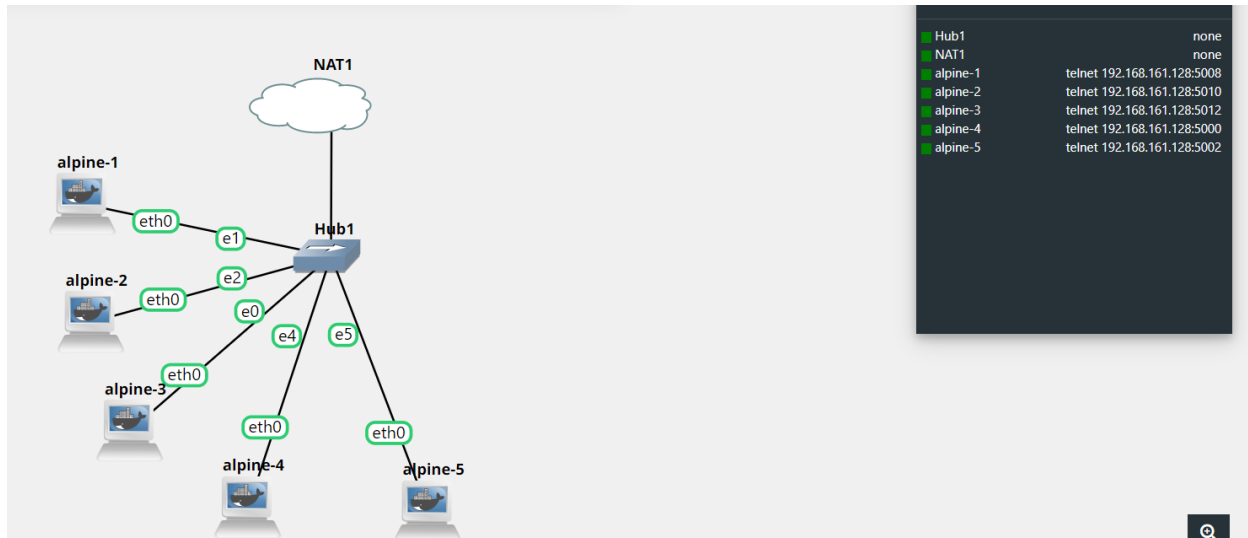


Kasus yang akan diuji disini adalah menjadikan alpine-1 sebagai client atau pengirim yang akan mengirim ke 4 penerima sekaligus yaitu alpine-2,3,4,5 menggunakan udp file dari progjar2. Pada alpine-1 akan dijalankan

1. multi thread
2. multi thread asynchronous
3. multi process
4. multi process asynchronous

Berikut Arsitekturnya



Mengambil informasi route dan nameserver dari alpine-1

```
alpine-1 console is now available... Press RETURN to get started.
udhcpc (v1.24.2) started
Sending discover...
Sending discover...
Sending discover...
Sending discover...
Sending discover...
udhcpc failed to get a DHCP lease
No lease, forking to background
ok
/ # cat /etc/resolv.conf
nameserver 192.168.122.1
/ # route -n
Kernel IP routing table
Destination      Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0          192.168.122.1  0.0.0.0         UG    209    0      0 eth0
192.168.122.0    0.0.0.0        255.255.255.0   U     0      0      0 eth0
/ #
```

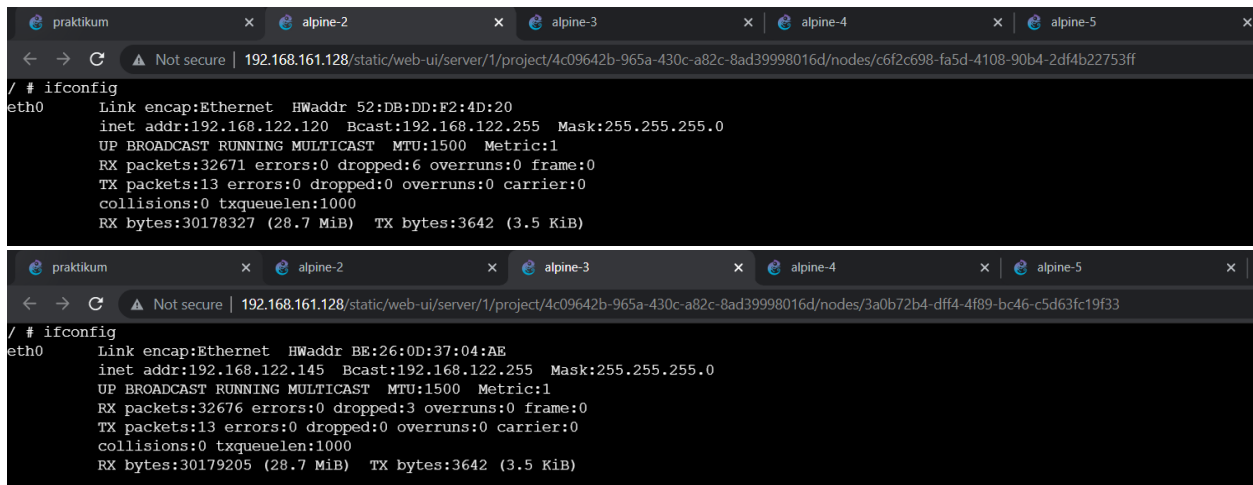
Untuk diterapkan pada alpine-4 dan 5 agar bisa terhubung ke internet dan mendapatkan ip

```
alpine-5 console is now available... Press RETURN to get started.  
ok  
/ # ifconfig eth0 192.168.122.113 netmask 255.255.255.0 up  
/ # route add default gw 192.168.122.1  
/ # echo "nameserver 192.168.122.1" > /etc/resolv.conf  
/ # ping 8.8.8.8  
PING 8.8.8.8 (8.8.8.8): 56 data bytes  
64 bytes from 8.8.8.8: seq=0 ttl=127 time=22.281 ms  
64 bytes from 8.8.8.8: seq=1 ttl=127 time=21.718 ms  
64 bytes from 8.8.8.8: seq=2 ttl=127 time=24.397 ms  
^Z  
--- 8.8.8.8 ping statistics ---  
3 packets transmitted, 3 packets received, 0% packet loss  
round-trip min/avg/max = 21.718/22.798/24.397 ms  
/ #
```

Tambahan command agar git bisa diakses

```
/ # git config --global --unset http.proxy  
/ # git config --global --unset https.proxy
```

Mengambil IP Address dari alpine-2,3,4,5 untuk target di library



The screenshot shows two terminal windows side-by-side. The top window is titled 'alpine-2' and shows the output of the 'ifconfig' command for the 'eth0' interface. The bottom window is titled 'alpine-5' and also shows the output of the 'ifconfig' command for the 'eth0' interface. Both windows show the IP address, netmask, and other network statistics.

```
alpine-2  
/ # ifconfig  
eth0      Link encap:Ethernet  HWaddr 52:DB:DD:F2:4D:20  
          inet addr:192.168.122.120 Bcast:192.168.122.255 Mask:255.255.255.0  
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1  
          RX packets:32671 errors:0 dropped:6 overruns:0 frame:0  
          TX packets:13 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0 txqueuelen:1000  
          RX bytes:30178327 (28.7 MiB)  TX bytes:3642 (3.5 KiB)  
  
alpine-5  
/ # ifconfig  
eth0      Link encap:Ethernet  HWaddr BE:26:0D:37:04:AE  
          inet addr:192.168.122.145 Bcast:192.168.122.255 Mask:255.255.255.0  
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1  
          RX packets:32676 errors:0 dropped:3 overruns:0 frame:0  
          TX packets:13 errors:0 dropped:0 overruns:0 carrier:0  
          collisions:0 txqueuelen:1000  
          RX bytes:30179205 (28.7 MiB)  TX bytes:3642 (3.5 KiB)
```

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```
praktikum x alpine-2 x alpine-3 x alpine-4 x alpine-5
< > ↻ Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/e721cb39-3b4d-4f47-a358-1749be4975a5
/ # ifconfig
eth0      Link encap:Ethernet  HWaddr 8A:0E:75:0A:83:49
          inet addr:192.168.122.97  Bcast:192.168.122.255  Mask:255.255.255.0
          inet6 addr: fe80::880e:75ff:fe0a:8349/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:505 errors:0 dropped:0 overruns:0 frame:0
          TX packets:13 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:26608 (25.9 KiB)  TX bytes:1006 (1006.0 B)

praktikum x alpine-2 x alpine-3 x alpine-4 x alpine-5
< > ↻ Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/63c5b9aa-f17b-47d8-af15-6bf77b4d5fcf
/ # ifconfig
eth0      Link encap:Ethernet  HWaddr 66:92:8E:FD:D8:17
          inet addr:192.168.122.113  Bcast:192.168.122.255  Mask:255.255.255.0
          inet6 addr: fe80::6492:8eff:fe0a:d817/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:503 errors:0 dropped:0 overruns:0 frame:0
          TX packets:14 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:26486 (25.8 KiB)  TX bytes:1076 (1.0 KiB)
```

Library.py untuk menyimpan ip target dan fungsi send_file

