

Title:

Study and implement various networking commands on terminal.

Description:

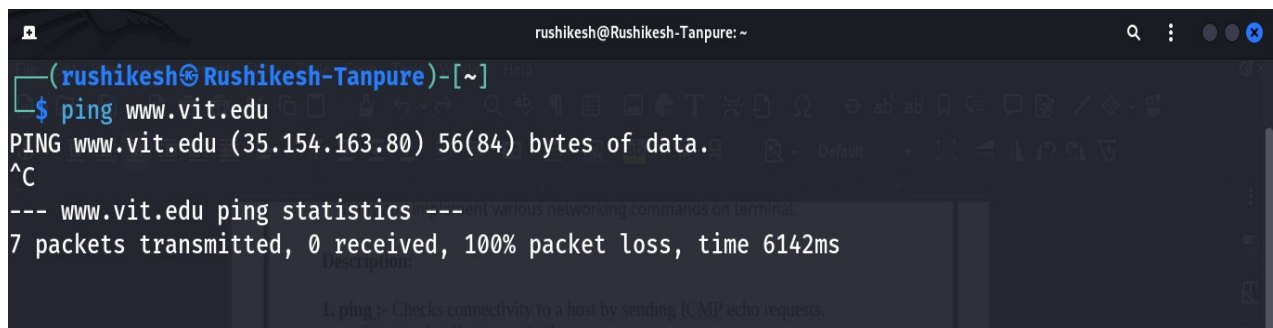
1. **ping** :- The `ping` command is a network utility tool used to test the reachability of a host on an Internet Protocol (IP) network. It also measures the round-trip time for messages sent from the originating host to a destination computer.

Options:

- `-c count`: Specifies the number of packets to send. For example, `ping -c 4 google.com` will send 4 packets to Google's servers.
- `-t timeout`: Sets the time, in seconds, to wait for a response. If the target doesn't respond within this time, the ping will time out.
- `-i interval`: Specifies the interval between sending each packet in seconds.
- `-s packetsize`: Sets the size of the data portion of the packet in bytes.

