

PROJET INFRA YNOV B2

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1 INTRODUCTION

On a Choisie Ubuntu server parce qu'elle offre une variété de fonctionnalités et d'outils pour les administrateurs système, tels que l'installation et la configuration de serveurs web, de bases de données, de serveurs de fichiers, de serveurs de messagerie et bien plus encore. Elle est également livrée avec un gestionnaire de packages qui facilite l'installation et la gestion des logiciels.

En outre, Ubuntu Server est connue pour sa grande flexibilité et sa capacité à être personnalisée en fonction des besoins spécifiques de chaque entreprise ou organisation. Cela en fait un choix populaire pour les petites et grandes entreprises, ainsi que pour les développeurs et les passionnés de technologie.

2 RÉSEAUX ET HOSTS

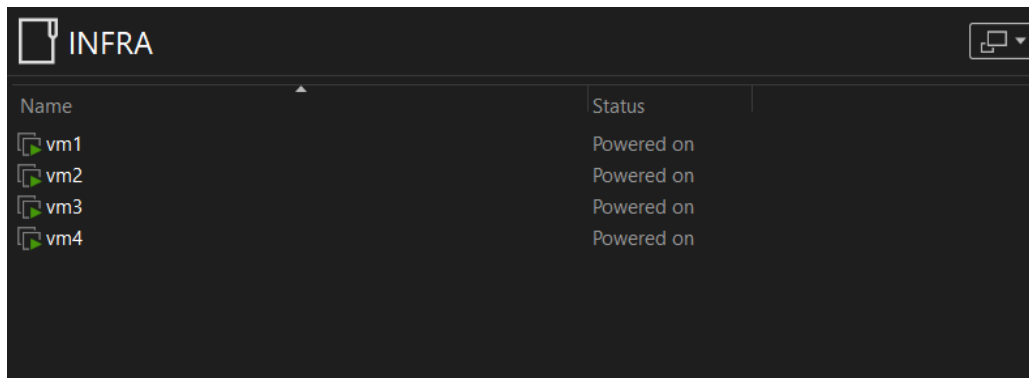
2.1 DÉFINITION :

Présentez l'architecture réseau globale, y compris les adresses IP utilisées, les sous-réseaux, et la configuration des différents hosts. Mentionnez les adresses IP assignées à chaque host, tels que le serveur DNS/DHCP (ns.donas.net), le serveur web (www.donas.net), et les stations de travail.

2.2 ETUDE DE L'ARCHITECTURE RÉSEAUX

Description :

On a créé d'une machine virtuelle quatre machine



| Name | Status |
|------|------------|
| vm1 | Powered on |
| vm2 | Powered on |
| vm3 | Powered on |
| vm4 | Powered on |

FIGURE 1. CREATION DE QUATRE HOSTES

Description :

Changer l'adresse de réseaux a 172.17.2.0/24

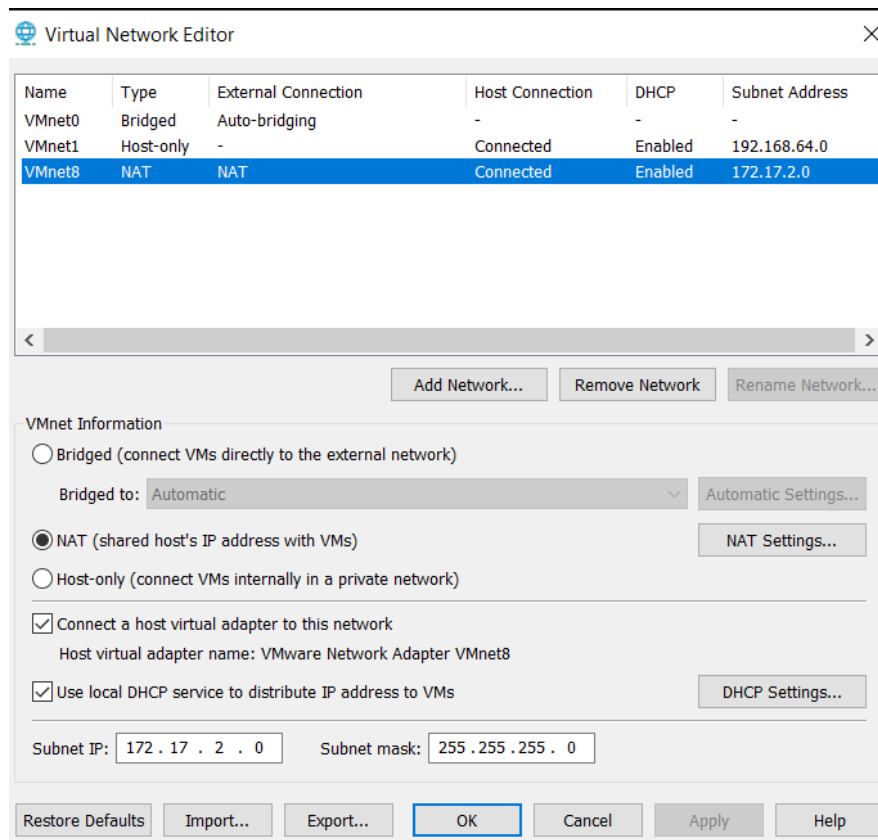


FIGURE 2. CHANGEMENT DE L'IP RESEAUX

Description :

Connection de tous les machine dans un seule réseaux en modifiant le Network Adapter

