

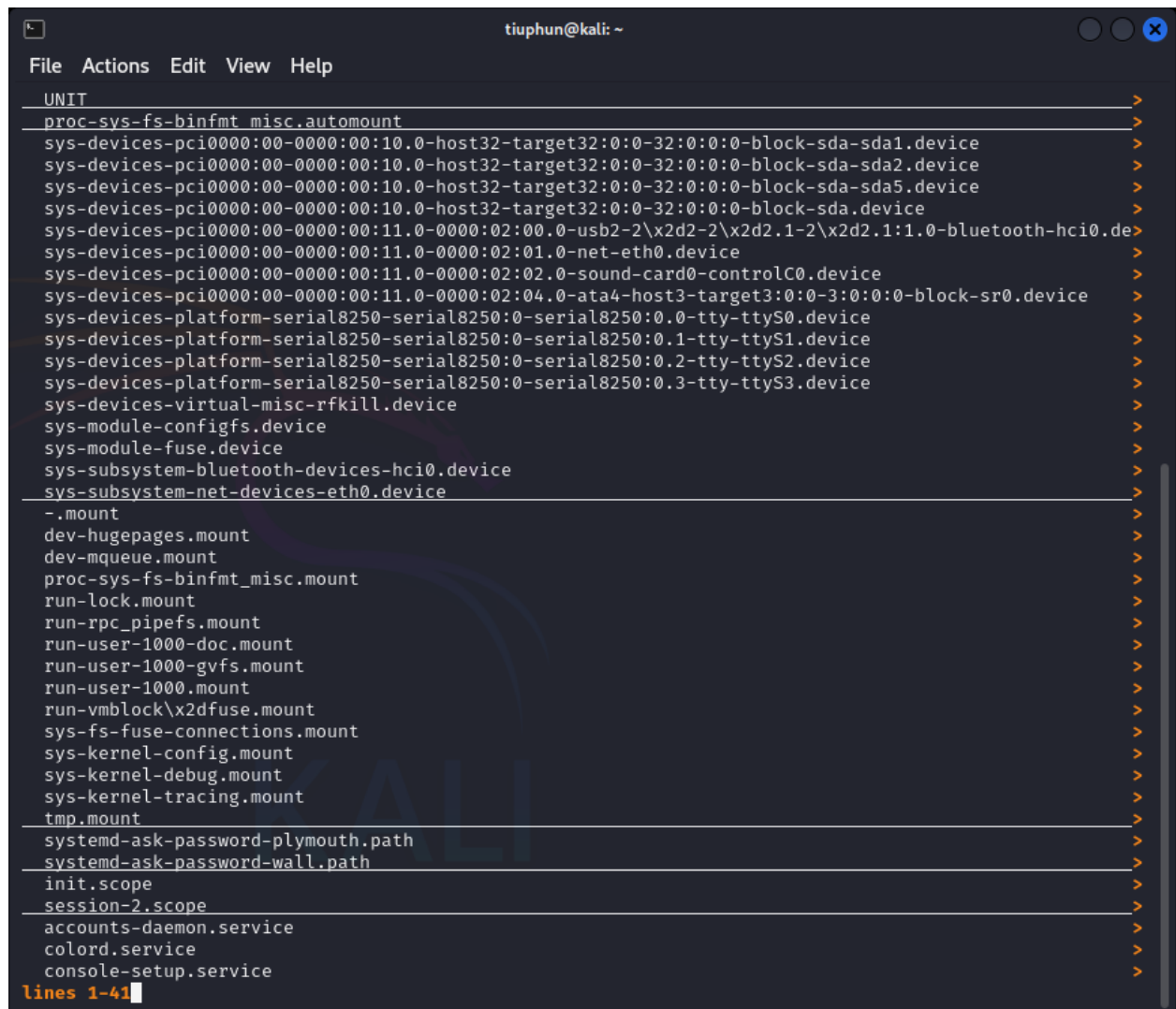
# Lab 09 Report

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FYI: All exercises are done in my Kali Linux VM, @tiuphun (local user account).

