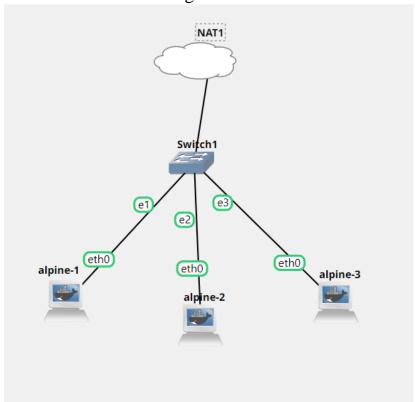
NRP: 05111840000161

# 1. Deskripsi Kasus

Diberikan sebuah file gambar berukuran  $\pm$  12 KB. Alpine-2 diminta untuk mengirimkan kedua file tersebut ke Alpine-1 dan Alpine-3 secara bersamaan. Kasus akan diselesaikan dengan menerapkan pendekatan *Concurrency* dan *Multiprocess*. Program akan dikembangkan melalui program UDP File Server Broadcast yang telah dijelaskan pada pertemuan sebelumnya.

# 2. Gambar Arsitektur Jaringan



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## 3. Gambar untuk program yang telah dibuat

• Library.py – fungsi get\_destination

```
GNU nano 4.6 library.py Modified import logging import os import time import datetime import base64 import socket

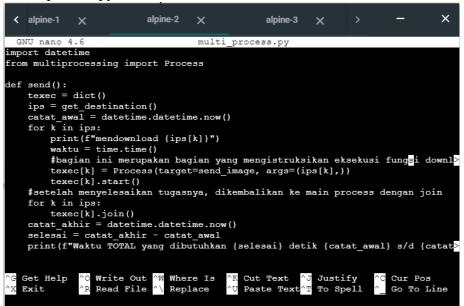
def get_destination():
    dest = dict()
    dest['ip1'] = '192.168.122.110'
    dest['ip2'] = '192.168.122.120'
    return dest
```

Library.py – fungsi send\_image

```
library.py
                                                                      Modified
  GNU nano 4.6
   dest['ip2'] = '192.168.122.120'
   return dest
def send_image(IP_ADDRESS):
   sckclient = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
   # Send Data
   namafile = "tes.jpg"
   ukuran = os.stat(namafile).st_size
   fp = open(namafile, 'rb')
   k = fp.read()
   terkirim = 0
   for x in k:
       k_bytes = bytes([x])
       sckclient.sendto(k_bytes, (IP_ADDRESS, 8888))
       terkirim = terkirim + 1
       print(k_bytes,f"terkirim {terkirim} of {ukuran} ")
```

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Multi\_process.py



Multi\_process\_async.py

```
GNU nano 4.
                               multi_process_async.py
def send():
   texec = dict()
   ips = get_destination()
   status task = dict()
   task pool = Pool(processes=20) #2 task yang dapat dikerjakan secara simulta
   catat_awal = datetime.datetime.now()
   for k in ips:
       print(f"mendownload {ips[k]}")
       #bagian ini merupakan bagian yang mengistruksikan eksekusi fungsi downl
       texec[k] = task_pool.apply_async(func=send_image, args=(ips[k],))
   ‡setelah menyelesaikan tuqasnya, dikembalikan ke main process dengan mengam
   for k in ips:
       status_task[k]=texec[k].get(timeout=10)
   catat_akhir = datetime.datetime.now()
   selesai = catat akhir - catat awal
   print(f"Waktu TOTAL yang dibutuhkan {selesai} detik {catat awal} s/d {catat>
   print ("status TASK")
   print(status task)
  Get Help
               Write Out ^W Where Is
                                          Cut Text
                                                       Justify
                                                                    Cur Pos
                                                       To Spell
  Exit
             ^R Read File ^\
                                          Paste Text^T
                                                                    Go To Line
                             Replace
```

