Лабораторная работа №13

Настройка пакетного фильтра firewalld

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07 ноября 2025

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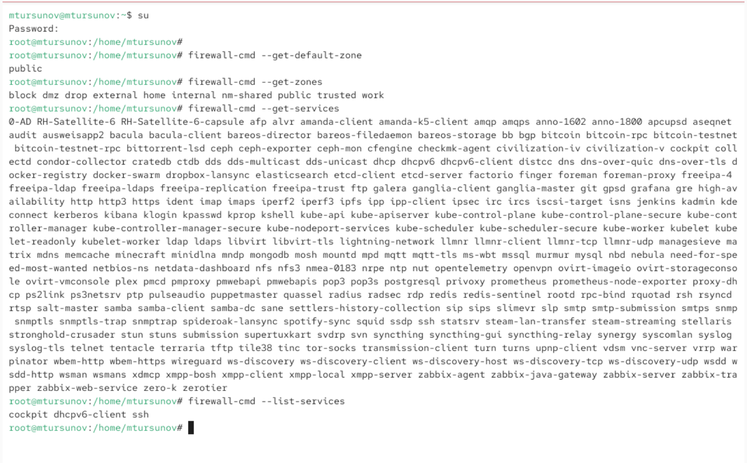
Цель работы

Основная цель

Получение навыков настройки пакетного фильтра Linux с использованием инструментов **firewall-cmd** и **firewall-config**.

Ход выполнения работы

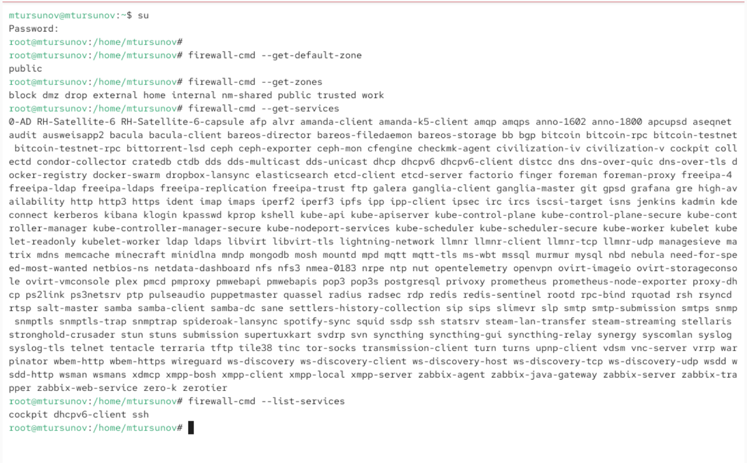
Определение зоны брандмауэра



```
mtursunov@mtursunov:~$ su
Password:
root@mtursunov:/home/mtursunov#
root@mtursunov:/home/mtursunov# firewall-cmd --get-default-zone
public
root@mtursunov:/home/mtursunov# firewall-cmd --get-zones
block dmz drop external home internal nm-shared public trusted work
root@mtursunov:/home/mtursunov# firewall-cmd --get-services
0-AD RH-Satellite-6 RH-Satellite-6-capsule afp alvr amanda-client amanda-k5-client amqp amqps anno-1602 anno-1800 apcupsd aseqnet
audit ausweisapp2 bacula bacula-client bareos-director bareos-filedaemon bareos-storage bb bgp bitcoin bitcoin-rpc bitcoin-testnet
 bitcoin-testnet-rpc bittorrent-lsd ceph ceph-exporter ceph-mon cfengine checkmk-agent civilization-iv civilization-v cockpit coll
ectd condor-collector cratedb ctdb dds dds-multicast dds-unicast dhcp dhcpv6 dhcpv6-client distcc dns dns-over-quic dns-over-tls d
ocker-registry docker-swarm dropbox-lansync elasticsearch etcd-client etcd-server factorio finger foreman foreman-proxy freeipa-4
freeipa-ldap freeipa-ldaps freeipa-replication freeipa-trust ftp galera ganglia-client ganglia-master git gpsd grafana gre high-av
ailability http http3 https ident imap imaps iperf2 iperf3 ipfs ipp ipp-client ipsec irc ircs iscsi-target isns jenkins kadmin kde
connect kerberos kibana klogin kpasswd kprop kshell kube-api kube-apiserver kube-control-plane kube-control-plane-secure kube-cont
roller-manager kube-controller-manager-secure kube-nodeport-services kube-scheduler kube-scheduler-secure kube-worker kubelet kube
let-readonly kubelet-worker ldap ldaps libvirt libvirt-tls lightning-network llmnr llmnr-client llmnr-tcp llmnr-udp managesieve ma
trix mdns memcache minecraft minidlna mndp mongodb mosh mountd mpd mqtt mqtt-tls ms-wbt mssql murmur mysql nbd nebula need-for-spe
ed-most-wanted netbios-ns netdata-dashboard nfs nfs3 nmea-0183 nrpe ntp nut opentelemetry openvpn ovirt-imageio ovirt-storageconso
le ovirt-vmconsole plex pmcd pmproxy pmwebapi pmwebapis pop3 pop3s postgresql privoxy prometheus prometheus-node-exporter proxy-dh
cp ps2link ps3netsrv ptp pulseaudio puppetmaster quassel radius radsec rdp redis redis-sentinel rootd rpc-bind rquotad rsh rsyncd
rtsp salt-master samba samba-client samba-dc sane settlers-history-collection sip sips slimevr slp smtp smtp-submission smtps snmp
 snmptls snmptls-trap snmptrap spideroak-lansync spotify-sync squid ssdp ssh statsrv steam-lan-transfer steam-streaming stellaris
stronghold-crusader stun stuns submission supertuxkart svdrp svn syncthing syncthing-gui syncthing-relay synergy syscomlan syslog
syslog-tls telnet tentacle terraria tftp tile38 tinc tor-socks transmission-client turn turns upnp-client vdsm vnc-server vrrp war
pinator wbem-http wbem-https wireguard ws-discovery ws-discovery-client ws-discovery-host ws-discovery-tcp ws-discovery-udp wsdd w
sdd-http wsman wsmans xdmcp xmpp-bosh xmpp-client xmpp-local xmpp-server zabbix-agent zabbix-java-gateway zabbix-server zabbix-tra
pper zabbix-web-service zero-k zerotier
root@mtursunov:/home/mtursunov# firewall-cmd --list-services
cockpit dhcpv6-client ssh
root@mtursunov:/home/mtursunov# 
```

