Haproxy+Keepalived高可用负载平衡集群

环境：centos7.4虚拟机5台，关闭防火墙、SELinux，清空iptables规则，搭建好yum源

规划： web1 eth0 192.168.1.1

Web2 eth0 192.168.1.2

Proxy1 eth0 192.168.1.3

Proxy2 eth0 192.168.1.4

Dns eth0 192.168.1.4

Vip1 eth0:1 192.168.1.10

Vip2 eth0:2 192.168.1.20

#部署后台web服务器

[root@web1 ~]# yum -y install httpd &> /dev/null

[root@web1 ~]# echo web1 >> /var/www/html/index.html

[root@web1 ~]# systemctl start httpd

[root@web1 ~]#

[root@web2 ~]# yum -y install httpd &> /dev/null

[root@web2 ~]# echo web2 >> /var/www/html/index.html

[root@web2 ~]# systemctl start httpd

[root@web2 ~]#

#测试后台web服务器

[root@hostos ~]# curl 192.168.1.1

web1

[root@hostos ~]# curl 192.168.1.2

web2

[root@hostos ~]#

#部署proxy服务器

[root@proxy1 ~]# yum -y install haproxy

[root@proxy1 ~]# vim /etc/haproxy/haproxy.cfg

[root@proxy1 ~]# sed -rn '87,$p' /etc/haproxy/haproxy.cfg

######################

#健康检查

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listen stats 0.0.0.0:1080

stats refresh 30s

stats uri /stats

stats realm Haproxy Manager

stats auth admin:admin

######################

#后台代理

######################

listen websvrs 0.0.0.0:80

balance roundrobin

server web1 192.168.1.1:80 check inter 2000 rise 2 fall 5

server web2 192.168.1.2:80 check inter 2000 rise 2 fall 5

[root@proxy1 ~]# systemctl restart haproxy.service

[root@proxy1 ~]# netstat -antpu | grep 80

tcp 0 0 0.0.0.0:80 0.0.0.0:\* LISTEN 1509/haproxy

tcp 0 0 0.0.0.0:1080 0.0.0.0:\* LISTEN 1509/haproxy

[root@proxy1 ~]# curl localhost

web1

[root@proxy1 ~]# curl localhost

web2

[root@proxy1 ~]# curl -I admin:admin@localhost:1080/stats

HTTP/1.1 200 OK

Cache-Control: no-cache

Content-Type: text/html

Refresh: 30

[root@proxy1 ~]#

[root@proxy2 ~]# yum -y install haproxy

[root@proxy2 ~]# vim /etc/haproxy/haproxy.cfg

[root@proxy2 ~]# sed -rn '87,$p' /etc/haproxy/haproxy.cfg

######################

#健康检查

######################

listen stats 0.0.0.0:1080

stats refresh 30s

stats uri /stats

stats realm Haproxy Manager

stats auth admin:admin

######################

#后台代理

######################

listen websvrs 0.0.0.0:80

balance roundrobin

server web1 192.168.1.1:80 check inter 2000 rise 2 fall 5

server web2 192.168.1.2:80 check inter 2000 rise 2 fall 5

[root@proxy2 ~]# systemctl restart haproxy.service

[root@proxy2 ~]# netstat -antpu | grep 80

tcp 0 0 0.0.0.0:80 0.0.0.0:\* LISTEN 1275/haproxy

tcp 0 0 0.0.0.0:1080 0.0.0.0:\* LISTEN 1275/haproxy

[root@proxy2 ~]# curl localhost

web1

[root@proxy2 ~]# curl localhost

web2

[root@proxy2 ~]# curl -I admin:admin@localhost:1080/stats

HTTP/1.1 200 OK

Cache-Control: no-cache

Content-Type: text/html

Refresh: 30

[root@proxy2 ~]#

#用Keepalived实现proxy高可用

[root@proxy1 ~]# yum -y install keepalived.x86\_64

[root@proxy1 ~]# vim /etc/keepalived/keepalived.conf

[root@proxy1 ~]# cat /etc/keepalived/keepalived.conf

global\_defs {

router\_id haproxy

}

vrrp\_instance VI\_1 {

state MASTER

interface eth0

virtual\_router\_id 101

priority 200

advert\_int 1

authentication {

auth\_type PASS

auth\_pass 1111

}

virtual\_ipaddress {

192.168.1.10/24 brd 192.168.1.255 dev eth0 label eth0:1

}

}

vrrp\_instance VI\_2 {

state BACKUP

interface eth0

virtual\_router\_id 102

priority 100

advert\_int 1

authentication {

auth\_type PASS

auth\_pass 2222

}

virtual\_ipaddress {

192.168.1.20/24 brd 192.168.1.255 dev eth0 label eth0:2

}

}

[root@proxy1 ~]# systemctl restart keepalived.service

[root@proxy1 ~]# ip a s | grep -E "\.10|\.20"

