

Project 2 Report

1. Programming design

This time we didn't completely coding with the given sample code, but its structure is almost the same. We construct a network with server and client module to communicate between master and slave, and then transmit the data. With "if" condition checking the third parameter in command line, we can choose the required approach of "mmap" or "fcntl".

2. The Result

Ubuntu terminal:

(1) fcntl

```
1604_RR [執行中] - Oracle VM VirtualBox
檔案 機器 檢視 輸入 裝置 說明
user@ubuntu:~/nfs/project2$ sudo ./master README.md fcntl
[sudo] password for user:
rmmod: ERROR: Module network_server is not currently loaded
file size=2667
user@ubuntu:~/nfs/project2$ sudo ./slave README_slave.md fcntl 192.168.50.145
rmmod: ERROR: Module network_client is not currently loaded
start slave
slave size=2667
user@ubuntu:~/nfs/project2$ _
```

(2) mmap

```
1604_RR [執行中] - Oracle VM VirtualBox
檔案 機器 檢視 輸入 裝置 說明
user@ubuntu:~/nfs/project2$ sudo ./master README.md mmap
file size=2667
user@ubuntu:~/nfs/project2$ sudo ./slave README_slave.md mmap 192.168.50.145
start slave
slave size=2667
user@ubuntu:~/nfs/project2$
```

dmesg:

(1) fcntl:

```
[ 223.747639] server: virt_to_phys = 34cc1990
[ 241.602145] Transmission time: 0.000063 ms, File size: 2667 bytes
[ 241.606509] client: virt_to_phys = 34ce1650
```

(2) mmap:

```
[ 30.441356] network_server: loading out-of-tree module taints kernel.
[ 30.441413] network_server: module verification failed: signature and/or required key missing - t
ainting kernel
[ 43.270717] network_client: module license 'unspecified' taints kernel.
[ 43.270720] Disabling lock debugging due to kernel taint
[ 48.269207] Transmission time: 0.000021 ms, File size: 2667 bytes
[ 48.294299] client : device_open(ffff8800396c3b00)
```

3. Performance Comparison

The approach 'mmap' is about three times faster than 'fcntl'. 'mmap' is faster because it reduces the number of copies needed when transferring large amount of data, thus can the number of kernel entries needed for reading cached data. On the other hand, 'fcntl' involves an extra memory-to-memory copy, which can be inefficient when transferring large amount of data.

4. Team

巫尚謙 coding, report

王憲儀 code review, report

陳翰生 code review, report

林子翔 code review, report