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Multi\_thread.py

```
GNU nano 4.6
                                  multi_thread.py
                                                                       Modified
def send():
    texec = dict()
    ips = get destination()
   catat awal = datetime.datetime.now()
    for k in ips:
       print(f"mendownload {ips[k]}")
       waktu = time.time()
       #bagian ini merupakan bagian yang mengistruksikan eksekusi fungsi downl
        texec[k] = threading.Thread(target=send_image, args=(ips[k],))
        texec[k].start()
    #setelah menyelesaikan tugasnya, dikembalikan ke main thread dengan join
   for k in ips:
       texec[k].join()
   catat akhir = datetime.datetime.now()
   selesai = catat akhir - catat awal
   print(f"Waktu TOTAL yang dibutuhkan {selesai} detik {catat awal} s/d {catat}
             ^O Write Out ^W Where Is
                                       ^K Cut Text
  Get Help
                                                    ^J Justify
               Read File ^\
                                        ^U Paste Text^T
                             Replace
                                                       To Spell
                                                                     Go To Line
  Exit
```

Multi\_thread\_async.py

```
< alpine-1
                         alpine-2
                                                                               ×
                                               alpine-3
             X
                                                        X
  GNU nano 4.6
                               multi_thread_async.py
def send():
    texec = dict()
    ips = get_destination()
    status_task = dict()
    task = concurrent.futures.ThreadPoolExecutor(max workers=4)
    catat_awal = datetime.datetime.now()
    for k in ips:
       print(f"mendownload {ips[k]}")
        waktu = time.time()
        #bagian ini merupakan bagian yang mengistruksikan eksekusi fungsi downl>
        texec[k] = task.submit(send image, ips[k])
    #setelah menyelesaikan tugasnya, dikembalikan ke main thread dengan memangg>
    for k in ips:
        status_task[k]=texec[k].result()
    catat akhir = datetime.datetime.now()
    selesai = catat_akhir - catat_awal
    print(f"Waktu TOTAL yang dibutuhkan {selesai} detik {catat awal} s/d {catat>
    print("hasil task yang dijalankan")
   Get Help
              O Write Out ^W Where Is
                                        ^K Cut Text
                                                        Justify
                                                                     Cur Pos
             ^R Read File ^\
  Exit
                             Replace
                                        ^U Paste Text^T To Spell
                                                                     Go To Line
```

NRP: 05111840000161
• Server.py

```
< :ole
                 alpine-1
                                                                               ×
                                                            alı >
                                       alpine-2
                                                ×
                                      server.py
  GNU nano 4.6
import socket
UDP_IP_ADDRESS = '0.0.0.0'
UDP PORT = 8888
serverSock = socket.socket(socket.AF_INET,socket.SOCK_DGRAM)
serverSock.bind(((UDP_IP_ADDRESS,UDP_PORT)))
filename = 'tesfinished.jpg'
fp = open(filename,'wb+')
count = 0
while True:
    data, addr = serverSock.recvfrom(1024)
    count=count+len(data)
   print(addr," blok ", count,"panjang : ",len(data), data)
    fp.write(data)
fp.close()
                                [ Read 19 lines ]
                                                     ^J Justify
  Get Help
                Write Out ^W Where Is
                                           Cut Text
                                                                      Cur Pos
                                           Paste Text^T
                Read File ^\
                                                        To Spell
                                                                      Go To Line
  Exit
                             Replace
```

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4. Hasil Output Program

### Multiprocess:

• Multi\_process.py – Alpine 2

```
< alpine-1
                            alpine-2
                                                                                      ×
                                                   alpine-3
b'(' terkirim 12359 of 12371
b'\xc3' terkirim 12364 of 12371
b'\x83' terkirim 12365 of 12371
o"'" terkirim 12360 of 12371
b'\xc0' terkirim 12361 of 12371
o'\xe4' terkirim 12366 of 12371
b'\xf9' terkirim 12362 of 12371
b'p' terkirim 12367 of 12371
 'x' terkirim 12368 of 12371
b'\x0f' terkirim 12369 of 12371
b'\xff' terkirim 12370 of 12371
b'\xd9' terkirim 12371 of 12371
b'\x18' terkirim 12363 of 12371
b'\xc3' terkirim 12364 of 12371
b'\x83' terkirim 12365 of 12371
b'\xe4' terkirim 12366 of 12371
b'p' terkirim 12367 of 12371
b'x' terkirim 12368 of 12371
b'\x0f' terkirim 12369 of 12371
b'\xff' terkirim 12370 of 12371
b'\xd9' terkirim 12371 of 12371
Waktu TOTAL yang dibutuhkan 0:00:00.884669 detik 2021-07-03 13:37:00.289504 s/d
2021-07-03 13:37:01.174173
Pemrograman Jaringan D/progjar3/Tugas 3 #
```