## Exercise 1. Manage services using systemd:

1. Check whether systemd is available in your Linux system (systemctl command)



```
tiuphun@kali: ~  
File Actions Edit View Help  
UNIT  
proc-sys-fs-binfmt_misc.automount  
sys-devices-pci0000:00-0000:00:10.0-host32-target32:0:0-32:0:0:0-block-sda-sda1.device  
sys-devices-pci0000:00-0000:00:10.0-host32-target32:0:0-32:0:0:0-block-sda-sda2.device  
sys-devices-pci0000:00-0000:00:10.0-host32-target32:0:0-32:0:0:0-block-sda-sda5.device  
sys-devices-pci0000:00-0000:00:10.0-host32-target32:0:0-32:0:0:0-block-sda.device  
sys-devices-pci0000:00-0000:00:11.0-0000:02:00.0-usb2-2\x2d2-2\x2d2.1-2\x2d2.1:1.0-bluetoot...  
sys-devices-pci0000:00-0000:00:11.0-0000:02:01.0-net-eth0.device  
sys-devices-pci0000:00-0000:00:11.0-0000:02:02.0-sound-card0-controlC0.device  
sys-devices-pci0000:00-0000:00:11.0-0000:02:04.0-ata4-host3-target3:0:0-3:0:0:0-block-sr0.device  
sys-devices-platform-serial8250-serial8250:0-serial8250:0.0-tty-ttyS0.device  
sys-devices-platform-serial8250-serial8250:0-serial8250:0.1-tty-ttyS1.device  
sys-devices-platform-serial8250-serial8250:0-serial8250:0.2-tty-ttyS2.device  
sys-devices-platform-serial8250-serial8250:0-serial8250:0.3-tty-ttyS3.device  
sys-devices-virtual-misc-rfkill.device  
sys-module-configfs.device  
sys-module-fuse.device  
sys-subsystem-bluetooth-devices-hci0.device  
sys-subsystem-net-devices-eth0.device  
-.mount  
dev-hugepages.mount  
dev-mqueue.mount  
proc-sys-fs-binfmt_misc.mount  
run-lock.mount  
run-rpc_pipefs.mount  
run-user-1000-doc.mount  
run-user-1000-gvfs.mount  
run-user-1000.mount  
run-vmblock\x2dfuse.mount  
sys-fs-fuse-connections.mount  
sys-kernel-config.mount  
sys-kernel-debug.mount  
sys-kernel-tracing.mount  
tmp.mount  
systemd-ask-password-plymouth.path  
systemd-ask-password-wall.path  
init.scope  
session-2.scope  
accounts-daemon.service  
colord.service  
console-setup.service  
lines 1-41
```

2. List all services in your Linux OS

```
$ systemctl list-units --type=service --all
```

```
tiuphun@kali: ~  
File Actions Edit View Help  
UNIT                                LOAD    ACTIVE SUB    DESCRIPTION  
accounts-daemon.service            loaded active running Accounts Service  
apparmor.service                   loaded inactive dead    Load AppArmor profiles  
apt-daily-upgrade.service           loaded inactive dead    Daily apt upgrade and clean a>  
apt-daily.service                   loaded inactive dead    Daily apt download activities  
● auditd.service                    not-found inactive dead    auditd.service  
auth-rpcgss-module.service          loaded inactive dead    Kernel Module supporting RPCS>  
● cloud-init-local.service           not-found inactive dead    cloud-init-local.service  
colord.service                      loaded active running Manage, Install and Generate >  
● connman.service                   not-found inactive dead    connman.service  
● console-screen.service             not-found inactive dead    console-screen.service  
console-setup.service              loaded active exited Set console font and keymap  
cron.service                        loaded active running Regular background program pr>  
dbus.service                        loaded active running D-Bus System Message Bus  
dpkg-db-backup.service              loaded inactive dead    Daily dpkg database backup se>  
e2scrub_all.service                 loaded inactive dead    Online ext4 Metadata Check fo>  
e2scrub_reap.service                loaded inactive dead    Remove Stale Online ext4 Meta>  
emergency.service                   loaded inactive dead    Emergency Shell  
fstirm.service                      loaded inactive dead    Discard unused blocks on file>  
getty-static.service               loaded inactive dead    getty on tty2-tty6 if dbus an>  
getty@tty1.service                 loaded active running Getty on tty1  
● gssproxy.service                  not-found inactive dead    gssproxy.service  
haveged.service                     loaded active running Entropy Daemon based on the H>  
ifupdown-pre.service               loaded active exited Helper to synchronize boot up>  
initrd-cleanup.service              loaded inactive dead    Cleaning Up and Shutting Down>  
initrd-parse-etc.service             loaded inactive dead    Mountpoints Configured in the>  
initrd-switch-root.service           loaded inactive dead    Switch Root  
initrd-udevadm-cleanup-db.service    loaded inactive dead    Cleanup udev Database  
● kbd.service                       not-found inactive dead    kbd.service  
keyboard-setup.service              loaded active exited Set the console keyboard layo>  
kmod-static-nodes.service            loaded active exited Create List of Static Device >  
ldconfig.service                    loaded active exited Rebuild Dynamic Linker Cache  
lightdm.service                     loaded active running Light Display Manager  
logrotate.service                   loaded inactive dead    Rotate log files  
man-db.service                      loaded inactive dead    Daily man-db regeneration  
ModemManager.service                loaded active running Modem Manager  
modprobe@configfs.service            loaded inactive dead    Load Kernel Module configfs  
modprobe@drm.service                 loaded inactive dead    Load Kernel Module drm  
modprobe@efi_pstore.service           loaded inactive dead    Load Kernel Module efi_pstore  
modprobe@fuse.service                 loaded inactive dead    Load Kernel Module fuse  
networking.service                  loaded active exited Raise network interfaces  
lines 1-41
```

