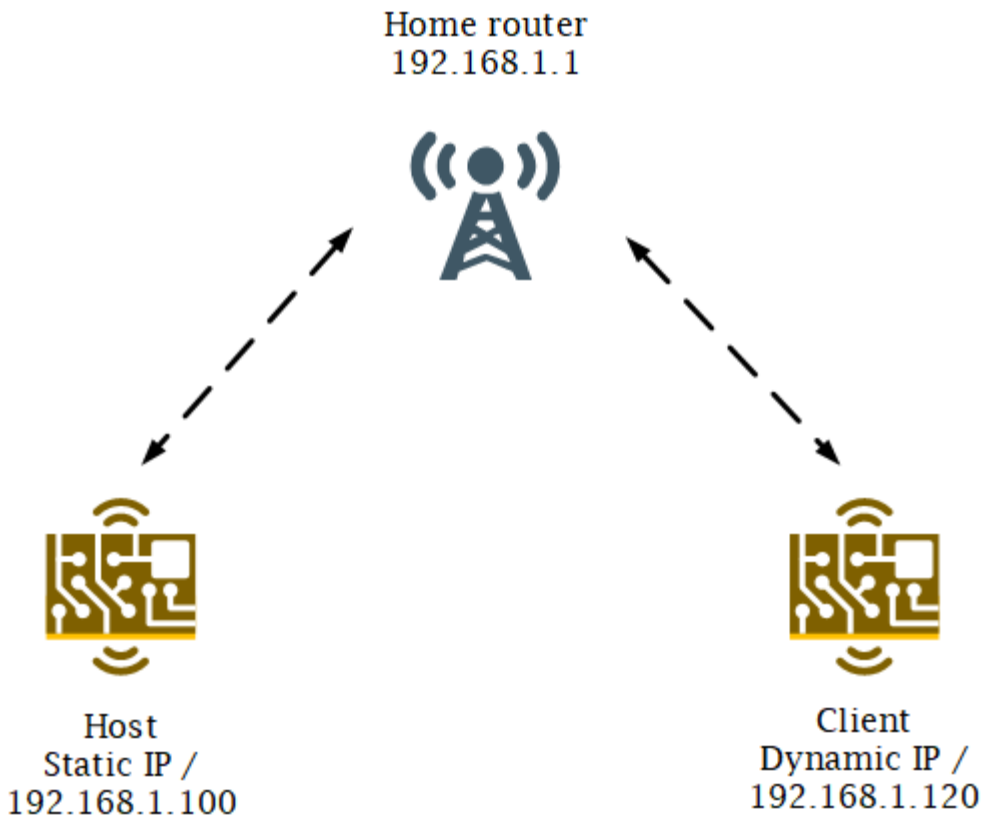
UF Nelms Institute for the Connected World
UNIVERSITY of FLORIDA