Syntax: `ping [hostname/url]`

Example: `ping www.vit.edu`



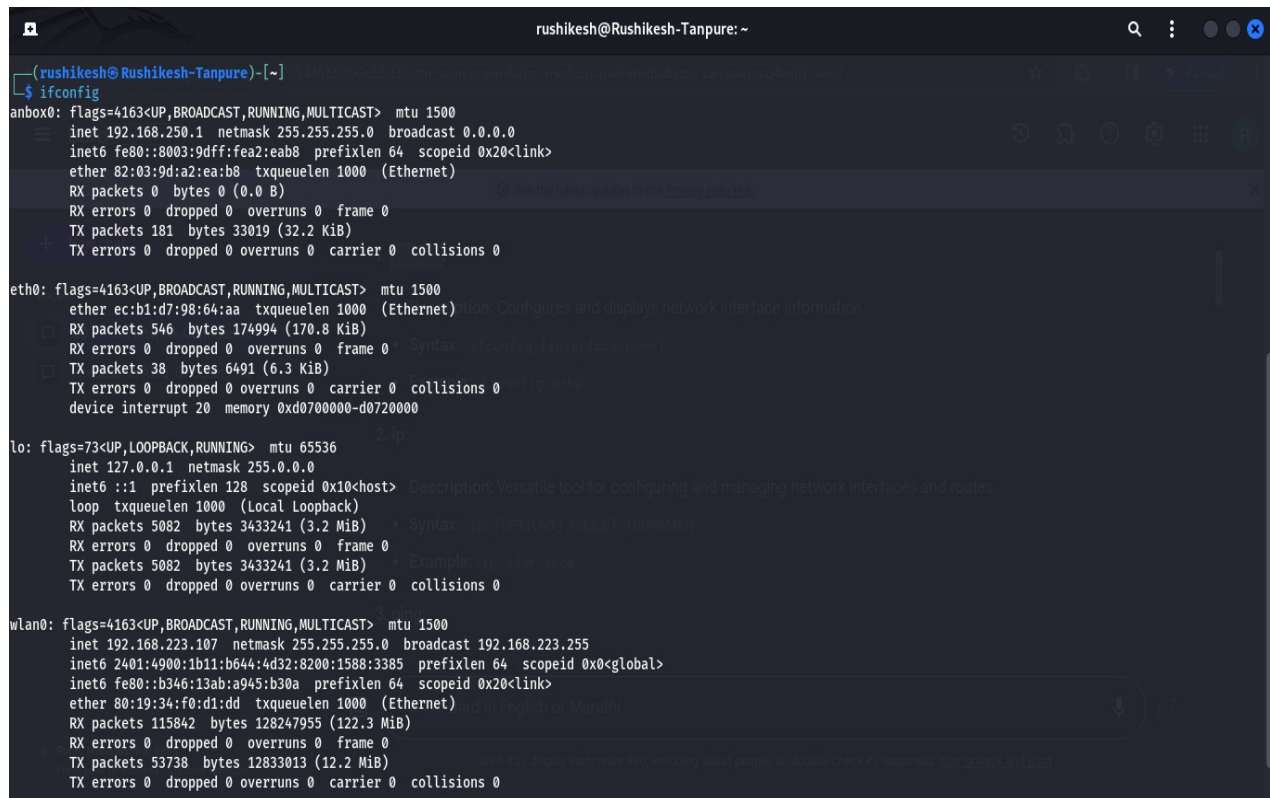
```
rushikesh@Rushikesh-Tanpure: ~  
(rushikesh@Rushikesh-Tanpure)-[~]  
$ ping www.vit.edu  
PING www.vit.edu (35.154.163.80) 56(84) bytes of data.  
^C  
--- www.vit.edu ping statistics ---  
7 packets transmitted, 0 received, 100% packet loss, time 6142ms
```

The screenshot shows a terminal window with a dark background. The user 'rushikesh' is at the 'Rushikesh-Tanpure' machine. They enter the command 'ping www.vit.edu'. The terminal shows the IP address 35.154.163.80 and the packet size 56(84) bytes. The user presses Ctrl-C (^C) to stop the command. The terminal then displays the ping statistics: 7 packets transmitted, 0 received, 100% packet loss, and a total time of 6142ms. A faint, semi-transparent text overlay is visible in the background of the terminal window.

2. **ifconfig** :- Configures and displays network interface information. The `ifconfig` command is commonly used to configure and display information about network interfaces on Unix-like operating systems.

Syntax: `ifconfig [interface_name]`

Example: `ifconfig`



```
(rushikesh@Rushikesh-Tanpure)-[~]
$ ifconfig
anbox0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.250.1 netmask 255.255.255.0 broadcast 0.0.0.0
    inet6 fe80::8003:9dff:fea2:eab8 prefixlen 64 scopeid 0x20<link>
    ether 82:03:9d:a2:ea:b8 txqueuelen 1000 (Ethernet)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 181 bytes 33019 (32.2 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    ether ec:b1:d7:98:64:aa txqueuelen 1000 (Ethernet)
    RX packets 546 bytes 174994 (170.8 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 38 bytes 6491 (6.3 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
    device interrupt 20 memory 0xd0700000-d0720000

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 5082 bytes 3433241 (3.2 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 5082 bytes 3433241 (3.2 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlan0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.223.107 netmask 255.255.255.0 broadcast 192.168.223.255
    inet6 2401:4900:1b11:b644:4d32:8200:1588:3385 prefixlen 64 scopeid 0x0<global>
    inet6 fe80::b346:13ab:a945:b30a prefixlen 64 scopeid 0x20<link>
    ether 80:19:34:f0:d1:dd txqueuelen 1000 (Ethernet)
    RX packets 115842 bytes 128247955 (122.3 MiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 53738 bytes 12833013 (12.2 MiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

3. **dig**: Flexible tool for performing DNS lookups. It allows users to query DNS servers to obtain information about domain names and their associated records. `dig` is a valuable command-line tool for network administrators, developers, and users who need to gather information about domain names and their DNS records.

Syntax: `dig [options] [hostname/ip]`

Example: `dig www.vit.edu`