3. Check whether Apache server is installed or not (httpd). If not, please install Apache server


```
tiuphun@kali: ~  
File Actions Edit View Help  
cron.service loaded active running Regular background program pr>  
dbus.service loaded active running D-Bus System Message Bus  
dpkg-db-backup.service loaded inactive dead Daily dpkg database backup se>  
e2scrub_all.service loaded inactive dead Online ext4 Metadata Check fo>  
e2scrub_reap.service loaded inactive dead Remove Stale Online ext4 Meta>  
emergency.service loaded inactive dead Emergency Shell  
fstrim.service loaded inactive dead Discard unused blocks on file>  
getty-static.service loaded inactive dead getty on tty2-tty6 if dbus an>  
getty@tty1.service loaded active running Getty on tty1  
● gssproxy.service not-found inactive dead gssproxy.service  
haveged.service loaded active running Entropy Daemon based on the H>  
ifupdown-pre.service loaded active exited Helper to synchronize boot up>  
initrd-cleanup.service loaded inactive dead Cleaning Up and Shutting Down>  
initrd-parse-etc.service loaded inactive dead Mountpoints Configured in the>  
initrd-switch-root.service loaded inactive dead Switch Root  
initrd-udevadm-cleanup-db.service loaded inactive dead Cleanup udev Database  
● kbd.service not-found inactive dead kbd.service  
keyboard-setup.service loaded active exited Set the console keyboard layo>  
kmod-static-nodes.service loaded active exited Create List of Static Device >  
ldconfig.service loaded active exited Rebuild Dynamic Linker Cache  
lightdm.service loaded active running Light Display Manager  
logrotate.service loaded inactive dead Rotate log files  
man-db.service loaded inactive dead Daily man-db regeneration  
ModemManager.service loaded active running Modem Manager  
modprobe@configfs.service loaded inactive dead Load Kernel Module configfs  
modprobe@drm.service loaded inactive dead Load Kernel Module drm  
modprobe@efi_pstore.service loaded inactive dead Load Kernel Module efi_pstore  
modprobe@fuse.service loaded inactive dead Load Kernel Module fuse  
networking.service loaded active exited Raise network interfaces  
  
(tiuphun@kali)-[~]  
$ sudo apt install apache2  
[sudo] password for tiuphun:  
apache2 is already the newest version (2.4.62-3).  
apache2 set to manually installed.  
Summary:  
Upgrading: 0, Installing: 0, Removing: 0, Not Upgrading: 17  
  
(tiuphun@kali)-[~]  
$
```

#### 4. Start Apache server

```
tiuphun@kali: ~  
File Actions Edit View Help  
modprobe@drm.service          loaded    inactive dead    Load Kernel Module drm  
modprobe@efi_pstore.service   loaded    inactive dead    Load Kernel Module efi_pstore  
modprobe@fuse.service         loaded    inactive dead    Load Kernel Module fuse  
networking.service            loaded    active   exited  Raise network interfaces  
  
(tiuphun@kali)-[~]  
$ sudo apt install apache2  
[sudo] password for tiuphun:  
apache2 is already the newest version (2.4.62-3).  
apache2 set to manually installed.  
Summary:  
  Upgrading: 0, Installing: 0, Removing: 0, Not Upgrading: 17  
  
(tiuphun@kali)-[~]  
$ sudo systemctl start apache2  
  
(tiuphun@kali)-[~]  
$
```

Apache2 Debian Default Page

localhost



# Apache2 Debian Default Page

It works!

This is the default welcome page used to test the correct operation of the Apache2 server after installation on Debian systems. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should **replace this file** (located at `/var/www/html/index.html`) before continuing to operate your HTTP server.

If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.

Configuration Overview

Debian's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Debian tools. The configuration system is **fully documented in `/usr/share/doc/apache2/README.Debian.gz`**. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the **manual** if the `apache2-doc` package was installed on this server.

The configuration layout for an Apache2 web server installation on Debian systems is as follows:

```
/etc/apache2/
|-- apache2.conf
|   |-- ports.conf
|-- mods-enabled
|   |-- *.load
|   |-- *.conf
|-- conf-enabled
|   |-- *.conf
|-- sites-enabled
|   |-- *.conf
```

- `apache2.conf` is the main configuration file. It puts the pieces together by including all remaining configuration files when starting up the web server.
- `ports.conf` is always included from the main configuration file. It is used to determine the listening ports for incoming connections, and this file can be customized anytime.
- Configuration files in the `mods-enabled/`, `conf-enabled/` and `sites-enabled/` directories contain particular configuration snippets which manage modules, global configuration fragments, or virtual host configurations, respectively.
- They are activated by symlinking available configuration files from their respective `*-available/` counterparts. These should be managed by using our helpers `a2enmod`, `a2dismod`, `a2ensite`,