```
library.py x
7
8  def get_targets():
9      targets = dict()
10     targets[
11         'rec1'] = '192.168.122.120'
12     targets['rec2'] = '192.168.122.145'
13     targets['rec3'] = '192.168.122.97'
14     targets['rec4'] = '192.168.122.113'
15     return targets
16
17
18  def send_file(ip):
19      waktu_awal = datetime.datetime.now()
20      sock = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
21
22      namafile = "bart.png"
23      ukuran = os.stat(namafile).st_size
24
25      fp = open('bart.png', 'rb')
26      k = fp.read()
27      ter kirim = 0
28      for x in k:
29          k_bytes = bytes([x])
30          sock.sendto(k_bytes, (ip, 5005))
31          ter kirim = ter kirim + 1
32          print(k_bytes, f"ter kirim {ter kirim} of {ukuran} ")
33      waktu_process = datetime.datetime.now() - waktu_awal
34      waktu_akhir = datetime.datetime.now()
35      logging.warning(f"writing {namafile} dalam waktu {waktu_process} {waktu_awal} s/d {waktu_akhir}")
```

Udpfilereceiver.py untuk dijalankan di penerima

```
1 import socket
2
3
4 SERVER_IP = '0.0.0.0'
5 SERVER_PORT = 5005
6 NAMAFILE='barthasilkirim.png'
7
8 sock = socket.socket(socket.AF_INET, socket.SOCK_DGRAM)
9 sock.bind((SERVER_IP, SERVER_PORT))
10
11 fp = open(NAMAFILE,'wb+')
12 ditulis=0
13
14 counter=0
15 while True:
16     data, addr = sock.recvfrom(1024)
17     counter=counter+len(data)
18     print(addr," blok ", counter,"panjang : ",len(data), data)
19     fp.write(data)
20
21
22 fp.close()
```

Hasil setelah dijalankan multi_thread

Multi_thread

```
9 def send_semua():
10     texec = dict()
11     targets = get_targets()
12
13     catat_awal = datetime.datetime.now()
14     for k in targets:
15         print(f"mengirim ke {k} di {targets[k]}")
16         # waktu = time.time()
17         #bagian ini merupakan bagian yang menginstruksikan eksekusi fungsi send gambar secara multithread
18         texec[k] = threading.Thread(target=send_file, args=(targets[k],))
19         texec[k].start()
20
21     #setelah menyelesaikan tugasnya, dikembalikan ke main thread dengan join
22     for k in targets:
23         texec[k].join()
24
25     catat_akhir = datetime.datetime.now()
26     selesai = catat_akhir - catat_awal
27     print(f"Waktu TOTAL yang dibutuhkan {selesai} detik {catat_awal} s/d {catat_akhir}")
28
29     #fungsi download_gambar akan dijalankan secara multithreading
30
31
32 if __name__ == '__main__':
33     send_semua()
```

Alpine-1

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Pemrograman Jaringan D – Tugas Praktikkum 3

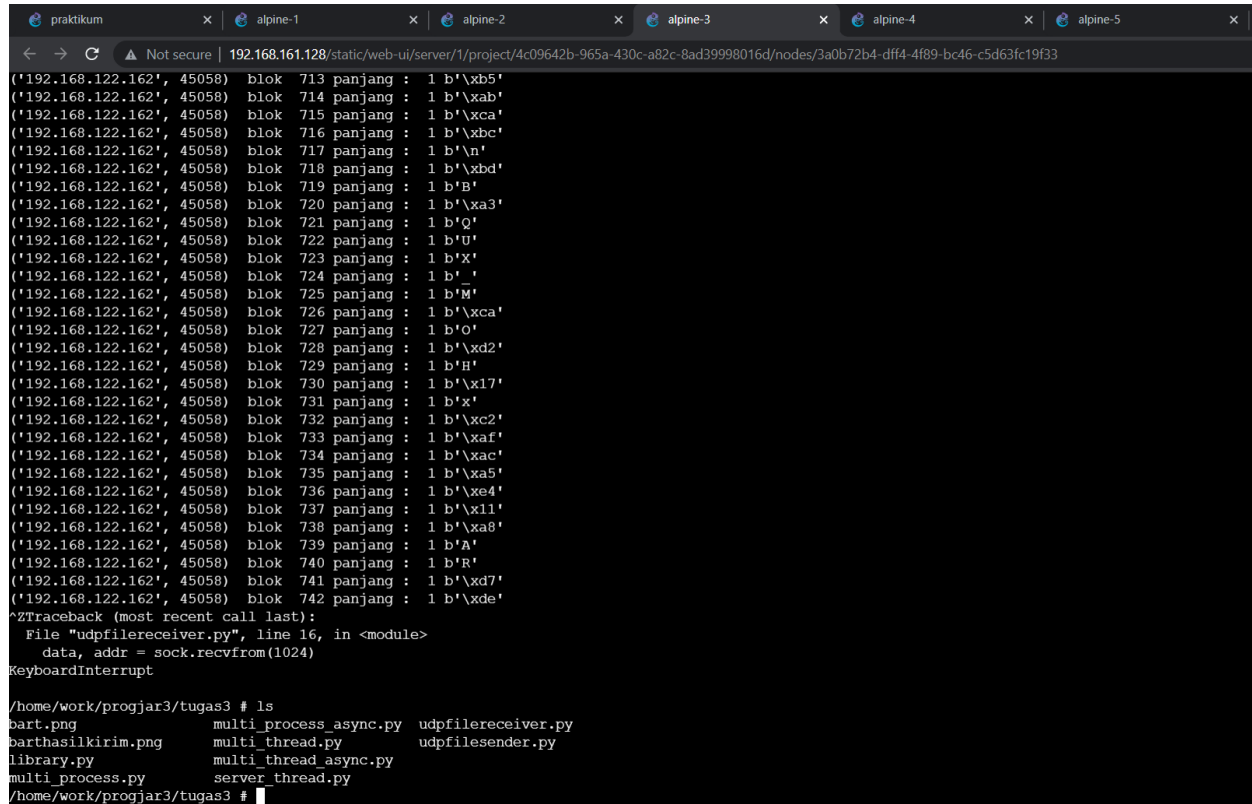
```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5 x
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/f8670367-7a09-4fa3-9f3c-fa55cf3164cc
b'G' terkirim 6729 of 6766
b'\x1e' terkirim 6730 of 6766
b'y' terkirim 6731 of 6766
b'\xe4' terkirim 6732 of 6766
b'\x91' terkirim 6733 of 6766
b'G' terkirim 6734 of 6766
b'\x1e' terkirim 6735 of 6766
b'y' terkirim 6736 of 6766
b'\xe4' terkirim 6737 of 6766
b'\x91' terkirim 6738 of 6766
b'G' terkirim 6739 of 6766
b'\x1e' terkirim 6740 of 6766
b'y' terkirim 6741 of 6766
b'\xfc' terkirim 6742 of 6766
b'\x7f' terkirim 6743 of 6766
b'\xc0' terkirim 6744 of 6766
b'\xff' terkirim 6745 of 6766
b'\x01' terkirim 6746 of 6766
b'\xba' terkirim 6747 of 6766
b'\xa1' terkirim 6748 of 6766
b'\xac' terkirim 6749 of 6766
b'm' terkirim 6750 of 6766
b'\xa6' terkirim 6751 of 6766
b'\xc5' terkirim 6752 of 6766
b'\xad' terkirim 6753 of 6766
b'\xd1' terkirim 6754 of 6766
b'\x00' terkirim 6755 of 6766
b'\x00' terkirim 6756 of 6766
b'\x00' terkirim 6757 of 6766
b'\x00' terkirim 6758 of 6766
b'I' terkirim 6759 of 6766
b'E' terkirim 6760 of 6766
b'N' terkirim 6761 of 6766
b'D' terkirim 6762 of 6766
b'\xae' terkirim 6763 of 6766
b'B' terkirim 6764 of 6766
b'' terkirim 6765 of 6766
b'\x82' terkirim 6766 of 6766
WARNING:root:writing bart.png dalam waktu 0:00:01.414737 2021-06-23 18:59:57.309423 s/d 2021-06-23 18:59:58.724165
Waktu TOTAL yang dibutuhkan 0:00:01.427802 detik 2021-06-23 18:59:57.296625 s/d 2021-06-23 18:59:58.724427
```

Alpine-2

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5 x
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/c6f2c698-fa5d-4108-90b4-2df4b22753ff
('192.168.122.162', 57735) blok 773 panjang : 1 b'\x9f'
('192.168.122.162', 57735) blok 774 panjang : 1 b'\xda'
('192.168.122.162', 57735) blok 775 panjang : 1 b'M'
('192.168.122.162', 57735) blok 776 panjang : 1 b'\xee'
('192.168.122.162', 57735) blok 777 panjang : 1 b'n'
('192.168.122.162', 57735) blok 778 panjang : 1 b'N'
('192.168.122.162', 57735) blok 779 panjang : 1 b'\xd0'
('192.168.122.162', 57735) blok 780 panjang : 1 b'\x19'
('192.168.122.162', 57735) blok 781 panjang : 1 b't'
('192.168.122.162', 57735) blok 782 panjang : 1 b'p'
('192.168.122.162', 57735) blok 783 panjang : 1 b'\xcf'
('192.168.122.162', 57735) blok 784 panjang : 1 b'\x1f'
('192.168.122.162', 57735) blok 785 panjang : 1 b's'
('192.168.122.162', 57735) blok 786 panjang : 1 b'\xb2'
('192.168.122.162', 57735) blok 787 panjang : 1 b'\xf6'
('192.168.122.162', 57735) blok 788 panjang : 1 b'\xd0'
('192.168.122.162', 57735) blok 789 panjang : 1 b'\xe0'
('192.168.122.162', 57735) blok 790 panjang : 1 b'\xbd'
('192.168.122.162', 57735) blok 791 panjang : 1 b'P'
('192.168.122.162', 57735) blok 792 panjang : 1 b'q'
('192.168.122.162', 57735) blok 793 panjang : 1 b'\x15'
('192.168.122.162', 57735) blok 794 panjang : 1 b'o'
('192.168.122.162', 57735) blok 795 panjang : 1 b'\x1c'
('192.168.122.162', 57735) blok 796 panjang : 1 b'\xf8'
('192.168.122.162', 57735) blok 797 panjang : 1 b'\x8d'
('192.168.122.162', 57735) blok 798 panjang : 1 b'F'
('192.168.122.162', 57735) blok 799 panjang : 1 b'\x87'
('192.168.122.162', 57735) blok 800 panjang : 1 b't'
('192.168.122.162', 57735) blok 801 panjang : 1 b'\xc0'
('192.168.122.162', 57735) blok 802 panjang : 1 b'\x11'
^ZTraceback (most recent call last):
  File "udpfilerreceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
KeyboardInterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilerreceiver.py
barthasilkirim.png multi_thread.py         udpfilesender.py
library.py        multi_thread_async.py
multi_process.py  server_thread.py
/home/work/progjar3/tugas3 #
```