• Multi\_process.py – Alpine 1

```
< :ole
                   alpine-1
                                          alpine-2
                                                                  alı >
                                                                                       ×
('192.168.122.19', 56097)
                              blok 4747 panjang :
                                                       1 b'A'
('192.168.122.19', 56097)
                              blok
                                     4748 panjang:
                                                       1 b'\xf4'
('192.168.122.19', 56097)
('192.168.122.19', 56097)
                                    4749 panjang :
                                                       1 b'\x80'
                              blok
                                                       1 b'\xc8'
                              blok
                                     4750 panjang
                                                       1 b'\xfb'
('192.168.122.19', 56097)
                              blok
                                     4751 panjang:
('192.168.122.19', 56097)
                                                       1 b'\xc8'
                              blok
                                     4752 panjang :
('192.168.122.19', 56097)
                                                       1 b'\xe7'
                              blok
                                     4753 panjang
('192.168.122.19', 56097)
('192.168.122.19', 56097)
                                                       1 b'J'
                              blok
                                     4754 panjang:
                                     4755 panjang:
                                                       1 b'\x18'
                              blok
('192.168.122.19', 56097)
                                     4756 panjang:
                                                       1 b'\x8b'
                              blok
                                                       1 b'('
1 b"'"
('192.168.122.19', 56097)
('192.168.122.19', 56097)
                              blok
                                     4757 panjang:
                              blok
                                     4758 panjang
('192.168.122.19', 56097)
                                                       1 b'\xc0'
                                     4759 panjang:
                              blok
                                     4760 panjang :
                                                       1 b'\xf9'
('192.168.122.19', 56097)
                              blok
('192.168.122.19', 56097)
                                                       1 b'\x18'
                              blok
                                     4761 panjang:
('192.168.122.19', 56097)
                                                       1 b'\xc3'
                              blok
                                     4762 panjang:
('192.168.122.19', 56097)
                                                       1 b'\x83'
                              blok
                                     4763 panjang:
                                                       1 b'\xe4'
('192.168.122.19', 56097)
                              blok
                                     4764 panjang:
('192.168.122.19', 56097)
('192.168.122.19', 56097)
                                     4765 panjang:
                                                       1 b'p'
                              blok
                                                       1 b'x'
                              blok
                                     4766 panjang:
('192.168.122.19', 56097)
                                     4767 panjang:
                                                       1 b'\x0f'
                              blok
('192.168.122.19', 56097)
('192.168.122.19', 56097)
                              blok
                                     4768 panjang:
                                                       1 b'\xff'
                                                       1 b'\xd9'
                              blok
                                     4769 panjang:
```

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• Multi\_process.py – Alpine 3

```
×
                                                alpine-3
 < alpine-1
             ×
                          alpine-2
                                   ×
                                                         X
('192.168.122.19', 59599)
                                  4767 panjang:
                                                   1 b'A'
                            blok
('192.168.122.19', 59599)
                                                   1 b'\xf4'
                            blok
                                  4768 panjang:
                                                   1 b'\x80'
('192.168.122.19', 59599)
                            blok
                                  4769 panjang:
('192.168.122.19', 59599)
                                  4770 panjang:
                                                   1 b'\xc8'
                            blok
('192.168.122.19', 59599)
                            blok
                                  4771 panjang:
                                                   1 b'\xfb'
                                                   1 b'\xc8'
('192.168.122.19', 59599)
                                  4772 panjang:
                            blok
('192.168.122.19', 59599)
                                                   1 b'\xe7'
                            blok
                                  4773 panjang:
('192.168.122.19', 59599)
('192.168.122.19', 59599)
                                                   1 b'J'
                            blok
                                  4774 panjang:
                            blok
                                  4775 panjang:
                                                   1 b'\x18'
('192.168.122.19', 59599)
                                  4776 panjang:
                                                   1 b'\x8b'
                            blok
('192.168.122.19', 59599)
                                  4777 panjang:
                                                   1 b'('
                            blok
('192.168.122.19', 59599)
                                                   1 b"'"
                            blok
                                  4778 panjang:
('192.168.122.19', 59599)
                            blok
                                  4779 panjang:
                                                   1 b'\xc0'
('192.168.122.19', 59599)
                            blok
                                  4780 panjang:
                                                   1 b'\xf9'
('192.168.122.19', 59599)
                            blok
                                  4781 panjang:
                                                   1 b'\x18'
('192.168.122.19', 59599)
                            blok
                                  4782 panjang:
                                                   1 b'\xc3'
('192.168.122.19', 59599)
                            blok
                                  4783 panjang:
                                                   1 b'\x83'
('192.168.122.19', 59599)
                                                   1 b'\xe4'
                            blok
                                  4784 panjang:
('192.168.122.19', 59599)
                                  4785 panjang:
                            blok
                                                   1 b'p'
('192.168.122.19', 59599)
                                  4786 panjang:
                                                   1 b'x'
                            blok
                                  4787 panjang:
('192.168.122.19', 59599)
                            blok
                                                   1 b'\x0f'
('192.168.122.19', 59599)
                            blok
                                  4788 panjang:
                                                   1 b'\xff'
('192.168.122.19', 59599)
                            blok 4789 panjang:
                                                   1 b'\xd9'
```

