

# Keepalived

## Objectif de départ

Mettre en place une **haute disponibilité** entre deux serveurs (srv-web1 et srv-web2), pour assurer la continuité des services suivants :

- Apache (HTTP)
- MySQL (base de données)
- Bind9 (DNS local)

En cas de panne d'un service ou d'un serveur, l'IP virtuelle `10.21.10.100` devait automatiquement **basculer** vers le nœud sain.

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## Étapes fonctionnelles réalisées

### 1. Nettoyage de l'héritage Heartbeat

- Le projet initial utilisait **Heartbeat**, mais il ne fonctionnait pas de manière fiable.
- Nous avons décidé de **le purger proprement** :

```
sudo systemctl stop heartbeat
sudo apt remove --purge -y heartbeat
sudo rm -rf /etc/heartbeat /var/log/ha-log /var/lib/heartbeat
```

- Keepalived a été retenu comme **remplaçant moderne et stable**.
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### 2. Installation de Keepalived sur les deux serveurs

- Installation classique :

```
sudo apt update && sudo apt install -y keepalived
```

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### 3. 🧠 Mise en place de l'IP virtuelle avec failover

- Mise en place d'un fichier `keepalived.conf` avec :
  - IP virtuelle partagée : `10.21.10.100/16`
  - Basculement automatique via `vrrp_instance`
  - Authentification avec mot de passe
  - Priorité pour désigner le **MASTER** et le **BACKUP**

Extrait :

```
vrrp_instance VI_1 {  
    state MASTER  
    interface eth0  
    virtual_router_id 51  
    priority 110  
    virtual_ipaddress {  
        10.21.10.100/16  
    }  
}
```

### 4. ✅ Validation du failover "serveur down"

- En arrêtant le service `keepalived` sur le MASTER, l'IP a bien basculé vers le BACKUP.
- Test du basculement via :

```
ip a show eth0
```

```
root@srv-web:/home/gady# systemctl start mysql  
root@srv-web:/home/gady# systemctl stop keepalived  
root@srv-web:/home/gady# ip a  
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000  
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00  
    inet 127.0.0.1/8 scope host lo  
        valid_lft forever preferred_lft forever  
    inet6 ::1/128 scope host noprefixroute  
        valid_lft forever preferred_lft forever  
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000  
    link/ether 00:15:5d:0a:01:04 brd ff:ff:ff:ff:ff:ff  
    inet 10.21.10.11/16 brd 10.21.255.255 scope global eth0  
        valid_lft forever preferred_lft forever  
    inet6 fe80::215:5dff:fe0a:104/64 scope link  
        valid_lft forever preferred_lft forever  
root@srv-web:/home/gady#
```

Ici on voit bien qu'après arrêt du service Keepalived le "srv-web2" prend le relais

```
valid_lft forever preferred_lft forever
root@srv-web2:/home/gady# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:0a:01:09 brd ff:ff:ff:ff:ff:ff
    inet 10.21.10.12/16 brd 10.21.255.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet 10.21.10.100/16 scope global secondary eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe0a:109/64 scope link
        valid_lft forever preferred_lft forever
root@srv-web2:/home/gady#
```

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## 5. Supervision combinée des services

- Création d'un script général `/etc/keepalived/check_services.sh` :

```
SERVICES=("apache2" "mysql" "bind9")
for SERVICE in "${SERVICES[@]}; do
    systemctl is-active --quiet "$SERVICE" || exit 1
done
```

- Ajout de plusieurs `track_script` dans `keepalived.conf` :

```
track_script {
    check_services
    check_mysql
}
```

-  Basculement déclenché si **n'importe quel service tombe**.
- Test avec `apache2` :

```

root@srv-web:/home/gady# systemctl stop apache2
root@srv-web:/home/gady# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:0a:01:04 brd ff:ff:ff:ff:ff:ff
    inet 10.21.10.11/16 brd 10.21.255.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe0a:104/64 scope link
        valid_lft forever preferred_lft forever
root@srv-web:/home/gady#