Remote Lab 5

LEVERAGING ZEROTIER AND PORT FORWARDING TECHNIQUES

Wireless communication

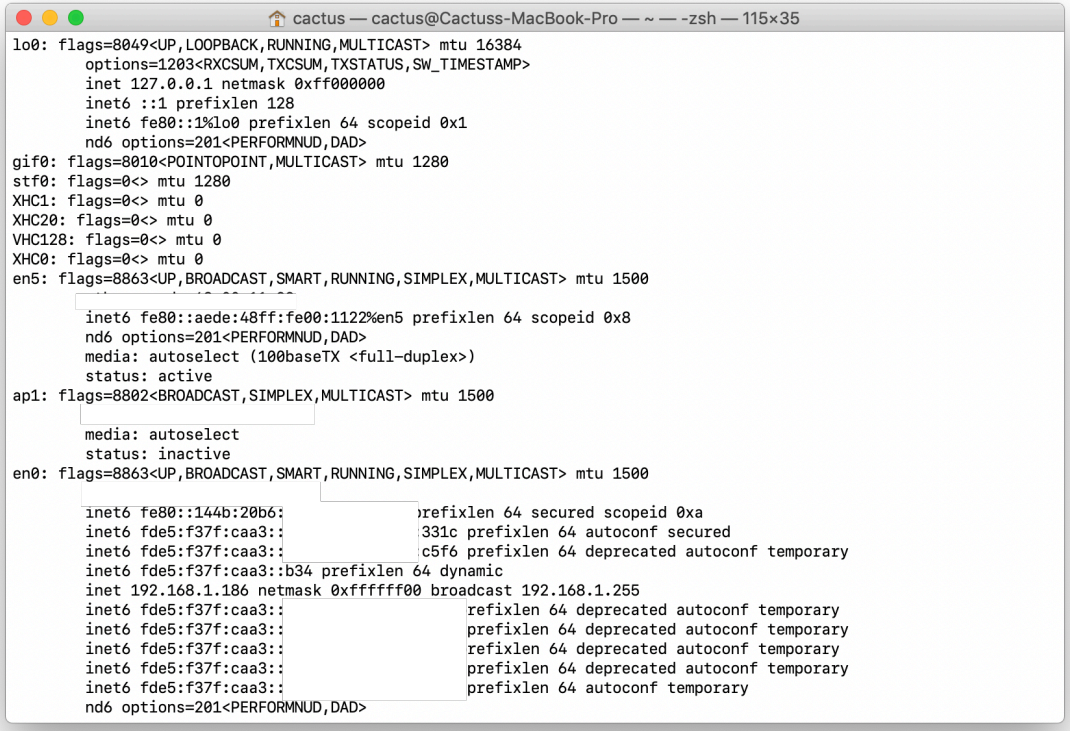


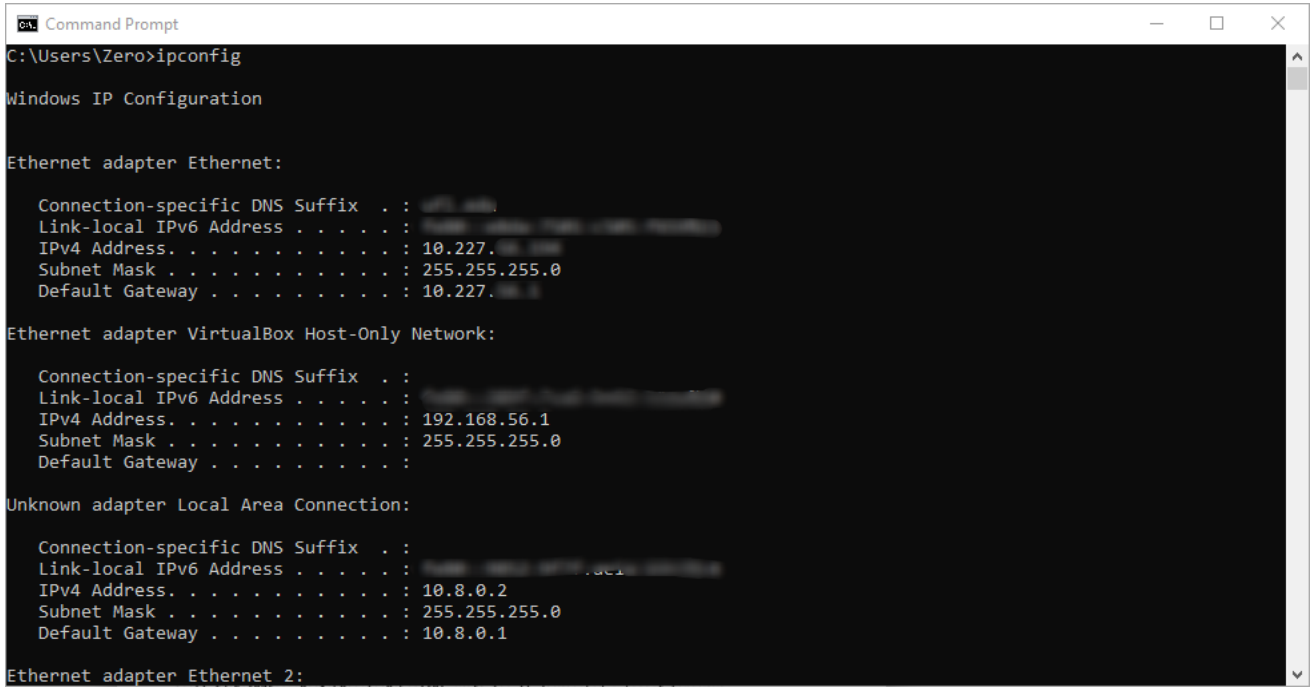
cc3100_usage.c | sl_common.h

SL_Common > sl_common.h > SECOND

```
73  /*
74   * Values for below macros shall be modified per the acce
75   * SimpleLink device will connect to following AP when th
76   */
77  #define SSID_NAME       "NETGEAR47"          /* Access poi
78  #define SEC_TYPE        SL_SEC_TYPE_WPA_WPA2     /* Securi
79  //#define SEC_TYPE        SL_SEC_TYPE_OPEN    /* Security
80  #define PASSKEY         "quaintcoconut392"
81  #define PASSKEY_LEN     pal_Strlen(PASSKEY)  /* Password
82
```