Alpine-3



The screenshot shows a web browser with multiple tabs labeled 'praktikum', 'alpine-1', 'alpine-2', 'alpine-3', 'alpine-4', and 'alpine-5'. The active tab 'alpine-3' displays a web page with a list of 32 data blocks. Each block contains a timestamp ('192.168.122.162', 45058), a block number (blok 713 to 742), and a length (panjang : 1). The data values are hexadecimal strings representing ASCII characters. Below the list, a traceback error is shown, indicating a 'KeyboardInterrupt' in the 'udpfilereceiver.py' file. At the bottom, a terminal window displays the contents of a directory named 'tugas3', listing files like 'bart.png', 'barthasilkirim.png', 'library.py', 'multi_process.py', 'multi_process_async.py', 'multi_thread.py', 'multi_thread_async.py', 'server_thread.py', and 'udpfilereceiver.py'.

```
('192.168.122.162', 45058) blok 713 panjang : 1 b'\xb5'  
(('192.168.122.162', 45058) blok 714 panjang : 1 b'\xab'  
(('192.168.122.162', 45058) blok 715 panjang : 1 b'\xca'  
(('192.168.122.162', 45058) blok 716 panjang : 1 b'\xbc'  
(('192.168.122.162', 45058) blok 717 panjang : 1 b'\n'  
(('192.168.122.162', 45058) blok 718 panjang : 1 b'\xbd'  
(('192.168.122.162', 45058) blok 719 panjang : 1 b'B'  
(('192.168.122.162', 45058) blok 720 panjang : 1 b'\xa3'  
(('192.168.122.162', 45058) blok 721 panjang : 1 b'Q'  
(('192.168.122.162', 45058) blok 722 panjang : 1 b'U'  
(('192.168.122.162', 45058) blok 723 panjang : 1 b'X'  
(('192.168.122.162', 45058) blok 724 panjang : 1 b' '  
(('192.168.122.162', 45058) blok 725 panjang : 1 b'M'  
(('192.168.122.162', 45058) blok 726 panjang : 1 b'\xca'  
(('192.168.122.162', 45058) blok 727 panjang : 1 b'O'  
(('192.168.122.162', 45058) blok 728 panjang : 1 b'\xd2'  
(('192.168.122.162', 45058) blok 729 panjang : 1 b'H'  
(('192.168.122.162', 45058) blok 730 panjang : 1 b'\x17'  
(('192.168.122.162', 45058) blok 731 panjang : 1 b'x'  
(('192.168.122.162', 45058) blok 732 panjang : 1 b'\xc2'  
(('192.168.122.162', 45058) blok 733 panjang : 1 b'\xaf'  
(('192.168.122.162', 45058) blok 734 panjang : 1 b'\xac'  
(('192.168.122.162', 45058) blok 735 panjang : 1 b'\xa5'  
(('192.168.122.162', 45058) blok 736 panjang : 1 b'\xe4'  
(('192.168.122.162', 45058) blok 737 panjang : 1 b'\x11'  
(('192.168.122.162', 45058) blok 738 panjang : 1 b'\xa8'  
(('192.168.122.162', 45058) blok 739 panjang : 1 b'A'  
(('192.168.122.162', 45058) blok 740 panjang : 1 b'R'  
(('192.168.122.162', 45058) blok 741 panjang : 1 b'\xd7'  
(('192.168.122.162', 45058) blok 742 panjang : 1 b'\xde'  
^ZTraceback (most recent call last):  
  File "udpfilereceiver.py", line 16, in <module>  
    data, addr = sock.recvfrom(1024)  
KeyboardInterrupt  
  
/home/work/progjar3/tugas3 # ls  
bart.png          multi_process_async.py  udpfilereceiver.py  
barthasilkirim.png multi_thread.py          udpfilesender.py  
library.py         multi_thread_async.py  
multi_process.py   server_thread.py  
/home/work/progjar3/tugas3 #
```

Alpine-4

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Pemrograman Jaringan D – Tugas Praktikum 3

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/e721cb39-3b4d-4f47-a358-1749be4975a5

('192.168.122.162', 53194) blok 491 panjang : 1 b'o'
('192.168.122.162', 53194) blok 492 panjang : 1 b'\xe0'
('192.168.122.162', 53194) blok 493 panjang : 1 b'J'
('192.168.122.162', 53194) blok 494 panjang : 1 b'\xcf'
('192.168.122.162', 53194) blok 495 panjang : 1 b'"'"
('192.168.122.162', 53194) blok 496 panjang : 1 b'\x00'
('192.168.122.162', 53194) blok 497 panjang : 1 b'g'
('192.168.122.162', 53194) blok 498 panjang : 1 b'+'
('192.168.122.162', 53194) blok 499 panjang : 1 b'"'"
('192.168.122.162', 53194) blok 500 panjang : 1 b'%'
('192.168.122.162', 53194) blok 501 panjang : 1 b'x'
('192.168.122.162', 53194) blok 502 panjang : 1 b'o'
('192.168.122.162', 53194) blok 503 panjang : 1 b'\x8a'
('192.168.122.162', 53194) blok 504 panjang : 1 b'\x1b'
('192.168.122.162', 53194) blok 505 panjang : 1 b'#'
('192.168.122.162', 53194) blok 506 panjang : 1 b'\xc9'
('192.168.122.162', 53194) blok 507 panjang : 1 b'C'
('192.168.122.162', 53194) blok 508 panjang : 1 b'n'
('192.168.122.162', 53194) blok 509 panjang : 1 b'\x1f'
('192.168.122.162', 53194) blok 510 panjang : 1 b'R'
('192.168.122.162', 53194) blok 511 panjang : 1 b'y'
('192.168.122.162', 53194) blok 512 panjang : 1 b'\xa4'
('192.168.122.162', 53194) blok 513 panjang : 1 b'\xf3'
('192.168.122.162', 53194) blok 514 panjang : 1 b' '
('192.168.122.162', 53194) blok 515 panjang : 1 b'N'
('192.168.122.162', 53194) blok 516 panjang : 1 b'\x04'
('192.168.122.162', 53194) blok 517 panjang : 1 b'w'
('192.168.122.162', 53194) blok 518 panjang : 1 b'Q'
('192.168.122.162', 53194) blok 519 panjang : 1 b'6'
('192.168.122.162', 53194) blok 520 panjang : 1 b'G'

^ZTraceback (most recent call last):
  File "udpfilereceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
KeyboardInterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilereceiver.py
barthasilkirim.png multi_thread.py          udpfilesender.py
library.py         multi_thread_async.py
multi_process.py   server_thread.py
/home/work/progjar3/tugas3 #
```

Alpine-5

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/63c5b9aa-f17b-47d8-af15-6bf77b4d5fcf

('192.168.122.162', 37129) blok 425 panjang : 1 b'\xe4'
('192.168.122.162', 37129) blok 426 panjang : 1 b'\x91'
('192.168.122.162', 37129) blok 427 panjang : 1 b'G'
('192.168.122.162', 37129) blok 428 panjang : 1 b'\x1e'
('192.168.122.162', 37129) blok 429 panjang : 1 b'y'
('192.168.122.162', 37129) blok 430 panjang : 1 b'\xfc'
('192.168.122.162', 37129) blok 431 panjang : 1 b'\x7f'
('192.168.122.162', 37129) blok 432 panjang : 1 b'\xc0'
('192.168.122.162', 37129) blok 433 panjang : 1 b'\xff'
('192.168.122.162', 37129) blok 434 panjang : 1 b'\x01'
('192.168.122.162', 37129) blok 435 panjang : 1 b'\xba'
('192.168.122.162', 37129) blok 436 panjang : 1 b'\xa1'
('192.168.122.162', 37129) blok 437 panjang : 1 b'\xac'
('192.168.122.162', 37129) blok 438 panjang : 1 b'm'
('192.168.122.162', 37129) blok 439 panjang : 1 b'\xa6'
('192.168.122.162', 37129) blok 440 panjang : 1 b'\xc5'
('192.168.122.162', 37129) blok 441 panjang : 1 b'\xad'
('192.168.122.162', 37129) blok 442 panjang : 1 b'\xd1'
('192.168.122.162', 37129) blok 443 panjang : 1 b'\x00'
('192.168.122.162', 37129) blok 444 panjang : 1 b'\x00'
('192.168.122.162', 37129) blok 445 panjang : 1 b'\x00'
('192.168.122.162', 37129) blok 446 panjang : 1 b'\x00'
('192.168.122.162', 37129) blok 447 panjang : 1 b'I'
('192.168.122.162', 37129) blok 448 panjang : 1 b'E'
('192.168.122.162', 37129) blok 449 panjang : 1 b'N'
('192.168.122.162', 37129) blok 450 panjang : 1 b'D'
('192.168.122.162', 37129) blok 451 panjang : 1 b'\xae'
('192.168.122.162', 37129) blok 452 panjang : 1 b'B'
('192.168.122.162', 37129) blok 453 panjang : 1 b''
('192.168.122.162', 37129) blok 454 panjang : 1 b'\x82'

^ZTraceback (most recent call last):
  File "udpfilereceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
KeyboardInterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilereceiver.py
barthasilkirim.png multi_thread.py          udpfilesender.py
library.py         multi_thread_async.py
multi_process.py   server_thread.py
/home/work/progjar3/tugas3 #
```