```
(rushikesh@Rushikesh-Tanpure)-[~]
$ dig www.vit.edu

; <<>> DiG 9.19.17-2~kali1-Kali <<>> www.vit.edu
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 5695
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 4, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1280
;; QUESTION SECTION:
;www.vit.edu.                IN      A

;; ANSWER SECTION:
www.vit.edu.                300     IN      A      35.154.163.80

;; AUTHORITY SECTION:
vit.edu.                    172800  IN      NS      ns-103.awsdns-12.com.
vit.edu.                    172800  IN      NS      ns-1325.awsdns-37.org.
vit.edu.                    172800  IN      NS      ns-1957.awsdns-52.co.uk.
vit.edu.                    172800  IN      NS      ns-574.awsdns-07.net.

;; Query time: 263 msec
;; SERVER: 192.168.223.30#53(192.168.223.30) (UDP)
;; WHEN: Wed Jan 03 11:15:34 IST 2024
;; MSG SIZE rcvd: 196
```

4. route :- Displays and manipulates the IP routing table. The routing table is a set of rules that determine how network traffic is directed, defining paths for packets to reach their destination.

Options

- `-n`: Displays numeric addresses instead of resolving hostnames.
- `-v`: Provides more detailed output, including the actual routes being added or deleted.
- `add`: Adds a new route to the routing table.
- `del` or `delete`: Removes a route from the routing table.

Syntax: `route [options]`

Example: `route -n`

```
(rushikesh@Rushikesh-Tanpure)-[~]
$ route -n

Kernel IP routing table
Destination    Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0        192.168.223.30 0.0.0.0         UG    600    0      0 wlan0
192.168.223.0  0.0.0.0        255.255.255.0   U     600    0      0 wlan0
192.168.250.0  0.0.0.0        255.255.255.0   U     0      0      0 anbox0
```

5. **arp** :- Manipulates the ARP cache for IPv4 addresses. Display and manipulate the Address Resolution Protocol (ARP) cache. ARP is a protocol used to map an IP address to a physical (MAC) address on a local network.

Options

- **-a**: Displays the current ARP cache.
- **-d**: Deletes an entry from the ARP cache.
- **-s**: Adds a static entry to the ARP cache.

Syntax: `arp [options]`

Example: `arp -a`

```
(rushikesh@Rushikesh-Tanpure)-[~]  
$ arp -a  
gateway (192.168.223.30) at 72:05:f7:5e:11:4b [ether] on wlan0
```

6. **netstat** :- Displays various network information like connections, routing tables, interface statistics, and multicast memberships. It provides information about network connections, routing tables, interface statistics, masquerade connections, and other network-related information.

Options:

- **-a** or **--all**: Display all sockets (both listening and non-listening).
- **-t** or **--tcp**: Display only TCP connections.
- **-u** or **--udp**: Display only UDP connections.
- **-n** or **--numeric**: Show numerical addresses and port numbers instead of resolving them.
- **-p** or **--program**: Display the process ID and program name for each socket.

Syntax: `netstat [OPTIONS]`

Example: `netstat`