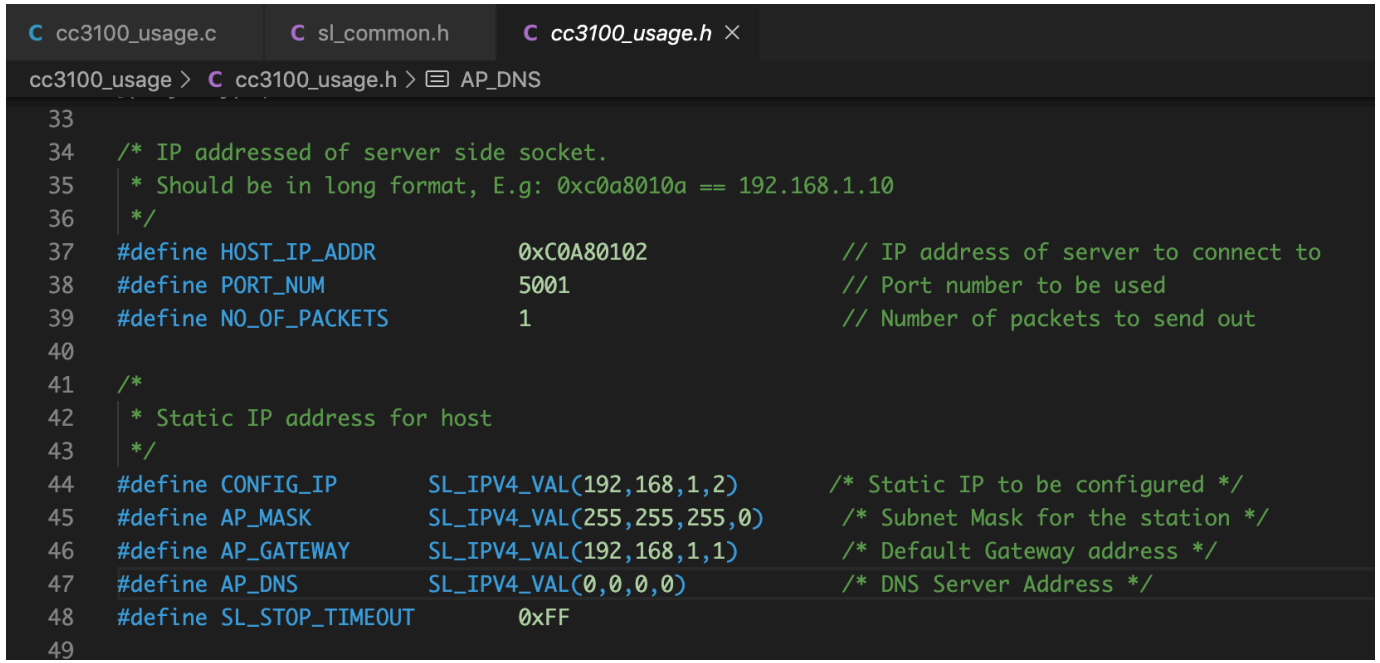
Wireless communication



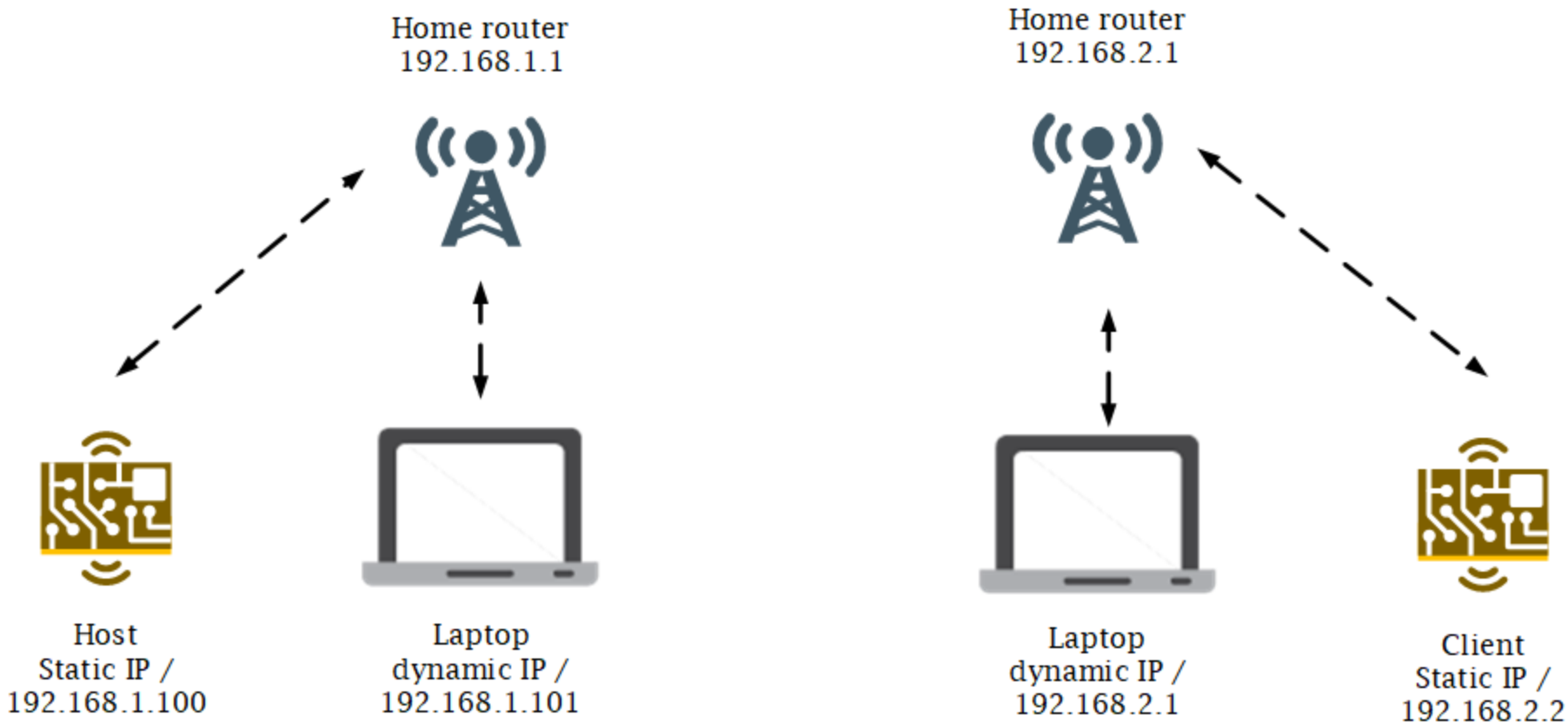