5. Show all using files of Apache server

```
tiuphun@kali: ~  
File Actions Edit View Help  
(tiuphun@kali)-[~]  
$ sudo lsof -c apache2  
lsof: WARNING: can't stat() fuse.gvfsd-fuse file system /run/user/1000/gvfs  
Output information may be incomplete.  
lsof: WARNING: can't stat() fuse.portal file system /run/user/1000/doc  
Output information may be incomplete.  
COMMAND  PID    USER  FD      TYPE DEVICE SIZE/OFF  NODE NAME  
apache2 141434 root   cwd      DIR    8,1    4096      2 /  
apache2 141434 root   rtd      DIR    8,1    4096      2 /  
apache2 141434 root   txt      REG    8,1   737792 2377095 /usr/sbin/apache2  
apache2 141434 root   mem      REG    0,1 134217728 8823 /dev/zero  
apache2 141434 root   mem      REG    8,1 31262256 2376946 /usr/lib/x86_64-linux-gnu/libcudata.so.72.1  
apache2 141434 root   mem      REG    8,1 2497768 2361653 /usr/lib/x86_64-linux-gnu/libstdc++.so.6.0.33  
apache2 141434 root   mem      REG    8,1 7153824 3156083 /usr/lib/php/20220829/fileinfo.so  
apache2 141434 root   mem      REG    8,1 3055776 2359693 /usr/lib/locale/locale-archive  
apache2 141434 root   mem      REG    8,1 128936 2361690 /usr/lib/x86_64-linux-gnu/openssl-modules/legacy.so  
apache2 141434 root   mem      REG    0,1 98304 8824 /dev/zero  
apache2 141434 root   mem      REG    8,1 5628992 2414620 /usr/lib/apache2/modules/libphp8.2.so  
apache2 141434 root   mem      REG    8,1 104552 3156093 /usr/lib/php/20220829/sockets.so  
apache2 141434 root   mem      REG    8,1 59472 2359976 /usr/lib/x86_64-linux-gnu/libmd.so.0.1.0  
apache2 141434 root   mem      REG    8,1 216368 2359401 /usr/lib/x86_64-linux-gnu/libtinfnfo.so.6.5  
apache2 141434 root   mem      REG    8,1 5772408 2361697 /usr/lib/x86_64-linux-gnu/libcrypto.so.3  
apache2 141434 root   mem      REG    8,1 182856 2359301 /usr/lib/x86_64-linux-gnu/libgcc_s.so.1  
apache2 141434 root   mem      REG    8,1 813048 2361661 /usr/lib/x86_64-linux-gnu/libzstd.so.1.5.6  
apache2 141434 root   mem      REG    8,1 34920 3156097 /usr/lib/php/20220829/tokenizer.so  
apache2 141434 root   mem      REG    8,1 220752 2366093 /usr/lib/x86_64-linux-gnu/libedit.so.2.0.74  
apache2 141434 root   mem      REG    8,1 288872 3156090 /usr/lib/php/20220829/phar.so  
apache2 141434 root   mem      REG    8,1 1060640 2361698 /usr/lib/x86_64-linux-gnu/libssl.so.3  
apache2 141434 root   mem      REG    8,1 84904 2361297 /usr/lib/x86_64-linux-gnu/libbsd.so.0.12.2  
apache2 141434 root   mem      REG    8,1 18536 3156096 /usr/lib/php/20220829/sysvshm.so  
apache2 141434 root   mem      REG    8,1 14440 3156095 /usr/lib/php/20220829/sysvsem.so  
apache2 141434 root   mem      REG    8,1 22632 3156094 /usr/lib/php/20220829/sysvmsg.so  
apache2 141434 root   mem      REG    8,1 14440 3156092 /usr/lib/php/20220829/shmop.so  
apache2 141434 root   mem      REG    8,1 34920 3156074 /usr/lib/php/20220829/readline.so  
apache2 141434 root   mem      REG    8,1 39016 3156091 /usr/lib/php/20220829/posix.so  
apache2 141434 root   mem      REG    8,1 34920 3147575 /usr/lib/php/20220829/pdo_mysql.so  
apache2 141434 root   mem      REG    8,1 161896 3147572 /usr/lib/php/20220829/mysqli.so  
apache2 141434 root   mem      REG    8,1 51304 3156087 /usr/lib/php/20220829/iconv.so  
apache2 141434 root   mem      REG    8,1 178280 3156082 /usr/lib/php/20220829/ffi.so  
apache2 141434 root   mem      REG    8,1 1043336 3147579 /usr/lib/php/20220829/opcode.so  
apache2 141434 root   mem      REG    8,1 2140328 2376951 /usr/lib/x86_64-linux-gnu/libicuuc.so.72.1
```

6. Try to access to your web server from another computer using IP address. If we want access the web server using the domain name (test.com), which steps should we do?

- **Edit the hosts file on the client machine:**

On the computer trying to access the server, edit its /etc/hosts file to map test.com to the Apache server's IP address:

```
sudo nano /etc/hosts
```

Add this line (replace `SERVER_IP` with your Apache server's IP address):

```
SERVER_IP test.com
```

Save and exit (Ctrl + O, then Enter, and Ctrl + X).

- **Set Up Virtual Host on the Apache Server:** On the server, configure Apache to recognize `test.com`:

```
sudo nano /etc/apache2/sites-available/test.com.conf
```

Add the following content:

```
<VirtualHost *:80>
    ServerName test.com
    DocumentRoot /var/www/html
</VirtualHost>
```

Save and exit the file.

- **Enable the Virtual Host:**

```
sudo a2ensite test.com.conf
sudo systemctl reload apache2
```

- **Access the Server:** From another computer, open a browser and visit `http://test.com`.

7. Turn off the Apache server's service, try to access to the Apache server from another computer

8. Configure your system so the Apache server boots up along with your computer

9. Restart your computer using the command line. Login to your system. How could we know whether the Apache server is working or not?