NRP: 05111840000161 Multithread:

• Multi\_thread.py – Alpine 2

```
×
 < alpine-1
                          alpine-2
                                                 alpine-3
                                                          ×
b'\x80' terkirim 12351 of 12371
b'\xc8' terkirim 12352 of 12371
b'\xfb' terkirim 12353 of 12371
b'\xc8' terkirim 12354 of 12371
b'\xe7' terkirim 12355 of 12371
b'J' terkirim 12356 of 12371
b'\x18' terkirim 12357 of 12371
b'\x8b' terkirim 12358 of 12371
b'(' terkirim 12359 of 12371
b"'" terkirim 12360 of 12371
b'\xc0' terkirim 12361 of 12371
b'\xf9' terkirim 12362 of 12371
b'\x18' terkirim 12363 of 12371
b'\xc3' terkirim 12364 of 12371
b'\x83' terkirim 12365 of 12371
b'\xe4' terkirim 12366 of 12371
b'p' terkirim 12367 of 12371
b'x' terkirim 12368 of 12371
b'\x0f' terkirim 12369 of 12371
b'\xff' terkirim 12370 of 12371
b'\xd9' terkirim 12371 of 12371
Waktu TOTAL yang dibutuhkan 0:00:00.621032 detik 2021-07-03 13:39:44.439821 s/d
2021-07-03 13:39:45.060853
/Pemrograman Jaringan D/progjar3/Tugas 3 #
```

• Multi\_thread.py – Alpine 1

```
< :ole
                      alpine-1
                                                                                                       ×
                                  ×
                                                  alpine-2
                                                                               al<sub>|</sub> >
                                                              X
('192.168.122.19', 33663)
('192.168.122.19', 33663)
('192.168.122.19', 33663)
                                   blok
                                           2913 panjang : 1 b'P'
                                                                 1 b'\x80'
                                   blok
                                            2914 panjang:
                                                                 1 b'\x8f'
                                   blok
                                           2915 panjang:
('192.168.122.19', 33663)
('192.168.122.19', 33663)
('192.168.122.19', 33663)
('192.168.122.19', 33663)
                                                                 1 b'\x84'
                                           2916 panjang :
                                   blok
                                                                 1 b'\x80'
                                   blok
                                            2917 panjang:
                                                                 1 b'\x01'
                                            2918 panjang
                                   blok
('192.168.122.19', 33663)
                                   blok
                                            2919 panjang:
                                                                 1 b'q'
('192.168.122.19', 33663)
('192.168.122.19', 33663)
('192.168.122.19', 33663)
                                            2920 panjang:
                                   blok
                                                                 1 b'\xa4'
                                                                   b'>'
                                   blok
                                            2921 panjang
                                   blok
                                            2922 panjang:
                                                                 1 b'\xe2'
('192.168.122.19', 33663)
('192.168.122.19', 33663)
                                                                 1 b';'
                                           2923 panjang:
                                   blok
                                                                   b'\xd0'
                                   blok
                                            2924 panjang:
('192.168.122.19', 33663)
                                           2925 panjang:
                                                                 1 b'|'
                                   blok
('192.168.122.19', 33663)
                                                                   b'\xd8'
                                   blok
                                            2926 panjang:
('192.168.122.19', 33663)
('192.168.122.19', 33663)
('192.168.122.19', 33663)
('192.168.122.19', 33663)
                                                                 1 b'@'
                                   blok
                                            2927 panjang :
                                           2928 panjang
                                                                 1 b'D'
                                   blok
                                                                 1 b'\x93'
                                   blok
                                            2929 panjang:
('192.168.122.19', 33663)
                                                                 1 b'\xb9'
                                   blok
                                            2930 panjang:
('192.168.122.19', 33663)
                                                                 1 b'A'
                                   blok
                                            2931 panjang
('192.168.122.19', 33663)
                                                                 1 b'\xf4'
                                   blok
                                            2932 panjang:
('192.168.122.19', 33663)
                                            2933 panjang:
                                                                 1 b'\x80'
                                   blok
('192.168.122.19', 33663)
('192.168.122.19', 33663)
                                                                 1 b'\xc8'
                                   blok
                                            2934 panjang:
                                                                 1 b'\xfb'
                                   blok
                                           2935 panjang :
```