Hasil setelah dijalankan multi_thread_async dengan worker 4

Multi_thread_async

```
multi_thread_async.py
7
8
9 def send_semua():
10     texec = dict()
11     targets = get_targets()
12     status_task = dict()
13     task = concurrent.futures.ThreadPoolExecutor(max_workers=4)
14     catat_awal = datetime.datetime.now()
15     for k in targets:
16         print(f"mengirim ke {k} di {targets[k]}")
17         # waktu = time.time()
18         #bagian ini merupakan bagian yang menginstruksikan eksekusi fungsi download gambar secara multithread
19         texec[k] = task.submit(send_file, targets[k])
20
21     #setelah menyelesaikan tugasnya, dikembalikan ke main thread dengan memanggil result
22     for k in targets:
23         status_task[k]=texec[k].result()
24
25     catat_akhir = datetime.datetime.now()
26     selesai = catat_akhir - catat_awal
27     print(f"Waktu TOTAL yang dibutuhkan {selesai} detik {catat_awal} s/d {catat_akhir}")
28     print("hasil task yang dijalankan")
29     print(status_task)
30
31
32 #fungsi download_gambar akan dijalankan secara multithreading
33
34 if __name__ == '__main__':
35     send_semua()
```

Alpine-1

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5 x
192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/f8670367-7a09-4fa3-9f3c-fa55cf3164cc
p'y' terkirim 6731 of 6766
p'\xe4' terkirim 6732 of 6766
p'\x91' terkirim 6733 of 6766
p'G' terkirim 6734 of 6766
p'\x1e' terkirim 6735 of 6766
p'y' terkirim 6736 of 6766
p'\xe4' terkirim 6737 of 6766
p'\x91' terkirim 6738 of 6766
p'G' terkirim 6739 of 6766
p'\x1e' terkirim 6740 of 6766
p'y' terkirim 6741 of 6766
p'\xfc' terkirim 6742 of 6766
p'\x7f' terkirim 6743 of 6766
p'\xc0' terkirim 6744 of 6766
p'\xff' terkirim 6745 of 6766
p'\x01' terkirim 6746 of 6766
p'\xba' terkirim 6747 of 6766
p'\xa1' terkirim 6748 of 6766
p'\xac' terkirim 6749 of 6766
p'm' terkirim 6750 of 6766
p'\xa6' terkirim 6751 of 6766
p'\xc5' terkirim 6752 of 6766
p'\xad' terkirim 6753 of 6766
p'\xd1' terkirim 6754 of 6766
p'\x00' terkirim 6755 of 6766
p'\x00' terkirim 6756 of 6766
p'\x00' terkirim 6757 of 6766
p'\x00' terkirim 6758 of 6766
p'!' terkirim 6759 of 6766
p'B' terkirim 6760 of 6766
p'H' terkirim 6761 of 6766
p'D' terkirim 6762 of 6766
p'\xae' terkirim 6763 of 6766
p'B' terkirim 6764 of 6766
p'' terkirim 6765 of 6766
p'\x82' terkirim 6766 of 6766
WARNING:root:writing bart.png dalam waktu 0:00:01.265443 2021-06-23 19:10:25.698753 s/d 2021-06-23 19:10:26.964200
Waktu TOTAL yang dibutuhkan 0:00:01.289670 detik 2021-06-23 19:10:25.674864 s/d 2021-06-23 19:10:26.964534
hasil task yang dijalankan
{'rec1': None, 'rec2': None, 'rec3': None, 'rec4': None}
/home/work/proglar3/tugas3 #
```


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Alpine-2

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5 x
< > Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/c6f2c698-fa5d-4108-90b4-2df4b22753ff
('192.168.122.162', 40513) blok 647 panjang : 1 b'\x83'
('192.168.122.162', 40513) blok 648 panjang : 1 b'#'
('192.168.122.162', 40513) blok 649 panjang : 1 b'r'
('192.168.122.162', 40513) blok 650 panjang : 1 b'w'
('192.168.122.162', 40513) blok 651 panjang : 1 b'\xb2'
('192.168.122.162', 40513) blok 652 panjang : 1 b'g'
('192.168.122.162', 40513) blok 653 panjang : 1 b'\xf6'
('192.168.122.162', 40513) blok 654 panjang : 1 b'\xca'
('192.168.122.162', 40513) blok 655 panjang : 1 b'\x8a'
('192.168.122.162', 40513) blok 656 panjang : 1 b'>'
('192.168.122.162', 40513) blok 657 panjang : 1 b'-'
('192.168.122.162', 40513) blok 658 panjang : 1 b'\xeb'
('192.168.122.162', 40513) blok 659 panjang : 1 b'\x03'
('192.168.122.162', 40513) blok 660 panjang : 1 b'\xd6'
('192.168.122.162', 40513) blok 661 panjang : 1 b'/'
('192.168.122.162', 40513) blok 662 panjang : 1 b'\x06'
('192.168.122.162', 40513) blok 663 panjang : 1 b'\xa8'
('192.168.122.162', 40513) blok 664 panjang : 1 b'\xba'
('192.168.122.162', 40513) blok 665 panjang : 1 b'\x8b'
('192.168.122.162', 40513) blok 666 panjang : 1 b'\xb3'
('192.168.122.162', 40513) blok 667 panjang : 1 b'\xf1'
('192.168.122.162', 40513) blok 668 panjang : 1 b'0'
('192.168.122.162', 40513) blok 669 panjang : 1 b'\xbf'
('192.168.122.162', 40513) blok 670 panjang : 1 b'.'
('192.168.122.162', 40513) blok 671 panjang : 1 b'\x10'
('192.168.122.162', 40513) blok 672 panjang : 1 b'p'
('192.168.122.162', 40513) blok 673 panjang : 1 b'\xbb'
('192.168.122.162', 40513) blok 674 panjang : 1 b'x'
('192.168.122.162', 40513) blok 675 panjang : 1 b'o'
('192.168.122.162', 40513) blok 676 panjang : 1 b'\x8a'
~ZTraceback (most recent call last):
  File "udpfilereceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
KeyboardInterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilereceiver.py
barthasilkirim.png multi_thread.py          udpfilesender.py
library.py         multi_thread_async.py
multi_process.py   server_thread.py
/home/work/progjar3/tugas3 #
```