```
rushikesh@Rushikesh-Tanpure: ~  
$ netstat  
Active Internet connections (w/o servers)  
Proto Recv-Q Send-Q Local Address           Foreign Address         State  
tcp        0      0 localhost:42522         localhost:39271         ESTABLISHED  
tcp        0      0 localhost:39271         localhost:42522         ESTABLISHED  
tcp        0      0 Rushikesh-Tanpure:46664 relay-d86998fb.ne:https ESTABLISHED  
tcp6       130    0 Rushikesh-Tanpure:56828 bom12s12-in-x02.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:48440 bom12s06-in-x0a.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:33508 bom07s33-in-x03.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:60302 bom07s27-in-x06.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:46640 bom07s37-in-x0e.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:52368 bom12s15-in-x0e.1:https CLOSE_WAIT  
tcp6        0      0 Rushikesh-Tanpure:39166 sg-in-f188.1e100.n:5228 ESTABLISHED  
tcp6       130    0 Rushikesh-Tanpure:41394 bom07s28-in-x0e.1:https CLOSE_WAIT  
tcp6        0      0 Rushikesh-Tanpure:48456 bom12s19-in-x03.1:https TIME_WAIT  
tcp6       130    0 Rushikesh-Tanpure:45062 bom07s26-in-x16.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:41392 bom07s28-in-x0e.1:https CLOSE_WAIT  
tcp6        0      0 Rushikesh-Tanpure:56798 bom07s18-in-x0e.1:https TIME_WAIT  
tcp6       130    0 Rushikesh-Tanpure:48622 bom07s28-in-x0e.1:https CLOSE_WAIT  
udp        0      0 Rushikesh-Tanpur:bootpc _gateway:bootps        ESTABLISHED  
udp6        0      0 Rushikesh-Tanpure:51668 sg-in-f84.1e100.n:https ESTABLISHED  
udp6        0      0 Rushikesh-Tanpure:60309 bom12s17-in-x0e.1:https ESTABLISHED  
udp6        0      0 Rushikesh-Tanpure:60309 bom12s17-in-x0e.1:https ESTABLISHED  
udp6        0      0 Rushikesh-Tanpure:46163 bom12s12-in-x0e.1:https ESTABLISHED  
Active UNIX domain sockets (w/o servers)  
Proto RefCnt Flags               Type               State             I-Node    Path  
unix    3      [ ]                 STREAM             CONNECTED          101066  
unix    3      [ ]                 STREAM             CONNECTED          53251
```

7. **host** :- The *host* command is mainly used to get the IP address of a specific domain. It allows you to query DNS servers to obtain information about domain names and their associated IP addresses or other DNS records.

Syntax: netstat [OPTIONS]

Example: netstat