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• Multi\_thread.py – Alpine 3

```
×
  < alpine-1
                                   alpine-2
                                               ×
                                                                alpine-3
                                                                            ×
('192.168.122.19', 34010)
('192.168.122.19', 34010)
                                     blok
                                             2945 panjang :
                                                                   1 b'\x0e'
                                                                  1 b'\x14'
                                             2946 panjang :
                                     blok
('192.168.122.19', 34010)
                                     blok
                                             2947 panjang:
                                                                  1 b'P'
('192.168.122.19', 34010)
('192.168.122.19', 34010)
('192.168.122.19', 34010)
('192.168.122.19', 34010)
                                                                   1 b'x'
                                     blok
                                             2948 panjang:
                                             2949 panjang :
                                     blok
                                                                   1 b'A'
                                             2950 panjang
                                                                   1 b'\x10'
                                     blok
('192.168.122.19', 34010)
                                             2951 panjang :
                                                                   1 b'J'
                                     blok
('192.168.122.19', 34010)
                                                                   1 b'\xa8'
                                     blok
                                             2952 panjang:
('192.168.122.19', 34010)
('192.168.122.19', 34010)
('192.168.122.19', 34010)
('192.168.122.19', 34010)
                                             2953 panjang:
                                                                   1 b'B'
                                     blok
                                                                    1 b'\x92'
                                     blok
                                             2954 panjang:
                                                                   1 b'\x8c'
                                     blok
                                             2955 panjang:
('192.168.122.19', 34010)
                                                                   1 b'\x92'
                                     blok
                                             2956 panjang:
('192.168.122.19', 34010)
('192.168.122.19', 34010)
('192.168.122.19', 34010)
('192.168.122.19', 34010)
                                             2957 panjang :
                                                                   1 b'\xc9'
                                     blok
                                                                      b'\x04'
                                     blok
                                             2958 panjang
                                                                    1
                                                                   1 b'|'
                                     blok
                                             2959 panjang
('192.168.122.19', 34010)
                                                                   1 b'K'
                                     blok
                                             2960 panjang:
('192.168.122.19', 34010)
                                             2961 panjang:
                                                                   1 b'\xe3'
                                     blok
('192.168.122.19', 34010)
('192.168.122.19', 34010)
                                     blok
                                             2962 panjang:
                                                                   1
                                                                      b'3'
                                                                   1 b'\xc0'
                                             2963 panjang:
                                     blok
('192.168.122.19', 34010)
                                     blok
                                             2964 panjang:
                                                                   1 b's'
('192.168.122.19', 34010)
('192.168.122.19', 34010)
('192.168.122.19', 34010)
                                                                   1 b' '
                                             2965 panjang:
                                     blok
                                     blok 2966 panjang:
blok 2967 panjang:
                                                                   1 b'\x1c'
                                                                   1 b'\xc2'
```

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Multiprocess Asynchronous:

