Задание 2

На лекции мы познакомились отдельно с ipvs и отдельно с keepalived. Воспользовавшись этими знаниями, совместите технологии вместе (VIP должен подниматься демоном keepalived). Приложите конфигурационные файлы, которые у вас получились, и продемонстрируйте работу получившейся конструкции. Используйте для директора отдельный хост, не совмещая его с риалом!

Подобная схема возможна, но выходит за рамки рассмотренного на лекции.

Решение:

С помощью Vagrant развернул три виртуальные машины (используя файл Vagrantfile из задания)

Сделал спапшоты и приступил к заданию

Итак,

netology1 (IP-адрес: 172.28.128.10) – мастер (keepalived, nginx)

netology2 (IP-адрес: 172.28.128.60) – slave (keepalived, nginx)

netology3 (IP-адрес: 172.28.128.90) – клиент.

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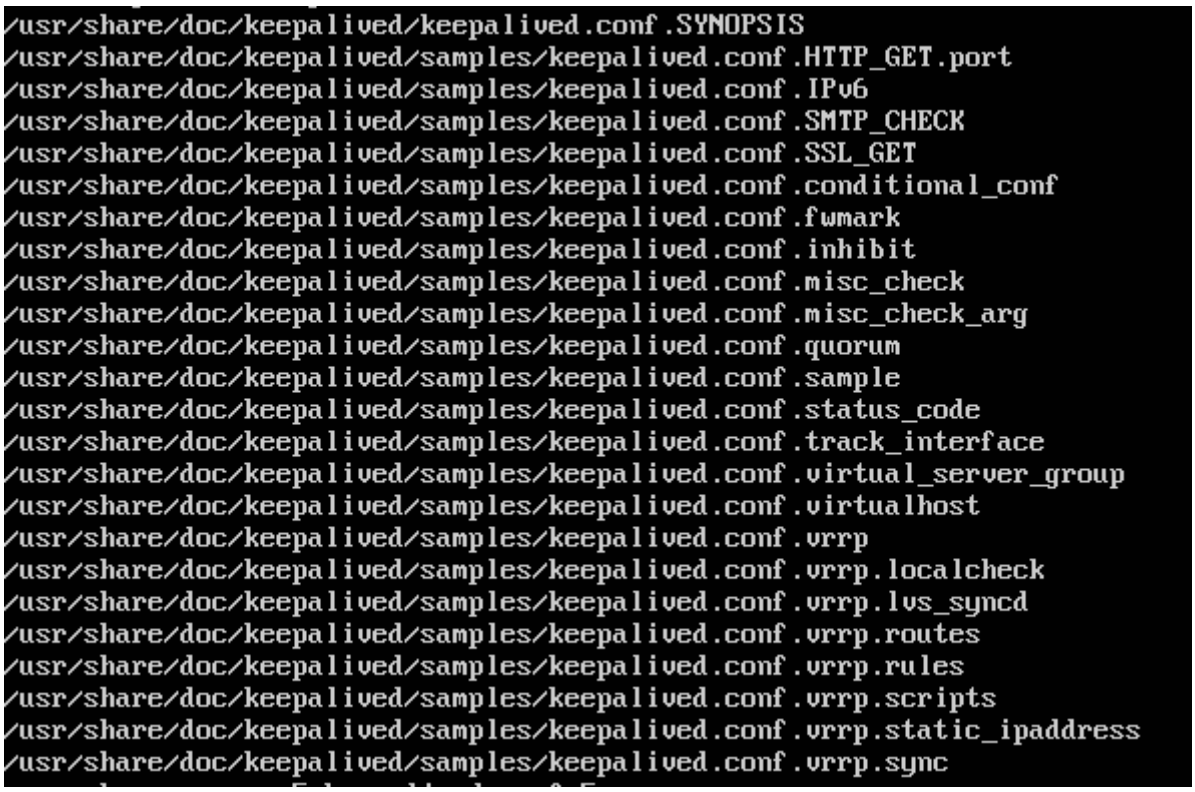
Поставил программу `mlocate` и нашел шаблоны файлов `keeaplived.conf`