```
rushikesh@Rushikesh-Tanpure: ~  
$ netstat  
Active Internet connections (w/o servers)  
Proto Recv-Q Send-Q Local Address           Foreign Address         State  
tcp        0      0 localhost:42522         localhost:39271         ESTABLISHED  
tcp        0      0 localhost:39271         localhost:42522         ESTABLISHED  
tcp        0      0 Rushikesh-Tanpure:46664 relay-d86998fb.ne:https ESTABLISHED  
tcp6       130    0 Rushikesh-Tanpure:56828 bom12s12-in-x02.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:48440 bom12s06-in-x0a.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:33508 bom07s33-in-x03.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:60302 bom07s27-in-x06.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:46640 bom07s37-in-x0e.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:52368 bom12s15-in-x0e.1:https CLOSE_WAIT  
tcp6        0      0 Rushikesh-Tanpure:39166 sg-in-f188.1e100.n:5228 ESTABLISHED  
tcp6       130    0 Rushikesh-Tanpure:41394 bom07s28-in-x0e.1:https CLOSE_WAIT  
tcp6        0      0 Rushikesh-Tanpure:48456 bom12s19-in-x03.1:https TIME_WAIT  
tcp6       130    0 Rushikesh-Tanpure:45062 bom07s26-in-x16.1:https CLOSE_WAIT  
tcp6       130    0 Rushikesh-Tanpure:41392 bom07s28-in-x0e.1:https CLOSE_WAIT  
tcp6        0      0 Rushikesh-Tanpure:56798 bom07s18-in-x0e.1:https TIME_WAIT  
tcp6       130    0 Rushikesh-Tanpure:48622 bom07s28-in-x0e.1:https CLOSE_WAIT  
udp        0      0 Rushikesh-Tanpur:bootpc _gateway:bootps        ESTABLISHED  
udp6        0      0 Rushikesh-Tanpure:51668 sg-in-f84.1e100.n:https ESTABLISHED  
udp6        0      0 Rushikesh-Tanpure:60309 bom12s17-in-x0e.1:https ESTABLISHED  
udp6        0      0 Rushikesh-Tanpure:60309 bom12s17-in-x0e.1:https ESTABLISHED  
udp6        0      0 Rushikesh-Tanpure:46163 bom12s12-in-x0e.1:https ESTABLISHED  
Active UNIX domain sockets (w/o servers)  
Proto RefCnt Flags               Type               State             I-Node    Path  
unix    3      [ ]                 STREAM             CONNECTED          101066  
unix    3      [ ]                 STREAM             CONNECTED          53251
```

8. **curl** :- Transfers data to/from servers, supports various protocols. Used for making HTTP requests to servers. `curl` supports various protocols, including HTTP, HTTPS, FTP, FTPS, SCP, SFTP, LDAP, and more.

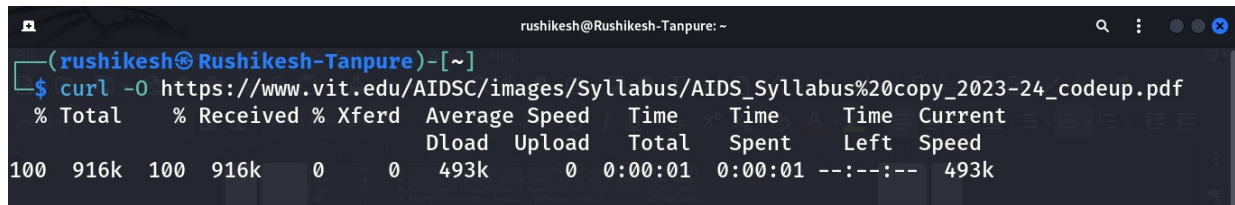
Options:

- `-X, --request`: Specifies the HTTP method (GET, POST, PUT, DELETE, etc.).
- `-H, --header`: Adds custom headers to the request.
- `-d, --data`: Sends data in the request body (used with POST or PUT requests).
- `-i, --include`: Includes the HTTP headers in the output.
- `-o, --output`: Specifies the output file for the downloaded content.
- `-L, --location`: Follows redirects.

Syntax: `curl [OPTIONS] [URL]`

Example: `curl -O`

`https://www.vit.edu/AIDSC/images/Syllabus/AIDS_Syllabus%20copy_2023-24_codeup.pdf`



```
rushikesh@Rushikesh-Tanpure: ~  
(rushikesh@Rushikesh-Tanpure)~$ curl -O https://www.vit.edu/AIDSC/images/Syllabus/AIDS_Syllabus%20copy_2023-24_codeup.pdf  
% Total % Received % Xferd Average Speed Time Time Time Current  
Dload Upload Total Spent Left Speed  
100 916k 100 916k 0 0 493k 0 0:00:01 0:00:01 --:--:-- 493k
```

9. **whois** :- Retrieves domain registration information. It provides details about the ownership, registration, and contact information associated with a domain name or an IP address. The information provided by `whois` can include details such as the domain's creation date, expiration date, nameservers, registrant information, and more.

Syntax: `whois [DOMAIN-NAME]`

Example: `whois vit.edu`


```
rushikesh@Rushikesh-Tanpure: ~  
  
(rushikesh@Rushikesh-Tanpure)-[~]  
$ whois vit.edu  
This Registry database contains ONLY .EDU domains.  
The data in the EDUCAUSE Whois database is provided  
by EDUCAUSE for information purposes in order to  
assist in the process of obtaining information about  
or related to .edu domain registration records.  
  
The EDUCAUSE Whois database is authoritative for the  
.EDU domain.  
  
