Nginx-keepalived+Nginx实现高可用集群

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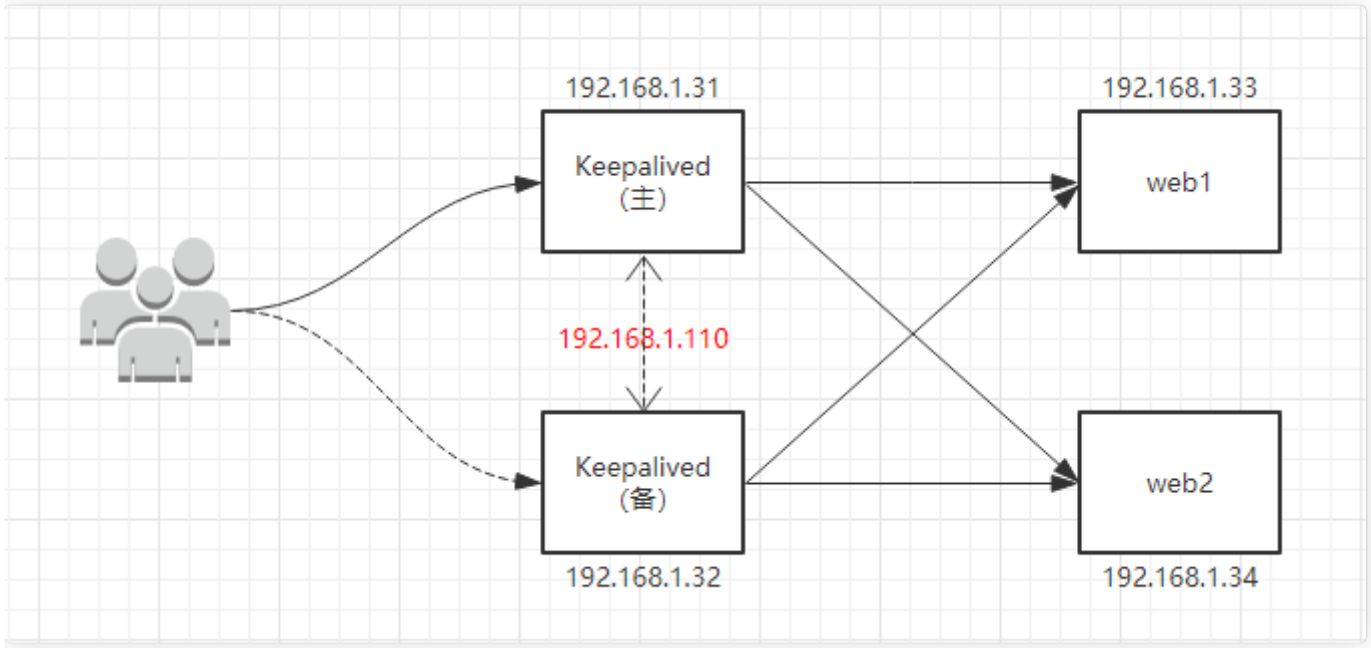
Keepalived+Nginx 高可用集群（主从模式）

集群架构图：



说明：Keepalived机器同样是nginx负载均衡器。

1）实验环境准备（此处都是使用的centos7系统）

```
# cat /etc/redhat-release
CentOS Linux release 7.4.1708 (Core)
```

HOSTNAME	IP	说明
LB-01	192.168.1.31	Keepalived 主服器（Nginx 主负载均衡器）
LB-02	192.168.1.32	Keepalived 备服器（Nginx 辅负载均衡器）
web01	192.168.1.33	后端web服务器节点1（nginx站点）
web02	192.168.1.34	后端web服务器节点2（nginx站点）
node01	192.168.1.35	测试机（充当客户端，可有可无）

在所有节点上面进行配置

```
# systemctl stop firewalld          //关闭防火墙
# sed -i 's/^SELINUX=.*/SELINUX=disabled/' /etc/sysconfig/selinux        //关闭selinux，重启生效
# setenforce 0                      //关闭selinux，临时生效
# ntpdate 0.centos.pool.ntp.org     //时间同步
# yum install nginx -y              //安装nginx
```