Скопировал файл keepalived.conf.vrrp в `/etc/keepalived/` , и привел их к следующему виду

На **netology1**:

```
! Configuration File for keepalived

global_defs {
   notification_email {
     acassen
   }
   notification_email_from romrsch@fgmail.com
   smtp_server 192.168.200.1
   smtp_connect_timeout 30

}

vrrp_instance VI_1 {
    state MASTER
    interface eth1
    garp_master_delay 10
    smtp_alert
    virtual_router_id 51
    priority 100
    advert_int 1
    authentication {
        auth_type PASS
        auth_pass 1111
    }
    virtual_ipaddress {
          172.28.128.200 label eth1:200
    }
}
```

Запуск и статус `keepalived` на **netology1**, появился VIP: 172.28.128.200

```
root@netology1:/etc/keepalived# /etc/init.d/keepalived status
● keepalived.service - Keepalive Daemon (LVS and VRRP)
     Loaded: loaded (/lib/systemd/system/keepalived.service; enabled; vendor preset: enabled)
     Active: active (running) since Wed 2021-06-16 06:21:26 UTC; 17min ago
   Main PID: 15793 (keepalived)
      Tasks: 2 (limit: 1074)
     Memory: 1.4M
     CGroup: /system.slice/keepalived.service
             ├─15793 /usr/sbin/keepalived --dont-fork
             └─15809 /usr/sbin/keepalived --dont-fork

Jun 16 06:21:26 netology1 Keepalived_vrrp[15809]: Registering Kernel netlink reflector
Jun 16 06:21:26 netology1 Keepalived_vrrp[15809]: Registering Kernel netlink command channel
Jun 16 06:21:26 netology1 Keepalived_vrrp[15809]: Opening file '/etc/keepalived/keepalived.conf'.
Jun 16 06:21:26 netology1 Keepalived_vrrp[15809]: Registering gratuitous ARP shared channel
Jun 16 06:21:26 netology1 Keepalived_vrrp[15809]: (VI_1) Entering BACKUP STATE (init)
Jun 16 06:21:26 netology1 Keepalived_vrrp[15809]: Remote SMTP server [192.168.200.1]:25 connected.
Jun 16 06:21:30 netology1 Keepalived_vrrp[15809]: (VI_1) Entering MASTER STATE
Jun 16 06:21:30 netology1 Keepalived_vrrp[15809]: Remote SMTP server [192.168.200.1]:25 connected.
Jun 16 06:21:56 netology1 Keepalived_vrrp[15809]: Timeout reading data to remote SMTP server [...]:25.
Jun 16 06:22:00 netology1 Keepalived_vrrp[15809]: Timeout reading data to remote SMTP server [...]:25.
Hint: Some lines were ellipsized, use -l to show in full.
root@netology1:/etc/keepalived# _
```

```
root@netology1:/etc/keepalived#
root@netology1:/etc/keepalived#
root@netology1:/etc/keepalived# ip -4 addr show | grep inet
    inet 127.0.0.1/8 scope host lo
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic eth0
    inet 172.28.128.10/24 scope global eth1
    inet 172.28.128.200/32 scope global eth1:200
root@netology1:/etc/keepalived#
```

На **netology2** – Slave

```
root@netology2:~#
root@netology2:~# cat    /etc/keepalived/keepalived.conf
! Configuration File for keepalived

global_defs {
   notification_email {
     acassen
   }
   notification_email_from romrsch@gmail.com
   smtp_server 192.168.200.1
   smtp_connect_timeout 30

}


vrrp_instance VI_1 {
    state BACKUP
    interface eth1
    garp_master_delay 10
    smtp_alert
    virtual_router_id 51
    priority 90
    advert_int 1
    authentication {
        auth_type PASS
        auth_pass 1111
    }
    virtual_ipaddress {
          172.28.128.200 label eth1:200
    }
}

root@netology2:~#
```