A Web interface for the .EDU EDUCAUSE Whois Server is  
available at: http://whois.educause.edu  
  
By submitting a Whois query, you agree that this information  
will not be used to allow, enable, or otherwise support  
the transmission of unsolicited commercial advertising or  
solicitations via e-mail. The use of electronic processes to  
harvest information from this server is generally prohibited  
except as reasonably necessary to register or modify .edu  
domain names.  
  
-----  
Domain Name: VIT.EDU  
Registrant:  
Vishwakarma Institute of Technology  
666, Upper Indira Nagar, bibwewadi  
Pune, Maharashtra 411037  
India  
  
Administrative Contact:  
Sahasrabuddhe Dimakh  
Dimakh Consultants  
2010, sadashiv peth, brahma chambers, tilak road  
Pune, MH 411 030  
India  
+91.4478512  
domain@dimakhconsultants.com  
  
Technical Contact:  
Sahasrabuddhe Dimakh  
Dimakh Consultants  
2010, sadashiv peth, brahma chambers, tilak road
```

10. traceroute :- Traces the path packets take to a destination host. Used to track the route that packets take from your local device to a destination host or IP address. It helps identify the network path and measure the time taken for packets to reach each intermediate hop (router) along the way.

Syntax: traceroute [HOSTNAME-OR-IP]

Example: traceroute 8.8.8.8

```
rushikesh@Rushikesh-Tanpure: ~  
  
(rushikesh@Rushikesh-Tanpure)-[~]  
$ traceroute www.vit.edu  
traceroute to www.vit.edu (35.154.163.80), 30 hops max, 60 byte packets  
1 _gateway (192.168.223.30) 4.113 ms 6.292 ms 8.604 ms  
2 100.64.0.100 (100.64.0.100) 66.214 ms * *  
3 192.168.28.173 (192.168.28.173) 75.798 ms 192.168.28.169 (192.168.28.169) 75.593 ms 78.054 ms  
4 192.168.31.10 (192.168.31.10) 80.039 ms 79.875 ms 79.729 ms  
5 192.168.31.40 (192.168.31.40) 82.040 ms 83.745 ms 82.009 ms  
6 10.188.79.90 (10.188.79.90) 81.788 ms 10.188.79.99 (10.188.79.99) 55.725 ms 10.188.79.91 (10.188.79.91) 55.485 ms  
7 nsg-corporate-74.218.187.122.airtel.in (122.187.218.74) 57.082 ms nsg-corporate-78.218.187.122.airtel.in (122.187.218.78) 133.580 ms 127.256 ms  
8 nsg-corporate-73.218.187.122.airtel.in (122.187.218.73) 127.177 ms 124.786 ms nsg-corporate-77.218.187.122.airtel.in (122.187.218.77) 123.196 ms  
9 * * 116.119.106.202 (116.119.106.202) 120.970 ms  
10 * * *  
11 * * 52.95.64.250 (52.95.64.250) 65.651 ms  
12 52.95.64.237 (52.95.64.237) 112.154 ms 52.95.64.136 (52.95.64.136) 78.628 ms 52.95.64.134 (52.95.64.134) 80.326 ms  
13 52.95.64.141 (52.95.64.141) 42.913 ms 52.95.67.107 (52.95.67.107) 42.864 ms 52.95.64.139 (52.95.64.139) 60.364 ms  
14 99.83.76.66 (99.83.76.66) 63.503 ms 99.83.76.83 (99.83.76.83) 60.329 ms 99.83.76.232 (99.83.76.232) 60.350 ms  
15 99.83.76.92 (99.83.76.92) 60.294 ms * *  
16 * * *  
17 * * *  
18 * * *  
19 * * *  
20 * * *  
21 * * *  
22 * * *  
23 * * *  
24 * * *  
25 * * *  
26 * * *  
27 * * *  
28 * * *  
29 * * *  
30 * * *
```