Mise en place d'une infrastructure Web à haute disponibilité

Apache2 & Heartbeat

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- Situation professionnelle E5

Objectifs

- Installer et configurer un serveur web Apache2.
- Mettre en place une configuration réseau fonctionnelle.
- Déployer un template web sur le serveur Apache.
- Configurer Heartbeat pour assurer la haute disponibilité.
- Mettre en œuvre un serveur web prioritaire.
- Sécuriser l'accès via une authentification.
- Vérifier le bon fonctionnement du service web côté client.

Contexte

Dans le cadre de la réalisation de la partie E5 du portfolio, ce document présente la mise en place d'une infrastructure web haute disponibilité basée sur Apache2 et Heartbeat. L'objectif est de garantir la continuité de service d'un site web en cas de défaillance du serveur principal, tout en assurant une configuration réseau et système cohérente.

Heartbeat installation

```
srv1 [Running]
Login incorrect
debian login: invite
Password:
Linux debian 6.1.0-26-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.112-1 (2024-09-30) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Mon Oct 21 15:34:34 CEST 2024 on tty1
invite@debian:~$ su
Mot de passe :
root@debian:/home/invite# apt install heartbeat
Lecture des listes de paquets... Fait
Construction de l'arbre des dépendances... Fait
Lecture des informations d'état... Fait
Les paquets supplémentaires suivants seront installés :
  bc cluster-glue corosync fence-agents gawk iptables libcfg7 libcib27 libcmap4 libcorosync-common4 libcpg4 libcrmcluster29 libcrmcommon34 libcrmservice28
  libcur14 libestr0 libfastjson4 libgpm2 libheartbeat2 libip6tc2 libknet1 liblognorm5 liblrm2 liblrmd28 libltdl7 liblzo2-2 libmpfr6 libncurses6
  libnet-telnet-perl libnet1 libnetfilter-conntrack3 libnfnetlink0 libnozzle1 libnspr4 libnss3 libopenhpi3 libopenipmi0 libpacemaker1 libpe-rules26
  libpe-status28 libpils2 libplumb2 libplumbgpl2 libqb100 libquorum5 libsensors-config libsensors5 libsgutils2-1.46-2 libsigsegv2 libsnmp-base libsnmp40
  libstatgrab10 libstonith1 libstonithd26 libtimedate-perl libvotequorum8 liburap0 libxml2-utils libxslt1.1 net-tools openhpid pacemaker pacemaker-cli-utils
  pacemaker-common pacemaker-resource-agents psmisc python3-boto3 python3-botocore python3-cachetools python3-cffi-backend python3-cryptography
  python3-dateutil python3-fasteners python3-google-auth python3-google-auth-httplib2 python3-googleapi python3-greenlet python3-jmespath python3-monotonic
  python3-oauth2client python3-openssl python3-pexpect python3-ptyprocess python3-pyasn1 python3-pyasn1-modules python3-rsa python3-s3transfer
  python3-sqlalchemy python3-sqlalchemy-ext python3-suds python3-uritemplate resource-agents rsyslog sg3-utils sgml-base snmp xsltproc
Paquets suggérés :
  ipmitool fence-virt python3-adal python3-azure python3-keystoneauth1 python3-keystoneclient python3-novaclient python3-kubernetes gawk-doc firewalld gpm
  lm-sensors snmp-mibs-downloader crmsh | pcs python3-cryptography-doc python3-cryptography-vectors python-greenlet-dev python-greenlet-doc python-openssl-doc
  python3-openssl-dbg python3-pexpect-doc python3-sqlalchemy-doc python3-fdb python3-pymssql python3-mysqldb python3-psycopg2 python3-asyncpg python3-aiosqlite
  rsyslog-mysql | rsyslog-pgsql rsyslog-mongodb rsyslog-doc rsyslog-openssl | rsyslog-gnutls rsyslog-gssapi rsyslog-relp sgml-base-doc
Les NOUVEAUX paquets suivants seront installés :
  bc cluster-glue corosync fence-agents gawk iptables libcfg7 libcib27 libcmap4 libcorosync-common4 libcpg4 libcrmcluster29 libcrmcommon34
  libcrmservice28 libcur14 libestr0 libfastjson4 libgpm2 libheartbeat2 libip6tc2 libknet1 liblognorm5 liblrm2 liblrmd28 libltdl7 liblzo2-2 libmpfr6
  libncurses6 libnet-telnet-perl libnet1 libnetfilter-conntrack3 libnfnetlink0 libnozzle1 libnspr4 libnss3 libopenhpi3 libopenipmi0 libpacemaker1
  libpe-rules26 libpe-status28 libpils2 libplumb2 libplumbgpl2 libqb100 libquorum5 libsensors-config libsensors5 libsgutils2-1.46-2 libsigsegv2 libsnmp-base
  libsnmp40 libstatgrab10 libstonith1 libstonithd26 libtimedate-perl libvotequorum8 liburap0 libxml2-utils libxslt1.1 net-tools openhpid pacemaker
  pacemaker-cli-utils pacemaker-common pacemaker-resource-agents psmisc python3-boto3 python3-botocore python3-cachetools python3-cffi-backend
  python3-cryptography python3-dateutil python3-fasteners python3-google-auth python3-google-auth-httplib2 python3-googleapi python3-greenlet python3-jmespath
  python3-monotonic python3-oauth2client python3-openssl python3-pexpect python3-ptyprocess python3-pyasn1 python3-pyasn1-modules python3-rsa
  python3-s3transfer python3-sqlalchemy python3-sqlalchemy-ext python3-suds python3-uritemplate resource-agents rsyslog sg3-utils sgml-base snmp xsltproc
0 mis à jour, 98 nouvellement installés, 0 à enlever et 0 non mis à jour.
Il est nécessaire de prendre 27,8 Mo dans les archives.
Après cette opération, 148 Mo d'espace disque supplémentaires seront utilisés.
Souhaitez-vous continuer ? [O/n] o
```

