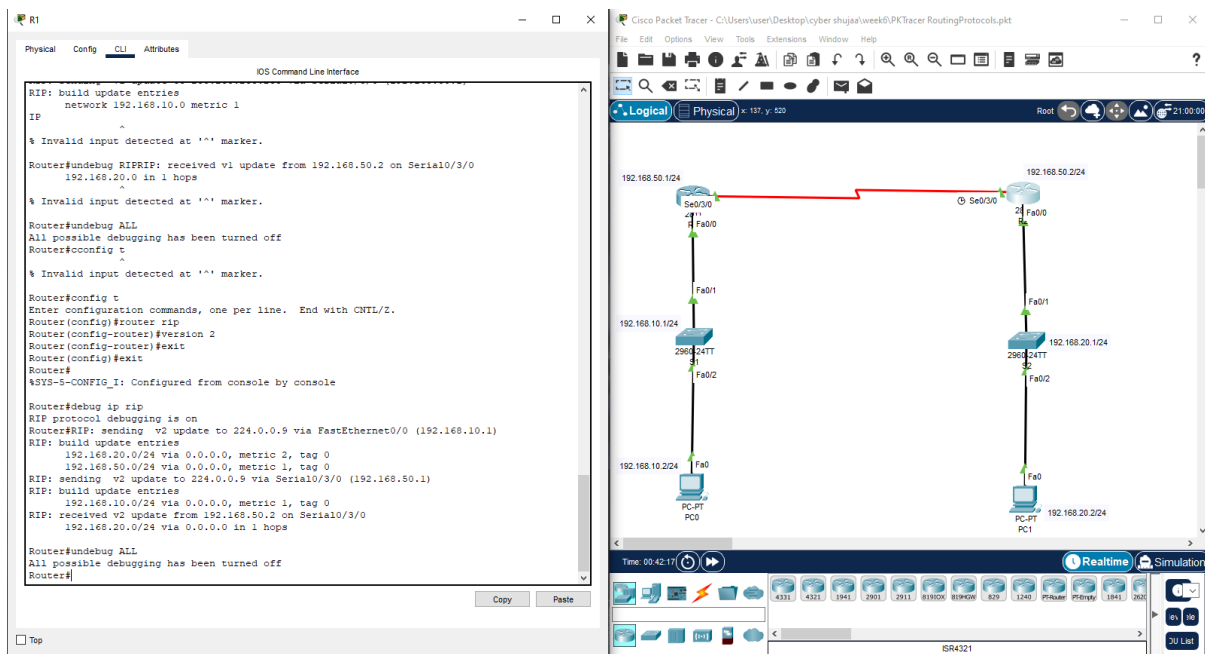
3) Enter the commands below to enable RIPv2 on every router.

router rip

version 2



4) What kind of traffic is used for the updates now?



The updates are being sent on the RIPv2 multicast address 224.0.0.9. Only RIPv2 routers will process the packets

6) Check that RIP routes have been added to R1 and it has a route to every subnet in the lab.

The screenshot displays the Cisco Packet Tracer interface. On the left, the R1 configuration window is open, showing the following commands and output:

```
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#debug ip rip
RIP protocol debugging is on
Router#RIP: sending v2 update to 224.0.0.9 via FastEthernet0/0 (192.168.10.1)
RIP: build update entries
  192.168.20.0/24 via 0.0.0.0, metric 2, tag 0
  192.168.50.0/24 via 0.0.0.0, metric 1, tag 0
RIP: sending v2 update to 224.0.0.9 via Serial0/3/0 (192.168.50.1)
RIP: build update entries
  192.168.10.0/24 via 0.0.0.0, metric 1, tag 0
RIP: received v2 update from 192.168.50.2 on Serial0/3/0
  192.168.20.0/24 via 0.0.0.0 in 1 hops

Router#undebug ALL
All possible debugging has been turned off
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       I - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

C    192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.10.0/24 is directly connected, FastEthernet0/0
L      192.168.10.1/32 is directly connected, FastEthernet0/0
R      192.168.20.0/24 [120/1] via 192.168.50.2, 00:00:23, Serial0/3/0
C      192.168.50.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.50.0/24 is directly connected, Serial0/3/0
L      192.168.50.1/32 is directly connected, Serial0/3/0

Router#
```

On the right, the network topology is shown. It includes two routers (R1 and R2) connected via their Serial0/0/0 interfaces. R1 is connected to PC0 (192.168.10.2/24) via Fa0/0 and to a switch (2960-24TT) via Fa0/1. The switch is connected to PC1 (192.168.20.2/24) via Fa0/2. R2 is connected to PC1 (192.168.20.2/24) via Fa0/0 and to a switch (2960-24TT) via Fa0/1. The switch is connected to PC0 (192.168.10.2/24) via Fa0/2. The network is running RIPv2.