Рис. 1: Определение зоны

Просмотр доступных зон и служб



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root@mtursunov:/home/mtursunov# firewall-cmd --get-services
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 bitcoin-testnet-rpc bittorrent-lsd ceph ceph-exporter ceph-mon cfengine checkmk-agent civilization-iv civilization-v cockpit coll
ectd condor-collector cratedb ctdb dds dds-multicast dds-unicast dhcp dhcpv6 dhcpv6-client distcc dns dns-over-quic dns-over-tls d
ocker-registry docker-swarm dropbox-lansync elasticsearch etcd-client etcd-server factorio finger foreman foreman-proxy freeipa-4
freeipa-ldap freeipa-ldaps freeipa-replication freeipa-trust ftp galera ganglia-client ganglia-master git gpsd grafana gre high-av
ailability http http3 https ident imap imaps iperf2 iperf3 ipfs ipp ipp-client ipsec irc ircs iscsi-target isns jenkins kadmin kde
connect kerberos kibana klogin kpasswd kprop kshell kube-api kube-apiserver kube-control-plane kube-control-plane-secure kube-cont
roller-manager kube-controller-manager-secure kube-nodeport-services kube-scheduler kube-scheduler-secure kube-worker kubelet kube
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cp ps2link ps3netsrv ptp pulseaudio puppetmaster quassel radius radsec rdp redis redis-sentinel rootd rpc-bind rquotad rsh rsyncd