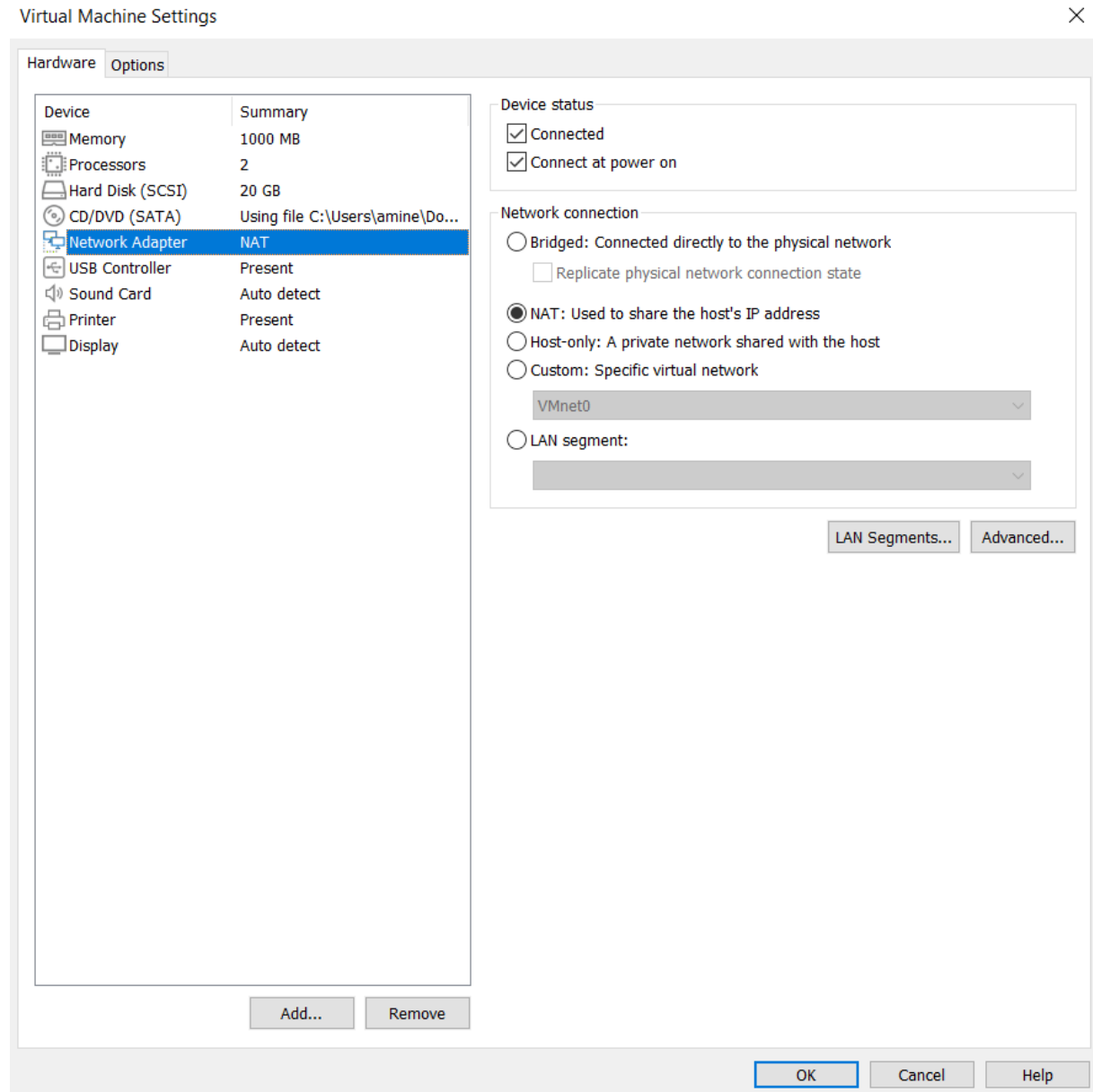


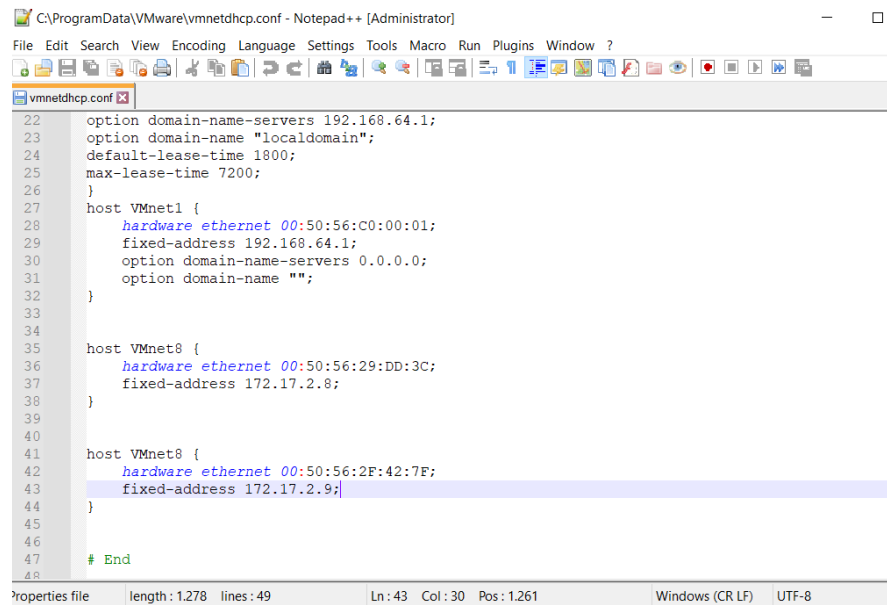
FIGURE 3. CONNECTING OUR VMS TO THE NETWORK

Description :

Changement de l'adresse IP du serveur 1 et 2 vers une IP statiques

Vm1 : 172.17.2.8

Vm2 : 172.17.2.9



```
22 option domain-name-servers 192.168.64.1;
23 option domain-name "localdomain";
24 default-lease-time 1800;
25 max-lease-time 7200;
26 }
27 host VMnet1 {
28     hardware ethernet 00:50:56:C0:00:01;
29     fixed-address 192.168.64.1;
30     option domain-name-servers 0.0.0.0;
31     option domain-name "";
32 }
33
34
35 host VMnet8 {
36     hardware ethernet 00:50:56:29:DD:3C;
37     fixed-address 172.17.2.8;
38 }
39
40
41 host VMnet8 {
42     hardware ethernet 00:50:56:2F:42:7F;
43     fixed-address 172.17.2.9;
44 }
45
46
47 # End
48
```

Properties file | length: 1,278 | lines: 49 | Ln: 43 Col: 30 Pos: 1,261 | Windows (CR LF) | UTF-8

FIGURE 4. RENDRE L'ADDRESS IP DES SERVEURS STATIQUES

Description :

Configuration du fichier hostname dans les deux machines ns et www

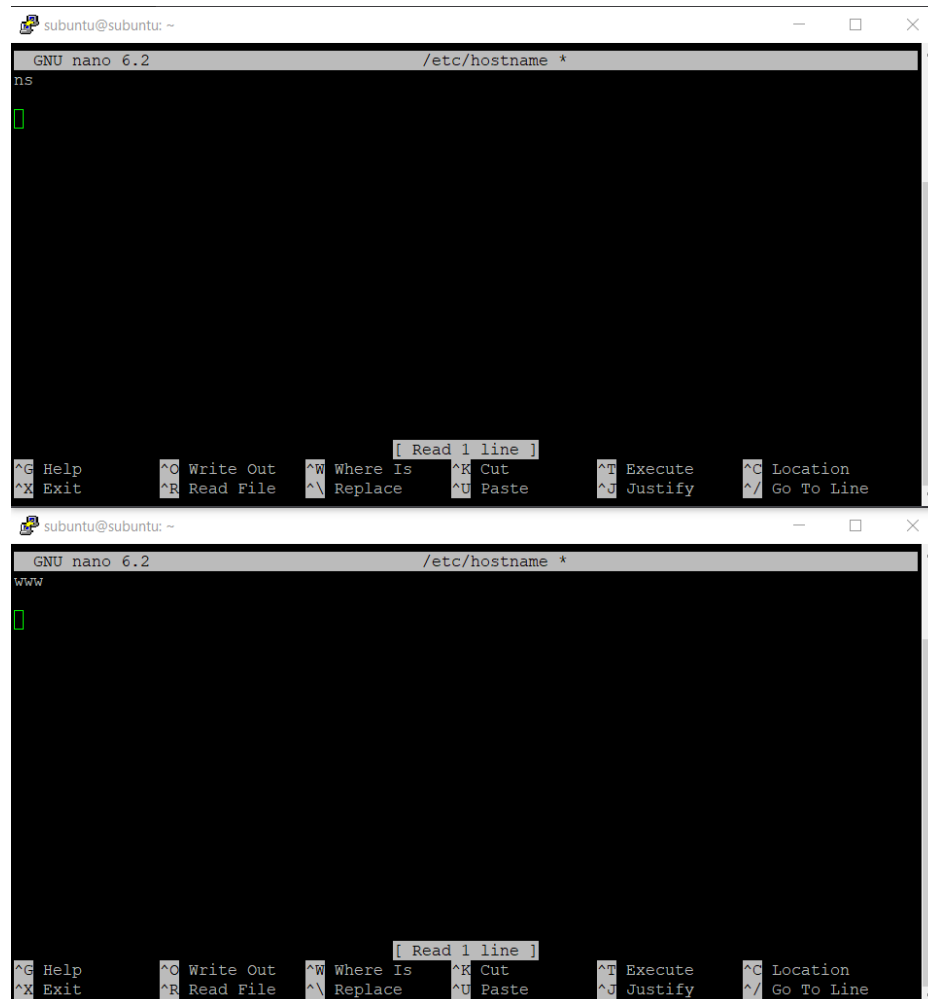
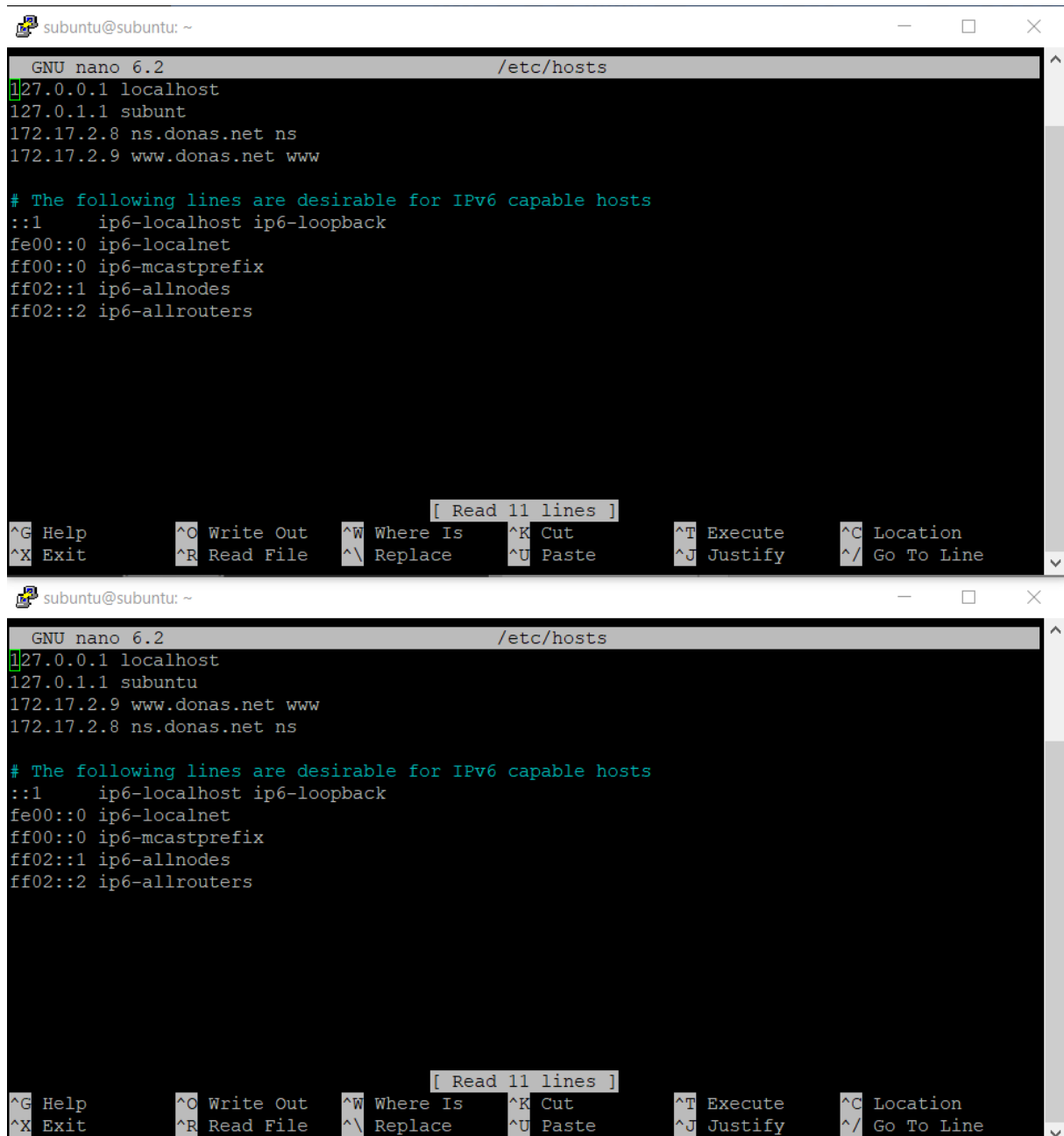