Installation de apache2


```
srv1 [Running]
update-alternatives: utilisation de « /usr/sbin/arptables-nft » pour fournir « /usr/sbin/arptables » (arptables) en mode automatique
update-alternatives: utilisation de « /usr/sbin/ebtables-nft » pour fournir « /usr/sbin/ebtables » (ebtables) en mode automatique
Paramétrage de python3-openssl (23.0.0-1) ...
Paramétrage de libstonith1 (1.0.12-21+b2) ...
Paramétrage de python3-s3transfer (0.6.0-1) ...
Paramétrage de snmp (5.9.3+dfsg-2) ...
Paramétrage de libheartbeat2 (1:3.0.6-13+b2) ...
Paramétrage de libcib27:amd64 (2.1.5-1+deb12u1) ...
Paramétrage de python3-google-auth (1.5.1-3) ...
Paramétrage de python3-google-auth-httplib2 (0.1.0-3) ...
Paramétrage de python3-boto3 (1.26.27+dfsg-1) ...
Paramétrage de liblrm2 (1.0.12-21+b2) ...
Paramétrage de libcrmcluster29:amd64 (2.1.5-1+deb12u1) ...
Paramétrage de liblrmd28:amd64 (2.1.5-1+deb12u1) ...
Paramétrage de python3-oauth2client (4.1.3-3) ...
Paramétrage de libpacemaker1:amd64 (2.1.5-1+deb12u1) ...
Paramétrage de cluster-glue (1.0.12-21+b2) ...
addgroup : Le groupe « haclient » existe déjà en tant que groupe système. Abandon.
L'utilisateur système « hacluster » existe déjà. Abandon.
Created symlink /etc/systemd/system/multi-user.target.wants/logd.service → /lib/systemd/system/logd.service.
Paramétrage de python3-googleapi (1.7.12-1) ...
Paramétrage de fence-agents (4.12.1-1) ...
Paramétrage de resource-agents (1:4.12.0-2) ...
resource-agents-deps.target is a disabled or a static unit, not starting it.
Paramétrage de pacemaker-resource-agents (2.1.5-1+deb12u1) ...
Paramétrage de heartbeat (1:3.0.6-13+b2) ...
update-rc.d: warning: start and stop actions are no longer supported; falling back to defaults
Created symlink /etc/systemd/system/multi-user.target.wants/heartbeat.service → /lib/systemd/system/heartbeat.service.
Paramétrage de pacemaker (2.1.5-1+deb12u1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/pacemaker.service → /lib/systemd/system/pacemaker.service.
Paramétrage de pacemaker-cli-utils (2.1.5-1+deb12u1) ...
Traitement des actions différées (« triggers ») pour man-db (2.11.2-2) ...
Traitement des actions différées (« triggers ») pour libc-bin (2.36-9+deb12u9) ...
root@debian:/home/invite# apt install apache2
Lecture des listes de paquets... Fait
Construction de l'arbre des dépendances... Fait
Lecture des informations d'état... Fait
Les paquets supplémentaires suivants seront installés :
  apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.3-0 ssl-cert
Paquets suggérés :
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser
Les NOUVEAUX paquets suivants seront installés :
  apache2 apache2-bin apache2-data apache2-utils libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.3-0 ssl-cert
0 mis à jour, 10 nouvellement installés, 0 à enlever et 1 non mis à jour.
Il est nécessaire de prendre 2 339 ko dans les archives.
Après cette opération, 8 365 ko d'espace disque supplémentaires seront utilisés.
Souhaitez-vous continuer ? [O/n]
```