• Multi\_process\_async.py – Alpine 2

```
×
  < alpine-1
                            alpine-2
                                     ×
                                                   alpine-3
                                                            X
b'\xfb' terkirim 12353 of 12371
b'\xc8' terkirim 12354 of 12371
b'\xe7' terkirim 12355 of 12371
b'J' terkirim 12356 of 12371
b'\x18' terkirim 12357 of 12371
b'\x8b' terkirim 12358 of 12371
b'(' terkirim 12359 of 12371
b"'" terkirim 12360 of 12371
b'\xc0' terkirim 12361 of 12371
b'\xf9' terkirim 12362 of 12371
b'\x18' terkirim 12363 of 12371
b'\xc3' terkirim 12364 of 12371
b'\x83' terkirim 12365 of 12371
b'\xe4' terkirim 12366 of 12371
b'p' terkirim 12367 of 12371
b'x' terkirim 12368 of 12371
b'\x0f' terkirim 12369 of 12371
b'\xff' terkirim 12370 of 12371
b'\xd9' terkirim 12371 of 12371
Waktu TOTAL yang dibutuhkan 0:00:00.858528 detik 2021-07-03 13:41:41.847440 s/d
2021-07-03 13:41:42.705968
status TASK
{'ip1': None, 'ip2': None}
/Pemrograman Jaringan_D/progjar3/Tugas_3 #
```

Multi\_process\_async.py – Alpine 1

```
alpine-1
                                                                                               ×
  < :ole
                               ×
                                              alpine-2
                                                                        alı >
                                                         ×
('192.168.122.19', 43840)
                                blok 4104 panjang: 1 b'A'
                                blok 4105 panjang: 1 b'\xf4'
('192.168.122.19', 43840)
('192.168.122.19', 43840)
                                        4106 panjang : 1 b'\x80'
                                blok
('192.168.122.19', 43840)
('192.168.122.19', 43840)
('192.168.122.19', 43840)
                                        4107 panjang : 1 b'\xc8'
                                blok
                                        4108 panjang:
                                                            1 b'\xfb'
                                blok
                                                            1 b'\xc8'
                                 blok
                                        4109 panjang
                                 blok
                                                            1 b'\xe7'
('192.168.122.19', 43840)
                                        4110 panjang:
('192.168.122.19', 43840)
                                 blok
                                        4111 panjang:
                                                            1 b'J'
('192.168.122.19', 43840)
('192.168.122.19', 43840)
('192.168.122.19', 43840)
('192.168.122.19', 43840)
                                        4112 panjang :
                                                           1 b'\x18'
                                 blok
                                 blok
                                        4113 panjang:
                                                            1 b'\x8b'
                                                            1 b'('
                                 blok
                                        4114 panjang:
('192.168.122.19', 43840)
                                                            1 b"'"
                                 blok
                                        4115 panjang :
('192.168.122.19', 43840)
                                                           1 b'\xc0'
                                 blok
                                       4116 panjang :
('192.168.122.19', 43840)
                                                           1 b'\xf9'
                                blok
                                       4117 panjang:
('192.168.122.19', 43840)
('192.168.122.19', 43840)
                                 blok
                                        4118 panjang:
                                                            1 b'\x18'
                                                            1 b'\xc3'
                                 blok
                                        4119 panjang:
                                                            1 b'\x83'
('192.168.122.19', 43840)
                                        4120 panjang:
                                 blok
                                                            1 b'\xe4'
('192.168.122.19', 43840)
                                 blok
                                        4121 panjang:
('192.168.122.19', 43840)
('192.168.122.19', 43840)
('192.168.122.19', 43840)
('192.168.122.19', 43840)
('192.168.122.19', 43840)
                                        4122 panjang:
                                 blok
                                                            1 b'p'
                                 blok
                                                           1 b'x'
                                        4123 panjang :
                                 blok
                                        4124 panjang:
                                                            1 b'\x0f'
                                                            1 b'\xff'
                                blok 4125 panjang:
('192.168.122.19', 43840)
                                blok 4126 panjang: 1 b'\xd9'
```