FIGURE 5. MODIFICATION DU FICHIER HOSTNAME DANS LES DEUX SERVEUR

Description :

Modification du fichier hosts en ajoutant les deux ip et leurs dns dans les serveurs

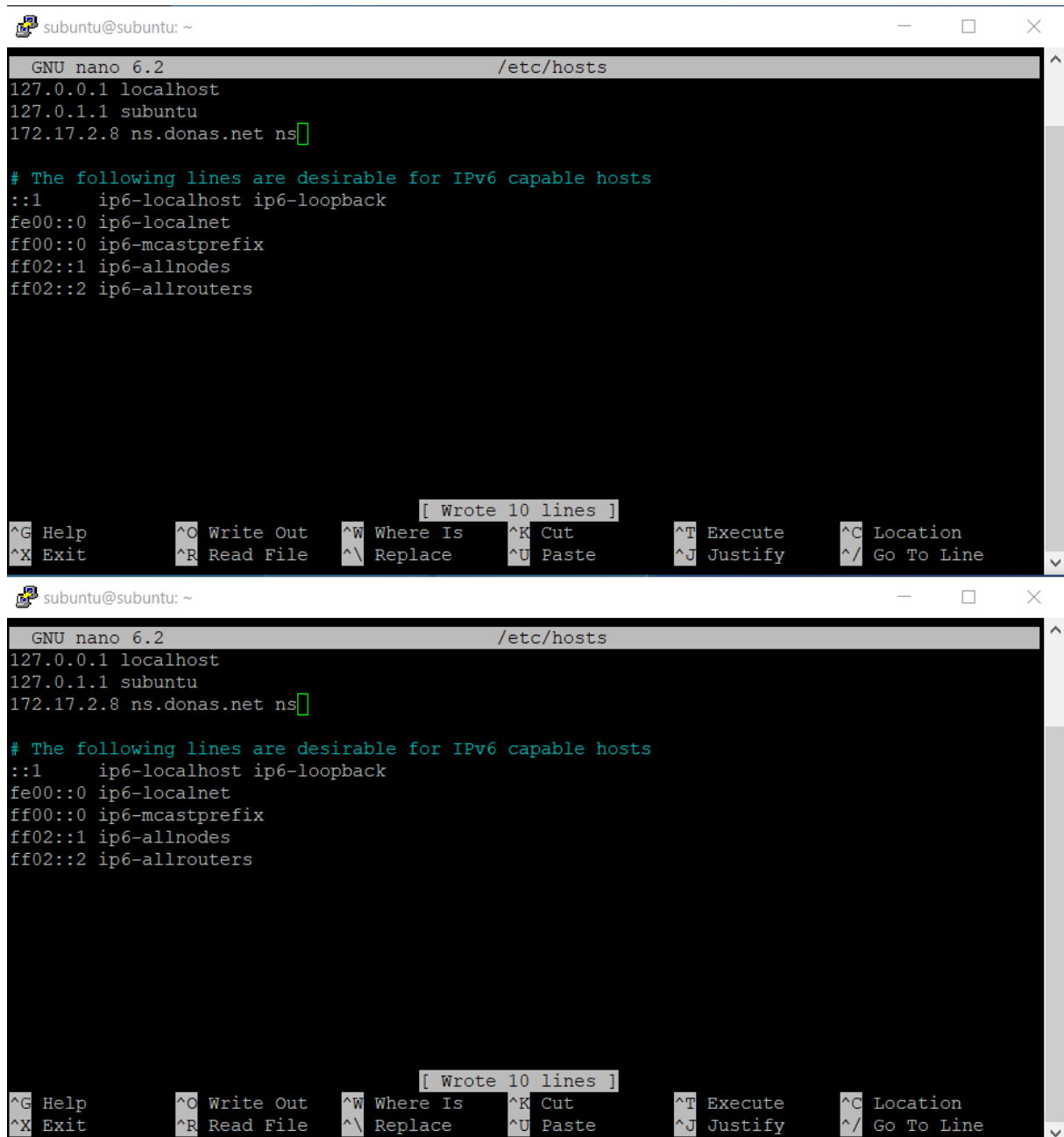


```
subuntu@subuntu: ~  
GNU nano 6.2 /etc/hosts  
127.0.0.1 localhost  
127.0.1.1 subunt  
172.17.2.8 ns.donas.net ns  
172.17.2.9 www.donas.net www  
  
# The following lines are desirable for IPv6 capable hosts  
::1 ip6-localhost ip6-loopback  
fe00::0 ip6-localnet  
ff00::0 ip6-mcastprefix  
ff02::1 ip6-allnodes  
ff02::2 ip6-allrouters  
[ Read 11 lines ]  
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location  
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line  
subuntu@subuntu: ~  
GNU nano 6.2 /etc/hosts  
127.0.0.1 localhost  
127.0.1.1 subuntu  
172.17.2.9 www.donas.net www  
172.17.2.8 ns.donas.net ns  
  
# The following lines are desirable for IPv6 capable hosts  
::1 ip6-localhost ip6-loopback  
fe00::0 ip6-localnet  
ff00::0 ip6-mcastprefix  
ff02::1 ip6-allnodes  
ff02::2 ip6-allrouters  
[ Read 11 lines ]  
^G Help      ^O Write Out  ^W Where Is   ^K Cut        ^T Execute    ^C Location  
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line
```

FIGURE 6. AJOUT DE L'ADRESS IP ET DNS DANS LE FICHIER HOST DU SERVEUR

Description :

Modification du fichier hosts et leurs dns dans les clients



The image displays two sequential screenshots of a terminal window on a Ubuntu system, showing the editing of the `/etc/hosts` file using the `nano` text editor. The terminal title bar indicates the user is `subuntu@subuntu` in the `~` directory.

Top Screenshot: The `nano` editor is open to `/etc/hosts`. The file content is as follows:

```
GNU nano 6.2 /etc/hosts
127.0.0.1 localhost
127.0.1.1 subuntu
172.17.2.8 ns.donas.net ns

# The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

The cursor is positioned at the end of the line `172.17.2.8 ns.donas.net ns`. The bottom status bar shows the text `[Wrote 10 lines]` and a row of keyboard shortcuts: `^G Help`, `^O Write Out`, `^W Where Is`, `^K Cut`, `^T Execute`, `^C Location`, `^X Exit`, `^R Read File`, `^_ Replace`, `^U Paste`, `^J Justify`, and `^_ Go To Line`.

Bottom Screenshot: This screenshot shows the same `nano` editor window after a modification. The file content is now:

```
GNU nano 6.2 /etc/hosts
127.0.0.1 localhost
127.0.1.1 subuntu
172.17.2.8 ns.donas.net ns

# The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

The cursor remains at the end of the line `172.17.2.8 ns.donas.net ns`. The bottom status bar is identical to the top screenshot, showing `[Wrote 10 lines]` and the same keyboard shortcuts.

FIGURE 7. AJOUT DE L'ADDRESS IP DU SERVEUR DHCP DANS LES CLIENTS

3 WEB SERVER

Description :

Téléchargement de Wordpress version 6.2 depuis le site officiel de wordpress

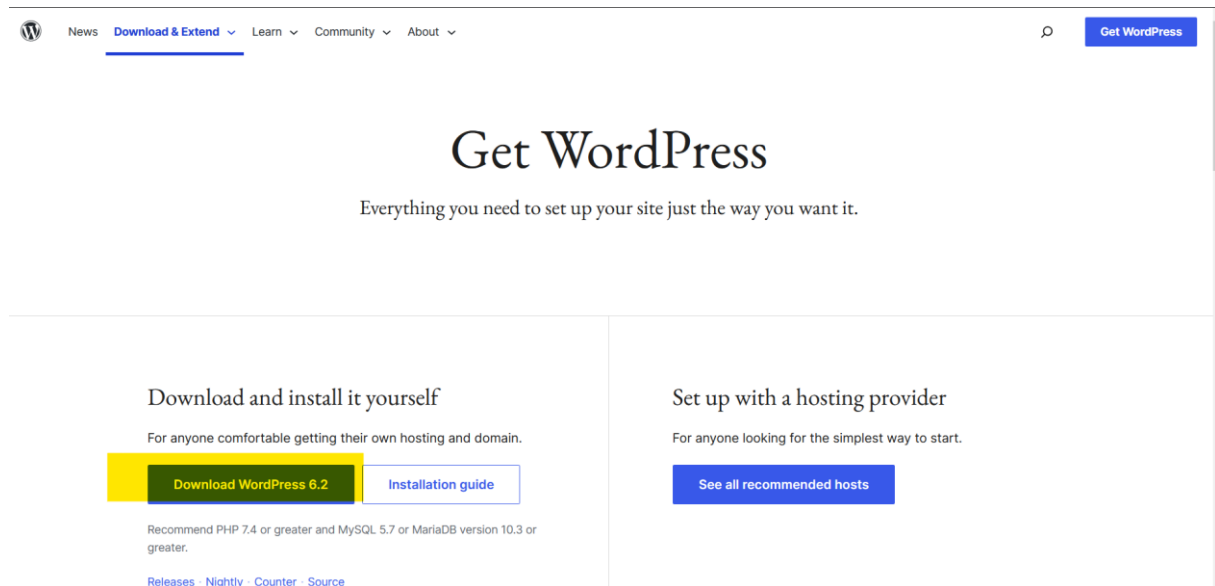


FIGURE 8. INSTALLER WORDPRESS

Description :

