

## 1. На сервере Server1 установить ipvsadm.

```
[root@server1 ~]# yum install -y ipvsadm Dependencies Resolved
Loaded plugins: fastestmirror
Loading mirror speeds from cached hostfile
epel/x86_64/metalink | 29 kB 00:00:00
* base: istanbul.centos-mirror.guzel.net.tr
* epel: mirror.yandex.ru
* extras: mirror.ni.net.tr
* updates: mirror-denizli.cenuta.com
base | 3.6 kB 00:00:00
epel | 4.7 kB 00:00:00
extras | 2.9 kB 00:00:00
frr | 3.0 kB 00:00:00
frr-extras | 3.0 kB 00:00:00
updates | 2.9 kB 00:00:00
(1/3): epel/x86_64/updateinfo | 1.0 MB 00:00:38
(2/3): updates/7/x86_64/primary_db | 8.8 MB 00:02:43
(3/3): epel/x86_64/primary_db | 6.9 MB 00:02:45
No package Dependencies available.
No package Resolved available.
Resolving Dependencies
--> Running transaction check
---> Package ipvsadm.x86_64 0:1.27-8.el7 will be installed
--> Finished Dependency Resolution

Dependencies Resolved
```

## 2 На сервере Server1 установить docker и запустить 2 контейнера с Nginx.

```
Digest: sha256:353c20f74d9b6aee359f30e8e4f69c3d7eaea2f610681c4a95849a2fd7c497f9
Status: Downloaded newer image for docker.io/nginx:latest
49184003f095773baced685ec01adf3c86f8f100fcc840375ef4b04481d7ce66
[root@server1 srv]# systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/usr/lib/systemd/system/docker.service; enabled; vendor preset: disabled)
   Active: active (running) since Tue 2021-07-13 10:05:52 EDT; 6min ago
     Docs: http://docs.docker.com
   Main PID: 2165 (dockerd-current)
    Tasks: 33
   Memory: 144.0K
   CGroup: /system.slice/docker.service
           └─2165 /usr/bin/dockerd-current --add-runtime docker-runc=/usr/libexec/docker/docker-runc-current --default-runtime-docker-r...
           └─2171 /usr/bin/docker-containerd-current -l unix:///var/run/docker/libcontainerd/docker-containerd.sock --metrics-interval=...
           └─2336 /usr/bin/docker-containerd-shim-current 49184003f095773baced685ec01adf3c86f8f100fcc840375ef4b04481d7ce66 /var/run/doc...

Jul 13 10:10:48 server1 dockerd-current[2165]: /docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
Jul 13 10:10:48 server1 dockerd-current[2165]: /docker-entrypoint.sh: Configuration complete; ready for start up
```

```
[root@server1 srv]# echo "This is A" > /srv/A/index.html
[root@server1 srv]# docker run --rm -d -v "/srv/A:/usr/share/nginx/html" --name nginx-A nginx
Unable to find image 'nginx:latest' locally
Trying to pull repository docker.io/library/nginx ...
latest: Pulling from docker.io/library/nginx
b4d181a07f80: Pull complete
66b1c490df3f: Pull complete
d0f91ae9b44c: Pull complete
baf987068537: Pull complete
6bbc76cbebeb: Pull complete
82b766478bc2: Pull complete
Digest: sha256:353c20f74d9b6aee359f30e8e4f69c3d7eaea2f610681c4a95849a2fd7c497f9
Status: Downloaded newer image for docker.io/nginx:latest
49184003f095773baced685ec01adf3c86f8f100fcc840375ef4b04481d7ce66
[root@server1 srv]# systemctl status docker
```

### 3 Создать интерфейс dummy2 и назначить ему IP-адрес 111.111.111.111/32.

```
valid_lft forever preferred_lft forever
6: dummy1: <BROADCAST,NOARP,UP,LOWER_UP> mtu 1500 qdisc noqueue state UNKNOWN group default qlen 1000
    link/ether 0e:3b:13:27:8b:e8 brd ff:ff:ff:ff:ff:ff
    inet 111.111.111.111/32 brd 111.111.111.111 scope global dummy1
        valid_lft forever preferred_lft forever
    inet6 fe80::c3b:13ff:fe27:8be8/64 scope link
        valid_lft forever preferred_lft forever
```