Alpine-3

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5 x
< > Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/3a0b72b4-dff4-4f89-bc46-c5d63fc19f33
('192.168.122.162', 32993) blok 728 panjang : 1 b'\xd6'
('192.168.122.162', 32993) blok 729 panjang : 1 b'\xae'
('192.168.122.162', 32993) blok 730 panjang : 1 b'\xd9'
('192.168.122.162', 32993) blok 731 panjang : 1 b'+'
('192.168.122.162', 32993) blok 732 panjang : 1 b'\xbc'
('192.168.122.162', 32993) blok 733 panjang : 1 b'\x81'
('192.168.122.162', 32993) blok 734 panjang : 1 b'\xa0'
('192.168.122.162', 32993) blok 735 panjang : 1 b'?'
('192.168.122.162', 32993) blok 736 panjang : 1 b'B'
('192.168.122.162', 32993) blok 737 panjang : 1 b'\xds'
('192.168.122.162', 32993) blok 738 panjang : 1 b'\x08'
('192.168.122.162', 32993) blok 739 panjang : 1 b'\xd9'
('192.168.122.162', 32993) blok 740 panjang : 1 b's'
('192.168.122.162', 32993) blok 741 panjang : 1 b'n'
('192.168.122.162', 32993) blok 742 panjang : 1 b'\x83'
('192.168.122.162', 32993) blok 743 panjang : 1 b'X'
('192.168.122.162', 32993) blok 744 panjang : 1 b'D'
('192.168.122.162', 32993) blok 745 panjang : 1 b'\x90'
('192.168.122.162', 32993) blok 746 panjang : 1 b'4'
('192.168.122.162', 32993) blok 747 panjang : 1 b'\xf6'
('192.168.122.162', 32993) blok 748 panjang : 1 b'\xd2'
('192.168.122.162', 32993) blok 749 panjang : 1 b'p'
('192.168.122.162', 32993) blok 750 panjang : 1 b'8'
('192.168.122.162', 32993) blok 751 panjang : 1 b'!'
('192.168.122.162', 32993) blok 752 panjang : 1 b'd'
('192.168.122.162', 32993) blok 753 panjang : 1 b'#'
('192.168.122.162', 32993) blok 754 panjang : 1 b'\xef'
('192.168.122.162', 32993) blok 755 panjang : 1 b'"'
('192.168.122.162', 32993) blok 756 panjang : 1 b'\xc2'
('192.168.122.162', 32993) blok 757 panjang : 1 b'\x0e'
~ZTraceback (most recent call last):
  File "udpfilereceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
KeyboardInterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilereceiver.py
barthasilkirim.png multi_thread.py          udpfilesender.py
library.py         multi_thread_async.py
multi_process.py   server_thread.py
/home/work/progjar3/tugas3 #
```

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Alpine-4

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
← → C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/e721cb39-3b4d-4f47-a358-1749be4975a5
''192.168.122.162', 44656) blok 590 panjang : 1 b'\xd5'
''192.168.122.162', 44656) blok 591 panjang : 1 b'k'
''192.168.122.162', 44656) blok 592 panjang : 1 b'+'
''192.168.122.162', 44656) blok 593 panjang : 1 b'\xb3'
''192.168.122.162', 44656) blok 594 panjang : 1 b'\xd9'
''192.168.122.162', 44656) blok 595 panjang : 1 b'+'
''192.168.122.162', 44656) blok 596 panjang : 1 b'\xbc'
''192.168.122.162', 44656) blok 597 panjang : 1 b'\x81'
''192.168.122.162', 44656) blok 598 panjang : 1 b'\xa0'
''192.168.122.162', 44656) blok 599 panjang : 1 b'?'
''192.168.122.162', 44656) blok 600 panjang : 1 b'B'
''192.168.122.162', 44656) blok 601 panjang : 1 b'\xde'
''192.168.122.162', 44656) blok 602 panjang : 1 b'\x08'
''192.168.122.162', 44656) blok 603 panjang : 1 b'\xd9'
''192.168.122.162', 44656) blok 604 panjang : 1 b's'
''192.168.122.162', 44656) blok 605 panjang : 1 b'B'
''192.168.122.162', 44656) blok 606 panjang : 1 b'\x83'
''192.168.122.162', 44656) blok 607 panjang : 1 b'X'
''192.168.122.162', 44656) blok 608 panjang : 1 b'D'
''192.168.122.162', 44656) blok 609 panjang : 1 b'\x90'
''192.168.122.162', 44656) blok 610 panjang : 1 b'4'
''192.168.122.162', 44656) blok 611 panjang : 1 b'\xf6'
''192.168.122.162', 44656) blok 612 panjang : 1 b'\xd2'
''192.168.122.162', 44656) blok 613 panjang : 1 b'P'
''192.168.122.162', 44656) blok 614 panjang : 1 b'8'
''192.168.122.162', 44656) blok 615 panjang : 1 b'!'
''192.168.122.162', 44656) blok 616 panjang : 1 b'd'
''192.168.122.162', 44656) blok 617 panjang : 1 b'!'
''192.168.122.162', 44656) blok 618 panjang : 1 b'\xef'
''192.168.122.162', 44656) blok 619 panjang : 1 b''''
ZTraceback (most recent call last):
  File "udpfilerceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
keyboardinterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilerceiver.py
barthasilkirim.png multi_thread.py         udpfilesender.py
library.py        multi_thread_async.py
multi_process.py  server_thread.py
/home/work/progjar3/tugas3 #
```

Alpine-5

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
← → C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/63c5b9aa-f17b-47d8-af15-6b77b4d5d5f
''192.168.122.162', 33904) blok 419 panjang : 1 b'\xe4'
''192.168.122.162', 33904) blok 420 panjang : 1 b'\x91'
''192.168.122.162', 33904) blok 421 panjang : 1 b'g'
''192.168.122.162', 33904) blok 422 panjang : 1 b'\x1e'
''192.168.122.162', 33904) blok 423 panjang : 1 b'y'
''192.168.122.162', 33904) blok 424 panjang : 1 b'\xfc'
''192.168.122.162', 33904) blok 425 panjang : 1 b'\x7f'
''192.168.122.162', 33904) blok 426 panjang : 1 b'\xc0'
''192.168.122.162', 33904) blok 427 panjang : 1 b'\xff'
''192.168.122.162', 33904) blok 428 panjang : 1 b'\x01'
''192.168.122.162', 33904) blok 429 panjang : 1 b'\xba'
''192.168.122.162', 33904) blok 430 panjang : 1 b'\xa1'
''192.168.122.162', 33904) blok 431 panjang : 1 b'\xac'
''192.168.122.162', 33904) blok 432 panjang : 1 b'm'
''192.168.122.162', 33904) blok 433 panjang : 1 b'\xa6'
''192.168.122.162', 33904) blok 434 panjang : 1 b'\xc5'
''192.168.122.162', 33904) blok 435 panjang : 1 b'\xad'
''192.168.122.162', 33904) blok 436 panjang : 1 b'\xd1'
''192.168.122.162', 33904) blok 437 panjang : 1 b'\x00'
''192.168.122.162', 33904) blok 438 panjang : 1 b'\x00'
''192.168.122.162', 33904) blok 439 panjang : 1 b'\x00'
''192.168.122.162', 33904) blok 440 panjang : 1 b'\x00'
''192.168.122.162', 33904) blok 441 panjang : 1 b'I'
''192.168.122.162', 33904) blok 442 panjang : 1 b'E'
''192.168.122.162', 33904) blok 443 panjang : 1 b'N'
''192.168.122.162', 33904) blok 444 panjang : 1 b'D'
''192.168.122.162', 33904) blok 445 panjang : 1 b'\xae'
''192.168.122.162', 33904) blok 446 panjang : 1 b'B'
''192.168.122.162', 33904) blok 447 panjang : 1 b''
''192.168.122.162', 33904) blok 448 panjang : 1 b'\x82'
ZTraceback (most recent call last):
  File "udpfilerceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
keyboardinterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilerceiver.py
barthasilkirim.png multi_thread.py         udpfilesender.py
library.py        multi_thread_async.py
multi_process.py  server_thread.py
/home/work/progjar3/tugas3 #
```

Hasil setelah dijalankan multi_process

Multi_process

```
multi_process.py x
1 import ...
5
6 def download_semua():
7     texec = dict()
8     targets = get_targets()
9     catat_awal = datetime.datetime.now()
10    for k in targets:
11        print(f"mengirim ke {k} di {targets[k]}")
12        # waktu = time.time()
13        #bagian ini merupakan bagian yang menginstruksikan eksekusi fungsi download gambar secara multiprocessing
14        texec[k] = Process(target=send_file, args=(targets[k],))
15        texec[k].start()
16        #setelah menyelesaikan tugasnya, dikembalikan ke main process dengan join
17    for k in targets:
18        texec[k].join()
19    catat_akhir = datetime.datetime.now()
20    selesai = catat_akhir - catat_awal
21    print(f"Waktu TOTAL yang dibutuhkan {selesai} detik {catat_awal} s/d {catat_akhir}")
22    #fungsi download gambar akan dijalankan secara multi process
23    if __name__ == '__main__':
24        download_semua()
```

Alpine-1

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5 x
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/f8670367-7a09-4fa3-9f3c-fa55cf3164cc
b'G' terkirim 6729 of 6766
b'\x1e' terkirim 6730 of 6766
b'y' terkirim 6731 of 6766
b'\xe4' terkirim 6732 of 6766
b'\x91' terkirim 6733 of 6766
b'G' terkirim 6734 of 6766
b'\x1e' terkirim 6735 of 6766
b'y' terkirim 6736 of 6766
b'\xe4' terkirim 6737 of 6766
b'\x91' terkirim 6738 of 6766
b'G' terkirim 6739 of 6766
b'\x1e' terkirim 6740 of 6766
b'y' terkirim 6741 of 6766
b'\xfc' terkirim 6742 of 6766
b'\x7f' terkirim 6743 of 6766
b'\xc0' terkirim 6744 of 6766
b'\xff' terkirim 6745 of 6766
b'\x01' terkirim 6746 of 6766
b'\xba' terkirim 6747 of 6766
b'\xa1' terkirim 6748 of 6766
b'\xac' terkirim 6749 of 6766
b'm' terkirim 6750 of 6766
b'\xa6' terkirim 6751 of 6766
b'\xc5' terkirim 6752 of 6766
b'\xad' terkirim 6753 of 6766
b'\xd1' terkirim 6754 of 6766
b'\x00' terkirim 6755 of 6766
b'\x00' terkirim 6756 of 6766
b'\x00' terkirim 6757 of 6766
b'\x00' terkirim 6758 of 6766
b'I' terkirim 6759 of 6766
b'E' terkirim 6760 of 6766
b'N' terkirim 6761 of 6766
b'D' terkirim 6762 of 6766
b'xae' terkirim 6763 of 6766
b'B' terkirim 6764 of 6766
b' ' terkirim 6765 of 6766
b'\x82' terkirim 6766 of 6766
WARNING:root:writing bart.png dalam waktu 0:00:01.685937 2021-06-23 19:15:34.841492 s/d 2021-06-23 19:15:36.527433
waktu TOTAL yang dibutuhkan 0:00:01.880243 detik 2021-06-23 19:15:34.651406 s/d 2021-06-23 19:15:36.531649
/home/work/progjar3/tugas3 #
```

Alpine-2

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/c6f2c698-fa5d-4108-90b4-2df4b22753ff

