LINUX NETWORK SERVICES

Hello here is your aircraft commanders speaking.
Our goal is to present a procedure for setting-up a simple server-client infrastructure . We will install two Virtual Machines running Debian environment. There will be different purposes for each one, so the requirements and configuration of each will be tailored to the demands. We also specify that the client should have a separate partition for the /home folder above all isolated from the provider's box and connected to the server by a virtual internal network. However the server is connected to the box by a secondary interface which allow access to the web and the execution of the following services:

- *DHCP : isc-dhcp-server*
- *DNS: Bind*
- *HTTP & MariaDB*

This server requires a weekly backup of the configuration's file and will be remotely manageable.

We will use automatic addressing for the client, the server's DHCP of the server that provides the IP.
The next step is to set up the following applications for the client, LibreOffice, Gimp, Firefox web-browser and Dia.
After that we're almost done, the last step is to enable ssh service on boot and add a user Boris with root privileges with a strong password to access to the user system to help the user.

We were using three tools before we started working and we assume you know to install and use them. Don't worry they were straightforward.
We need a password manager (we recommend keepassXC) to keep our passwords safe, so we don't have to remember them and save time while switching between users.
We will be using a virtualization hypervisor like VirtualBox (Or Microsoft hyper-v) to create our two client-server virtual machines.
Then for the last but not the least PuTTY, we recommend you to follow a guide while using it if you are not friendly with it.
Here is a guide for it : here. PuTTY will help us to manage each entity after setting up of ssh connection.

Now that we have introduced you to the mission you can roll up your sleeves and begin the installation.

LAchaufferie ... EOT STANBY

Create the virtual machines

Here is the system configuration information.

server (no GUI) :

chaudiere

Users : root, aqua

Disk storage: 10 Gb

Memory 4096 Mo

partition: 2 disks. system on a single partition on disk 1. A second disk for the backup files

client:

radiateur

Users: roger, boris.

disk storage :1 harddrive 30 Gb

Memory : 6144 Mo

partition: 1 disk. /home in a separate partition of from the main

passwords can be found in the keepass

- ❖ **Network configuration**
  - ➢ **Network configuration**
  - ➢ **Virtual box**

    in entity's configuration panel

    server : add an external network card with bridge access.

    add an internal network card on a second slot

    client : add a internal network card
  - ➢ **Hyper-V**

    create a new virtual switch with internal networking

    create a new network card slot on the server “lachaudiere”

    add the cards on the virtual machines:

    server : add an external network card who is linked to the wi-fi or ethernet plus the internal network card created above to the second slot.

    client : add an internal network card

❖ **Server :**

- Check the activation of the ssh server:
  systemctl status ssh
  if it's disable run : systemctl start ssh
  then run on boot : systemctl enable ssh

➢ ***DHCP :***

- IP's informations :

`ip a`

- Edit the file :

`nano /etc/network/interfaces`

```
# This file describes the network interfaces available on your system
# 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 static
address 192.168.1.208
netmask 255.255.255.0
gateway 192.168.1.1

# The secondary network interface intern
allow-hotplug enp0s8
iface enp0s8 inet static
address 192.168.2.1
network 192.168.2.0
netmask 255.255.255.0
broadcast 1921.168.2.255
```

- Switch to the root user :

`su -`

`ifdown eth0s8`

`ifup eth0s8`

- Verify that the IP address is truly modified :

`ip a`

`nano /etc/host.conf`

`nano /etc/hosts`

- Install and set up DHCP :

`apt install isc-dhcp-server`

`/etc/dhcp/dhcpd.conf`

```
subnet 192.168.2.0 netmask 255.255.255.0 {
option broadcast-address 192.168.2.255;
option routers 192.168.2.254;
option domain-name-servers 192.168.2.1;
option domain-name "LWLANchaufferie.hot";
  range 192.168.2.10 192.168.2.20;
 }
```

- Interface listening:

`/etc/default/isc-dhcp-server`

```
# On what interfaces should the DHCP server (dhcpd) serve DHCP requests?
#       Separate multiple interfaces with spaces, e.g. "eth0 eth1".
INTERFACESv4="enp0s8"
#INTERFACESv6=""
```

- Restart server :

`sudo service isc-dhcp-server restart`

- Vérification :

`tail /var/log/syslog`

➢ ***DNS :***

Pré-requis :

- IP address for “eth0 ” on server “lwchaudiere” : 192.168.2.1
- domain name : “LWLANchaufferie.hot”
- a client computer on the local network : “lwradiateur” with l'IP 192.168.2.2

SERVER SIDE:

- Install and set up of server DNS :

`apt-get update`
`apt-get install bind9`

- Create the file “/etc/bind/db.LWLANchaufferie.hot” :

`cp /etc/bind/db.local /etc/bind/db.LWLANchaufferie.hot`

- Edit the file :

`nano /etc/bind/db.LWLANchaufferie.hot`

```
;
; BIND data file for enp0s8 interface
;
$TTL    604800
@       IN      SOA     lwchaudiere.LWLANchaufferie.hot. root.LWLANchaufferie.hot. (
                              2         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@               IN      NS      lwchaudiere.LWLANchaufferie.hot.
lwchaudiere     IN      A       192.168.2.1
lwradiateur     IN      A       192.168.2.2
```