Transfer du dossier wordpress vers notre serveur avec Filezilla

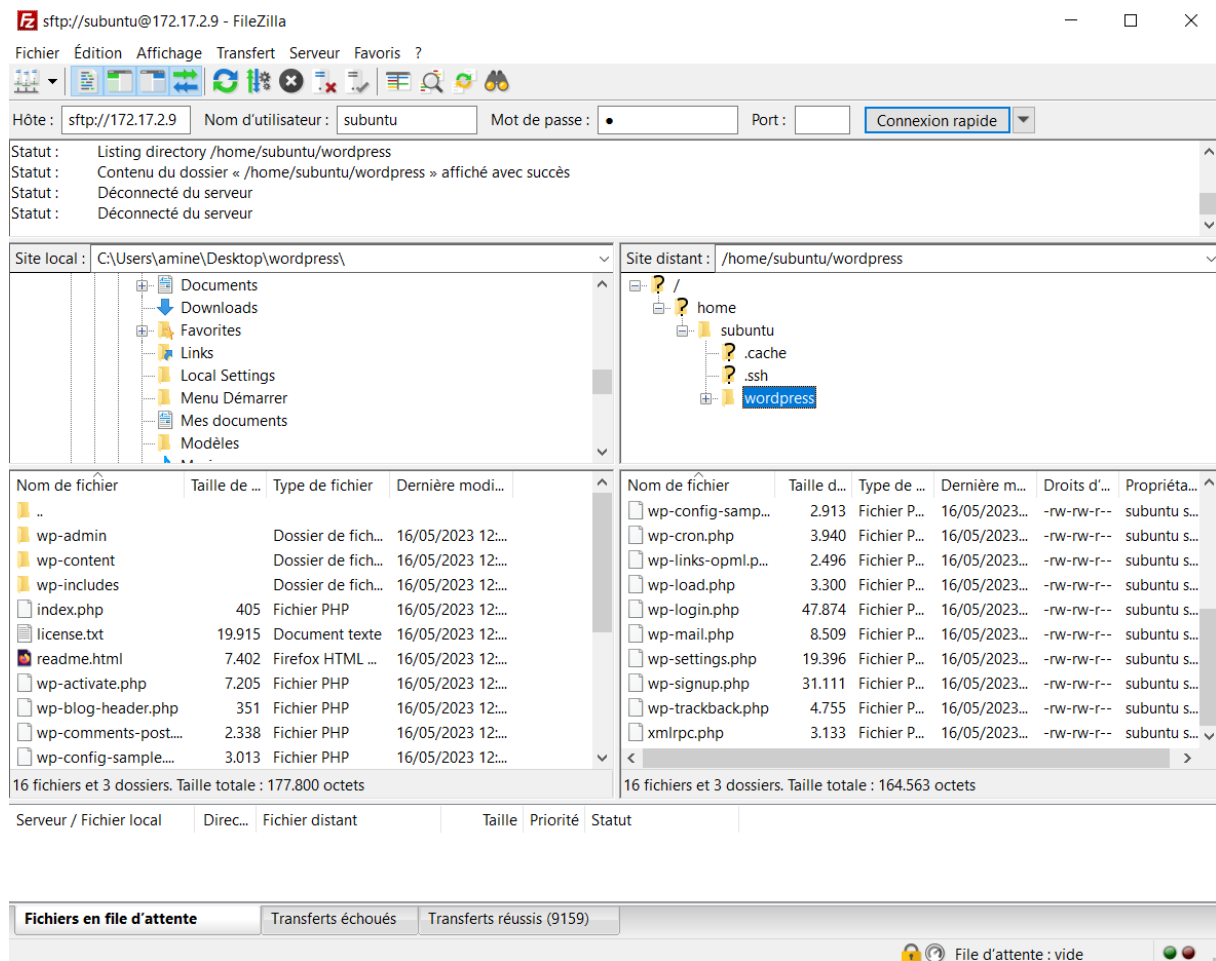


FIGURE 9. TRANSFERRING WORDPRESS FROM MY LAPTOP TO MY SERVER USING FILEZILLA

Description :

Changement des droits pour le dossier Wordpress et ces fichiers

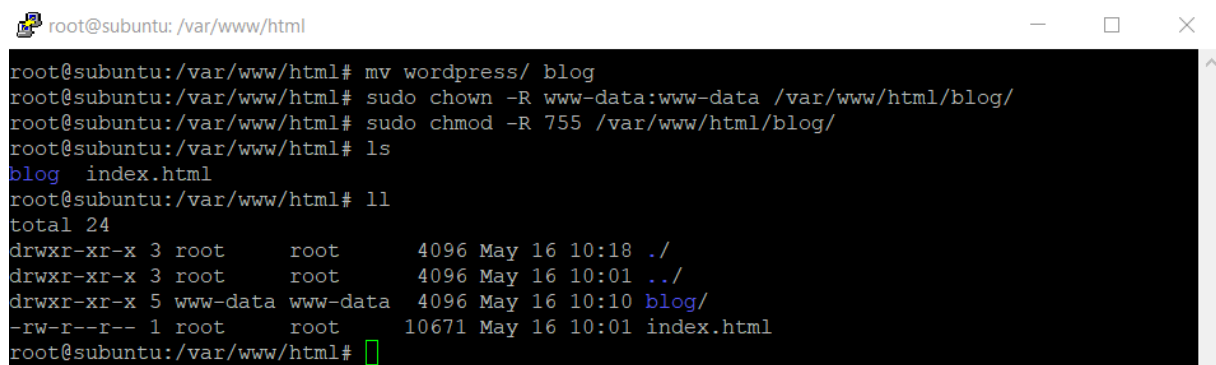
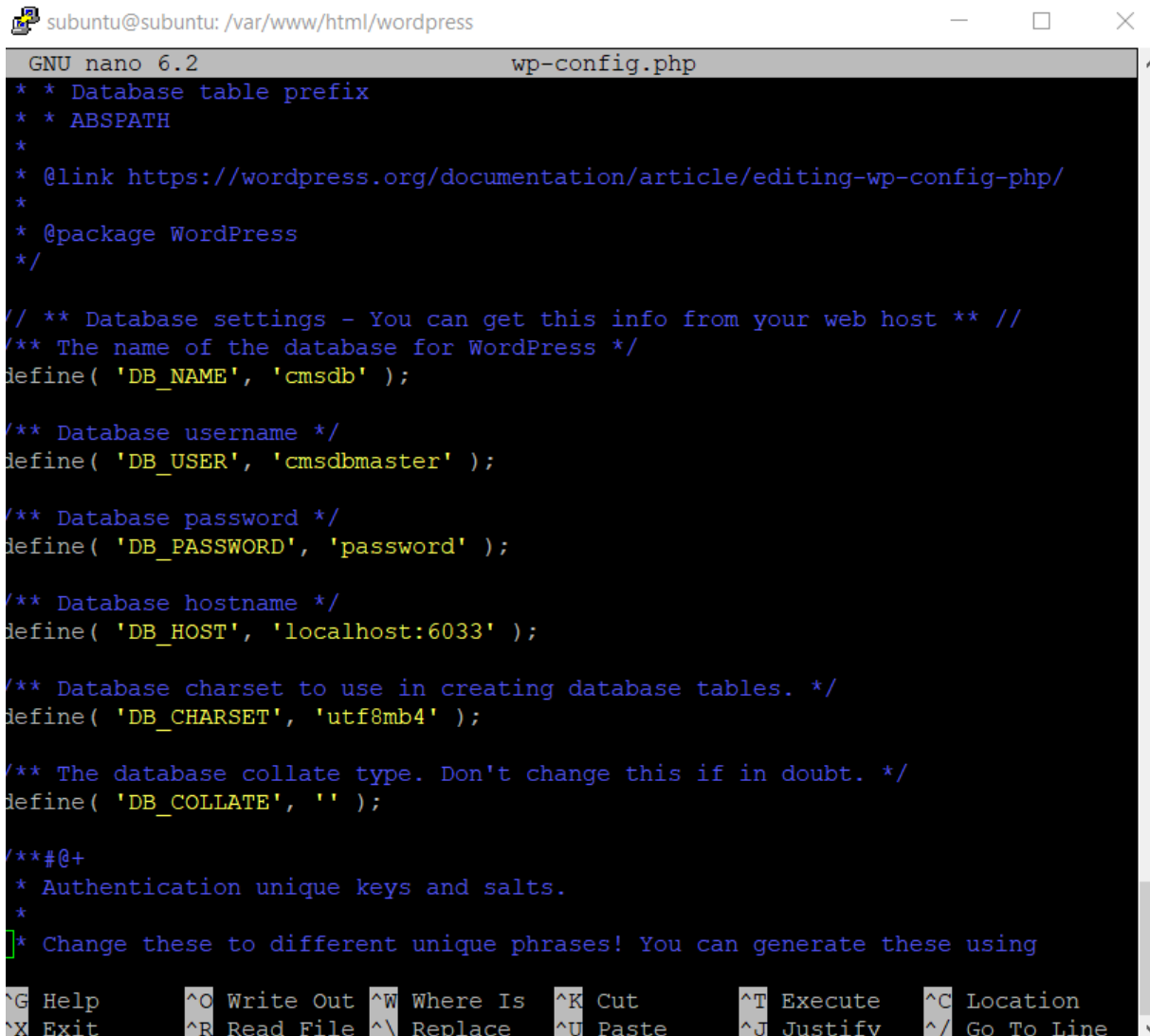