```

```

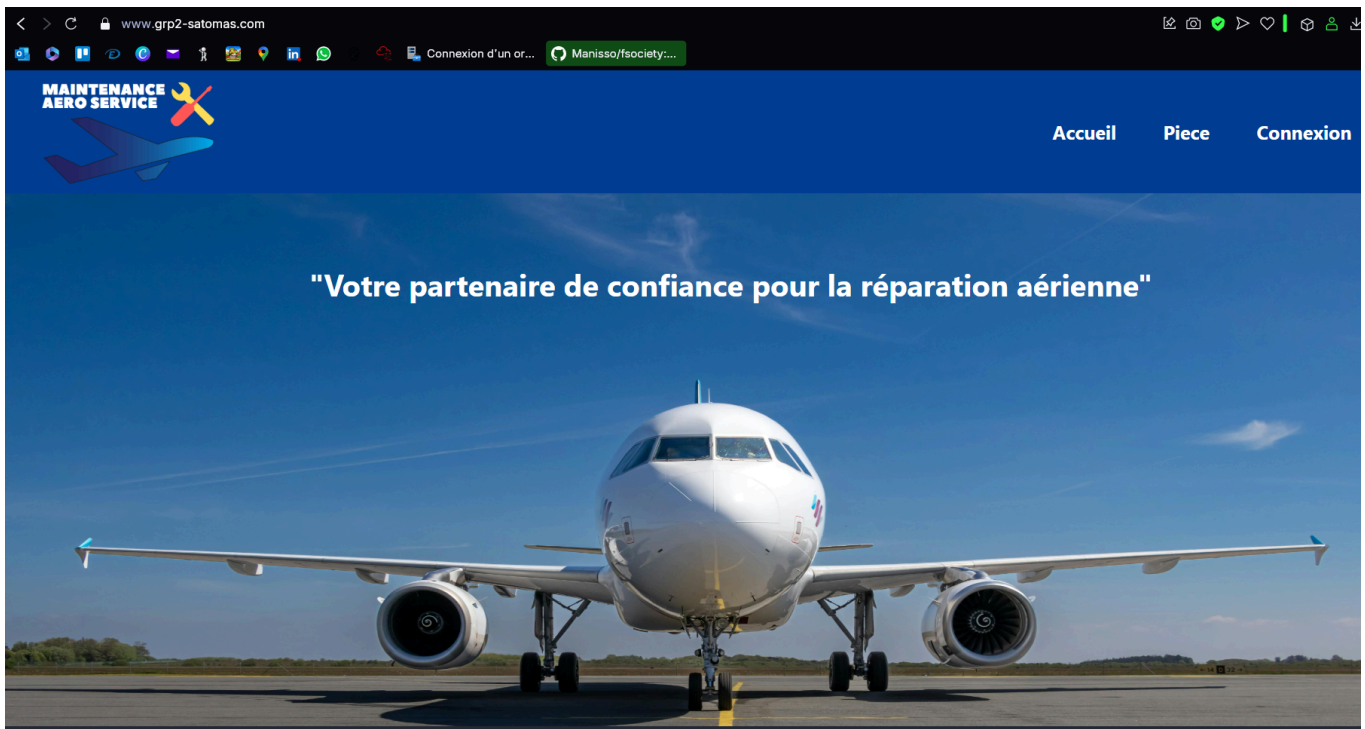
root@srv-web2:/home/gady# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:0a:01:09 brd ff:ff:ff:ff:ff:ff
    inet 10.21.10.12/16 brd 10.21.255.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet 10.21.10.100/16 scope global secondary eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe0a:109/64 scope link
        valid_lft forever preferred_lft forever
root@srv-web2:/home/gady#

```

- Test avec bind9 :

```
root@srv-web:/home/gady# systemctl stop bind9
root@srv-web:/home/gady# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:0a:01:04 brd ff:ff:ff:ff:ff:ff
    inet 10.21.10.11/16 brd 10.21.255.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet 10.21.10.100/16 scope global secondary eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe0a:104/64 scope link
        valid_lft forever preferred_lft forever
root@srv-web:/home/gady# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:0a:01:04 brd ff:ff:ff:ff:ff:ff
    inet 10.21.10.11/16 brd 10.21.255.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe0a:104/64 scope link
        valid_lft forever preferred_lft forever
root@srv-web:/home/gady#
```

```
root@srv-web2:/home/gady# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:0a:01:09 brd ff:ff:ff:ff:ff:ff
    inet 10.21.10.12/16 brd 10.21.255.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet 10.21.10.100/16 scope global secondary eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe0a:109/64 scope link
        valid_lft forever preferred_lft forever
root@srv-web2:/home/gady#
```



Le site est toujours disponible via le DNS

- Test avec mysql :

```
root@srv-web:/home/gady# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:0a:01:04 brd ff:ff:ff:ff:ff:ff
    inet 10.21.10.11/16 brd 10.21.255.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet 10.21.10.100/16 scope global secondary eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe0a:104/64 scope link
        valid_lft forever preferred_lft forever
root@srv-web:/home/gady# systemctl stop mysql
root@srv-web:/home/gady# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
        valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:0a:01:04 brd ff:ff:ff:ff:ff:ff
    inet 10.21.10.11/16 brd 10.21.255.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fe0a:104/64 scope link
        valid_lft forever preferred_lft forever
root@srv-web:/home/gady#
```

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## 8. Corrections Keepalived

- Activation de `script_security` dans `global_defs` :

```
global_defs {
    script_security 1
}
```

- Correction des priorités :
    - MASTER : `priority 110`
    - BACKUP : `priority 100`
-