Wireless communication

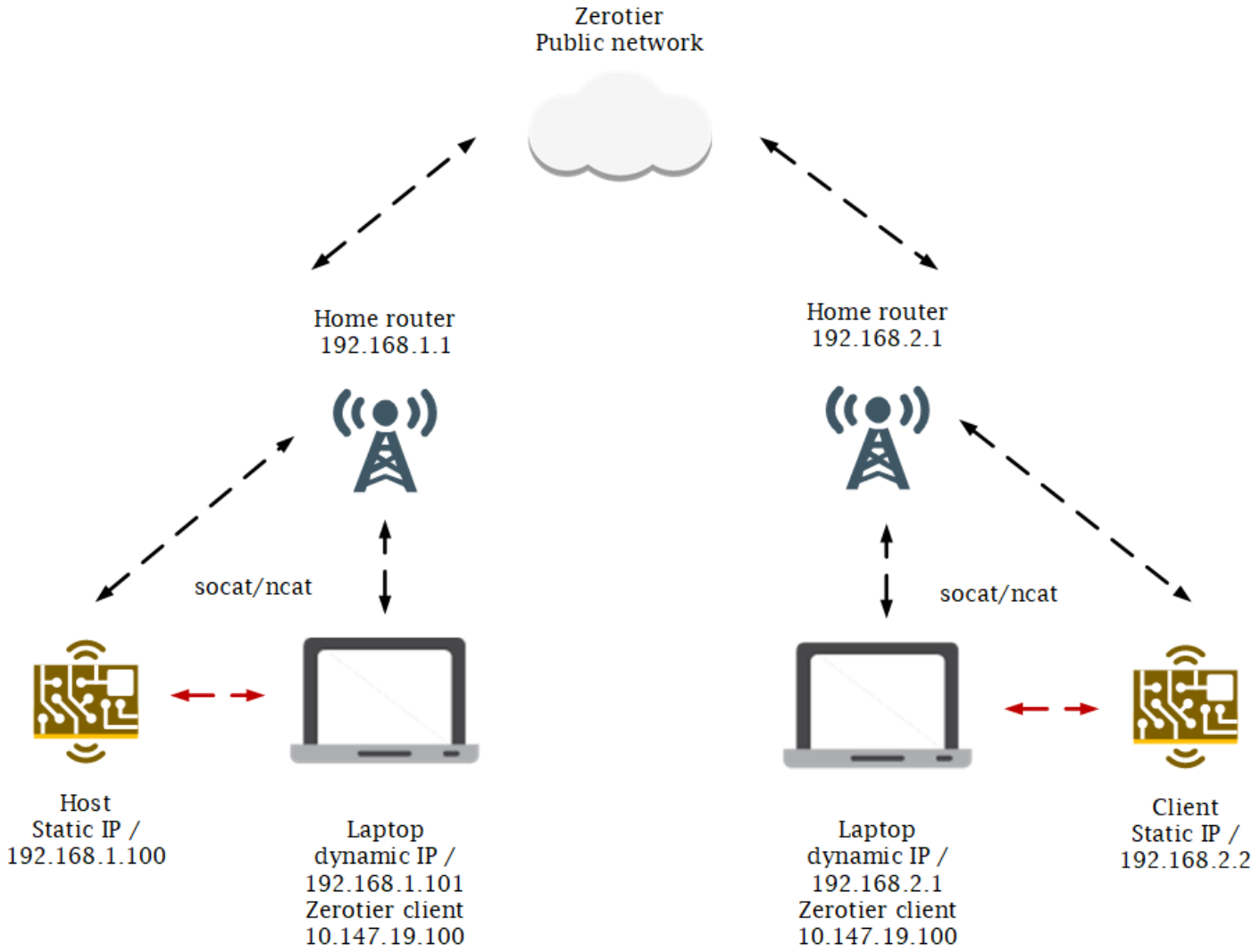
- Why do we need local ip address?