('192.168.122.162', 53737) blok 959 panjang : 1 b'\x00'
('192.168.122.162', 53737) blok 960 panjang : 1 b'\x11'
('192.168.122.162', 53737) blok 961 panjang : 1 b'w'
('192.168.122.162', 53737) blok 962 panjang : 1 b'\x99'
('192.168.122.162', 53737) blok 963 panjang : 1 b'\xe8'
('192.168.122.162', 53737) blok 964 panjang : 1 b'\x08'
('192.168.122.162', 53737) blok 965 panjang : 1 b'K'
('192.168.122.162', 53737) blok 966 panjang : 1 b'#'
('192.168.122.162', 53737) blok 967 panjang : 1 b'~'
('192.168.122.162', 53737) blok 968 panjang : 1 b'\x15'
('192.168.122.162', 53737) blok 969 panjang : 1 b'F'
('192.168.122.162', 53737) blok 970 panjang : 1 b'\x08'
('192.168.122.162', 53737) blok 971 panjang : 1 b'\xb5'
('192.168.122.162', 53737) blok 972 panjang : 1 b'\x07'
('192.168.122.162', 53737) blok 973 panjang : 1 b'\x8d'
('192.168.122.162', 53737) blok 974 panjang : 1 b'^'
('192.168.122.162', 53737) blok 975 panjang : 1 b'm'
('192.168.122.162', 53737) blok 976 panjang : 1 b'\xa6'
('192.168.122.162', 53737) blok 977 panjang : 1 b'\xc5'
('192.168.122.162', 53737) blok 978 panjang : 1 b'\xad'
('192.168.122.162', 53737) blok 979 panjang : 1 b'\xd1'
('192.168.122.162', 53737) blok 980 panjang : 1 b'\x00'
('192.168.122.162', 53737) blok 981 panjang : 1 b'\x00'
('192.168.122.162', 53737) blok 982 panjang : 1 b'\x00'
('192.168.122.162', 53737) blok 983 panjang : 1 b'\x00'
('192.168.122.162', 53737) blok 984 panjang : 1 b'I'
('192.168.122.162', 53737) blok 985 panjang : 1 b'E'
('192.168.122.162', 53737) blok 986 panjang : 1 b'N'
('192.168.122.162', 53737) blok 987 panjang : 1 b'D'
('192.168.122.162', 53737) blok 988 panjang : 1 b'\xae'

~ZTraceback (most recent call last):
  File "udpfilereceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
KeyboardInterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilereceiver.py
barthasilkirim.png multi_thread.py          udpfilesender.py
library.py         multi_thread_async.py
multi_process.py   server_thread.py
/home/work/progjar3/tugas3 #
```

Alpine-3

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/3a0b72b4-dff4-4f89-bc46-c5d63fc19f33

('192.168.122.162', 41981) blok 905 panjang : 1 b'\x0e'
('192.168.122.162', 41981) blok 906 panjang : 1 b'\xba'
('192.168.122.162', 41981) blok 907 panjang : 1 b'b'
('192.168.122.162', 41981) blok 908 panjang : 1 b'\xe2'
('192.168.122.162', 41981) blok 909 panjang : 1 b'\x97'
('192.168.122.162', 41981) blok 910 panjang : 1 b'C'
('192.168.122.162', 41981) blok 911 panjang : 1 b'\x82'
('192.168.122.162', 41981) blok 912 panjang : 1 b'~'
('192.168.122.162', 41981) blok 913 panjang : 1 b'\x15'
('192.168.122.162', 41981) blok 914 panjang : 1 b'F'
('192.168.122.162', 41981) blok 915 panjang : 1 b'\x08'
('192.168.122.162', 41981) blok 916 panjang : 1 b'e'
('192.168.122.162', 41981) blok 917 panjang : 1 b'\x8c'
('192.168.122.162', 41981) blok 918 panjang : 1 b','
('192.168.122.162', 41981) blok 919 panjang : 1 b'6'
('192.168.122.162', 41981) blok 920 panjang : 1 b'\xe7'
('192.168.122.162', 41981) blok 921 panjang : 1 b'\x91'
('192.168.122.162', 41981) blok 922 panjang : 1 b'G'
('192.168.122.162', 41981) blok 923 panjang : 1 b'\x1e'
('192.168.122.162', 41981) blok 924 panjang : 1 b'y'
('192.168.122.162', 41981) blok 925 panjang : 1 b'\xe4'
('192.168.122.162', 41981) blok 926 panjang : 1 b'\x91'
('192.168.122.162', 41981) blok 927 panjang : 1 b'G'
('192.168.122.162', 41981) blok 928 panjang : 1 b'\x1e'
('192.168.122.162', 41981) blok 929 panjang : 1 b'y'
('192.168.122.162', 41981) blok 930 panjang : 1 b'\xe4'
('192.168.122.162', 41981) blok 931 panjang : 1 b'\x91'
('192.168.122.162', 41981) blok 932 panjang : 1 b'G'
('192.168.122.162', 41981) blok 933 panjang : 1 b'\x1e'
('192.168.122.162', 41981) blok 934 panjang : 1 b'y'

~ZTraceback (most recent call last):
  File "udpfilereceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
KeyboardInterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilereceiver.py
barthasilkirim.png multi_thread.py          udpfilesender.py
library.py         multi_thread_async.py
multi_process.py   server_thread.py
/home/work/progjar3/tugas3 #
```

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Alpine-4

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/e721cb39-3b4d-4f47-a358-1749be4975a5

('192.168.122.162', 34093) blok 680 panjang : 1 b'\xbd'
('192.168.122.162', 34093) blok 681 panjang : 1 b'B'
('192.168.122.162', 34093) blok 682 panjang : 1 b'\xa3'
('192.168.122.162', 34093) blok 683 panjang : 1 b'Q'
('192.168.122.162', 34093) blok 684 panjang : 1 b'U'
('192.168.122.162', 34093) blok 685 panjang : 1 b'X'
('192.168.122.162', 34093) blok 686 panjang : 1 b'\xfd'
('192.168.122.162', 34093) blok 687 panjang : 1 b'\xf4'
('192.168.122.162', 34093) blok 688 panjang : 1 b'\xa3'
('192.168.122.162', 34093) blok 689 panjang : 1 b'\x07'
('192.168.122.162', 34093) blok 690 panjang : 1 b'\xbf'
('192.168.122.162', 34093) blok 691 panjang : 1 b'\xd3'
('192.168.122.162', 34093) blok 692 panjang : 1 b'j'
('192.168.122.162', 34093) blok 693 panjang : 1 b'S'
('192.168.122.162', 34093) blok 694 panjang : 1 b'\xe4'
('192.168.122.162', 34093) blok 695 panjang : 1 b't'
('192.168.122.162', 34093) blok 696 panjang : 1 b'\x0e'
('192.168.122.162', 34093) blok 697 panjang : 1 b'\xa2'
('192.168.122.162', 34093) blok 698 panjang : 1 b'\xe2'
('192.168.122.162', 34093) blok 699 panjang : 1 b'\x98'
('192.168.122.162', 34093) blok 700 panjang : 1 b'\x88'
('192.168.122.162', 34093) blok 701 panjang : 1 b'\xb0'
('192.168.122.162', 34093) blok 702 panjang : 1 b' '
('192.168.122.162', 34093) blok 703 panjang : 1 b'D'
('192.168.122.162', 34093) blok 704 panjang : 1 b'\xdc'
('192.168.122.162', 34093) blok 705 panjang : 1 b'\x00'
('192.168.122.162', 34093) blok 706 panjang : 1 b'\x11'
('192.168.122.162', 34093) blok 707 panjang : 1 b'w'
('192.168.122.162', 34093) blok 708 panjang : 1 b'\x99'
('192.168.122.162', 34093) blok 709 panjang : 1 b'\xe8'
~ZTraceback (most recent call last):
  File "udpfilereceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
KeyboardInterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilereceiver.py
barthasilkirim.png multi_thread.py          udpfilesender.py
library.py         multi_thread_async.py
multi_process.py   server_thread.py
/home/work/progjar3/tugas3 #
```

Alpine-5

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/63c5b9aa-f17b-47d8-af15-6bf77b4d5fcf

('192.168.122.162', 50269) blok 530 panjang : 1 b' '
('192.168.122.162', 50269) blok 531 panjang : 1 b'D'
('192.168.122.162', 50269) blok 532 panjang : 1 b'\xdc'
('192.168.122.162', 50269) blok 533 panjang : 1 b'\x00'
('192.168.122.162', 50269) blok 534 panjang : 1 b'\x11'
('192.168.122.162', 50269) blok 535 panjang : 1 b'w'
('192.168.122.162', 50269) blok 536 panjang : 1 b'\x99'
('192.168.122.162', 50269) blok 537 panjang : 1 b'\xe8'
('192.168.122.162', 50269) blok 538 panjang : 1 b'\x08'
('192.168.122.162', 50269) blok 539 panjang : 1 b'K'
('192.168.122.162', 50269) blok 540 panjang : 1 b'#'
('192.168.122.162', 50269) blok 541 panjang : 1 b'-'
('192.168.122.162', 50269) blok 542 panjang : 1 b'\x15'
('192.168.122.162', 50269) blok 543 panjang : 1 b'F'
('192.168.122.162', 50269) blok 544 panjang : 1 b'\x08'
('192.168.122.162', 50269) blok 545 panjang : 1 b'\xb5'
('192.168.122.162', 50269) blok 546 panjang : 1 b'F'
('192.168.122.162', 50269) blok 547 panjang : 1 b'\xc5'
('192.168.122.162', 50269) blok 548 panjang : 1 b'\xcc'
('192.168.122.162', 50269) blok 549 panjang : 1 b'\x1c'
('192.168.122.162', 50269) blok 550 panjang : 1 b'*'
('192.168.122.162', 50269) blok 551 panjang : 1 b'n'
('192.168.122.162', 50269) blok 552 panjang : 1 b'\x96'
('192.168.122.162', 50269) blok 553 panjang : 1 b'\xbd'
('192.168.122.162', 50269) blok 554 panjang : 1 b'd'
('192.168.122.162', 50269) blok 555 panjang : 1 b'\x14'
('192.168.122.162', 50269) blok 556 panjang : 1 b'\xba'
('192.168.122.162', 50269) blok 557 panjang : 1 b'\x00'
('192.168.122.162', 50269) blok 558 panjang : 1 b'\xf1'
('192.168.122.162', 50269) blok 559 panjang : 1 b'\x18'
~ZTraceback (most recent call last):
  File "udpfilereceiver.py", line 16, in <module>
    data, addr = sock.recvfrom(1024)
KeyboardInterrupt

/home/work/progjar3/tugas3 # ls
bart.png          multi_process_async.py  udpfilereceiver.py
barthasilkirim.png multi_thread.py          udpfilesender.py
library.py         multi_thread_async.py
multi_process.py   server_thread.py
/home/work/progjar3/tugas3 #
```