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 snmptls snmptls-trap snmptrap spideroak-lansync spotify-sync squid ssdp ssh statsrv steam-lan-transfer steam-streaming stellaris
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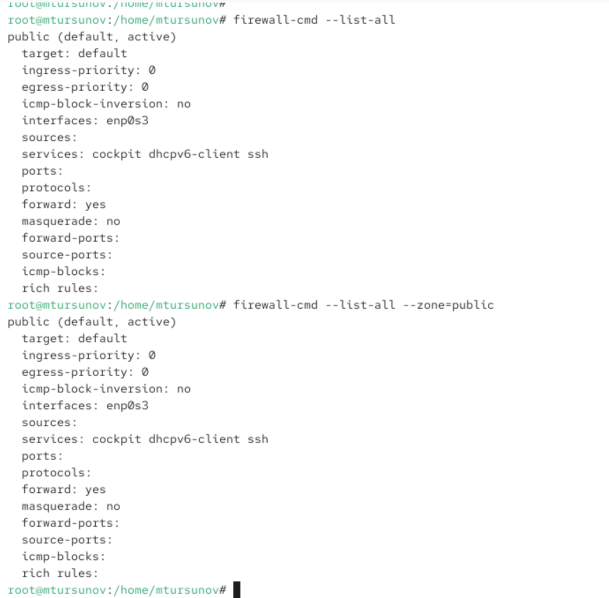
pper zabbix-web-service zero-k zerotier
root@mtursunov:/home/mtursunov# firewall-cmd --list-services
cockpit dhcpv6-client ssh
root@mtursunov:/home/mtursunov# █
```

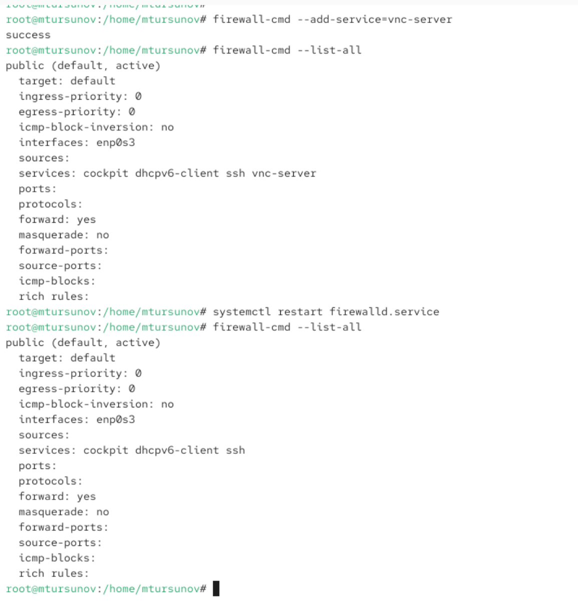
Рис. 2: Список зон и служб

Анализ конфигурации зоны



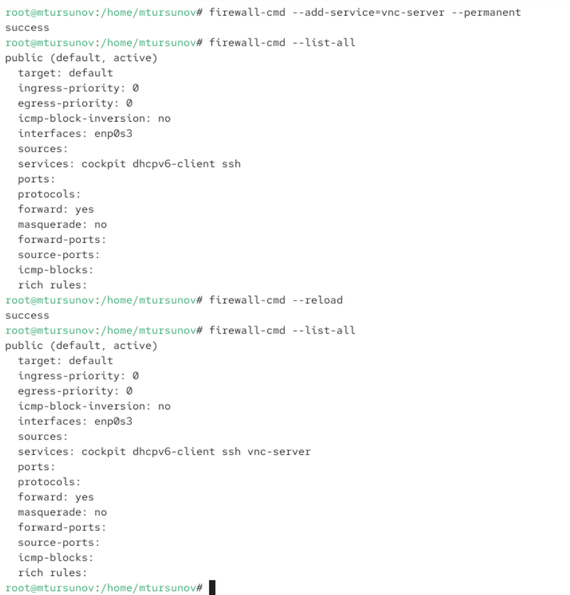
```
root@mtursunov:/home/mtursunov#
root@mtursunov:/home/mtursunov# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ssh
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov# firewall-cmd --list-all --zone=public
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ssh
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov# 
```

Добавление службы VNC (временное)



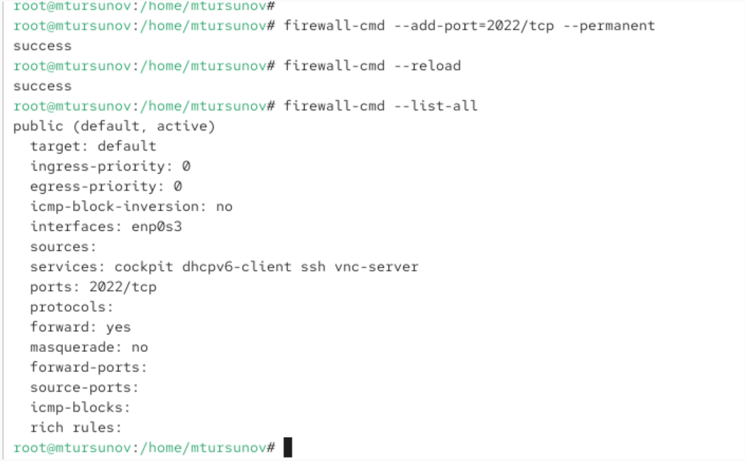
```
root@mtursunov:/home/mtursunov#
root@mtursunov:/home/mtursunov# firewall-cmd --add-service=vnc-server
success
root@mtursunov:/home/mtursunov# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ssh vnc-server
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov# systemctl restart firewalld.service
root@mtursunov:/home/mtursunov# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ssh
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov# 
```

Добавление службы VNC (постоянное)