Changement du nom du host

```
Iraitement des actions differees (« triggers ») pour libc-bin (2.36
root@debian:/home/invite# hostnamectl set-hostname srvWeb1
root@debian:/home/invite# _
```

Configuration de la carte reseau

```
# This file describes the network interfaces available on your syst
# and how to activate them. For more information, see interfaces(5)

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
allow-hotplug enp0s3
iface enp0s3 inet dhcp

auto enp0s8
iface enp0s8 inet static
    address 172.20.0.11
    netmask 255.255.255.0_
```

La commande pour pouvoir modifier le config ip

```
root@srvWeb1:/home/invite#
root@srvWeb1:/home/invite#
root@srvWeb1:/home/invite# nano /etc/network/interfaces
```

Téléchargement d'un template pour le apache server web

```
root@srvWeb1:/home/invite# wget https://github.com/technext/thegrill/archive/master.
--2025-03-04 15:02:24--  https://github.com/technext/thegrill/archive/master.zip
Résolution de github.com (github.com)… 140.82.121.4
Connexion à github.com (github.com)|140.82.121.4|:443… connecté.
requête HTTP transmise, en attente de la réponse… 302 Found
Emplacement : https://codeload.github.com/technext/thegrill/zip/refs/heads/master [s
--2025-03-04 15:02:24--  https://codeload.github.com/technext/thegrill/zip/refs/head
Résolution de codeload.github.com (codeload.github.com)… 140.82.121.10
Connexion à codeload.github.com (codeload.github.com)|140.82.121.10|:443… connecté.
requête HTTP transmise, en attente de la réponse… 200 OK
Taille : non indiqué [application/zip]
Sauvegarde en : « master.zip »

master.zip                                        [        <=>

2025-03-04 15:02:26 (2,94 MB/s) - « master.zip » sauvegardé [4534581]
```