7) View the RIP database on R1.

The screenshot displays the Cisco Packet Tracer interface. On the left, the R1 configuration window is open, showing the following commands and output:

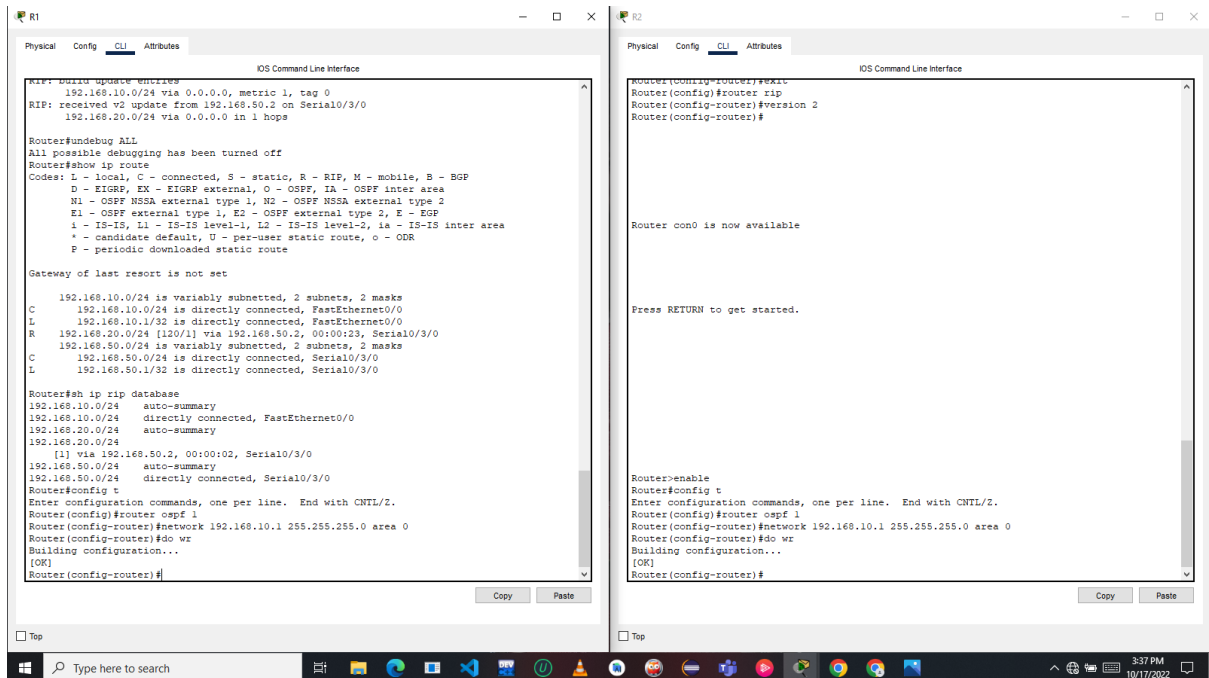
```
Router#show ip rip database
192.168.10.0/24 auto-summary
192.168.10.0/24 directly connected, FastEthernet0/0
192.168.20.0/24 auto-summary
192.168.20.0/24
[1] via 192.168.50.2, 00:00:02, Serial0/3/0
192.168.50.0/24 auto-summary
192.168.50.0/24 directly connected, Serial0/3/0

Router#
```