We run **sudo systemctl status apache2** or go to <http://localhost> or from another computer go to `http://server_IP`

## Exercise 2. Create and manage a new service

1. Create a new file `server.php` with the following content. Try to guess the purpose of this file? (Hint: you can do it after executing the step 3)

```
<?php
```

```
$sock = socket_create(AF_INET, SOCK_DGRAM, SOL_UDP);
```



```

socket_bind($sock, '0.0.0.0', 10000);

for (;;) {

socket_recvfrom($sock, $message, 1024, 0, $ip, $port);

$reply = str_rot13($message);

socket_sendto($sock, $reply, strlen($reply), 0, $ip, $port);

}

```

```

tiuphun@kali: ~
File Actions Edit View Help
GNU nano 8.2 server.php *
<?php
$sock = socket_create(AF_INET, SOCK_DGRAM, SOL_UDP);
socket_bind($sock, '0.0.0.0', 10000);
for (;;) {
    socket_recvfrom($sock, $message, 1024, 0, $ip, $port);
    $reply = str_rot13($message);
    socket_sendto($sock, $reply, strlen($reply), 0, $ip, $port);
}

```

works!

the correct operation of the Apache2 server after  
d this page, it means that the Apache HTTP server installed  
place this file (located at /var/www/html/index.html)  
t.  
on't know what this page is about, this probably means  
aintenance. if the problem persists, please contact the

### Installation Overview

erent from the upstream default configuration, and split  
h Debian tools. The configuration system is **fully**  
**README.Debian.gz**. Refer to this for the full  
erver itself can be found by accessing the **manual** if the  
rver.

server installation on Debian systems is as follows:

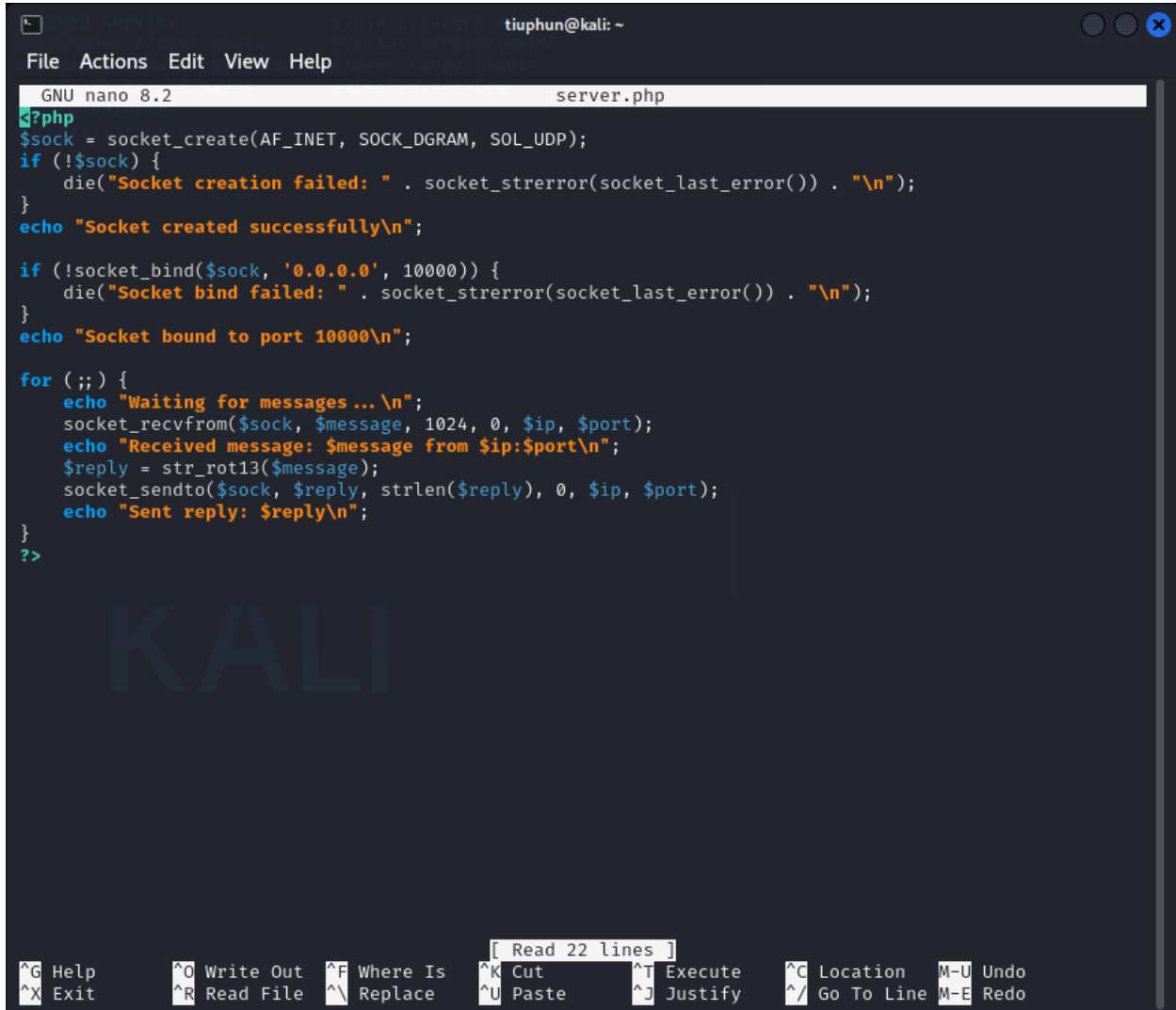
```

^G Helpable/ ^O Write Out ^F Where Is ^K Cut/ain
^X Exitodules, ^R Read File ^\ Replace ent ^U Paste
^T Execute ^C Location M-U Undo
^J Justify ^_ Go To Line M-E Redo