Dezip

```
         creating: thegrill-master/assets/img/ico/
  inflating: thegrill-master/assets/img/ico/apple-touch-icon-114x114.png
  inflating: thegrill-master/assets/img/ico/apple-touch-icon-144x144.png
 extracting: thegrill-master/assets/img/ico/apple-touch-icon-57x57.png
 extracting: thegrill-master/assets/img/ico/apple-touch-icon-72x72.png
 extracting: thegrill-master/assets/img/ico/apple-touch-icon.png
  inflating: thegrill-master/assets/img/ico/favicon.ico
  inflating: thegrill-master/assets/img/intro-logo.jpg
  inflating: thegrill-master/assets/img/intro-logo.png
 extracting: thegrill-master/assets/img/large_logo.png
  inflating: thegrill-master/assets/img/loading.GIF
   creating: thegrill-master/assets/img/logo/
  inflating: thegrill-master/assets/img/logo/logo1.png
  inflating: thegrill-master/assets/img/logo/logo2.png
  inflating: thegrill-master/assets/img/logo/logo3.png
  inflating: thegrill-master/assets/img/logo/logo4.png
  inflating: thegrill-master/assets/img/logo/logo5.png
  inflating: thegrill-master/assets/img/logo/logo6.png
  inflating: thegrill-master/assets/img/logo/logo7.png
  inflating: thegrill-master/assets/img/logo/logo8.png
  inflating: thegrill-master/assets/img/map-image.png
  inflating: thegrill-master/assets/img/marker.GIF
  inflating: thegrill-master/assets/img/marker.png
   creating: thegrill-master/assets/img/team/
  inflating: thegrill-master/assets/img/team/1.jpg
  inflating: thegrill-master/assets/img/team/2.jpg
  inflating: thegrill-master/assets/img/team/3.jpg
  inflating: thegrill-master/assets/img/team/4.jpg
  inflating: thegrill-master/assets/img/team/small1.jpg
  inflating: thegrill-master/assets/img/team/small2.jpg
  inflating: thegrill-master/assets/img/team/team1.jpg
  inflating: thegrill-master/assets/img/team/team2.jpg
 extracting: thegrill-master/assets/img/world-map.png
   creating: thegrill-master/assets/js/
  inflating: thegrill-master/assets/js/bigvideo.js
  inflating: thegrill-master/assets/js/bootstrap.js
  inflating: thegrill-master/assets/js/bootstrap.min.js
  inflating: thegrill-master/assets/js/init.js
  inflating: thegrill-master/assets/js/jquery.js
  inflating: thegrill-master/assets/js/plugins.js
  inflating: thegrill-master/index-video.html
  inflating: thegrill-master/index.html
  inflating: thegrill-master/single-post.html
root@srvWeb1:/home/invite# ls
master.zip  thegrill-master
root@srvWeb1:/home/invite# unzip master.zip
```

Verification des interfaces

```
root@srvWeb1:/home/invite# systemctl restart networking
root@srvWeb1:/home/invite# systemctl status networking
● networking.service - Raise network interfaces
     Loaded: loaded (/lib/systemd/system/networking.service; enabled; preset: enabled)
     Active: active (exited) since Tue 2025-03-11 12:26:54 CET; 15s ago
       Docs: man:interfaces(5)
    Process: 763 ExecStart=/sbin/ifup -a --read-environment (code=exited, status=0/SUCCE
    Process: 808 ExecStart=/bin/sh -c if [ -f /run/network/restart-hotplug ]; then /sbin
   Main PID: 808 (code=exited, status=0/SUCCESS)
      Tasks: 1 (limit: 2306)
     Memory: 988.0K
        CPU: 328ms
     CGroup: /system.slice/networking.service
             └─832 dhclient -4 -v -i -pf /run/dhclient.enp0s3.pid -lf /var/lib/dhcp/dhcl

mars 11 12:26:49 srvWeb1 sh[832]: DHCPOFFER of 10.0.222.59 from 10.0.220.1
mars 11 12:26:49 srvWeb1 sh[832]: DHCPREQUEST for 10.0.222.59 on enp0s3 to 255.255.255.2
mars 11 12:26:49 srvWeb1 dhclient[832]: DHCPREQUEST for 10.0.222.59 on enp0s3 to 255.255
mars 11 12:26:54 srvWeb1 dhclient[832]: DHCPREQUEST for 10.0.222.59 on enp0s3 to 255.255
mars 11 12:26:54 srvWeb1 sh[832]: DHCPREQUEST for 10.0.222.59 on enp0s3 to 255.255.255.2
mars 11 12:26:54 srvWeb1 dhclient[832]: DHCPACK of 10.0.222.59 from 10.0.220.1
mars 11 12:26:54 srvWeb1 sh[832]: DHCPACK of 10.0.222.59 from 10.0.220.1
mars 11 12:26:54 srvWeb1 dhclient[832]: bound to 10.0.222.59 -- renewal in 6546 seconds.
mars 11 12:26:54 srvWeb1 sh[832]: bound to 10.0.222.59 -- renewal in 6546 seconds.
mars 11 12:26:54 srvWeb1 systemd[1]: Finished networking.service - Raise network interfa
lines 1-23/23 (END)
```