Remote communication



Remote communication

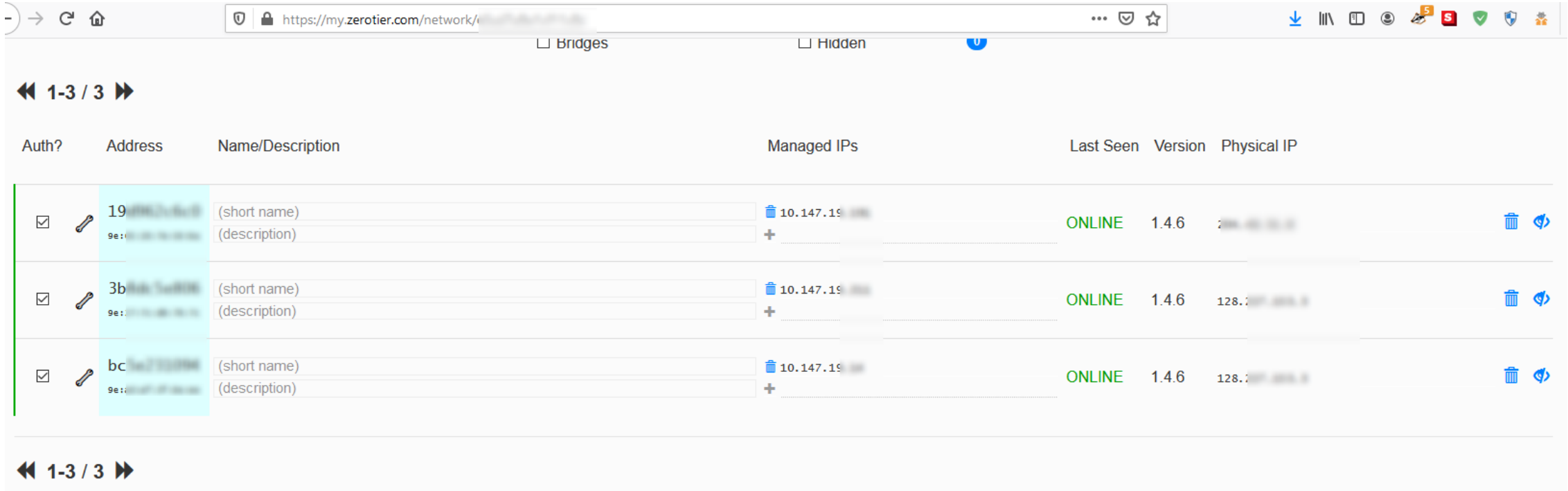


Zerotier

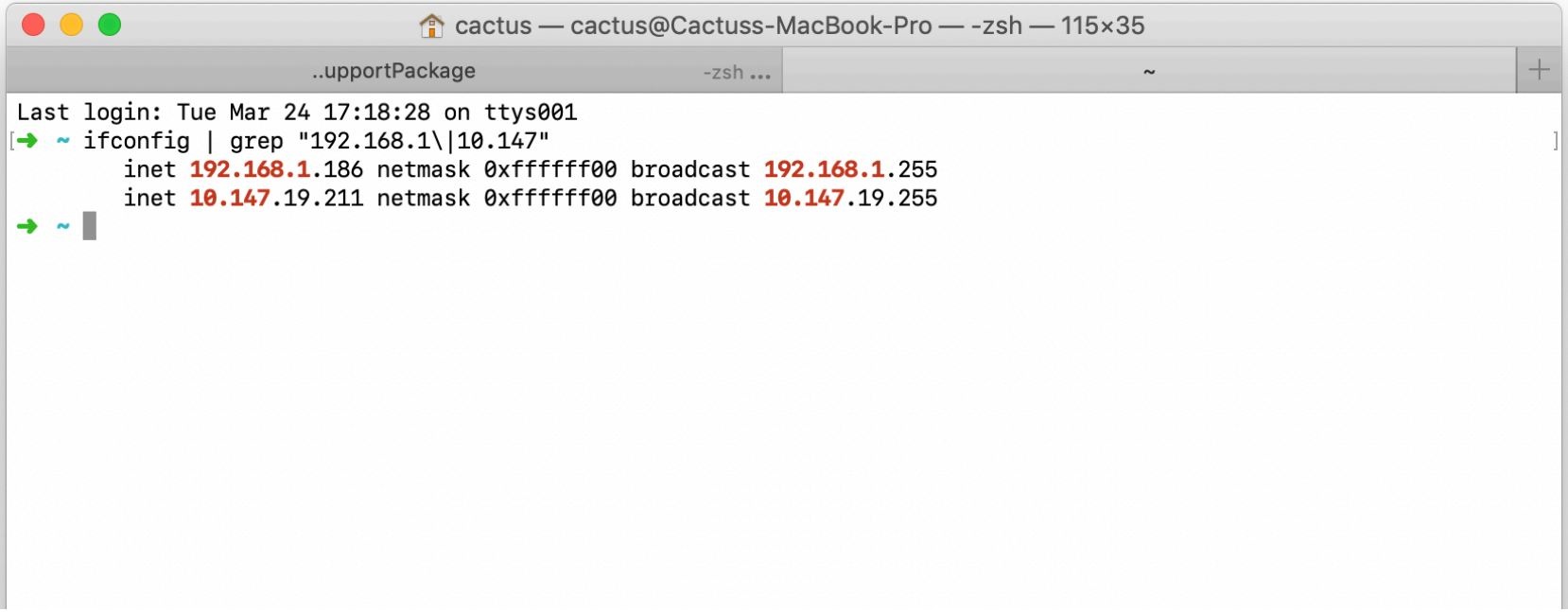
- Free virtual network for devices
- Bring all your private machines together, laptops, servers, phones, even routers
- Enable direct communication capabilities for all your connected devices
- Website: https://www.zerotier.com/

Zerotier client

- Installation
  - https://www.zerotier.com/download/
  - Find network id from https://my.zerotier.com/network
- Enable and authenticate joined device