2）配置后端web服务器（两台一样）

```
# echo "`hostname` `ifconfig ens33 |sed -n 's#.*inet \(.*\)netmask.*#\1#p'`" > /usr/share/nginx/html/index.html          //准备测试文件
```

```
# vim /etc/nginx/nginx.conf        //编辑配置文件
user nginx;
worker_processes auto;
error_log /var/log/nginx/error.log;
pid /run/nginx.pid;
include /usr/share/nginx/modules/*.conf;
events {
    worker_connections 1024;
}
http {
    log_format  main  '$remote_addr - $remote_user [$time_local] "$request" '
                      '$status $body_bytes_sent "$http_referer" '
                      '"$http_user_agent" "$http_x_forwarded_for"';
    access_log  /var/log/nginx/access.log  main;
    sendfile            on;
    tcp_nopush          on;
    tcp_nodelay         on;
    keepalive_timeout   65;
    types_hash_max_size 2048;
    include             /etc/nginx/mime.types;
    default_type        application/octet-stream;
    include /etc/nginx/conf.d/*.conf;
    server {
        listen       80;
        server_name  www.mtian.org;
        location / {
            root         /usr/share/nginx/html;
        }
    access_log    /var/log/nginx/access.log main;
    }
}
```

```
# systemctl start nginx    //启动nginx
# systemctl enable nginx    //加入开机启动
```

3）配置LB服务器（两台都一样）

```
# vim /etc/nginx/nginx.conf
user nginx;
worker_processes auto;
error_log /var/log/nginx/error.log;
pid /run/nginx.pid;
include /usr/share/nginx/modules/*.conf;
events {
    worker_connections 1024;
}
http {
    log_format  main  '$remote_addr - $remote_user [$time_local] "$request" '
                      '$status $body_bytes_sent "$http_referer" '
                      '"$http_user_agent" "$http_x_forwarded_for"';
    access_log  /var/log/nginx/access.log  main;
    sendfile            on;
    tcp_nopush          on;
    tcp_nodelay         on;
    keepalive_timeout   65;
    types_hash_max_size 2048;
    include             /etc/nginx/mime.types;
    default_type        application/octet-stream;
    include /etc/nginx/conf.d/*.conf;
    upstream backend {
    server 192.168.1.33:80 weight=1 max_fails=3 fail_timeout=20s;
    server 192.168.1.34:80 weight=1 max_fails=3 fail_timeout=20s;
    }
    server {
```

CONTENTS

```
        listen       80;
        server_name  www.mtian.org;
        location / {
        proxy_pass http://backend;
        proxy_set_header Host $host:$proxy_port;
        proxy_set_header X-Forwarded-For $remote_addr;
        }
    }
}
```

```
# systemctl start nginx      //启动nginx
# systemctl enable nginx     //加入开机自启动
```

4）在测试机（192.168.1.35）上面添加host解析，并测试lb集群是否正常。（测试机任意都可以，只要能访问lb节点。）

```
[root@node01 ~]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.168.1.32    www.mtian.org
192.168.1.31    www.mtian.org
```

```
// 测试时候轮流关闭lb1 和 lb2 节点，关闭后还是能够访问并看到轮循效果即表示 nginx lb集群搭建成功。
[root@node01 ~]# curl www.mtian.org
web01 192.168.1.33
[root@node01 ~]# curl www.mtian.org
web02 192.168.1.34
[root@node01 ~]# curl www.mtian.org
web01 192.168.1.33
[root@node01 ~]# curl www.mtian.org
```

CONTENTS

```
web02 192.168.1.34
[root@node01 ~]# curl www.mtian.org
web01 192.168.1.33
[root@node01 ~]# curl www.mtian.org
web02 192.168.1.34
```

5）上面步骤成功后，开始搭建keepalived，在两台 lb节点上面安装keepalived（也可以源码编译安装、此处直

```
# yum install keepalived -y
```