- Create the file “/etc/bind/db.192” based on /etc/bind/db.127 :

`cp /etc/bind/db.127 /etc/bind/db.192`

- Edit the file :

`nano /etc/bind/db.192`

```
;
; BIND reverse data file for enp0s8 interface
;
$TTL    604800
@       IN      SOA     lwchaudiere.LWLANchaufferie.hot. root.LWLANchaufferie.hot. (
                              1         ; Serial
                         604800         ; Refresh
                          86400         ; Retry
                        2419200         ; Expire
                         604800 )       ; Negative Cache TTL
;
@       IN      NS      lwchaudiere.
1       IN      PTR     lwchaudiere.LWLANchaufferie.hot.
2       IN      PTR     lwradiateur.
```

- Set up the file “/etc/bind/named.conf.local” :

`nano /etc/bind/named.conf.local`

```
//
// 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 "LWLANchaufferie.hot" {
        type master;
        file "/etc/bind/db.LWLANchaufferie.hot";
        allow-query { any; };
};
zone "2.168.192.in-addr.arpa" {
        type master;
        file "/etc/bind/db.192";
};
```

- Set up “/etc/bind/named.conf.options” :

`nano /etc/bind/named.conf.options`

```
forwarders {
        192.168.1.1;
        8.8.8.8;
};
```

```
        dnssec-validation auto;

        auth-nxdomain no;       # conform to RFC1035
        forward only;
//      listen-on-v6 { any; };
};
```

- Restart bind9 :

`service bind9 restart`

TESTING PHASE

first step is to test our configuration in the server
Verify that the DNS/CLIENT configuration
On itself:
`nslookup`
ask for address with hostname
same for the reverse DNS
`dig`
`ping`

➢ ***HTTP :***

Pré-requis :

All setup must be done with root access:

su -

- Update the packets list then upgrade them

`apt-get update && apt-get upgrade`

- Install Apache2, PHP et MariaDB :

`apt-get install apache2 php libapache2-mod-php`

`apt-get install php-imap php-ldap php-curl php-xmlrpc php-gd php-mysql php-cas`
`apt-get install mariadb-server`
`mysql_secure_installation`

Answer Y at all the enquiries and please note the password of the root of MariaDB for later.

- Additional modules :

`apt-get install apcupsd php-apcu`

- Restart services :

`systemctl restart apache2`
`systemctl restart mysql`

- Create the database to be able to install GLPI :

`mysql -u root -p`
Enter the password of the MariaDB root account.

MariaDB [(none)]> create database glpidb;
MariaDB [(none)]> grant all privileges on glpidb.* to glpiuser@localhost identified by “your-password-here";
MariaDB [(none)]> quit

Change “your-password-here” by keeping quotes.

- Install phpMyAdmin for be able to manage the database in a graphical interface :

`apt-get install phpmyadmin`

Select Apache2 by clicking on the spacebar and answer NON to “create the base with db_common”.

- Install GLPI and the set up :

- **in command line**

`cd /usr/src/`
`wget https://github.com/glpi-project/glpi/releases/download/9.3.3/glpi-9.3.3.tgz`
`tar -xvzf glpi-9.3.3.tgz -C /var/www/html`

- Assign rights the the LAMP server to act on the files :

`chown -R www-data /var/www/html/glpi/`

- **web interface**

Open a browser and enter in the text field l'IP of your machine, followed by /glpi.
You arrive on the page GLPI SETUP.
Follow all the steps and complete the installation.
The list of packages and the verification of their installation appear. Click on continue.

Step 1 : Configure the connection to the database (created previously by MariaDB).
Step 2 : Select the database **glpidb** and Continue.
Step 3, 4 et 5 : Click on continue.
Step 6 : The installation is completed, click on use GLPI.

You can connect to GLPI.

❖ **Client :**

- Check the activation of the ssh server:
  systemctl status ssh
  if it's disable run : systemctl start ssh
  then run on boot : systemctl enable ssh

➢ ***Install applications :***

- search for existing software :

` cd /bin && ls | grep 'libreoffice\|gimp\|firefox\|chrome\|dia'`

The applications LibreOffice, gimp et firefox are already installed. We only have to install the dia application.

`sudo apt-get install dia`

➢ ***Install and set up DNS :***

CLIENT SIDE

- edit the /etc/host.conf file

`nano /etc/host.conf`

```
order hosts,bind
multi on
nospoof on
```

- edit the /etc/resolv.conf file
- install a client script :

`cd /etc/NetworkManager/`
`nano /etc/NetworkManager/dispatcher.d/99-dns`

```
#!/bin/sh
echo "domain LWLANchaufferie.hot" > /etc/resolv.conf
echo "search LWLANchaufferie.hot" >> /etc/resolv.conf
echo "nameserver 192.168.2.1" >> /etc/resolv.conf
```

- give execution rights

`chmod 755 /etc/NetworkManager/dispatcher.d/99-dns`

- execute the script

`bash /etc/NetworkManager/dispatcher.d/99-dns`

- restart the networking service

`systemctl restart networking`

TESTING PHASE

second step is to test our configuration in the client
Verify that the client question the local DNS

`host`
`dig`
`ping`

Congratulations, now your server can distribute IP addresses to all clients in the local network. Server also provide graphical interfaces from a web browser that give access to the client at the database.