Zerotier client



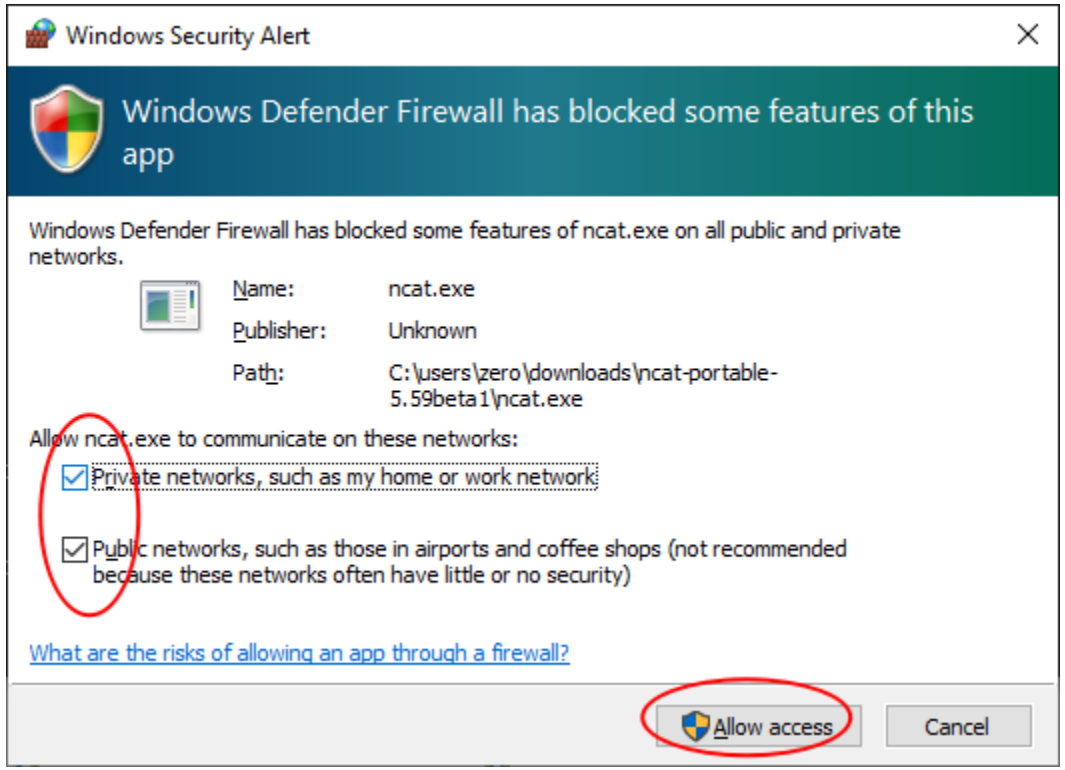
Port forwarding

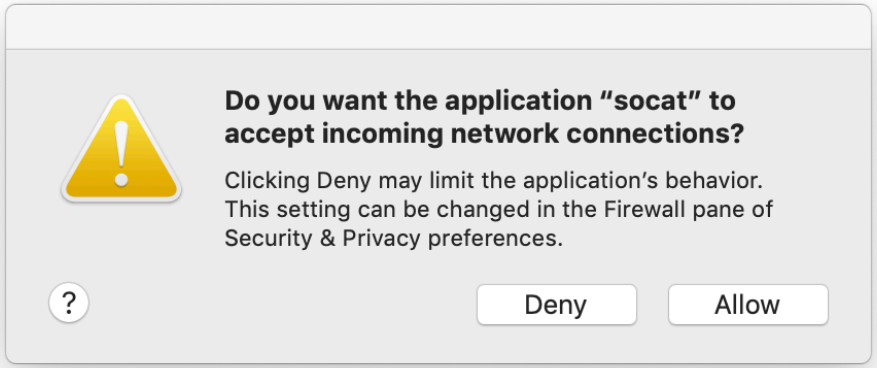
- socat
  - socat - Multipurpose relay (SOcket CAT)
  - https://linux.die.net/man/1/socat
- Installation
  - Linux: install via distributions repository (apt install socat)
  - Mac: install via brew package manager (brew install socat)
    - https://brew.sh/
  - Windows: pre-built binary executable file
    - https://github.com/StudioEtrange/socat-windows

Port forwarding

- Example usage of socat (execute on your laptop)
- socat -dd -x udp4-recv:15001 udp4-sendto:192.168.53.149:5001
  - -dd verbose output
  - -x print data with decimal format
  - udp4-recv:15001 listen on port 15001