Запуск и статус `keepalived` на **netology2**, VIP - нет

```
vagrant@netology2:~$ sudo su - ^C
vagrant@netology2:~$ systemctl status keepalived
● keepalived.service - Keepalive Daemon (LVS and VRRP)
     Loaded: loaded (/lib/systemd/system/keepalived.service; enabled; vendor preset: enabled)
     Active: active (running) since Wed 2021-06-16 06:31:31 UTC; 5h 59min ago
   Main PID: 15649 (keepalived)
      Tasks: 2 (limit: 1074)
     Memory: 1.7M
     CGroup: /system.slice/keepalived.service
             ├─15649 /usr/sbin/keepalived --dont-fork
             └─15665 /usr/sbin/keepalived --dont-fork

Jun 16 06:31:31 netology2 Keepalived_vrrp[15665]: Remote SMTP server [192.168.200.1]:25 connected.
Jun 16 06:32:01 netology2 Keepalived_vrrp[15665]: Timeout reading data to remote SMTP server [192.1
Jun 16 12:26:03 netology2 Keepalived_vrrp[15665]: (VI_1) Backup received priority 0 advertisement
Jun 16 12:26:04 netology2 Keepalived_vrrp[15665]: (VI_1) Entering MASTER STATE
Jun 16 12:26:04 netology2 Keepalived_vrrp[15665]: Remote SMTP server [192.168.200.1]:25 connected.
Jun 16 12:26:34 netology2 Keepalived_vrrp[15665]: Timeout reading data to remote SMTP server [192.1
Jun 16 12:30:02 netology2 Keepalived_vrrp[15665]: (VI_1) Master received advert from 172.28.128.10
Jun 16 12:30:02 netology2 Keepalived_vrrp[15665]: (VI_1) Entering BACKUP STATE
Jun 16 12:30:02 netology2 Keepalived_vrrp[15665]: Remote SMTP server [192.168.200.1]:25 connected.
Jun 16 12:30:32 netology2 Keepalived_vrrp[15665]: Timeout reading data to remote SMTP server [192.1
lines 1-20/20 (END)
```

```
root@netology2:~# ip -4 addr show | grep inet
    inet 127.0.0.1/8 scope host lo
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic eth0
    inet 172.28.128.60/24 scope global eth1
root@netology2:~#
```

Проверка

netology3 пингует 172.28.128.200, делаем к нему запрос curl

```
vagrant@netology3:~$ ping 172.28.128.200
PING 172.28.128.200 (172.28.128.200) 56(84) bytes of data.
64 bytes from 172.28.128.200: icmp_seq=1 ttl=64 time=2.55 ms
64 bytes from 172.28.128.200: icmp_seq=2 ttl=64 time=1.42 ms
64 bytes from 172.28.128.200: icmp_seq=3 ttl=64 time=1.49 ms
64 bytes from 172.28.128.200: icmp_seq=4 ttl=64 time=1.42 ms
64 bytes from 172.28.128.200: icmp_seq=5 ttl=64 time=1.44 ms
^C
--- 172.28.128.200 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4008ms
rtt min/avg/max/mdev = 1.417/1.663/2.550/0.444 ms
vagrant@netology3:~$ for i in {1..50}; do curl -I -s 172.28.128.200 > /dev/null ; done
vagrant@netology3:~$ _
```

На **netology1** – «мастер» смотрим, что nginx обработал 50 запросов.

```
root@netology1:/etc/keepalived# wc -l /var/log/nginx/access.log
50 /var/log/nginx/access.log
root@netology1:/etc/keepalived# _
```