FIGURE 10. CHNAGER LES PERMISSIONS DE WORDPRESS

Description :

Configuration du fichier wp-config.php on posant les Creds de notre base de données cmsdb



The screenshot shows a terminal window with the title bar 'subuntu@subuntu: /var/www/html/wordpress'. The terminal content shows the GNU nano 6.2 editor editing wp-config.php. The code defines database settings for a WordPress installation, including the database name 'cmsdb', username 'cmsdbmaster', password 'password', and host 'localhost:6033'. The charset is set to 'utf8mb4' and the collate type is left empty. A comment at the bottom suggests changing authentication keys and salts.

```
GNU nano 6.2 wp-config.php
* * Database table prefix
* * ABSPATH
*
* @link https://wordpress.org/documentation/article/editing-wp-config-php/
*
* @package WordPress
*/

// ** Database settings - You can get this info from your web host ** //
/** The name of the database for WordPress */
define( 'DB_NAME', 'cmsdb' );

/** Database username */
define( 'DB_USER', 'cmsdbmaster' );

/** Database password */
define( 'DB_PASSWORD', 'password' );

/** Database hostname */
define( 'DB_HOST', 'localhost:6033' );

/** Database charset to use in creating database tables. */
define( 'DB_CHARSET', 'utf8mb4' );

/** The database collate type. Don't change this if in doubt. */
define( 'DB_COLLATE', '' );

/**#@+
 * Authentication unique keys and salts.
 *
 * Change these to different unique phrases! You can generate these using
```

At the bottom of the terminal, there is a status bar with various keyboard shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, ^_ Go To Line.

FIGURE 11. CHANGING DATABASE CREDENTIALS

Description :

Dans notre client on va vers le dns de notre serveur qui est www.donas.net et la on peut configurer notre site web

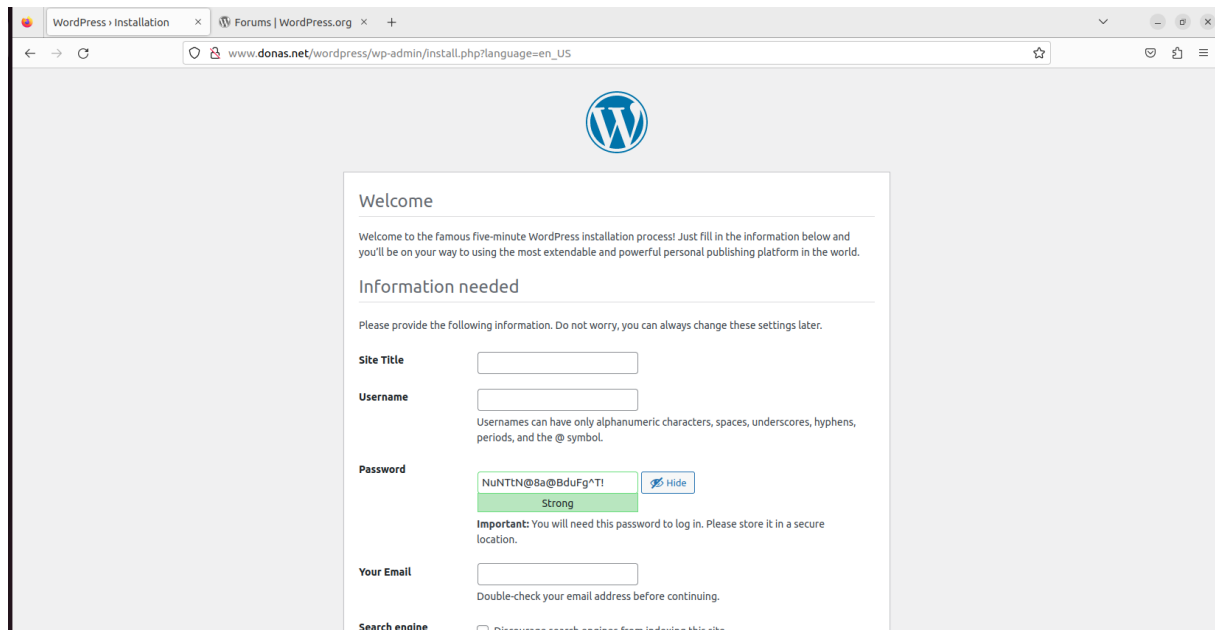
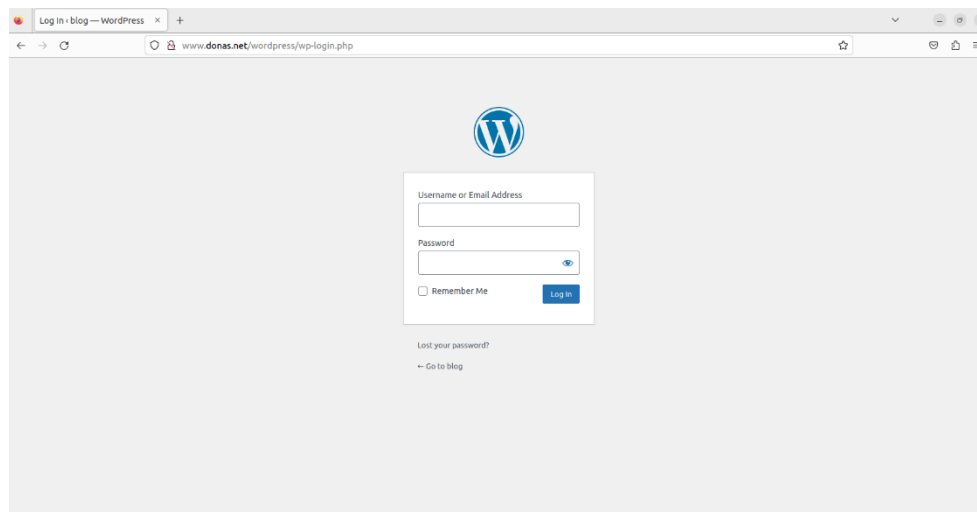


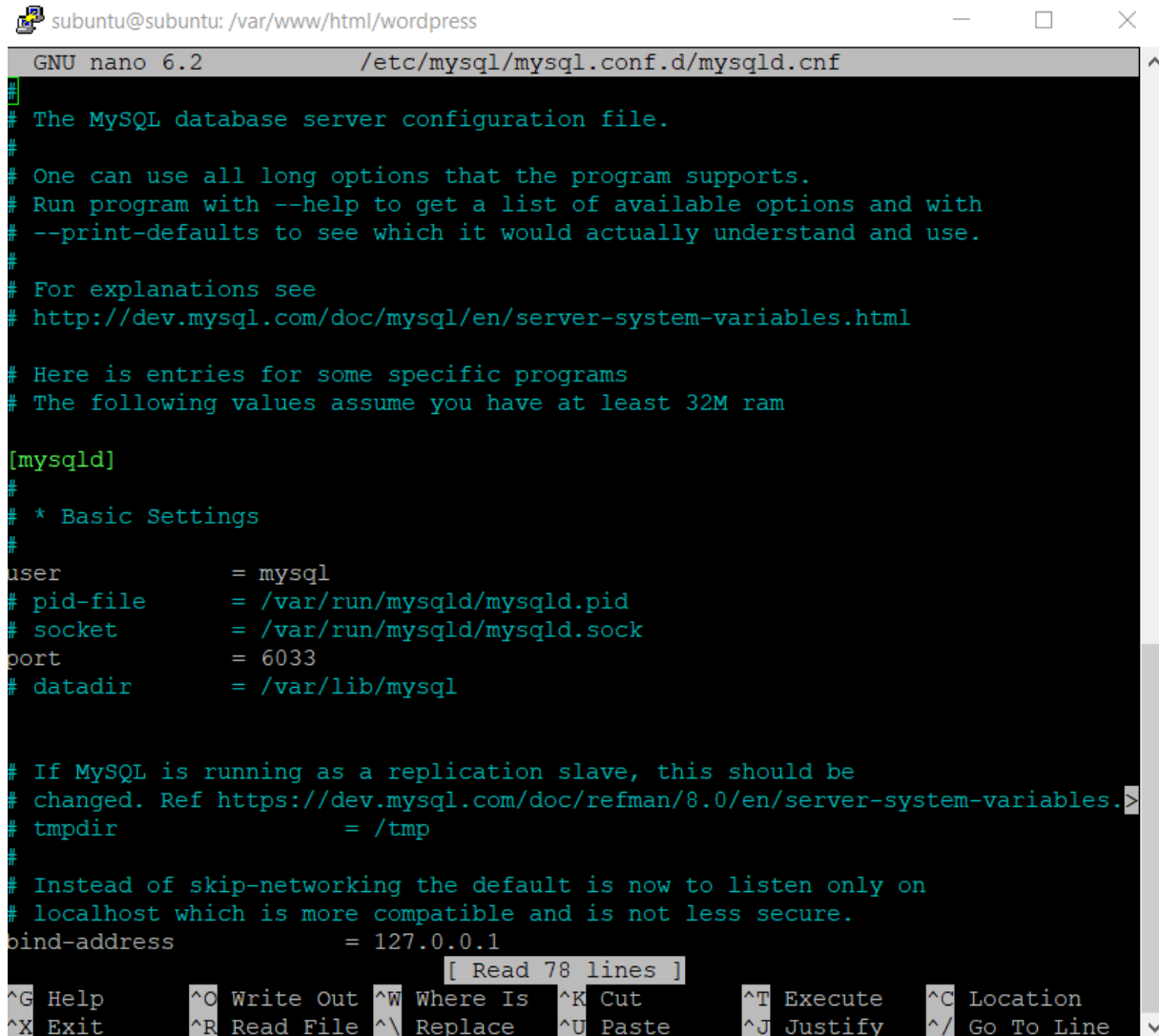
FIGURE 12. GETTING ACCESS TO WORDPRESS



4 MYSQL

Description :