Hasil setelah dijalankan multi_process_async dengan processes 20

Multi_process_async

```
multi_process_async.py x
8
9 def download_semua():
10     texec = dict()
11     targets = get_targets()
12     status_task = dict()
13     task_pool = Pool(processes=20) #2 task yang dapat dikerjakan secara simultan, dapat diset sesuai jumlah core
14     catat_awal = datetime.datetime.now()
15     for k in targets:
16         print(f"mengirim ke {k} di {targets[k]}")
17         #bagian ini merupakan bagian yang menginstruksikan eksekusi fungsi download gambar secara multiprocessing
18         texec[k] = task_pool.apply_async(func=send_file, args=(targets[k],))
19
20     #setelah menyelesaikan tugasnya, dikembalikan ke main process dengan mengambil hasilnya dengan get
21     for k in targets:
22         status_task[k]=texec[k].get(timeout=10)
23
24     catat_akhir = datetime.datetime.now()
25     selesai = catat_akhir - catat_awal
26     print(f"Waktu TOTAL yang dibutuhkan {selesai} detik {catat_awal} s/d {catat_akhir}")
27     print("status TASK")
28     print(status_task)
29
30
31 #fungsi download gambar akan dijalankan secara multi process
32
33 if __name__=='__main__':
34     download_semua()
```

Alpine-1

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5 x
Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad3998016d/nodes/f8670367-7a09-4fa3-9f3c-fa55c3164cc
b'\x91' terkirim 6733 of 6766
b'G' terkirim 6734 of 6766
b'\x1e' terkirim 6735 of 6766
b'y' terkirim 6736 of 6766
b'\xe4' terkirim 6737 of 6766
b'\x91' terkirim 6738 of 6766
b'G' terkirim 6739 of 6766
b'\x1e' terkirim 6740 of 6766
b'y' terkirim 6741 of 6766
b'\xfc' terkirim 6742 of 6766
b'\x7f' terkirim 6743 of 6766
b'\xc0' terkirim 6744 of 6766
b'\xff' terkirim 6745 of 6766
b'\x01' terkirim 6746 of 6766
b'\xba' terkirim 6747 of 6766
b'\xa1' terkirim 6748 of 6766
b'\xac' terkirim 6749 of 6766
b'm' terkirim 6750 of 6766
b'\xa6' terkirim 6751 of 6766
b'\xc5' terkirim 6752 of 6766
b'\xad' terkirim 6753 of 6766
b'\xd1' terkirim 6754 of 6766
b'\x00' terkirim 6755 of 6766
b'\x00' terkirim 6756 of 6766
b'\x00' terkirim 6757 of 6766
b'\x00' terkirim 6758 of 6766
b'I' terkirim 6759 of 6766
b'E' terkirim 6760 of 6766
b'N' terkirim 6761 of 6766
b'D' terkirim 6762 of 6766
b'\xae' terkirim 6763 of 6766
b'B' terkirim 6764 of 6766
b'' terkirim 6765 of 6766
b'\x82' terkirim 6766 of 6766
WARNING:root:writing bart.png dalam waktu 0:00:01.765197 2021-06-23 19:19:21.237039 s/d 2021-06-23 19:19:23.002240
WARNING:root:writing bart.png dalam waktu 0:00:01.901004 2021-06-23 19:19:21.218429 s/d 2021-06-23 19:19:23.119437
WARNING:root:writing bart.png dalam waktu 0:00:01.795758 2021-06-23 19:19:21.221650 s/d 2021-06-23 19:19:23.017413
Waktu TOTAL yang dibutuhkan 0:00:01.953633 detik 2021-06-23 19:19:21.203073 s/d 2021-06-23 19:19:23.156706
status TASK
{'rec1': None, 'rec2': None, 'rec3': None, 'rec4': None}
/home/work/progjar3/tugas3 #
```


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Alpine-2

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/c6f2c698-fa5d-4108-90b4-2df4b22753ff
('192.168.122.162', 44155) blok 620 panjang : 1 b'\x08'
('192.168.122.162', 44155) blok 621 panjang : 1 b'K'
('192.168.122.162', 44155) blok 622 panjang : 1 b'#'
('192.168.122.162', 44155) blok 623 panjang : 1 b'~'
('192.168.122.162', 44155) blok 624 panjang : 1 b'\x15'
('192.168.122.162', 44155) blok 625 panjang : 1 b'F'
('192.168.122.162', 44155) blok 626 panjang : 1 b'\x08'
('192.168.122.162', 44155) blok 627 panjang : 1 b'\xb5'
('192.168.122.162', 44155) blok 628 panjang : 1 b'F'
('192.168.122.162', 44155) blok 629 panjang : 1 b'\xce'
('192.168.122.162', 44155) blok 630 panjang : 1 b'\xcc'
('192.168.122.162', 44155) blok 631 panjang : 1 b'\x1c'
('192.168.122.162', 44155) blok 632 panjang : 1 b''
('192.168.122.162', 44155) blok 633 panjang : 1 b'n'
('192.168.122.162', 44155) blok 634 panjang : 1 b'\x96'
('192.168.122.162', 44155) blok 635 panjang : 1 b'\xbd'
('192.168.122.162', 44155) blok 636 panjang : 1 b'd'
('192.168.122.162', 44155) blok 637 panjang : 1 b'\x14'
('192.168.122.162', 44155) blok 638 panjang : 1 b'\xba'
('192.168.122.162', 44155) blok 639 panjang : 1 b'\x00'
('192.168.122.162', 44155) blok 640 panjang : 1 b'\xf1'
('192.168.122.162', 44155) blok 641 panjang : 1 b'\x18'
('192.168.122.162', 44155) blok 642 panjang : 1 b'\xbf'
('192.168.122.162', 44155) blok 643 panjang : 1 b'\xb5'
('192.168.122.162', 44155) blok 644 panjang : 1 b','
('192.168.122.162', 44155) blok 645 panjang : 1 b'\xe5'
('192.168.122.162', 44155) blok 646 panjang : 1 b'q'
('192.168.122.162', 44155) blok 647 panjang : 1 b')'
('192.168.122.162', 44155) blok 648 panjang : 1 b'\xa5'
('192.168.122.162', 44155) blok 649 panjang : 1 b'n'
('192.168.122.162', 44155) blok 650 panjang : 1 b'\xbb'
('192.168.122.162', 44155) blok 651 panjang : 1 b'\x93'
('192.168.122.162', 44155) blok 652 panjang : 1 b'\xd5'
('192.168.122.162', 44155) blok 653 panjang : 1 b'\x19'
('192.168.122.162', 44155) blok 654 panjang : 1 b'\x07'
('192.168.122.162', 44155) blok 655 panjang : 1 b'\x8d'
('192.168.122.162', 44155) blok 656 panjang : 1 b'^'
('192.168.122.162', 44155) blok 657 panjang : 1 b'\x89'
('192.168.122.162', 44155) blok 658 panjang : 1 b'\x10'
('192.168.122.162', 44155) blok 659 panjang : 1 b'\x1c'
```