Имитируем, что **netology1** вдруг стал недоступен:

```
root@netology1:/etc/keepalived# /etc/init.d/keepalived stop
Stopping keepalived (via systemctl): keepalived.service.
root@netology1:/etc/keepalived#
root@netology1:/etc/keepalived#
root@netology1:/etc/keepalived# /etc/init.d/keepalived status
● keepalived.service - Keepalive Daemon (LVS and VRRP)
     Loaded: loaded (/lib/systemd/system/keepalived.service; enabled; vendor preset: enabled)
     Active: inactive (dead) since Wed 2021-06-16 12:26:04 UTC; 29s ago
    Process: 15793 ExecStart=/usr/sbin/keepalived --dont-fork $DAEMON_ARGS (code=exited, status=0/SU
CCESS)
   Main PID: 15793 (code=exited, status=0/SUCCESS)

Jun 16 06:21:30 netology1 Keepalived_vrrp[15809]: Remote SMTP server [192.168.200.1]:25 connected.
Jun 16 06:21:56 netology1 Keepalived_vrrp[15809]: Timeout reading data to remote SMTP server [...]:25.
Jun 16 06:22:00 netology1 Keepalived_vrrp[15809]: Timeout reading data to remote SMTP server [...]:25.
Jun 16 12:26:03 netology1 Keepalived[15793]: Stopping
Jun 16 12:26:03 netology1 Keepalived_vrrp[15809]: (VI_1) sent 0 priority
Jun 16 12:26:03 netology1 systemd[1]: Stopping Keepalive Daemon (LVS and VRRP)...
Jun 16 12:26:04 netology1 Keepalived_vrrp[15809]: Stopped
Jun 16 12:26:04 netology1 Keepalived[15793]: Stopped Keepalived v2.0.19 (10/19,2019)
Jun 16 12:26:04 netology1 systemd[1]: keepalived.service: Succeeded.
Jun 16 12:26:04 netology1 systemd[1]: Stopped Keepalive Daemon (LVS and VRRP).
Hint: Some lines were ellipsized, use -l to show in full.
root@netology1:/etc/keepalived# ip -4 a s eth1
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    inet 172.28.128.10/24 scope global eth1
       valid_lft forever preferred_lft forever
root@netology1:/etc/keepalived# _
```

VIP: 172.28.128.200 – на **netology1** пропал.

Но **netology3** может без задержек взаимодействовать с 172.28.128.200.

Отправляем с **netology3** через **curl** также 50 запросов к 172.28.128.200.

```
vagrant@netology3:~$ ping 172.28.128.200
PING 172.28.128.200 (172.28.128.200) 56(84) bytes of data.
64 bytes from 172.28.128.200: icmp_seq=1 ttl=64 time=2.53 ms
64 bytes from 172.28.128.200: icmp_seq=2 ttl=64 time=1.44 ms
64 bytes from 172.28.128.200: icmp_seq=3 ttl=64 time=1.64 ms
64 bytes from 172.28.128.200: icmp_seq=4 ttl=64 time=1.35 ms
64 bytes from 172.28.128.200: icmp_seq=5 ttl=64 time=1.38 ms
^C
--- 172.28.128.200 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4010ms
rtt min/avg/max/mdev = 1.354/1.669/2.533/0.443 ms
vagrant@netology3:~$ ping 172.28.128.200
PING 172.28.128.200 (172.28.128.200) 56(84) bytes of data.
64 bytes from 172.28.128.200: icmp_seq=1 ttl=64 time=3.30 ms
64 bytes from 172.28.128.200: icmp_seq=2 ttl=64 time=1.77 ms
64 bytes from 172.28.128.200: icmp_seq=3 ttl=64 time=4.08 ms
64 bytes from 172.28.128.200: icmp_seq=4 ttl=64 time=1.54 ms
64 bytes from 172.28.128.200: icmp_seq=5 ttl=64 time=1.81 ms
64 bytes from 172.28.128.200: icmp_seq=6 ttl=64 time=1.65 ms
64 bytes from 172.28.128.200: icmp_seq=7 ttl=64 time=1.53 ms
^C
--- 172.28.128.200 ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6015ms
rtt min/avg/max/mdev = 1.526/2.239/4.084/0.946 ms
vagrant@netology3:~$ for i in {1..50}; do curl -I -s 172.28.128.200 > /dev/null ; done
vagrant@netology3:~$
```