```
root@mtursunov:/home/mtursunov# firewall-cmd --add-service=vnc-server --permanent
success
root@mtursunov:/home/mtursunov# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ssh
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov# firewall-cmd --reload
success
root@mtursunov:/home/mtursunov# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ssh vnc-server
  ports:
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov# 
```

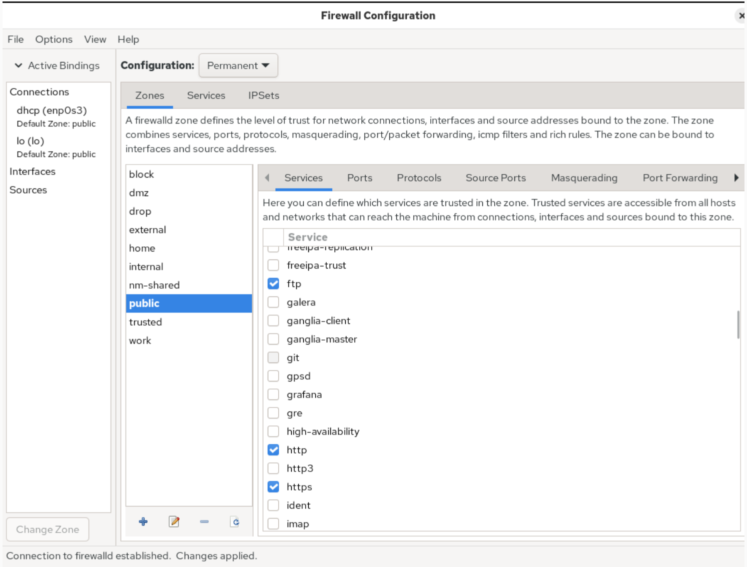
Добавление порта 2022/tcp