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

inet 192.168.1.20/24 brd 192.168.1.255 scope global secondary eth0:2

[root@proxy1 ~]# curl 192.168.1.10

web1

[root@proxy1 ~]# curl 192.168.1.10

web2

[root@proxy1 ~]# curl 192.168.1.20

web1

[root@proxy1 ~]# curl 192.168.1.20

web2

[root@proxy1 ~]#

[root@proxy2 ~]# yum -y install keepalived.x86\_64

[root@proxy2 ~]# vim /etc/keepalived/keepalived.conf

[root@proxy2 ~]# cat /etc/keepalived/keepalived.conf

global\_defs {

router\_id haproxy

}

vrrp\_instance VI\_1 {

state BACKUP

interface eth0

virtual\_router\_id 101

priority 100

advert\_int 1

authentication {

auth\_type PASS

auth\_pass 1111

}

virtual\_ipaddress {

192.168.1.10/24 brd 192.168.1.255 dev eth0 label eth0:1

}

}

vrrp\_instance VI\_2 {

state MASTER

interface eth0

virtual\_router\_id 102

priority 200

advert\_int 1

authentication {

auth\_type PASS

auth\_pass 2222

}

virtual\_ipaddress {

192.168.1.20/24 brd 192.168.1.255 dev eth0 label eth0:2

}

}

[root@proxy2 ~]# systemctl restart keepalived.service

[root@proxy2 ~]# ip a s | grep -E "\.10|\.20"

inet 192.168.1.20/24 brd 192.168.1.255 scope global secondary eth0:2

[root@proxy2 ~]# curl 192.168.1.20

web1

[root@proxy2 ~]# curl 192.168.1.20

web2

[root@proxy2 ~]#

[root@proxy1 ~]# ip a s | grep -E "\.10|\.20"

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

[root@proxy1 ~]#

#验证调度器的虚拟IP地址

[root@hostos ~]# curl 192.168.1.20

web1

[root@hostos ~]# curl 192.168.1.20

web2

[root@hostos ~]# curl 192.168.1.10

web1

[root@hostos ~]# curl 192.168.1.10

web2

[root@hostos ~]#

#验证调度器虚拟ip漂移

[root@proxy1 ~]# systemctl stop keepalived.service

[root@proxy1 ~]# ip a s | grep -E '\.10|\.20'

[root@proxy1 ~]#

[root@proxy2 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.20/24 brd 192.168.1.255 scope global secondary eth0:2

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

[root@proxy2 ~]#

[root@proxy1 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

[root@proxy1 ~]#

[root@proxy2 ~]# systemctl stop keepalived.service

[root@proxy2 ~]# ip a s | grep -E '\.10|\.20'

[root@proxy2 ~]#

[root@proxy1 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

inet 192.168.1.20/24 brd 192.168.1.255 scope global secondary eth0:2

[root@proxy1 ~]#

[root@proxy2 ~]# systemctl start keepalived.service

[root@proxy2 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.20/24 brd 192.168.1.255 scope global secondary eth0:2

[root@proxy2 ~]#

[root@proxy1 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

[root@proxy1 ~]#

#问题分析

[root@proxy1 ~]# systemctl stop haproxy.service

[root@proxy1 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

[root@proxy1 ~]# curl 192.168.1.10

curl: (7) Failed connect to 192.168.1.10:80; 拒绝连接

[root@proxy1 ~]#

#如果调度器的Haproxy服务出现故障，vip不会漂移，导致该vip不可用

#修改Keepalived配置，关联Haproxy服务

[root@proxy1 ~]# systemctl start haproxy.service

[root@proxy1 ~]# curl 192.168.1.10

web1

[root@proxy1 ~]# curl 192.168.1.10

web2

[root@proxy1 ~]#

#关联Keepalived和Haproxy

[root@proxy1 ~]# vim /etc/keepalived/keepalived.conf

[root@proxy1 ~]# cat /etc/keepalived/keepalived.conf

global\_defs {

router\_id haproxy

}

vrrp\_script check\_haproxy {

script "killall -0 haproxy"

