

# ASE TP Optimisation

December 2022

## 1 Configuration du noyau

### 1.1

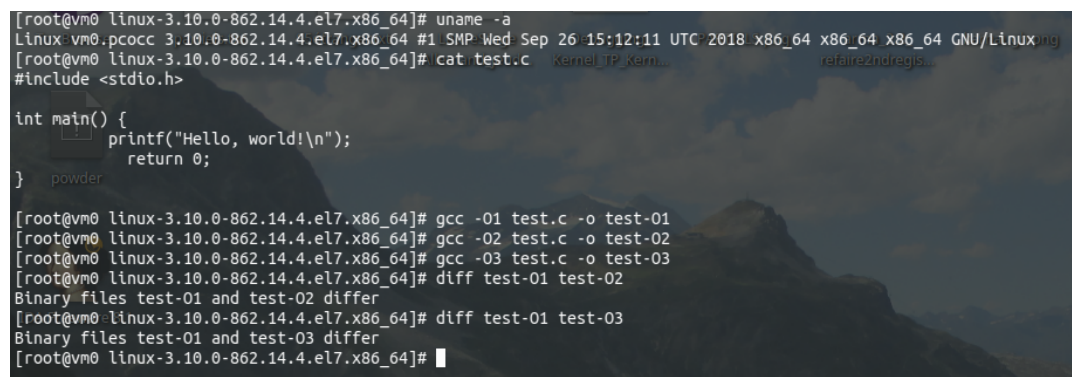
On compile le noyau:

```
make
make oldconfig
```

On n'observe pas de spécificités dans la version du noyau mais on peut compiler avec des options d'optimisation:

Le fichier se situe dans .config

### 1.2



```
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# uname -a
Linux vm0.pcocc 3.10.0-862.14.4.el7.x86_64 #1 SMP Wed Sep 26 15:12:11 UTC 2018 x86_64 x86_64 x86_64 GNU/Linux
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# cat test.c
#include <stdio.h>

int main() {
    printf("Hello, world!\n");
    return 0;
}

[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# gcc -O1 test.c -o test-01
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# gcc -O2 test.c -o test-02
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# gcc -O3 test.c -o test-03
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# diff test-01 test-02
Binary files test-01 and test-02 differ
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# diff test-01 test-03
Binary files test-01 and test-03 differ
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]#
```

## 1.3

```
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# head -n 30 .config
# Tor Browser      partels.txt      55stranger.txt      LettreStage      Debugging_      PARTELS.png      arma_2.2      refaire2ndreg
# Automatically generated file; DO NOT EDIT.
# Linux/x86 3.10.0 Kernel Configuration
#
CONFIG_64BIT=y
CONFIG_X86_64=y
CONFIG_X86=y
CONFIG_INSTRUCTION_DECODER=y
CONFIG_OUTPUT_FORMAT="elf64-x86-64"
CONFIG_ARCH_DEFCONFIG="arch/x86/configs/x86_64_defconfig"
CONFIG_LOCKDEP_SUPPORT=y
CONFIG_STACKTRACE_SUPPORT=y
CONFIG_HAVE_LATENCYTOP_SUPPORT=y
CONFIG_MMU=y
CONFIG_ARCH_MMAP_RND_BITS_MIN=28
CONFIG_ARCH_MMAP_RND_BITS_MAX=32
CONFIG_ARCH_MMAP_RND_COMPAT_BITS_MIN=8
CONFIG_ARCH_MMAP_RND_COMPAT_BITS_MAX=16
CONFIG_NEED_DMA_MAP_STATE=y
CONFIG_NEED_SG_DMA_LENGTH=y
CONFIG_GENERIC_ISA_DMA=y
CONFIG_GENERIC_BUG=y
CONFIG_GENERIC_BUG_RELATIVE_POINTERS=y
CONFIG_GENERIC_HWEIGHT=y
CONFIG_ARCH_MAY_HAVE_PC_FDC=y
CONFIG_RWSEM_XCHGADD_ALGORITHM=y
CONFIG_GENERIC_CALIBRATE_DELAY=y
CONFIG_ARCH_HAS_CPU_RELAX=y
CONFIG_ARCH_HAS_CACHE_LINE_SIZE=y
CONFIG_ARCH_HAS_CPU_AUTOPROBE=y
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]#
```

## 1.4

```
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# cat .config | grep CONFIG_XFS_FS
CONFIG_XFS_FS=m
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]#
```

## 1.5

- =y indique qu'un module doit être compilé directement dans le noyau
- =m indique qu'un module doit être compilé en tant que modulé et chargé à la demande, c'est donc le cas ici

# 2 sysctl

## 2.1

On modifie la fréquence d'utilisation de la mémoire virtuelle:

```
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# sysctl -a | grep swappiness
sysctl: reading key "net.ipv6.conf.all.stable_secret"
sysctl: reading key "net.ipv6.conf.default.stable_secret"
sysctl: reading key "net.ipv6.conf.eth0.stable_secret"
sysctl: reading key "net.ipv6.conf.eth1.stable_secret"
sysctl: reading key "net.ipv6.conf.lo.stable_secret"
vm.swappiness = 30
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# sysctl -w vm.swappiness=50
vm.swappiness = 50
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]# sysctl -a | grep swappiness
sysctl: reading key "net.ipv6.conf.all.stable_secret"
sysctl: reading key "net.ipv6.conf.default.stable_secret"
sysctl: reading key "net.ipv6.conf.eth0.stable_secret"
sysctl: reading key "net.ipv6.conf.eth1.stable_secret"
sysctl: reading key "net.ipv6.conf.lo.stable_secret"
vm.swappiness = 50
[root@vm0 linux-3.10.0-862.14.4.el7.x86_64]#
```

```
vim /etc/sysctl.conf
```

### 3 Flamgraph

D'après la doc du `FlameGraph.tar.gz` on peut effectuer:

```
perf record -F 99 -a -g -- sleep 6
perf script > out.perf
./stackcollapse-perf.pl out.perf > out.folded
./flamegraph.pl out.folded > kernel.svg
```



On voit dans l'histogramme que le processus crazy monopolise la mémoire et effectue beaucoup d'open dans les appels systèmes