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• Multi\_process\_async.py – Alpine 3

```
< alpine-1
                 ×
                                  alpine-2
                                                                alpine-3
                                                                            ×
                                                                                                           ×
('192.168.122.19', 35346)
                                     blok
                                              4046 panjang :
                                                                   1 b'\x93'
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
                                     blok
                                              4047 panjang : 1 b'\xb9'
                                              4048 panjang:
                                     blok
                                                                   1 b'A'
                                              4049 panjang:
                                                                    1 b'\xf4'
                                     blok
                                                                    1 b'\x80'
                                     blok
                                              4050 panjang:
('192.168.122.19', 35346)
                                                                   1 b'\xc8'
                                     blok
                                              4051 panjang:
('192.168.122.19', 35346)
                                                                    1 b'\xfb'
                                     blok
                                              4052 panjang:
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
                                              4053 panjang:
                                     blok
                                                                    1 b'\xc8'
                                                                    1 b'\xe7'
1 b'J'
                                     blok
                                              4054 panjang:
                                              4055 panjang
                                     blok
('192.168.122.19', 35346)
                                     blok
                                             4056 panjang:
                                                                    1 b'\x18'
('192.168.122.19', 35346)
                                                                    1 b'\x8b'
                                     blok
                                              4057 panjang:
('192.168.122.19', 35346)
                                                                   1 b'('
                                             4058 panjang:
                                     blok
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
                                                                   1 b"'"
                                     blok
                                             4059 panjang:
                                                                    1 b'\xc0'
                                     blok
                                              4060 panjang:
                                                                    1 b'\xf9'
                                     blok
                                              4061 panjang :
('192.168.122.19', 35346)
                                                                    1 b'\x18'
                                     blok
                                              4062 panjang:
('192.168.122.19', 35346)
                                                                    1 b'\xc3'
                                     blok
                                              4063 panjang:
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
('192.168.122.19', 35346)
                                     blok
                                             4064 panjang:
                                                                   1 b'\x83'
                                             4065 panjang:
                                                                   1 b'\xe4'
                                     blok
                                             4066 panjang : 1 b'p'
4067 panjang : 1 b'x'
                                     blok
                                     blok
('192.168.122.19', 35346)
                                     blok
                                             4068 panjang : 1 b'\x0f'
```

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#### Multithread Asynchronous:

• Multi\_thread\_async.py – Alpine 2

```
×
 < alpine-1
                          alpine-2
             ×
                                                 alpine-3
                                                          ×
b'\xfb' terkirim 12353 of 12371
b'\xc8' terkirim 12354 of 12371
b'\xe7' terkirim 12355 of 12371
b'J' terkirim 12356 of 12371
b'\x18' terkirim 12357 of 12371
b'\x8b' terkirim 12358 of 12371
b'(' terkirim 12359 of 12371
b"'" terkirim 12360 of 12371
b'\xc0' terkirim 12361 of 12371
b'\xf9' terkirim 12362 of 12371
b'\x18' terkirim 12363 of 12371
b'\xc3' terkirim 12364 of 12371
b'\x83' terkirim 12365 of 12371
b'\xe4' terkirim 12366 of 12371
b'p' terkirim 12367 of 12371
b'x' terkirim 12368 of 12371
b'\x0f' terkirim 12369 of 12371
b'\xff' terkirim 12370 of 12371
b'\xd9' terkirim 12371 of 12371
Waktu TOTAL yang dibutuhkan 0:00:00.662029 detik 2021-07-03 13:43:17.407988 s/d
2021-07-03 13:43:18.070017
hasil task yang dijalankan
{'ip1': None, 'ip2': None}
/Pemrograman Jaringan D/progjar3/Tugas 3 #
```

• Multi thread async.py – Alpine 1

```
alpine-1
                            ×
                                         alpine-2
                                                                alı >
                                                                                    ×
  < :ole
                                                   X
('192.168.122.19', 45122)
                             blok
                                    3164 panjang :
                                                     1 b'A'
('192.168.122.19', 45122)
                                    3165 panjang:
                             blok
                                                     1 b'\xf4'
('192.168.122.19', 45122)
                             blok
                                   3166 panjang:
                                                     1 b'\x80'
('192.168.122.19', 45122)
                             blok
                                   3167 panjang :
                                                     1 b'\xc8'
('192.168.122.19', 45122)
                                   3168 panjang:
                                                     1 b'\xfb'
                             blok
('192.168.122.19', 45122)
                             blok
                                   3169 panjang :
                                                     1 b'\xc8'
('192.168.122.19', 45122)
                             blok
                                   3170 panjang : 1 b'\xe7'
('192.168.122.19', 45122)
                             blok
                                   3171 panjang : 1 b'J'
('192.168.122.19', 45122)
                             blok
                                   3172 panjang:
                                                     1 b'\x18'
('192.168.122.19', 45122)
                             blok
                                    3173 panjang:
                                                     1 b'\x8b'
('192.168.122.19', 45122)
('192.168.122.19', 45122)
('192.168.122.19', 45122)
                             blok
                                    3174 panjang:
                                                     1 b'('
                                                     1 b"'"
                             blok
                                    3175 panjang:
                             blok
                                    3176 panjang:
                                                     1 b'\xc0'
('192.168.122.19', 45122)
                                   3177 panjang:
                             blok
                                                     1 b'\xf9'
('192.168.122.19', 45122)
                                   3178 panjang:
                                                     1 b'\x18'
                             blok
('192.168.122.19', 45122)
                             blok
                                   3179 panjang:
                                                     1 b'\xc3'
('192.168.122.19', 45122)
                                   3180 panjang:
                             blok
                                                     1 b'\x83'
('192.168.122.19', 45122)
                                   3181 panjang:
                                                     1 b'\xe4'
                             blok
('192.168.122.19', 45122)
                                   3182 panjang:
                             blok
                                                     1 b'p'
('192.168.122.19', 45122)
                                                     1 b'x'
                             blok
                                   3183 panjang:
('192.168.122.19', 45122)
('192.168.122.19', 45122)
('192.168.122.19', 45122)
                             blok
                                    3184 panjang:
                                                     1 b'\x0f'
                             blok
                                    3185 panjang:
                                                     1 b'\xff'
                                                     1 b'\xd9'
                            blok 3186 panjang :
```