interval 2

}

vrrp\_instance VI\_1 {

state MASTER

interface eth0

virtual\_router\_id 101

priority 200

advert\_int 1

authentication {

auth\_type PASS

auth\_pass 1111

}

virtual\_ipaddress {

192.168.1.10/24 brd 192.168.1.255 dev eth0 label eth0:1

}

track\_script {

check\_haproxy weight=0

}

}

vrrp\_instance VI\_2 {

state BACKUP

interface eth0

virtual\_router\_id 102

priority 100

advert\_int 1

authentication {

auth\_type PASS

auth\_pass 2222

}

virtual\_ipaddress {

192.168.1.20/24 brd 192.168.1.255 dev eth0 label eth0:2

}

}

[root@proxy1 ~]# systemctl restart keepalived.service

[root@proxy1 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

[root@proxy1 ~]#

[root@proxy2 ~]# vim /etc/keepalived/keepalived.conf

[root@proxy2 ~]# cat /etc/keepalived/keepalived.conf

global\_defs {

router\_id haproxy

}

vrrp\_script check\_haproxy {

script "killall -0 haproxy"

interval 2

}

vrrp\_instance VI\_1 {

state BACKUP

interface eth0

virtual\_router\_id 101

priority 100

advert\_int 1

authentication {

auth\_type PASS

auth\_pass 1111

}

virtual\_ipaddress {

192.168.1.10/24 brd 192.168.1.255 dev eth0 label eth0:1

}

}

vrrp\_instance VI\_2 {

state MASTER

interface eth0

virtual\_router\_id 102

priority 200

advert\_int 1

authentication {

auth\_type PASS

auth\_pass 2222

}

virtual\_ipaddress {

192.168.1.20/24 brd 192.168.1.255 dev eth0 label eth0:2

}

track\_script {

check\_haproxy weight=0

}

}

[root@proxy2 ~]# systemctl restart keepalived.service

[root@proxy2 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.20/24 brd 192.168.1.255 scope global secondary eth0:2

[root@proxy2 ~]#

#测试关联结果

[root@proxy1 ~]# systemctl stop haproxy.service

[root@proxy1 ~]# ip a s | grep -E '\.10|\.20'

[root@proxy1 ~]#

[root@proxy2 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.20/24 brd 192.168.1.255 scope global secondary eth0:2

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

[root@proxy2 ~]#

[root@proxy1 ~]# systemctl start haproxy.service

[root@proxy1 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

[root@proxy1 ~]#

[root@proxy2 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.20/24 brd 192.168.1.255 scope global secondary eth0:2

[root@proxy2 ~]# systemctl stop haproxy.service

[root@proxy2 ~]# ip a s | grep -E '\.10|\.20'

[root@proxy2 ~]#

[root@proxy1 ~]# ip a s | grep -E '\.10|\.20'

inet 192.168.1.10/24 brd 192.168.1.255 scope global secondary eth0:1

inet 192.168.1.20/24 brd 192.168.1.255 scope global secondary eth0:2

[root@proxy1 ~]#

#测试通过，Keepalived和Haproxy关联成功

#因为有两个vip，并且都可用，所以采用dns轮训的方式

[root@dnsserver ~]# yum -y install bind bind-chroot

[root@dnsserver ~]# vim /etc/named.conf

[root@dnsserver ~]# cat /etc/named.conf

options {

directory "/var/named/";

};

zone "tedu.cn" IN {

type master;

file "tedu.cn.zone";

};

[root@dnsserver ~]# cd /var/named/

[root@dnsserver named]# cp -p named.localhost tedu.cn.zone

[root@dnsserver named]# vim tedu.cn.zone

[root@dnsserver named]# tail -3 tedu.cn.zone

dnsserver A 192.168.1.5

www A 192.168.1.10

www A 192.168.1.20

[root@dnsserver named]# systemctl restart named

[root@dnsserver named]# cd

[root@dnsserver ~]#

[root@dnsserver ~]# echo "nameserver 192.168.1.5" > /etc/resolv.conf

[root@dnsserver ~]# nslookup www.tedu.cn

Server: 192.168.1.5

Address: 192.168.1.5#53

Name: www.tedu.cn

Address: 192.168.1.10

Name: www.tedu.cn

Address: 192.168.1.20

[root@dnsserver ~]# curl www.tedu.cn

web1

[root@dnsserver ~]# curl www.tedu.cn

web2

[root@dnsserver ~]#