```



The script above doesn't work. I tried to fix and replace with the new code:

A screenshot of a terminal window on a Kali Linux system. The window title is 'tiuphun@kali: ~'. The terminal shows the nano 8.2 editor editing a file named 'server.php'. The PHP code in the file is as follows:

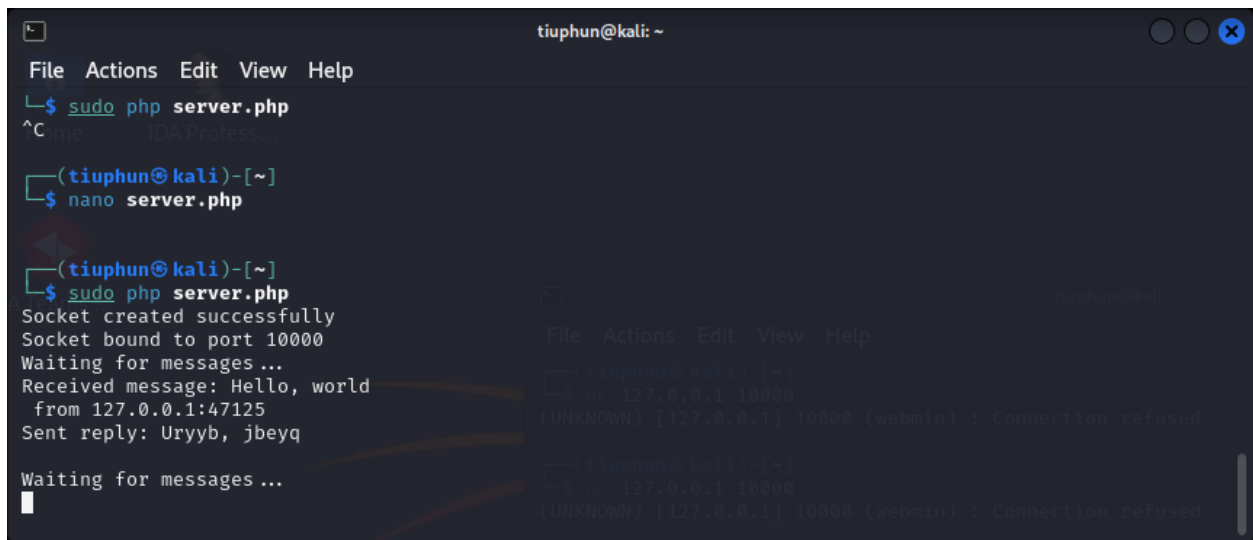
```
?php
$sock = socket_create(AF_INET, SOCK_DGRAM, SOL_UDP);
if (!$sock) {
    die("Socket creation failed: " . socket_strerror(socket_last_error()) . "\n");
}
echo "Socket created successfully\n";

if (!socket_bind($sock, '0.0.0.0', 10000)) {
    die("Socket bind failed: " . socket_strerror(socket_last_error()) . "\n");
}
echo "Socket bound to port 10000\n";

for (;;) {
    echo "Waiting for messages... \n";
    socket_recvfrom($sock, $message, 1024, 0, $ip, $port);
    echo "Received message: $message from $ip:$port\n";
    $reply = str_rot13($message);
    socket_sendto($sock, $reply, strlen($reply), 0, $ip, $port);
    echo "Sent reply: $reply\n";
}
?>
```

The bottom of the terminal shows the nano editor's command shortcuts: ^G Help, ^O Write Out, ^F Where Is, ^K Cut, ^T Execute, ^C Location, M-U Undo, ^X Exit, ^R Read File, ^\ Replace, ^U Paste, ^J Justify, ^\_ Go To Line, M-E Redo. A status bar at the bottom indicates '[ Read 22 lines ]'. A large 'KALI' watermark is visible in the background.

2. Run “php server.php” to start the php server. (You might need to install php server – php\_cli)



```
tiuphun@kali: ~  
File Actions Edit View Help  
$ sudo php server.php  
^C  
(tiuphun@kali)-[~]  
$ nano server.php  
(tiuphun@kali)-[~]  
$ sudo php server.php  
Socket created successfully  
Socket bound to port 10000  
Waiting for messages ...  
Received message: Hello, world  
from 127.0.0.1:47125  
Sent reply: Uryyb, jbeyq  
Waiting for messages ...  
[ ]  
(tiuphun@kali)-[~]  
$ nc 127.0.0.1 10000  
(UNKNOWN) [127.0.0.1] 10000 (webmin) : Connection refused  
(tiuphun@kali)-[~]  
$ nc 127.0.0.1 10000  
(UNKNOWN) [127.0.0.1] 10000 (webmin) : Connection refused
```

3. Check the status of php server by login to another account (different terminal). Run the command “nc 127.0.0.1 10000” and then type “Hello world” after connecting with local php server. Is the printed message “Uryyb, jbeyq”?