  - udp4-sendto:192.168.53.149:5001 forward whatever udp data you received on port 15001 to udp port 5001 of 192.168.53.149
- ALLOW incoming connection when your laptop pops up warning windows (firewall restriction)

Port forwarding

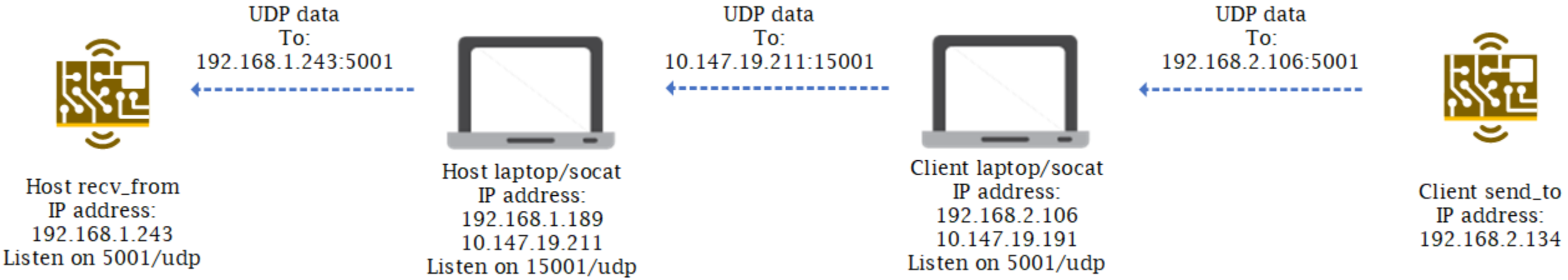




Host/Client development

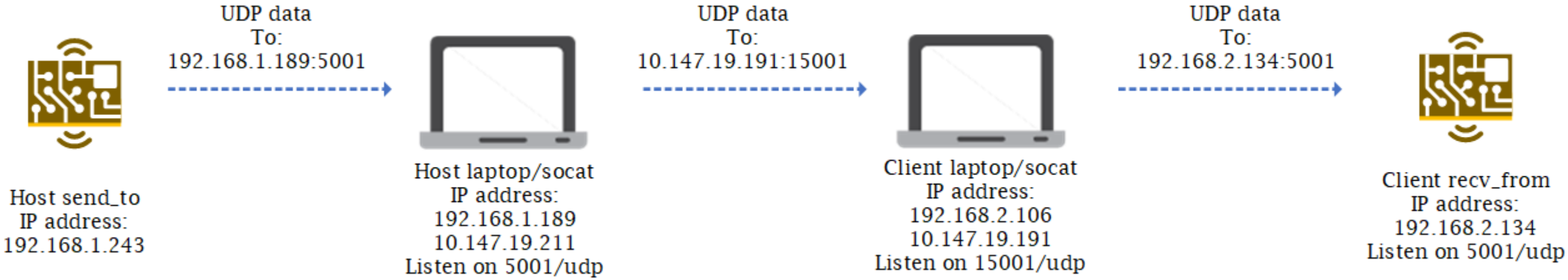
- Before:
  - Your board send/receive data to/from the other board
- Now:
  - Your board send/receive data to/from your laptop
  - Meanwhile your laptop forward the data to your partner's laptop
  - Your partner's board receive/send data from/to his/her board
- Commands:
  - socat -dd -x udp4-recv:5001 udp4-sendto:10.147.19.191:15001
  - socat -dd -x udp4-recv:15001 udp4-sendto:192.168.1.243:5001