```
root@mtursunov:/home/mtursunov#
root@mtursunov:/home/mtursunov# firewall-cmd --add-port=2022/tcp --permanent
success
root@mtursunov:/home/mtursunov# firewall-cmd --reload
success
root@mtursunov:/home/mtursunov# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ssh vnc-server
  ports: 2022/tcp
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov#
```

Рис. 6: Добавление порта 2022

Добавление сервисов в зоне public



Configuration: Permanent

A firewalld zone defines the level of trust for network connections, interfaces and source addresses bound to the zone. The zone combines services, ports, protocols, masquerading, port/packet forwarding, icmp filters and rich rules. The zone can be bound to interfaces and source addresses.

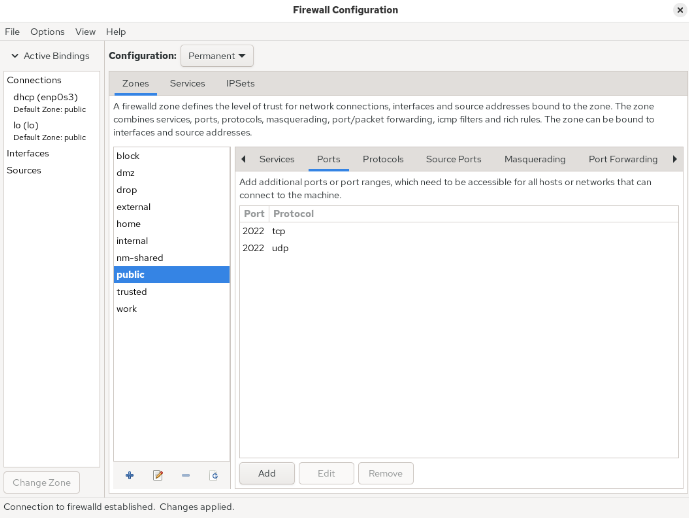
Here you can define which services are trusted in the zone. Trusted services are accessible from all hosts and networks that can reach the machine from connections, interfaces and sources bound to this zone.

Service

- □ freeipa-replication
- □ freeipa-trust
- ☑ ftp
- □ galera
- □ ganglia-client
- □ ganglia-master
- □ git
- □ gpsd
- □ grafana
- □ gre
- □ high-availability
- ☑ http
- □ http3
- ☑ https
- □ ident
- □ imap

Connection to firewalld established. Changes applied.

Добавление порта через GUI



Configuration: Permanent

A firewalld zone defines the level of trust for network connections, interfaces and source addresses bound to the zone. The zone combines services, ports, protocols, masquerading, port/packet forwarding, icmp filters and rich rules. The zone can be bound to interfaces and source addresses.

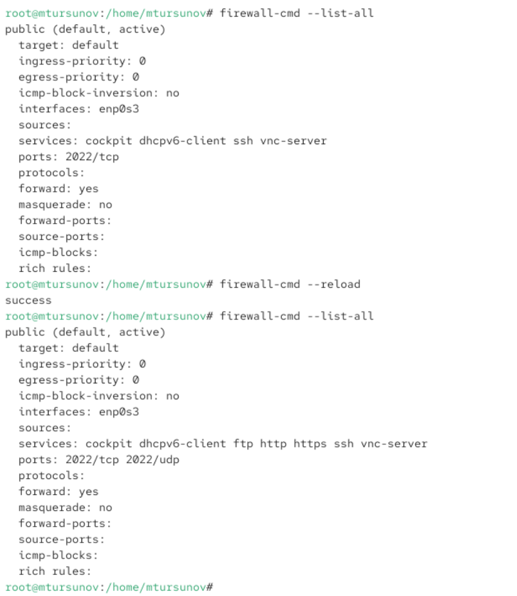
Add additional ports or port ranges, which need to be accessible for all hosts or networks that can connect to the machine.

Port	Protocol
2022	tcp
2022	udp

Connection to firewalld established. Changes applied.

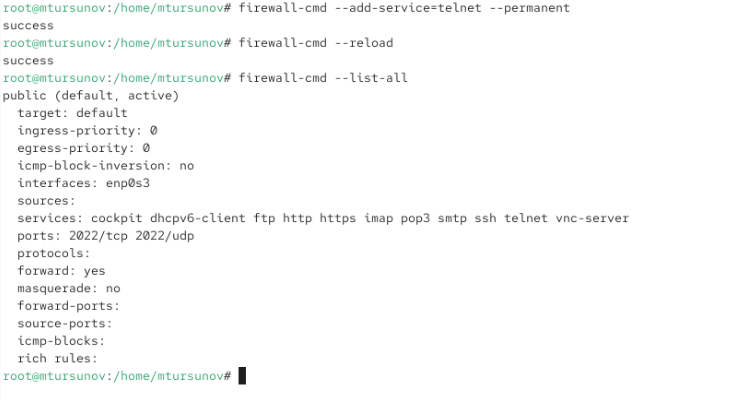
Рис. 8: GUI — добавление порта

Применение изменений



```
root@mtursunov:/home/mtursunov# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ssh vnc-server
  ports: 2022/tcp
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov# firewall-cmd --reload
success
root@mtursunov:/home/mtursunov# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ftp http https ssh vnc-server
  ports: 2022/tcp 2022/udp
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov#
```

Добавление служб telnet, imap, pop3, smtp



```
root@mtursunov:/home/mtursunov# firewall-cmd --add-service=telnet --permanent
success
root@mtursunov:/home/mtursunov# firewall-cmd --reload
success
root@mtursunov:/home/mtursunov# firewall-cmd --list-all
public (default, active)
  target: default
  ingress-priority: 0
  egress-priority: 0
  icmp-block-inversion: no
  interfaces: enp0s3
  sources:
  services: cockpit dhcpv6-client ftp http https imap pop3 smtp ssh telnet vnc-server
  ports: 2022/tcp 2022/udp
  protocols:
  forward: yes
  masquerade: no
  forward-ports:
  source-ports:
  icmp-blocks:
  rich rules:
root@mtursunov:/home/mtursunov# 
```

# Итоги работы

Вывод

В ходе работы:

- изучены режимы *runtime* и *permanent* в firewalld;
- освоены инструменты **firewall-cmd** и **firewall-config**;
- произведены операции добавления служб, портов и интерфейсов к зонам.

Получены навыки управления сетевой безопасностью в Linux.