Yes

```
tiuphun@kali: ~  
File Actions Edit View Help  
(tiuphun@kali)-[~]  
$ nc 127.0.0.1 10000  
(UNKNOWN) [127.0.0.1] 10000 (webmin) : Connection refused  
  
(tiuphun@kali)-[~]  
$ nc 127.0.0.1 10000  
(UNKNOWN) [127.0.0.1] 10000 (webmin) : Connection refused  
  
(tiuphun@kali)-[~]  
$ ls  
Desktop Downloads gr2.gpr ida-pro-9.0 Music Public Templates  
Documents FlowDroid gr2.rep Mobile-Security-Framework-MobSF Pictures server.php Videos  
  
(tiuphun@kali)-[~]  
$ nc 127.0.0.1 10000  
(UNKNOWN) [127.0.0.1] 10000 (webmin) : Connection refused  
  
(tiuphun@kali)-[~]  
$ nc -u 127.0.0.1 10000  
Hello, world  
Uryyb, jbeyq  
█
```

4. To convert the PHP server to a service, create a file `/etc/systemd/system/rot13.service` with the following content

```
[Unit] Description=ROT13 demo service After=network.target  
StartLimitIntervalSec=0[Service]
```

```
Type=simple Restart=always RestartSec=1 User=centos ExecStart=/usr/bin/env php  
/path/to/server.php [Install] WantedBy=multi-user.target
```



## 6. Use systemctl to configure rot13 so it can boot up along with the Linux OS

```
tiuphun@kali: /etc/systemd/system
File Actions Edit View Help
(tiuphun@kali)-[/etc/systemd/system]
$ sudo nano rot13.service
(tiuphun@kali)-[/etc/systemd/system]
$ sudo systemctl enable rot13
Created symlink '/etc/systemd/system/multi-user.target.wants/rot13.service' -> '/etc/systemd/system/rot13.service'.
(tiuphun@kali)-[/etc/systemd/system]
$ sudo reboot
```

Reboot the system and verify that the service boot up with the OS:

```
tiuphun@kali: ~
File Actions Edit View Help
(tiuphun@kali)-[~]
$ sudo systemctl status rot13
[sudo] password for tiuphun:
● rot13.service - ROT13 demo service
   Loaded: loaded (/etc/systemd/system/rot13.service; enabled; preset: disabled)
   Active: active (running) since Tue 2024-12-24 09:55:41 +07; 2min 13s ago
 Invocation: b5abb5c24d47425c87c665903e86d05b
   Main PID: 882 (php)
     Tasks: 1 (limit: 9343)
    Memory: 22.4M (peak: 22.7M)
       CPU: 420ms
    CGroup: /system.slice/rot13.service
           └─882 /usr/bin/php /home/tiuphun/server.php


Dec 24 09:55:41 kali systemd[1]: Started rot13.service - ROT13 demo service.
Dec 24 09:55:42 kali php[882]: Socket created successfully
Dec 24 09:55:42 kali php[882]: Socket bound to port 10000
Dec 24 09:55:42 kali php[882]: Waiting for messages ...

(tiuphun@kali)-[~]
$
```

It works!

## Exercise 3. Configure your networking server application

1. Configure your networking program (on server side) so it will become a Linux service. Change your system so your server will start when your computer boots up



```
tiuphun@kali: ~  
File Actions Edit View Help  
GNU nano 8.2 /etc/systemd/system/networkserver.service  
[Unit]  
Description=Networking Server Application  
After=network.target  
  
[Service]  
Type=simple  
ExecStart=/usr/bin/php /home/tiuphun/server.php  
Restart=always  
RestartSec=5  
User=root  
  
[Install]  
WantedBy=multi-user.target  
  
[ Wrote 13 lines ]  
^G Help      ^O Write Out  ^F Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo  
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line  M-E Redo
```

```
tiuphun@kali: ~  
File Actions Edit View Help  
CPU: 107ms  
(tiuphun@kali)-[~]  
$ sudo nano /etc/systemd/system/networkserver.service  
(tiuphun@kali)-[~]  
$ sudo systemctl daemon-reload  
sudo systemctl enable networkserver  
(tiuphun@kali)-[~]  
$ sudo systemctl start networkserver  
(tiuphun@kali)-[~]  
$ sudo systemctl status networkserver  
● networkserver.service - Networking Server Application  
   Loaded: loaded (/etc/systemd/system/networkserver.service; enabled; preset: disabled)  
   Active: activating (auto-restart) since Tue 2024-12-24 10:05:36 +07; 3s ago  
 Invocation: 808ae85efdc745a0a93aaaf019f522ab  
   Process: 6530 ExecStart=/usr/bin/php /home/tiuphun/server.php (code=exited, status=0/SUCCESS)  
 Main PID: 6530 (code=exited, status=0/SUCCESS)  
  Mem peak: 6.4M  
    CPU: 115ms  
(tiuphun@kali)-[~]  
$
```