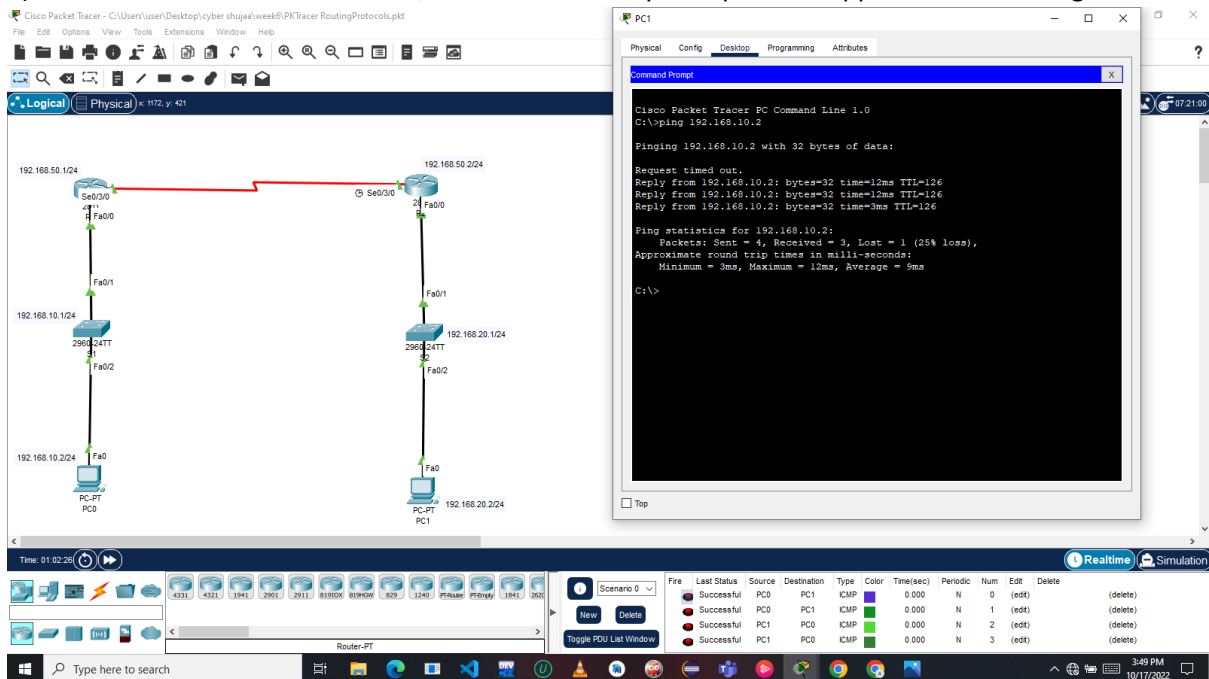
On the right, the network topology is shown, identical to the previous screenshot. It includes two routers (R1 and R2) connected via their Serial0/0/0 interfaces. R1 is connected to PC0 (192.168.10.2/24) via Fa0/0 and to a switch (2960-24TT) via Fa0/1. The switch is connected to PC1 (192.168.20.2/24) via Fa0/2. R2 is connected to PC1 (192.168.20.2/24) via Fa0/0 and to a switch (2960-24TT) via Fa0/1. The switch is connected to PC0 (192.168.10.2/24) via Fa0/2. The network is running RIPv2.

router ospf 1

network 192.168.10.1 255.255.255.0 area 0



9) Disable interface FastEthernet 0/0 on R2. What do you expect to happen to R1's routing table?



10) Verify your expected changes to R1's routing table.

The screenshot shows the Cisco Packet Tracer interface with two router windows open: R1 and R2.

Router R1 CLI:

```
Router>enable
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       I - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, Ia - IS-IS inter
       area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, FastEthernet0/0
L       192.168.10.1/32 is directly connected, FastEthernet0/0
R       192.168.20.0/24 [120/1] via 192.168.50.2, 00:00:06, Serial0/3/0
C       192.168.50.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.50.0/24 is directly connected, Serial0/3/0
L       192.168.50.1/32 is directly connected, Serial0/3/0

Router#
```

Router R2 CLI:

```
Press RETURN to get started.

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 192.168.10.1 255.255.255.0 area 0
Router(config-router)#do wr
Building configuration...
[OK]
Router(config-router)#
Router(config-router)#exit
Router(config-if)#interface Fa0/0
Router(config-if)#no shutdown
Router(config-if)#
```

The bottom of the screen shows the network topology with various devices and a table of active connections.

| Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete |
|------------|-------------|--------|-------------|------|-------|-----------|----------|--------|----------|--------|
| Successful | PC0 | PC1 | ICMP | | 0.000 | N | 0 | (edit) | (delete) | |
| Successful | PC0 | PC1 | ICMP | | 0.000 | N | 1 | (edit) | (delete) | |
| Successful | PC1 | PC0 | ICMP | | 0.000 | N | 2 | (edit) | (delete) | |
| Successful | PC1 | PC0 | ICMP | | 0.000 | N | 3 | (edit) | (delete) | |