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• Multi\_thread\_async.py – Alpine 3

```
×
  < alpine-1
                                alpine-2
                                                           alpine-3
                                                                      ×
('192.168.122.19', 33319)
('192.168.122.19', 33319)
('192.168.122.19', 33319)
('192.168.122.19', 33319)
                                  blok
                                          3081 panjang:
                                                              1 b'\x06'
                                  blok
                                          3082 panjang:
                                                              1 b'\x89'
                                                              1 b'9'
                                  blok
                                          3083 panjang:
                                                              1 b'\x00'
                                  blok
                                          3084 panjang:
('192.168.122.19', 33319)
                                  blok
                                                              1 b' '
                                          3085 panjang:
('192.168.122.19', 33319)
                                                              1 b'\x17'
                                  blok
                                          3086 panjang:
('192.168.122.19', 33319)
('192.168.122.19', 33319)
('192.168.122.19', 33319)
                                          3087 panjang:
                                                              1 b'\xe8'
                                  blok
                                          3088 panjang:
                                  blok
                                                              1 b'\x17'
                                                              1 b'z'
                                  blok
                                          3089 panjang
('192.168.122.19', 33319)
                                                              1 b'\x06'
                                          3090 panjang:
                                  blok
('192.168.122.19', 33319)
                                                              1 b'\xd5'
                                  blok
                                          3091 panjang:
('192.168.122.19', 33319)
                                          3092 panjang:
                                                              1 b'\x12'
                                  blok
('192.168.122.19', 33319)
('192.168.122.19', 33319)
('192.168.122.19', 33319)
('192.168.122.19', 33319)
                                  blok
                                          3093 panjang:
                                                              1 b'\x84'
                                                                 b'\x0e'
                                          3094 panjang:
                                  blok
                                                              1 b'"
                                  blok
                                          3095 panjang
('192.168.122.19', 33319)
                                                              1 b'\x84'
                                  blok
                                          3096 panjang:
('192.168.122.19', 33319)
                                  blok
                                          3097 panjang:
('192.168.122.19', 33319)
('192.168.122.19', 33319)
('192.168.122.19', 33319)
('192.168.122.19', 33319)
                                  blok
                                          3098 panjang:
                                                              1 b'X'
                                  blok
                                          3099 panjang:
                                                              1 b'@'
                                                              1 b'\x14'
                                  blok
                                          3100 panjang
                                                              1 b'\x03'
('192.168.122.19', 33319)
                                  blok
                                          3101 panjang:
('192.168.122.19', 33319)
                                                              1 b'\x1f'
                                  blok
                                          3102 panjang:
 '192.168.122.19', 33319)
                                                              1 b'\x03'
                                  blok
                                          3103 panjang:
```

## Kesimpulan:

Diperoleh kecepatan processing untuk masing – masing script sebagai berikut:

Multiprocess: 0.0884669 detikMultithread: 0.0621032 detik

• Multiprocess Asynchronous: 0.0858528 detik

• Multithread Asynchronous: 0.0662029 detik

Sehingga, dapat disimpulkan bahwa *script* yang berjalan lebih cepat merupakan *script* yang menggunakan pendekatan **Multithread**