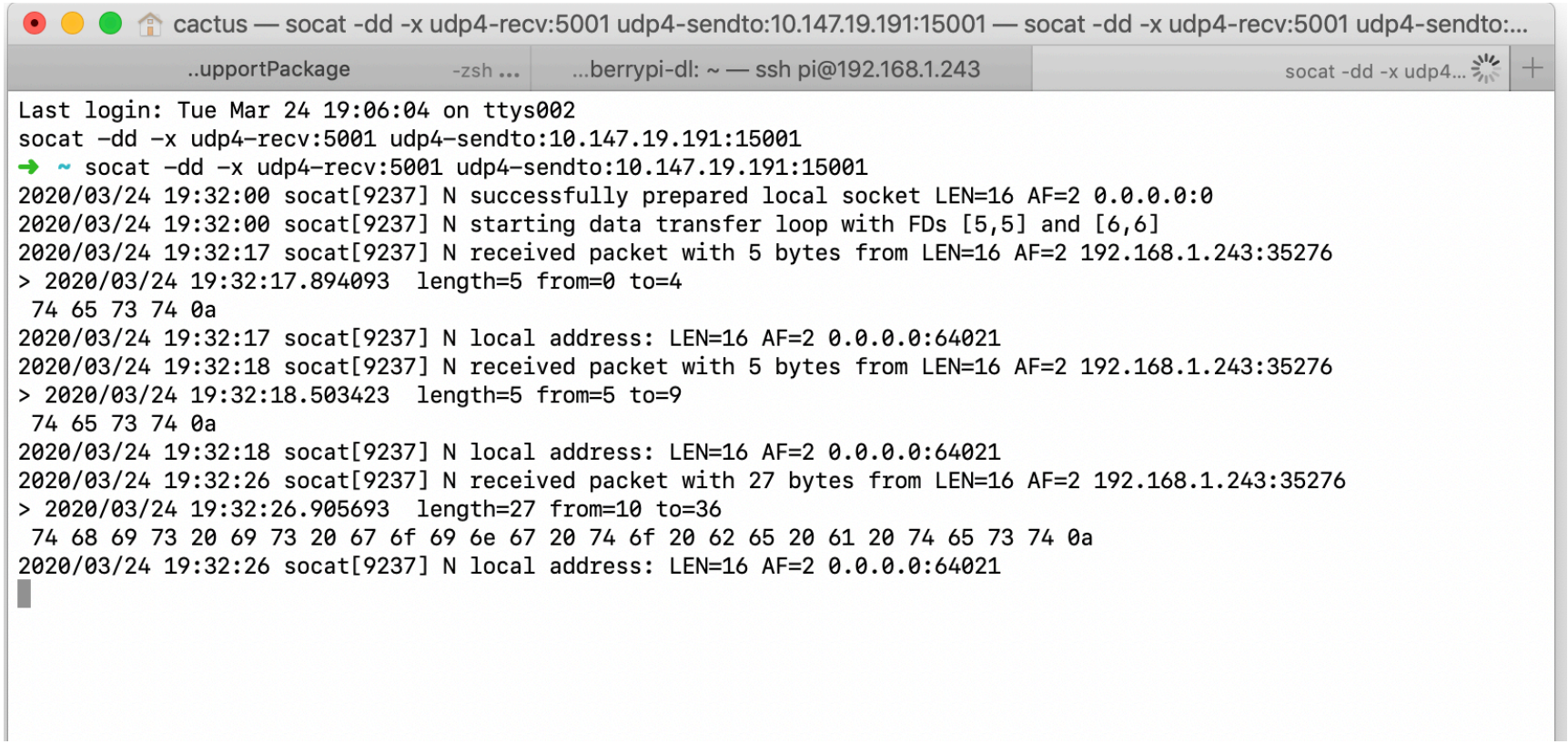
Host development



- Host laptop:
  - socat -dd -x udp4-recv:15001 udp4-sendto:192.168.1.243:5001
- Client laptop
  - socat -dd -x udp4-recv:5001 udp4-sendto:10.147.19.211:15001

Client development



- Host laptop:
  - socat -dd -x udp4-recv:5001 udp4-sendto:10.147.19.191:15001
- Client laptop
  - socat -dd -x udp4-recv:15001 udp4-sendto:192.168.2.134:5001

socat output