Но их уже обработает **netology2** – «Slave», т.к. у него появился VIP: 172.28.128.200

```
vagrant@netology2:~$
vagrant@netology2:~$
vagrant@netology2:~$ ip -4 a s eth1
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    inet 172.28.128.60/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet 172.28.128.200/32 scope global eth1:200
       valid_lft forever preferred_lft forever
vagrant@netology2:~$
vagrant@netology2:~$ wc -l /var/log/nginx/access.log
50 /var/log/nginx/access.log
vagrant@netology2:~$ _
```

Запускаем **netology1** в работу и все возвращается в исходное состояние:

```
root@netology1:/etc/keepalived# ip -4 a s eth1
3: eth1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    inet 172.28.128.10/24 scope global eth1
       valid_lft forever preferred_lft forever
    inet 172.28.128.200/32 scope global eth1:200
       valid_lft forever preferred_lft forever
root@netology1:/etc/keepalived# systemctl status keepalived
● keepalived.service - Keepalive Daemon (LVS and VRRP)
     Loaded: loaded (/lib/systemd/system/keepalived.service; enabled; vendor preset: enabled)
     Active: active (running) since Wed 2021-06-16 12:29:58 UTC; 2min 1s ago
   Main PID: 16141 (keepalived)
      Tasks: 2 (limit: 1074)
     Memory: 1.4M
     CGroup: /system.slice/keepalived.service
             ├─16141 /usr/sbin/keepalived --dont-fork
             └─16157 /usr/sbin/keepalived --dont-fork

Jun 16 12:29:58 netology1 Keepalived_vrrp[16157]: Registering gratuitous ARP shared channel
Jun 16 12:29:59 netology1 Keepalived_vrrp[16157]: (VI_1) Entering BACKUP STATE (init)
Jun 16 12:29:59 netology1 Keepalived_vrrp[16157]: Remote SMTP server [192.168.200.1]:25 connected.
Jun 16 12:29:59 netology1 Keepalived_vrrp[16157]: (VI_1) received lower priority (90) advert from 1>
Jun 16 12:30:00 netology1 Keepalived_vrrp[16157]: (VI_1) received lower priority (90) advert from 1>
Jun 16 12:30:01 netology1 Keepalived_vrrp[16157]: (VI_1) received lower priority (90) advert from 1>
Jun 16 12:30:02 netology1 Keepalived_vrrp[16157]: (VI_1) Entering MASTER STATE
Jun 16 12:30:02 netology1 Keepalived_vrrp[16157]: Remote SMTP server [192.168.200.1]:25 connected.
Jun 16 12:30:29 netology1 Keepalived_vrrp[16157]: Timeout reading data to remote SMTP server [192.1>
Jun 16 12:30:32 netology1 Keepalived_vrrp[16157]: Timeout reading data to remote SMTP server [192.1>
lines 1-20/20 (END)
```

netology1 снова получает VIP: 172.28.128.200

С **netology3** снова делаем 50 запросов к 172.28.128.200

```
vagrant@netology3:~$ for i in {1..50}; do curl -I -s 172.28.128.200 > /dev/null ; done
vagrant@netology3:~$ for i in {1..50}; do curl -I -s 172.28.128.200 > /dev/null ; done
vagrant@netology3:~$
```

И видим, что их уже обработал **netology1**

```
root@netology1:/etc/keepalived#
root@netology1:/etc/keepalived#
root@netology1:/etc/keepalived# wc -l /var/log/nginx/access.log
100 /var/log/nginx/access.log
root@netology1:/etc/keepalived#
```

Добавилось 50 новых записей в /var/log/nginx/access.log, итого: 100.