6）配置 LB-01节点

```
[root@LB-01 ~]# vim /etc/keepalived/keepalived.conf
! Configuration File for keepalived

global_defs {
   notification_email {
    381347268@qq.com
   }
   smtp_server 192.168.200.1
   smtp_connect_timeout 30
   router_id LVS_DEVEL
}

vrrp_instance VI_1 {
    state MASTER
    interface ens33
    virtual_router_id 51
    priority 150
    advert_int 1
    authentication {
```

```
        auth_type PASS
        auth_pass 1111
    }
    virtual_ipaddress {
    192.168.1.110/24 dev ens33 label ens33:1
    }
}
```

```
[root@LB-01 ~]# systemctl start keepalived      //启动keepalived
[root@LB-01 ~]# systemctl enable keepalived     //加入开机自启动
```

```
[root@LB-01 ~]# ip a    //查看IP，会发现多出了VIP 192.168.1.110
......
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 00:0c:29:94:17:44 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.31/24 brd 192.168.1.255 scope global ens33
       valid_lft forever preferred_lft forever
    inet 192.168.1.110/24 scope global secondary ens33:1
       valid_lft forever preferred_lft forever
    inet6 fe80::20c:29ff:fe94:1744/64 scope link
       valid_lft forever preferred_lft forever
......
```

7）配置 LB-02节点

```
[root@LB-02 ~]# vim /etc/keepalived/keepalived.conf
! Configuration File for keepalived

global_defs {
```

CONTENTS

```
   notification_email {
    381347268@qq.com
   }
   smtp_server 192.168.200.1
   smtp_connect_timeout 30
   router_id LVS_DEVEL
}

vrrp_instance VI_1 {
    state BACKUP
    interface ens33
    virtual_router_id 51
    priority 100
    advert_int 1
    authentication {
        auth_type PASS
        auth_pass 1111
    }
    virtual_ipaddress {
    192.168.1.110/24 dev ens33 label ens33:1
    }
}
```

```
[root@LB-02 ~]# systemctl start keepalived        //启动keepalived
[root@LB-02 ~]# systemctl enable keepalived    //加入开机自启动
```

```
[root@LB-02 ~]# ifconfig   //查看IP，此时备节点不会有VIP（只有当主挂了的时候，VIP才会飘到备节点）
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.32  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::20c:29ff:feab:6532  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:ab:65:32  txqueuelen 1000  (Ethernet)
        RX packets 43752  bytes 17739987 (16.9 MiB)
```

CONTENTS

```
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 4177  bytes 415805 (406.0 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
......
```

8）在测试机器上面访问 Keepalived上面配置的VIP 192.168.1.110

```
[root@node01 ~]# curl 192.168.1.110
web01 192.168.1.33
[root@node01 ~]# curl 192.168.1.110
web02 192.168.1.34
[root@node01 ~]# curl 192.168.1.110
web01 192.168.1.33
[root@node01 ~]# curl 192.168.1.110
web02 192.168.1.34
```

```
//关闭LB-01 节点上面keepalived主节点。再次访问
[root@LB-01 ~]# systemctl stop keepalived
[root@node01 ~]#
[root@node01 ~]# curl 192.168.1.110
web01 192.168.1.33
[root@node01 ~]# curl 192.168.1.110
web02 192.168.1.34
[root@node01 ~]# curl 192.168.1.110
web01 192.168.1.33
[root@node01 ~]# curl 192.168.1.110
web02 192.168.1.34
```

CONTENTS

```
//此时查看LB-01 主节点上面的IP ， 发现已经没有了 VIP
[root@LB-01 ~]# ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.31  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::20c:29ff:fe94:1744  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:94:17:44  txqueuelen 1000  (Ethernet)
        RX packets 46813  bytes 18033403 (17.1 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 9350  bytes 1040882 (1016.4 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
...
```

```
//查看LB-02 备节点上面的IP，发现 VIP已经成功飘过来了
[root@LB-02 ~]# ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.32  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::20c:29ff:feab:6532  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:ab:65:32  txqueuelen 1000  (Ethernet)
        RX packets 44023  bytes 17760070 (16.9 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 4333  bytes 430037 (419.9 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

ens33:1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.110  netmask 255.255.255.0  broadcast 0.0.0.0
        ether 00:0c:29:ab:65:32  txqueuelen 1000  (Ethernet)
...
```