Changement du port de mysql de 3306 vers 6033



```
subuntu@subuntu: /var/www/html/wordpress
GNU nano 6.2 /etc/mysql/mysql.conf.d/mysqld.cnf
#
# The MySQL database server configuration file.
#
# One can use all long options that the program supports.
# Run program with --help to get a list of available options and with
# --print-defaults to see which it would actually understand and use.
#
# For explanations see
# http://dev.mysql.com/doc/mysql/en/server-system-variables.html
#
# Here is entries for some specific programs
# The following values assume you have at least 32M ram
[mysqld]
#
# * Basic Settings
#
user                = mysql
# pid-file           = /var/run/mysqld/mysqld.pid
# socket             = /var/run/mysqld/mysqld.sock
port                = 6033
# datadir            = /var/lib/mysql

# If MySQL is running as a replication slave, this should be
# changed. Ref https://dev.mysql.com/doc/refman/8.0/en/server-system-variables.>
# tmpdir             = /tmp
#
# Instead of skip-networking the default is now to listen only on
# localhost which is more compatible and is not less secure.
bind-address        = 127.0.0.1
[ Read 78 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```

FIGURE 13. CHANGING PORT FROM 3306 TO 6033

Description :

Ajout d'un utilisateur et sa base de données et son mot de pass

```
subuntu@subuntu:/var/www/html/wordpress$ sudo nano /etc/mysql/mysql.conf.d/mysql
d.cnf
subuntu@subuntu:/var/www/html/wordpress$

sudo systemctl restart mysql
subuntu@subuntu:/var/www/html/wordpress$ mysql -u root -p
Enter password:
ERROR 1698 (28000): Access denied for user 'root'@'localhost'
subuntu@subuntu:/var/www/html/wordpress$ mysql -u root -p
Enter password:
ERROR 1698 (28000): Access denied for user 'root'@'localhost'
subuntu@subuntu:/var/www/html/wordpress$ sudo mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 10
Server version: 8.0.33-0ubuntu0.22.04.2 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE cmsdb;
Query OK, 1 row affected (0.01 sec)

mysql> GRANT ALL PRIVILEGES ON cmsdb.* TO 'cmsdbmaster'@'localhost' IDENTIFIED B
Y 'password';
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that
corresponds to your MySQL server version for the right syntax to use near 'IDENT
IFIED BY 'password'' at line 1
mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.00 sec)

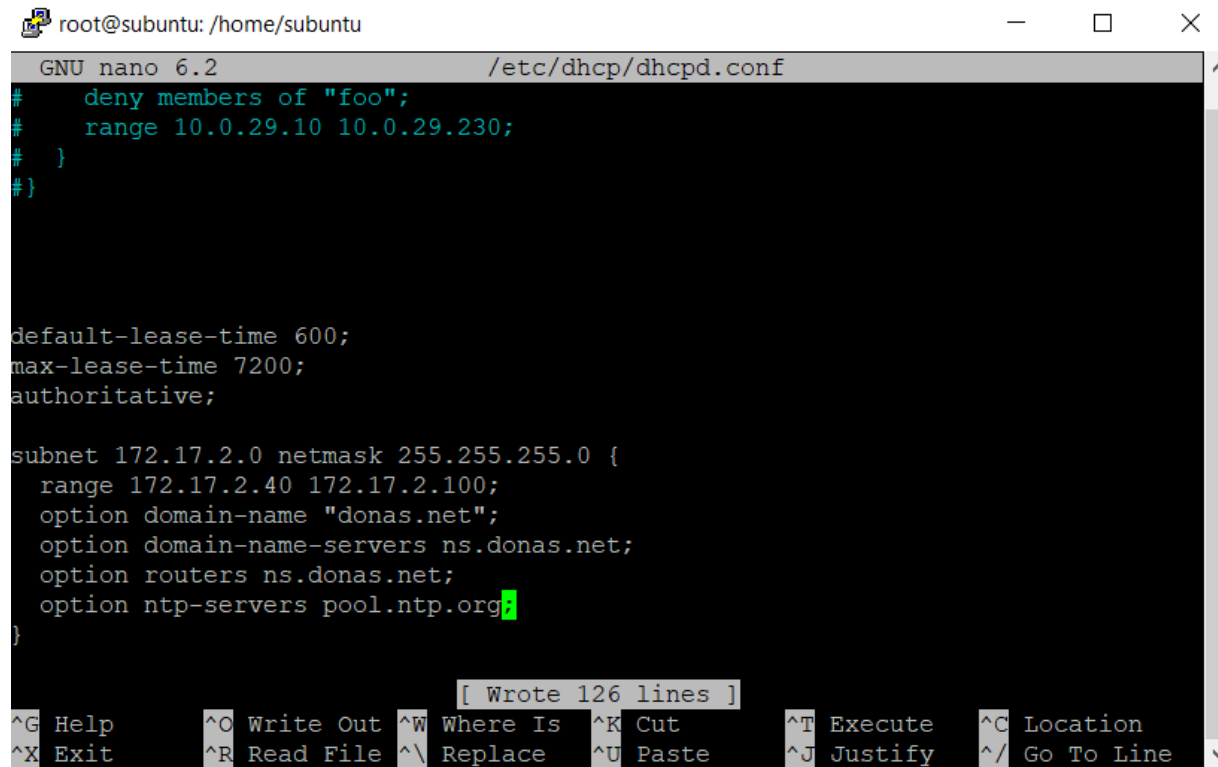
mysql> exit
Bye
subuntu@subuntu:/var/www/html/wordpress$
```

FIGURE 14. AJOUT DE LA BASE DE DONNÉES ET DE L'UTILISATEUR AVEC SON PASSWORD

5 DHCP

Description :

Configuration de notre serveur dhcp on créer un pool qui va de 172.17.2.40 a 172.17.2.100 avec le nom de domaine donas.net et le ntp public (pool.ntp.org)



```
root@subuntu: /home/subuntu
GNU nano 6.2 /etc/dhcp/dhcpd.conf
# deny members of "foo";
# range 10.0.29.10 10.0.29.230;
# }
# }

default-lease-time 600;
max-lease-time 7200;
authoritative;

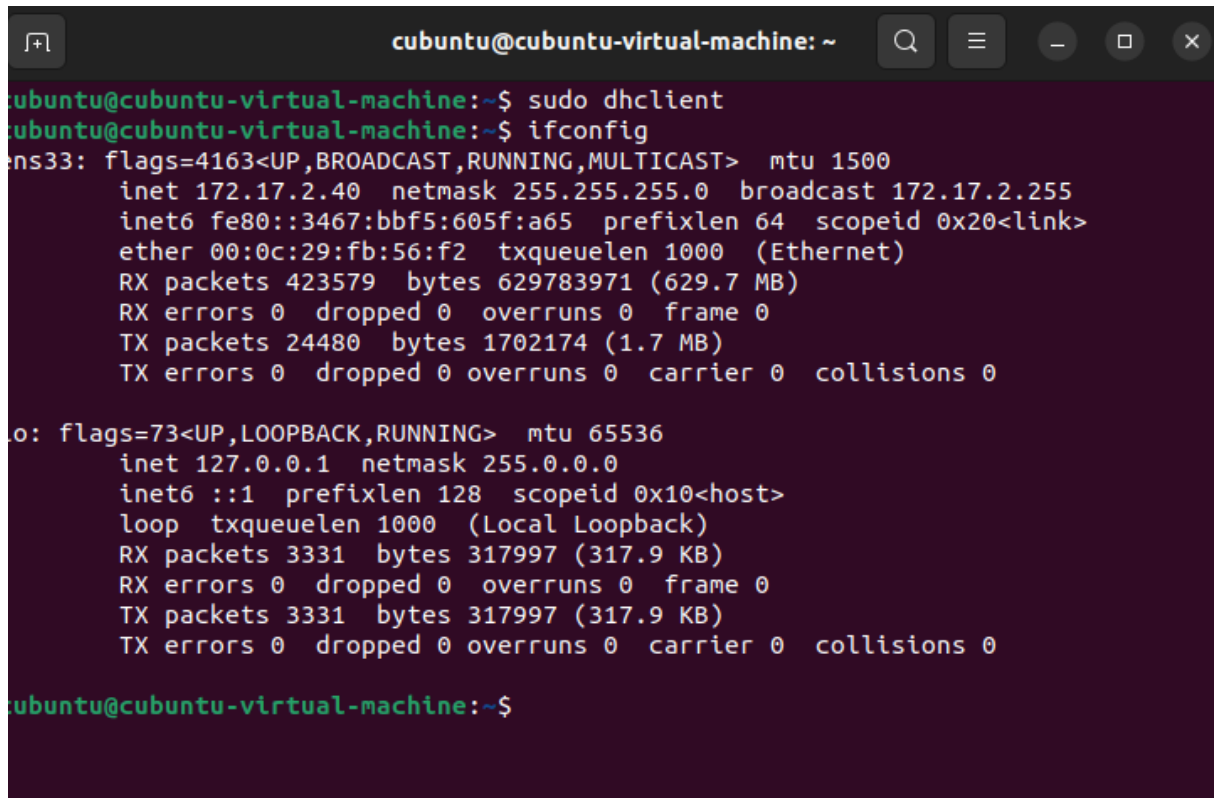
subnet 172.17.2.0 netmask 255.255.255.0 {
    range 172.17.2.40 172.17.2.100;
    option domain-name "donas.net";
    option domain-name-servers ns.donas.net;
    option routers ns.donas.net;
    option ntp-servers pool.ntp.org;
}