deplace -ment du template

Debian GNU/Linux 12 srvWeb1 tty1

srvWeb1 login: invite
Password:
Linux srvWeb1 6.1.0-26-amd64 #1 SMP PREEMPT_DYNAMIC Debian 6.1.112-1 (2024-09-30) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Tue Mar 11 12:04:21 CET 2025 on tty1
invite@srvWeb1:~$ su
Mot de passe :
root@srvWeb1:/home/invite# ls
master.zip thegrill-master
root@srvWeb1:/home/invite# mv thegrill-master/* /var/www/html
root@srvWeb1:/home/invite# rm -rf thegrill-master master.zip
root@srvWeb1:/home/invite# chown -R www-data:www-data /var/www/html

config de apache

```
# The ServerName directive sets the request scheme, hostname and port that
# the server uses to identify itself. This is used when creating
# redirection URLs. In the context of virtual hosts, the ServerName
# specifies what hostname must appear in the request's Host: header to
# match this virtual host. For the default virtual host (this file) this
# value is not decisive as it is used as a last resort host regardless.
# However, you must set it for any further virtual host explicitly.
#ServerName www.example.com

ServerAdmin webmaster@localhost
DocumentRoot /var/www/html/

# Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
# error, crit, alert, emerg.
# It is also possible to configure the loglevel for particular
# modules, e.g.
#LogLevel info ssl:warn

ErrorLog ${APACHE_LOG_DIR}/error.log
CustomLog ${APACHE_LOG_DIR}/access.log combined

# For most configuration files from conf-available/, which are
# enabled or disabled at a global level, it is possible to
# include a line for only one particular virtual host. For example the
# following line enables the CGI configuration for this host only
# after it has been globally disabled with "a2disconf".
#Include conf-available/serve-cgi-bin.conf
```
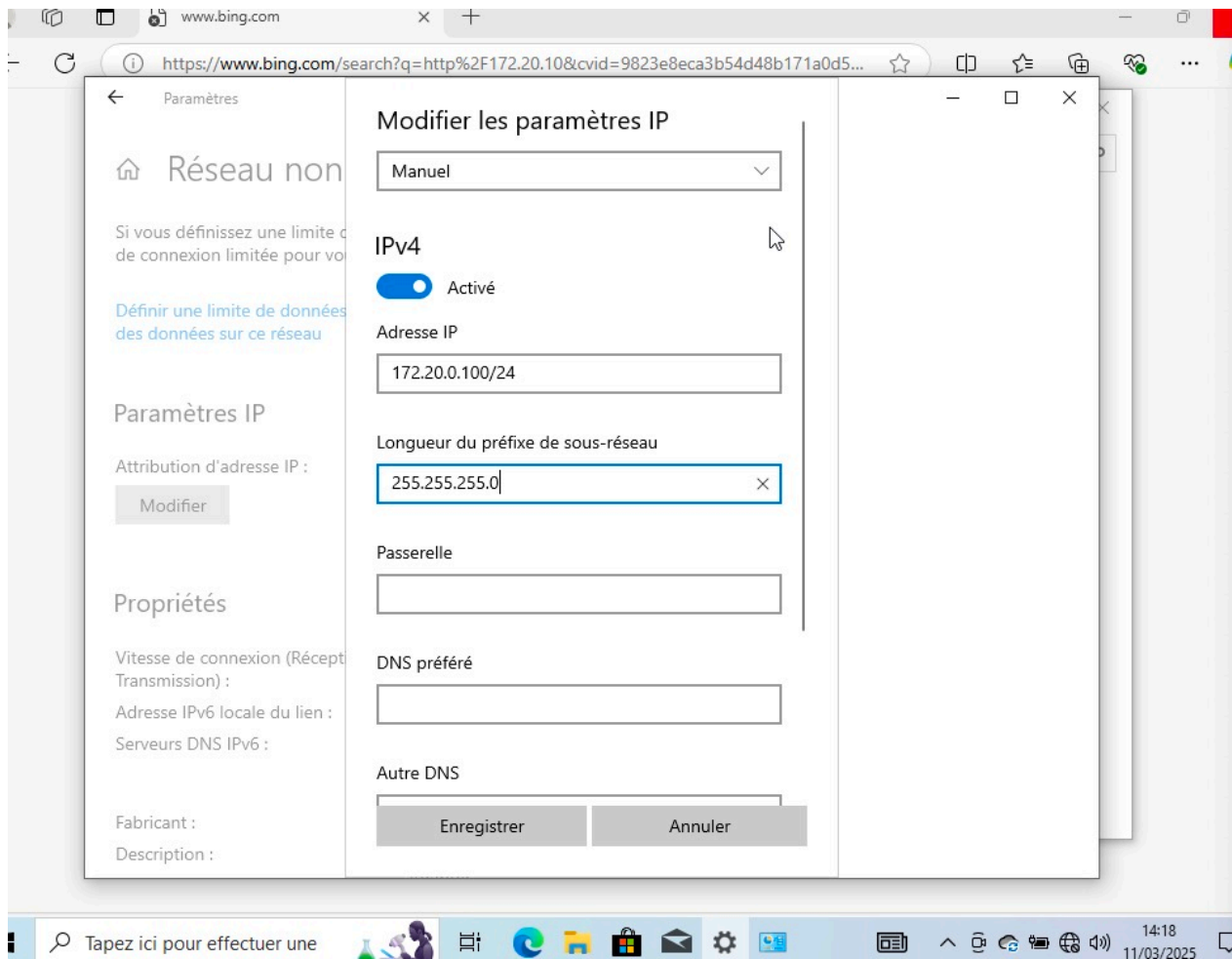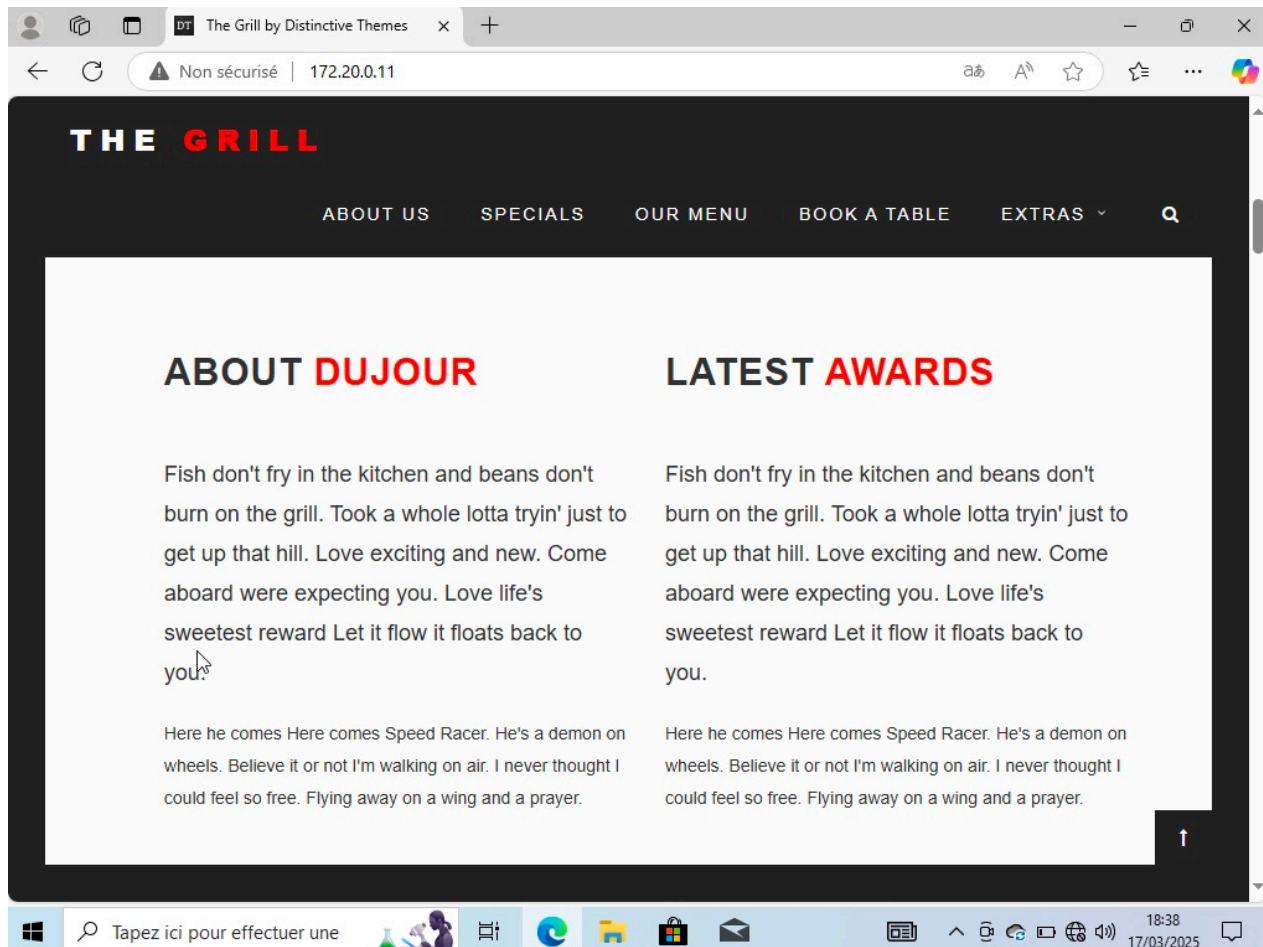
Verification de la configuration de apache2

```
root@srvWeb1:/home/invite# systemctl resttart apache2
```

Config de l'ip du client window

Teste pour voir si le site marche avec apache2

Configuration de heartbeat

les config de heartbeat


```
  GNU nano 7.2                                            /etc/ha.d/ha.cf *
logfile   /var/log/heartbeat
logfacility   locale0
keepalive   5
deadtime   30
bcast     enp0s8
node    srvWeb1
node    srvWeb2
auto_failback on
```

Mise en place du premier srvweb prioritaire

```
  GNU nano 7.2                                              /etc/ha.d/haresources
srvWeb1    IPaddr::172.20.0.10/24/enp0s8     apache2
```

mise ne place de l'authenrification

```
  GNU nano 7.2                                              /etc/ha.d/authkeys *
auth 1
1    md5    greta
```

Protection du fichier d'auth pour élever son niveau d'accès

```
root@srvWeb1:/home/invite# chmod 600 /etc/ha.d/authkeys _
```

on desactive apache2 au démarrage

```
root@srvWeb1:/home/invite# chmod 600 /etc/ha.d/authkeys
root@srvWeb1:/home/invite# systemctl disable apche2_
```