Alpine-3

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/3a0b72b4-dff4-4f89-bc46-c5d63fc19f33
('192.168.122.162', 49206) blok 679 panjang : 1 b'n'
('192.168.122.162', 49206) blok 680 panjang : 1 b','
('192.168.122.162', 49206) blok 681 panjang : 1 b')'
('192.168.122.162', 49206) blok 682 panjang : 1 b'\xe5'
('192.168.122.162', 49206) blok 683 panjang : 1 b'y'
('192.168.122.162', 49206) blok 684 panjang : 1 b'\x87'
('192.168.122.162', 49206) blok 685 panjang : 1 b'\xcd'
('192.168.122.162', 49206) blok 686 panjang : 1 b'\xfa'
('192.168.122.162', 49206) blok 687 panjang : 1 b'\x9a'
('192.168.122.162', 49206) blok 688 panjang : 1 b'@'
('192.168.122.162', 49206) blok 689 panjang : 1 b'\xe0'
('192.168.122.162', 49206) blok 690 panjang : 1 b''
('192.168.122.162', 49206) blok 691 panjang : 1 b'\xd6'
('192.168.122.162', 49206) blok 692 panjang : 1 b' '
('192.168.122.162', 49206) blok 693 panjang : 1 b':'
('192.168.122.162', 49206) blok 694 panjang : 1 b'\x0f'
('192.168.122.162', 49206) blok 695 panjang : 1 b'\x95'
('192.168.122.162', 49206) blok 696 panjang : 1 b'\x92'
('192.168.122.162', 49206) blok 697 panjang : 1 b'\xf7'
('192.168.122.162', 49206) blok 698 panjang : 1 b'\xd4'
('192.168.122.162', 49206) blok 699 panjang : 1 b'\x12'
('192.168.122.162', 49206) blok 700 panjang : 1 b'\x8d'
('192.168.122.162', 49206) blok 701 panjang : 1 b'\xce'
('192.168.122.162', 49206) blok 702 panjang : 1 b'K'
('192.168.122.162', 49206) blok 703 panjang : 1 b'\xcb'
('192.168.122.162', 49206) blok 704 panjang : 1 b'p'
('192.168.122.162', 49206) blok 705 panjang : 1 b'\xcf'
('192.168.122.162', 49206) blok 706 panjang : 1 b'\x1f'
('192.168.122.162', 49206) blok 707 panjang : 1 b's'
('192.168.122.162', 49206) blok 708 panjang : 1 b'\xb2'
('192.168.122.162', 49206) blok 709 panjang : 1 b'\xf6'
('192.168.122.162', 49206) blok 710 panjang : 1 b'\xd0'
('192.168.122.162', 49206) blok 711 panjang : 1 b'\xe0'
('192.168.122.162', 49206) blok 712 panjang : 1 b'\xbd'
('192.168.122.162', 49206) blok 713 panjang : 1 b'P'
('192.168.122.162', 49206) blok 714 panjang : 1 b'q'
('192.168.122.162', 49206) blok 715 panjang : 1 b'\x15'
('192.168.122.162', 49206) blok 716 panjang : 1 b'o'
('192.168.122.162', 49206) blok 717 panjang : 1 b'\x1c'
('192.168.122.162', 49206) blok 718 panjang : 1 b'\xf8'
```

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Alpine-4

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5 x
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/e721cb39-3b4d-4f47-a358-1749be4975a5
('192.168.122.162', 45600) blok 669 panjang : 1 b'\xe4'
('192.168.122.162', 45600) blok 670 panjang : 1 b'\x91'
('192.168.122.162', 45600) blok 671 panjang : 1 b'G'
('192.168.122.162', 45600) blok 672 panjang : 1 b'\x1e'
('192.168.122.162', 45600) blok 673 panjang : 1 b'y'
('192.168.122.162', 45600) blok 674 panjang : 1 b'\xe4'
('192.168.122.162', 45600) blok 675 panjang : 1 b'\x91'
('192.168.122.162', 45600) blok 676 panjang : 1 b'G'
('192.168.122.162', 45600) blok 677 panjang : 1 b'\x1e'
('192.168.122.162', 45600) blok 678 panjang : 1 b'y'
('192.168.122.162', 45600) blok 679 panjang : 1 b'\xe4'
('192.168.122.162', 45600) blok 680 panjang : 1 b'\x91'
('192.168.122.162', 45600) blok 681 panjang : 1 b'G'
('192.168.122.162', 45600) blok 682 panjang : 1 b'\x1e'
('192.168.122.162', 45600) blok 683 panjang : 1 b'y'
('192.168.122.162', 45600) blok 684 panjang : 1 b'\xfc'
('192.168.122.162', 45600) blok 685 panjang : 1 b'\x7f'
('192.168.122.162', 45600) blok 686 panjang : 1 b'\xc0'
('192.168.122.162', 45600) blok 687 panjang : 1 b'\xff'
('192.168.122.162', 45600) blok 688 panjang : 1 b'\x01'
('192.168.122.162', 45600) blok 689 panjang : 1 b'\xba'
('192.168.122.162', 45600) blok 690 panjang : 1 b'\xa1'
('192.168.122.162', 45600) blok 691 panjang : 1 b'\xac'
('192.168.122.162', 45600) blok 692 panjang : 1 b'm'
('192.168.122.162', 45600) blok 693 panjang : 1 b'\xa6'
('192.168.122.162', 45600) blok 694 panjang : 1 b'\xc5'
('192.168.122.162', 45600) blok 695 panjang : 1 b'\xad'
('192.168.122.162', 45600) blok 696 panjang : 1 b'\xd1'
('192.168.122.162', 45600) blok 697 panjang : 1 b'\x00'
('192.168.122.162', 45600) blok 698 panjang : 1 b'\x00'
('192.168.122.162', 45600) blok 699 panjang : 1 b'\x00'
('192.168.122.162', 45600) blok 700 panjang : 1 b'\x00'
('192.168.122.162', 45600) blok 701 panjang : 1 b'I'
('192.168.122.162', 45600) blok 702 panjang : 1 b'E'
('192.168.122.162', 45600) blok 703 panjang : 1 b'N'
('192.168.122.162', 45600) blok 704 panjang : 1 b'D'
('192.168.122.162', 45600) blok 705 panjang : 1 b'\xae'
('192.168.122.162', 45600) blok 706 panjang : 1 b'B'
('192.168.122.162', 45600) blok 707 panjang : 1 b''
('192.168.122.162', 45600) blok 708 panjang : 1 b'\x82'
```

Alpine-5

```
praktikum x alpine-1 x alpine-2 x alpine-3 x alpine-4 x alpine-5 x
< -> C Not secure | 192.168.161.128/static/web-ui/server/1/project/4c09642b-965a-430c-a82c-8ad39998016d/nodes/63c5b9aa-f17b-47d8-af15-6bf77b4d5fcd
('192.168.122.162', 47896) blok 669 panjang : 1 b'\x12'
('192.168.122.162', 47896) blok 670 panjang : 1 b'('
('192.168.122.162', 47896) blok 671 panjang : 1 b'*'
('192.168.122.162', 47896) blok 672 panjang : 1 b'\xba'
('192.168.122.162', 47896) blok 673 panjang : 1 b'\xf0'
('192.168.122.162', 47896) blok 674 panjang : 1 b'\xdb'
('192.168.122.162', 47896) blok 675 panjang : 1 b'u'
('192.168.122.162', 47896) blok 676 panjang : 1 b'\xa0'
('192.168.122.162', 47896) blok 677 panjang : 1 b'\x97'
('192.168.122.162', 47896) blok 678 panjang : 1 b'\x80'
('192.168.122.162', 47896) blok 679 panjang : 1 b'\xd3'
('192.168.122.162', 47896) blok 680 panjang : 1 b'^'
('192.168.122.162', 47896) blok 681 panjang : 1 b'\x16'
('192.168.122.162', 47896) blok 682 panjang : 1 b'x'
('192.168.122.162', 47896) blok 683 panjang : 1 b'5'
('192.168.122.162', 47896) blok 684 panjang : 1 b'\xeb'
('192.168.122.162', 47896) blok 685 panjang : 1 b'$'
('192.168.122.162', 47896) blok 686 panjang : 1 b'|'
('192.168.122.162', 47896) blok 687 panjang : 1 b't'
('192.168.122.162', 47896) blok 688 panjang : 1 b'\xcd'
('192.168.122.162', 47896) blok 689 panjang : 1 b''
('192.168.122.162', 47896) blok 690 panjang : 1 b'\x0c'
('192.168.122.162', 47896) blok 691 panjang : 1 b'\xca'
('192.168.122.162', 47896) blok 692 panjang : 1 b'#'
('192.168.122.162', 47896) blok 693 panjang : 1 b's'
('192.168.122.162', 47896) blok 694 panjang : 1 b'B'
('192.168.122.162', 47896) blok 695 panjang : 1 b'\x83'
('192.168.122.162', 47896) blok 696 panjang : 1 b'X'
('192.168.122.162', 47896) blok 697 panjang : 1 b'D'
('192.168.122.162', 47896) blok 698 panjang : 1 b'\x90'
('192.168.122.162', 47896) blok 699 panjang : 1 b'4'
('192.168.122.162', 47896) blok 700 panjang : 1 b'\xf6'
('192.168.122.162', 47896) blok 701 panjang : 1 b'\xd2'
('192.168.122.162', 47896) blok 702 panjang : 1 b'P'
('192.168.122.162', 47896) blok 703 panjang : 1 b'8'
('192.168.122.162', 47896) blok 704 panjang : 1 b'!'
('192.168.122.162', 47896) blok 705 panjang : 1 b'd'
('192.168.122.162', 47896) blok 706 panjang : 1 b'#'
('192.168.122.162', 47896) blok 707 panjang : 1 b'\xef'
('192.168.122.162', 47896) blok 708 panjang : 1 b'\x93'
```


- | | |
|--------------------------------|----------------------|
| 1. multi thread: | 0:00:01.414737 detik |
| 2. multi thread asynchronous: | 0:00:01.289670 detik |
| 3. multi process: | 0:00:01.880423 detik |
| 4. multi process asynchronous: | 0:00:01.953633 detik |

Kesimpulan yang didapat jika dibandingkan antara keempat metode jika mengirim file menggunakan udp ke 4 target sekaligus yang paling cepat adalah multi thread asynchronous