[ Wrote 126 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify   ^/ Go To Line
```

FIGURE 15. AJOUT DU SERVEUR DHCP

Description :

Connecter note client au serveur dhcp

A terminal window titled 'cubuntu@cubuntu-virtual-machine: ~' with standard window controls. The terminal shows the execution of 'sudo dhclient' followed by 'ifconfig'. The output for the 'ens33' interface shows it is up and running with an assigned IP of 172.17.2.40. The output for the 'lo' loopback interface shows it is also up and running with the standard 127.0.0.1 IP.

```
cubuntu@cubuntu-virtual-machine:~$ sudo dhclient
cubuntu@cubuntu-virtual-machine:~$ ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 172.17.2.40  netmask 255.255.255.0  broadcast 172.17.2.255
    inet6 fe80::3467:bbf5:605f:a65  prefixlen 64  scopeid 0x20<link>
    ether 00:0c:29:fb:56:f2  txqueuelen 1000  (Ethernet)
    RX packets 423579  bytes 629783971 (629.7 MB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 24480  bytes 1702174 (1.7 MB)
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
    inet 127.0.0.1  netmask 255.0.0.0
    inet6 ::1  prefixlen 128  scopeid 0x10<host>
    loop txqueuelen 1000  (Local Loopback)
    RX packets 3331  bytes 317997 (317.9 KB)
    RX errors 0  dropped 0  overruns 0  frame 0
    TX packets 3331  bytes 317997 (317.9 KB)
    TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

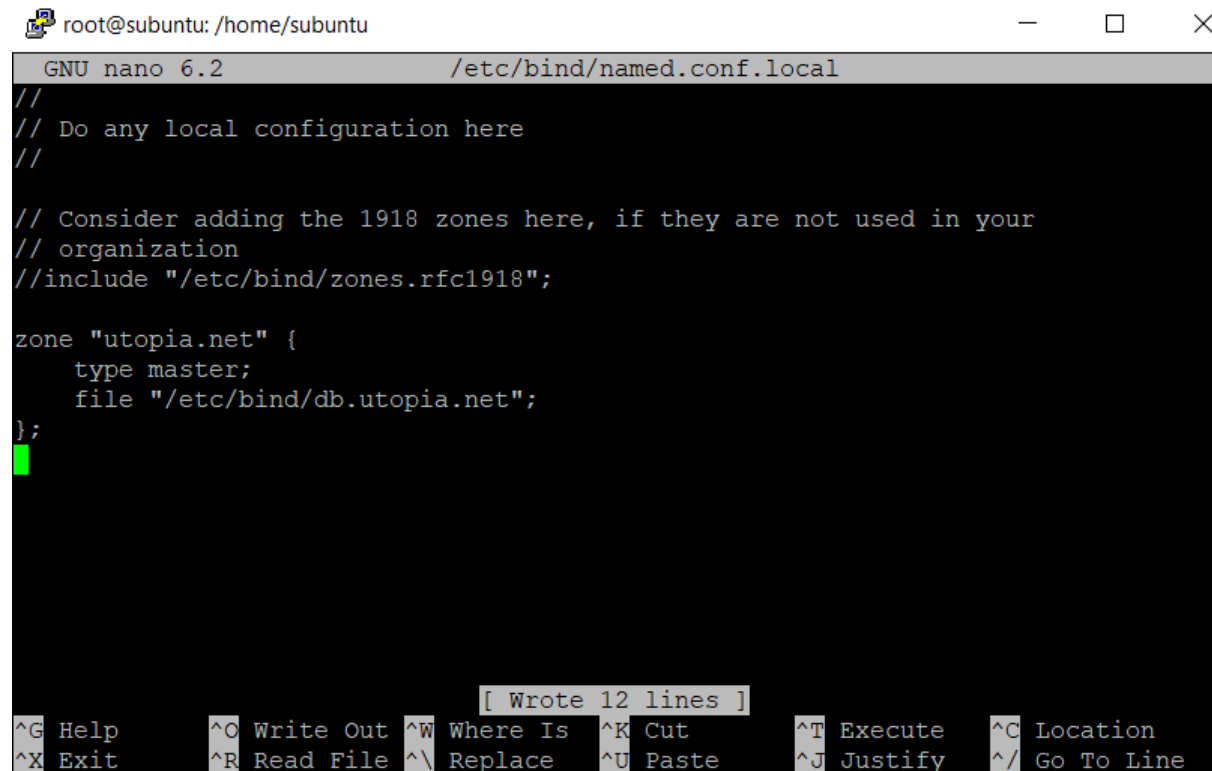
cubuntu@cubuntu-virtual-machine:~$
```

FIGURE 16. CHECKING DHCP CONFIGURATION AND GETTING AN IP FROM THE SERVER

6 DNS

Description :

Configuration du serveur dns



The screenshot shows a terminal window titled 'root@subuntu: /home/subuntu'. Inside, the GNU nano 6.2 editor is open, editing the file '/etc/bind/named.conf.local'. The file content is as follows:

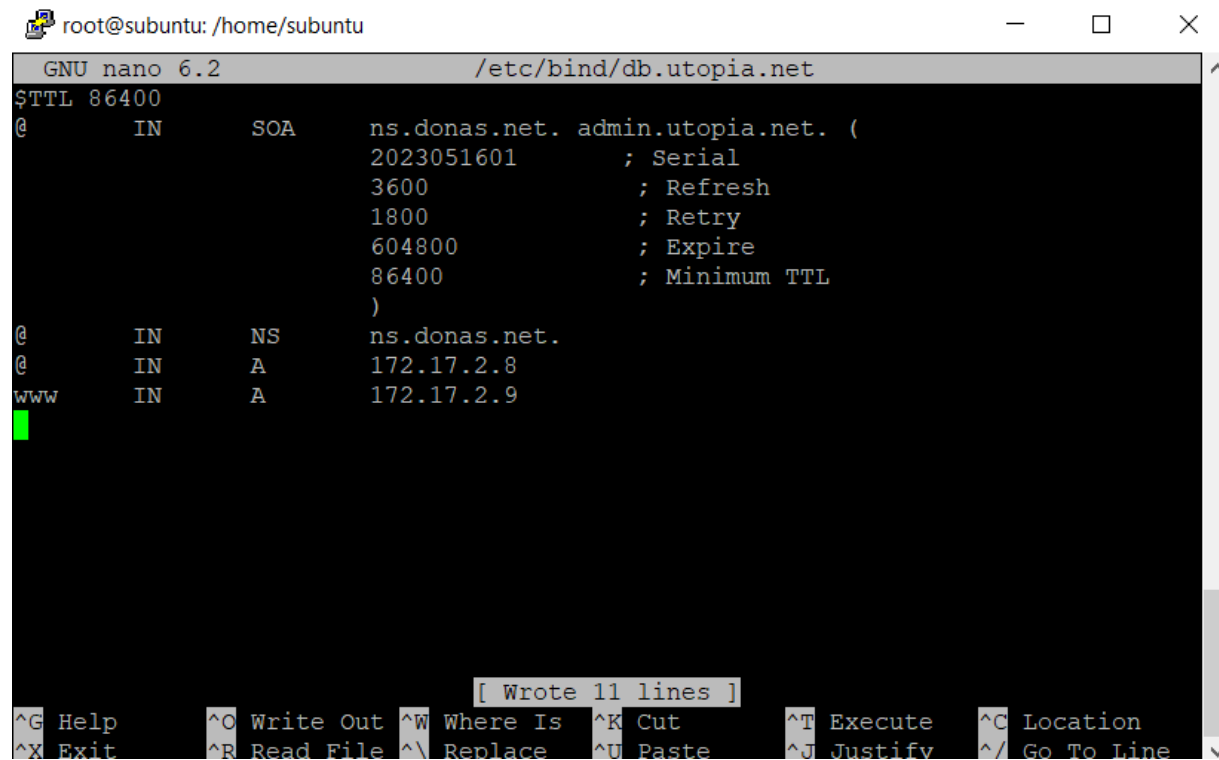
```
//  
// Do any local configuration here  
//  
  