2. Regularly write down your server status to log files (For example: every 15 minutes)

```
tiuphun@kali: ~  
File Actions Edit View Help  
GNU nano 8.2 /tmp/crontab.crqvg0/crontab  
# Each task to run has to be defined through a single line  
# indicating with different fields when the task will be run  
# and what command to run for the task  
#  
# To define the time you can provide concrete values for  
# minute (m), hour (h), day of month (dom), month (mon),  
# and day of week (dow) or use '*' in these fields (for 'any').  
#  
# Notice that tasks will be started based on the cron's system  
# daemon's notion of time and timezones.  
#  
# Output of the crontab jobs (including errors) is sent through  
# email to the user the crontab file belongs to (unless redirected).  
#  
# For example, you can run a backup of all your user accounts  
# at 5 a.m every week with:  
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/  
#  
# For more information see the manual pages of crontab(5) and cron(8)  
#  
# m h dom mon dow  command  
*/15 * * * * systemctl status networkserver > /var/log/networkserver_status.log 2>&1  
[ Wrote 24 lines ]  
^G Help      ^O Write Out  ^F Where Is   ^K Cut        ^T Execute    ^C Location   M-U Undo  
^X Exit      ^R Read File  ^\ Replace    ^U Paste      ^J Justify    ^_ Go To Line  M-E Redo
```



```
tiuphun@kali: ~  
File Actions Edit View Help  
└─$ sudo systemctl start networkserver  
  
(tiuphun@kali)-[~]  
└─$ sudo systemctl status networkserver  
  
● networkserver.service - Networking Server Application  
   Loaded: loaded (/etc/systemd/system/networkserver.service; enabled; preset: disabled)  
   Active: activating (auto-restart) since Tue 2024-12-24 10:05:36 +07; 3s ago  
  Invocation: 808ae85efdc745a0a93aaaf019f522ab  
    Process: 6530 ExecStart=/usr/bin/php /home/tiuphun/server.php (code=exited, status=0/SUCCESS)  
   Main PID: 6530 (code=exited, status=0/SUCCESS)  
  Mem peak: 6.4M  
    CPU: 115ms  
  
(tiuphun@kali)-[~]  
└─$ sudo crontab -e  
no crontab for root - using an empty one  
Select an editor. To change later, run select-editor again.  
 1. /bin/nano ← easiest  
 2. /usr/bin/vim.basic  
 3. /usr/bin/vim.tiny  
  
Choose 1-3 [1]: ^C1  
crontab: installing new crontab  
  
(tiuphun@kali)-[~]  
└─$
```

3. Configure that your PC will send you an email if your server process crashes

Create a new script for alert

```
tiuphun@kali: ~  
File Actions Edit View Help  
GNU nano 8.2 /usr/local/bin/server_alert.sh  
#!/bin/bash  
echo "The networking server has crashed!" | mail -s "Server Crash Alert" phuong.nt210692@sis.hust.edu.vn  
  
[ Wrote 2 lines ]  
^G Help      ^O Write Out  ^F Where Is   ^K Cut        ^T Execute  
^X Exit      ^R Read File  ^\ Replace    ^U Paste       ^J Justify  
^C Location  M-U Undo  
^_/ Go To Line M-E Redo
```

Set run permissions

```
tiuphun@kali: ~  
File Actions Edit View Help  
xim4-base.timer'.  
exim4-base.service is a disabled or a static unit, not starting it.  
Setting up exim4-daemon-light (4.98-2) ...  
exim4.service is a disabled or a static unit, not starting it.  
Processing triggers for doc-base (0.11.2) ...  
Processing 3 added doc-base files ...  
Processing triggers for libc-bin (2.40-3) ...  
Processing triggers for man-db (2.13.0-1) ...  
Processing triggers for kali-menu (2024.4.0) ...  
  
(tiuphun@kali)-[~]  
$ sudo nano /usr/local/bin/server_alert.sh  
  
(tiuphun@kali)-[~]  
$ sudo chmod +x /usr/local/bin/server_alert.sh  
  
(tiuphun@kali)-[~]  
$ sudo nano /etc/systemd/system/networkserver.service  
  
(tiuphun@kali)-[~]  
$ sudo systemctl daemon-reload  
  
(tiuphun@kali)-[~]  
$ sudo systemctl stop networkserver  
  
(tiuphun@kali)-[~]  
$
```

Reconfig service to run the alert script in case of failure

```
tiuphun@kali: ~  
File Actions Edit View Help  
GNU nano 8.2 /etc/systemd/system/networkserver.service  
[Unit]  
Description=Networking Server Application  
After=network.target  
  
[Service]  
Type=simple  
ExecStart=/usr/bin/php /home/tiuphun/server.php  
Restart=always  
RestartSec=5  
User=root  
OnFailure=/usr/local/bin/server_alert.sh  
  
[Install]  
WantedBy=multi-user.target  
  
[ Wrote 14 lines ]  
^G Help      ^O Write Out  ^F Where Is  ^K Cut       ^T Execute   ^C Location  M-U Undo  
^X Exit      ^R Read File  ^\ Replace   ^U Paste     ^J Justify   ^_ Go To Line  M-E Redo
```

---

*THE END*

---