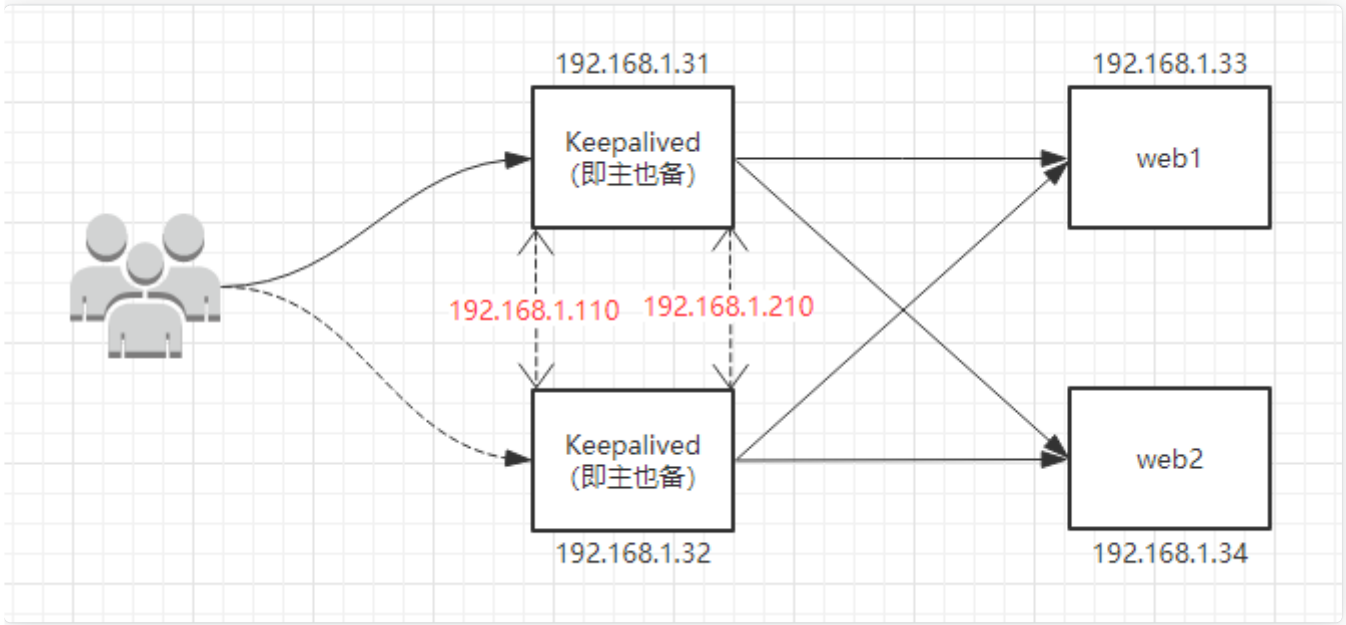
到此，Keepalived+Nginx高可用集群（主从）就搭建完成了。

CONTENTS

Keepalived+Nginx 高可用集群（双主模式）

将keepalived做成双主模式，其实很简单，就是再配置一段新的vrrp_instance（实例）规则，主上面加配置一个从的实例规则，从上面加配置一个主的实例规则。

集群架构图：



说明：还是按照上面的环境继续做实验，只是修改LB节点上面的keepalived服务的配置文件即可。此时LB-01节点即为Keepalived的主节点也为备节点，LB-02节点同样即为Keepalived的主节点也为备节点。LB-01节点默认的主节点VIP（192.168.1.110），LB-02节点默认的主节点VIP（192.168.1.210）