### 4 Проанонсировать этот IP в сеть из трёх серверов.

```
memfis@ubuntu:~$ ping 111.111.111.111
PING 111.111.111.111 (111.111.111.111) 56(84) bytes of data.
64 bytes from 111.111.111.111: icmp_seq=1 ttl=64 time=0.331 ms
64 bytes from 111.111.111.111: icmp_seq=2 ttl=64 time=0.447 ms
64 bytes from 111.111.111.111: icmp_seq=3 ttl=64 time=0.375 ms
64 bytes from 111.111.111.111: icmp_seq=4 ttl=64 time=0.582 ms
64 bytes from 111.111.111.111: icmp_seq=5 ttl=64 time=0.432 ms
64 bytes from 111.111.111.111: icmp_seq=6 ttl=64 time=0.506 ms
64 bytes from 111.111.111.111: icmp_seq=7 ttl=64 time=0.461 ms
64 bytes from 111.111.111.111: icmp_seq=8 ttl=64 time=0.447 ms
64 bytes from 111.111.111.111: icmp_seq=9 ttl=64 time=0.429 ms
64 bytes from 111.111.111.111: icmp_seq=10 ttl=64 time=0.466 ms
64 bytes from 111.111.111.111: icmp_seq=11 ttl=64 time=0.439 ms
64 bytes from 111.111.111.111: icmp_seq=12 ttl=64 time=0.499 ms
^C

```

### 5 Настроить ipvs для передачи http запросов с сервера server3 в оба контейнера в Nginx используя механизм балансировки round-robin.

```
IPVS IS B
[root@server1 ~]# ipvsadm -A -t 111.111.111.111:80 -s rr
[root@server1 ~]# ipvsadm -l -n
IP Virtual Server version 1.2.1 (size=4096)
Prot LocalAddress:Port Scheduler Flags
  -> RemoteAddress:Port          Forward Weight ActiveConn InActConn
TCP  111.111.111.111:80 rr
[root@server1 ~]# ipvsadm -a -t 111.111.111.111:80 -r 172.17.0.2 -m
[root@server1 ~]# ipvsadm -a -t 111.111.111.111:80 -r 172.17.0.3 -m
[root@server1 ~]# ipvsadm -l -n
IP Virtual Server version 1.2.1 (size=4096)
Prot LocalAddress:Port Scheduler Flags
  -> RemoteAddress:Port          Forward Weight ActiveConn InActConn
TCP  111.111.111.111:80 rr
  -> 172.17.0.2:80               Masq    1        0          0
  -> 172.17.0.3:80               Masq    1        0          0
[root@server1 ~]#
```

## Проверяем

[illegible]

## 6 Удостовериться, что запросы балансируются между контейнерами путем проверки access.log внутри каждого из них.

Проверяем лог контейнера nginx-A

```
[root@server1 ~]# docker logs nginx-A
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2021/07/14 14:46:17 [notice] 1#1: using the "epoll" event method
2021/07/14 14:46:17 [notice] 1#1: nginx/1.21.1
2021/07/14 14:46:17 [notice] 1#1: built by gcc 8.3.0 (Debian 8.3.0-6)
2021/07/14 14:46:17 [notice] 1#1: OS: Linux 3.10.0-1160.el7.x86_64
2021/07/14 14:46:17 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2021/07/14 14:46:17 [notice] 1#1: start worker processes
2021/07/14 14:46:17 [notice] 1#1: start worker process 30
2021/07/14 14:46:17 [notice] 1#1: start worker process 31
172.17.0.1 - - [14/Jul/2021:14:47:41 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.29.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:47 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:49 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:50 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:51 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:53 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:55 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
[root@server1 ~]#
```

В данном случае видим что прилетает запрос get с сервера 192.168.23.14

Так же проверяем лог контейнера nginx-B

```
[root@server1 ~]# docker logs nginx-B
/docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
/docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
/docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
10-listen-on-ipv6-by-default.sh: info: Getting the checksum of /etc/nginx/conf.d/default.conf
10-listen-on-ipv6-by-default.sh: info: Enabled listen on IPv6 in /etc/nginx/conf.d/default.conf
/docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
/docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
/docker-entrypoint.sh: Configuration complete; ready for start up
2021/07/14 14:46:27 [notice] 1#1: using the "epoll" event method
2021/07/14 14:46:27 [notice] 1#1: nginx/1.21.1
2021/07/14 14:46:27 [notice] 1#1: built by gcc 8.3.0 (Debian 8.3.0-6)
2021/07/14 14:46:27 [notice] 1#1: OS: Linux 3.10.0-1160.el7.x86_64
2021/07/14 14:46:27 [notice] 1#1: getrlimit(RLIMIT_NOFILE): 1048576:1048576
2021/07/14 14:46:27 [notice] 1#1: start worker processes
2021/07/14 14:46:27 [notice] 1#1: start worker process 30
2021/07/14 14:46:27 [notice] 1#1: start worker process 31
172.17.0.1 - - [14/Jul/2021:14:47:44 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.29.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:45 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:48 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:49 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:51 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:52 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:54 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
192.168.23.14 - - [14/Jul/2021:14:58:56 +0000] "GET / HTTP/1.1" 200 10 "-" "curl/7.68.0" "-"
[root@server1 ~]#
```

Видим, что прилетает get с сервера 192.168.23.14.

Балансировка работает между двумя контейнерами nginx.