// Consider adding the 1918 zones here, if they are not used in your  
// organization  
//include "/etc/bind/zones.rfc1918";  
  
zone "utopia.net" {  
    type master;  
    file "/etc/bind/db.utopia.net";  
};
```

A green cursor is positioned at the end of the last line. At the bottom of the terminal, a status bar indicates '[Wrote 12 lines]' and a list of keyboard shortcuts: ^G Help, ^O Write Out, ^W Where Is, ^K Cut, ^T Execute, ^C Location, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, and ^_ Go To Line.

FIGURE 17. AJOUT DU SERVEUR DNS

Description :

Configuration de notre serveur dns



The screenshot shows a terminal window with the title bar "root@subuntu: /home/subuntu". Inside the terminal, the GNU nano 6.2 editor is open, editing the file "/etc/bind/db.utopia.net". The content of the file is as follows:

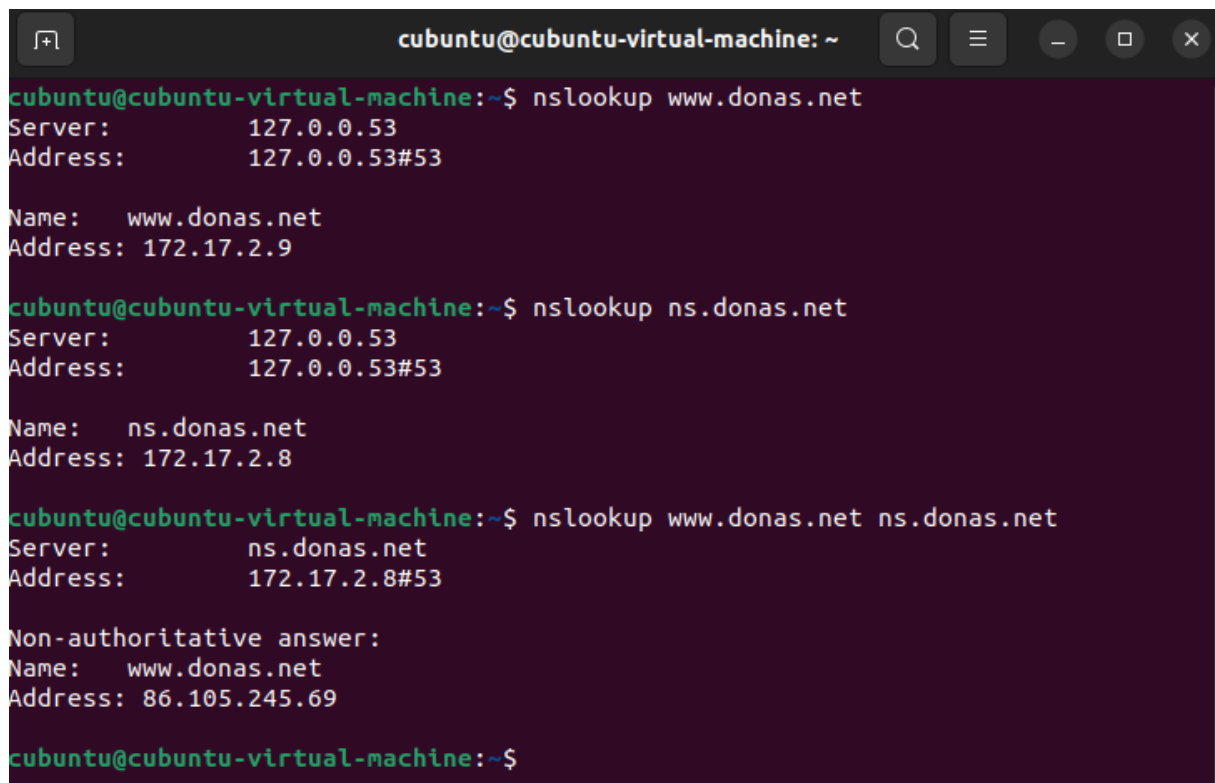
```
$TTL 86400
@      IN      SOA      ns.donas.net. admin.utopia.net. (
                        2023051601      ; Serial
                        3600              ; Refresh
                        1800              ; Retry
                        604800            ; Expire
                        86400             ; Minimum TTL
                        )
@      IN      NS       ns.donas.net.
@      IN      A        172.17.2.8
www    IN      A        172.17.2.9
```

A status bar at the bottom of the editor indicates "[Wrote 11 lines]". Below the editor, a list of keyboard shortcuts is displayed:

| | | | | | |
|---------|--------------|-------------|----------|------------|---------------|
| ^G Help | ^O Write Out | ^W Where Is | ^K Cut | ^T Execute | ^C Location |
| ^X Exit | ^R Read File | ^_ Replace | ^U Paste | ^J Justify | ^_ Go To Line |

FIGURE 18. AJOUT DU DNS

6.1 TEST DU DNS



```
cubuntu@cubuntu-virtual-machine: ~  
cubuntu@cubuntu-virtual-machine:~$ nslookup www.donas.net  
Server:          127.0.0.53  
Address:         127.0.0.53#53  
  
Name:   www.donas.net  
Address: 172.17.2.9  
  
cubuntu@cubuntu-virtual-machine:~$ nslookup ns.donas.net  
Server:          127.0.0.53  
Address:         127.0.0.53#53  
  
Name:   ns.donas.net  
Address: 172.17.2.8  
  
cubuntu@cubuntu-virtual-machine:~$ nslookup www.donas.net ns.donas.net  
Server:          ns.donas.net  
Address:         172.17.2.8#53  
  
Non-authoritative answer:  
Name:   www.donas.net  
Address: 86.105.245.69  
  
cubuntu@cubuntu-virtual-machine:~$
```

FIGURE 19. CHECKING DNS SERVER

7 CONCLUSION

En conclusion, ce projet a permis de mettre en place une infrastructure de serveur web robuste et sécurisée basée sur Ubuntu Server. Nous avons configuré un réseau avec des adresses IP spécifiques pour chaque hôte, en utilisant le serveur DNS/DHCP (ns.donas.net) pour attribuer dynamiquement les adresses IP aux clients.

Le serveur web (www.donas.net) a été installé avec Apache et le CMS WordPress, offrant ainsi une plateforme puissante pour la création de sites web. Nous avons configuré une base de données MySQL sécurisée pour prendre en charge WordPress, en créant une base de données dédiée (cmsdb) et un utilisateur avec des privilèges appropriés (cmsdbmaster).

Le serveur DNS (ns.donas.net) a été configuré en tant que serveur maître pour résoudre les noms de domaine de manière efficace, en prenant en compte les requêtes provenant de différentes sources. Nous avons également mis en place un serveur DHCP sur ns.donas.net pour attribuer les adresses IP aux clients du réseau.

La documentation d'architecture fournit une description détaillée de l'ensemble de l'infrastructure, y compris la répartition des services, les bonnes pratiques de mise en œuvre et les configurations réalisées. Cela permettra aux administrateurs système de comprendre et de maintenir l'architecture en toute confiance.

En mettant en œuvre des pratiques de sécurité telles que l'utilisation de mots de passe forts, la configuration de pare-feu et la gestion des utilisateurs, nous avons veillé à ce que l'infrastructure soit protégée contre les menaces potentielles.

Enfin, en configurant un dispositif RAID 5 sur les disques durs du serveur web, nous avons renforcé la fiabilité et la résilience du système, offrant ainsi une meilleure protection contre les défaillances matérielles.

Dans l'ensemble, ce projet a été une expérience pratique pour la mise en place d'un environnement serveur complet, en intégrant différents services et en suivant les meilleures pratiques. Il a fourni une base solide pour héberger des sites web et offrir des services aux utilisateurs, tout en garantissant la sécurité, la performance et la disponibilité.

8 ABREVEATIONS

- IP: Internet Protocol
- TCP: Transmission Control Protocol
- UDP: User Datagram Protocol
- HTTP: Hypertext Transfer Protocol
- HTTPS: Hypertext Transfer Protocol Secure
- FTP: File Transfer Protocol
- DNS: Domain Name System
- DHCP: Dynamic Host Configuration Protocol
- SSL: Secure Sockets Layer
- TLS: Transport Layer Security
- RAID: Redundant Array of Independent Disks
- CMS: Content Management System
- HTML: Hypertext Markup Language
- CSS: Cascading Style Sheets
- PHP: Hypertext Preprocessor
- SQL: Structured Query Language
- MVC: Model-View-Controller
- API: Application Programming Interface
- IDE: Integrated Development Environment
- CLI: Command Line Interface
- OS: Operating System
- BIOS: Basic Input/Output System
- HTTPS: Hypertext Transfer Protocol Secure
- URI: Uniform Resource Identifier
- URL: Uniform Resource Locator
- SMTP: Simple Mail Transfer Protocol
- POP: Post Office Protocol
- IMAP: Internet Message Access Protocol
- JSON: JavaScript Object Notation
- SSL: Secure Sockets Layer
- TLS: Transport Layer Security
- SSH: Secure Shell
- FTP: File Transfer Protocol

9 WEBOGRAPHIE

UBUNTU : <https://ubuntu.com/download/server>

WORDPRESS : <https://wordpress.org/>

DNS : <https://ubuntu.com/server/docs/service-domain-name-service-dns>

DHCP : <https://ubuntu.com/server/docs/network-dhcp>

VMWARE : <https://www.vmware.com/products/workstation-pro/workstation-pro-evaluation.html>

FILEZILLA : <https://filezilla-project.org/>

PUTTY : <https://www.putty.org/>

WP DOCUMENTATION : <https://codex.wordpress.org/>