1）配置 LB-01 节点

```
[root@LB-01 ~]# vim /etc/keepalived/keepalived.conf    //编辑配置文件，增加一段新的vrrp_instance规则
! Configuration File for keepalived
```

```
global_defs {
   notification_email {
    381347268@qq.com
   }
   smtp_server 192.168.200.1
   smtp_connect_timeout 30
   router_id LVS_DEVEL
}

vrrp_instance VI_1 {
    state MASTER
    interface ens33
    virtual_router_id 51
    priority 150
    advert_int 1
    authentication {
        auth_type PASS
        auth_pass 1111
    }
    virtual_ipaddress {
    192.168.1.110/24 dev ens33 label ens33:1
    }
}

vrrp_instance VI_2 {
    state BACKUP
    interface ens33
    virtual_router_id 52
    priority 100
    advert_int 1
    authentication {
    auth_type PASS
    auth_pass 2222
```

CONTENTS

```
    }
    virtual_ipaddress {
    192.168.1.210/24 dev ens33 label ens33:2
    }
}
```

```
[root@LB-01 ~]# systemctl restart keepalived     //重新启动keepalived
```

```
// 查看LB-01 节点的IP地址，发现VIP（192.168.1.110）同样还是默认在该节点
[root@LB-01 ~]# ip a
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 00:0c:29:94:17:44 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.31/24 brd 192.168.1.255 scope global ens33
       valid_lft forever preferred_lft forever
    inet 192.168.1.110/24 scope global secondary ens33:1
       valid_lft forever preferred_lft forever
    inet6 fe80::20c:29ff:fe94:1744/64 scope link
       valid_lft forever preferred_lft forever
```

2）配置 LB-02 节点

```
[root@LB-02 ~]# vim /etc/keepalived/keepalived.conf     //编辑配置文件，增加一段新的vrrp_instance规则
! Configuration File for keepalived

global_defs {
   notification_email {
    381347268@qq.com
   }
   smtp_server 192.168.200.1
```

CONTENTS

```
   smtp_connect_timeout 30
   router_id LVS_DEVEL
}

vrrp_instance VI_1 {
    state BACKUP
    interface ens33
    virtual_router_id 51
    priority 100
    advert_int 1
    authentication {
        auth_type PASS
        auth_pass 1111
    }
    virtual_ipaddress {
    192.168.1.110/24 dev ens33 label ens33:1
    }
}

vrrp_instance VI_2 {
    state MASTER
    interface ens33
    virtual_router_id 52
    priority 150
    advert_int 1
    authentication {
        auth_type PASS
        auth_pass 2222
    }
    virtual_ipaddress {
        192.168.1.210/24 dev ens33 label ens33:2
    }
}
```

CONTENTS

```
[root@LB-02 ~]# systemctl restart keepalived    //重新启动keepalived
```

```
// 查看LB-02节点IP，会发现也多了一个VIP（192.168.1.210），此时该节点也就是一个主了。
[root@LB-02 ~]# ip a
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP qlen 1000
    link/ether 00:0c:29:ab:65:32 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.32/24 brd 192.168.1.255 scope global ens33
       valid_lft forever preferred_lft forever
    inet 192.168.1.210/24 scope global secondary ens33:2
       valid_lft forever preferred_lft forever
    inet6 fe80::20c:29ff:feab:6532/64 scope link
       valid_lft forever preferred_lft forever
```

3）测试

```
[root@node01 ~]# curl 192.168.1.110
web01 192.168.1.33
[root@node01 ~]# curl 192.168.1.110
web02 192.168.1.34
[root@node01 ~]# curl 192.168.1.210
web01 192.168.1.33
[root@node01 ~]# curl 192.168.1.210
web02 192.168.1.34
```

```
// 停止LB-01节点的keepalived再次测试
[root@LB-01 ~]# systemctl stop keepalived
[root@node01 ~]# curl 192.168.1.110
```

```
web01 192.168.1.33
[root@node01 ~]# curl 192.168.1.110
web02 192.168.1.34
[root@node01 ~]# curl 192.168.1.210
web01 192.168.1.33
[root@node01 ~]# curl 192.168.1.210
web02 192.168.1.34
```

测试可以发现我们访问keepalived中配置的两个VIP都可以正常调度等，当我们停止任意一台keepalived节点，同
此，keepalived+nginx高可用集群（双主模式）就搭建完成了。

« 上一篇： Nginx-upstream模块
» 下一篇： Nginx-http_proxy_module模块