REALTEK Interview Presentation

- **Interviewee :** 陳文遠
- **Position :** Audio系統設計工程師 (預聘_110年度應屆畢業)
- **Date :** October 19, 2020

INTRODUCTION

ABOUT

EDUCATION

- **National Tsing Hua University (GPA 4.08)** — Hsinchu, Taiwan
  Institute of Communications Engineering (MS) — Sep. 2019 – Present

- **Feng Chia University** — Taichung, Taiwan
  Department of Communications Engineering (BS) — Sep. 2014 – Jan. 2019

ACADEMIC EXPERIENCE

1. **2018 National University Competition of Python** — Certified
2. **2017 IMP 2017 Conference** — Publish
3. **2017 Independent Study Competition** — Honorable Mention Award

SKILLS

WHAT I HAVE DONE	
Skills	**Tools**
Website and Server Develop	Node.js(Server), HTML, Javascript, CSS
Computer Vision	C++(or Python) with OpenCV
Network Programming	C language
Embedded System Development	C(or Python) with Raspberry PI
Communication Simulation	Matlab
Blockchain Technology	Go lang with Hyperledger
Linux (UNIX) Operation	Basic operation

PROJECT

(1) VoIP Phone Call Monitoring Platform

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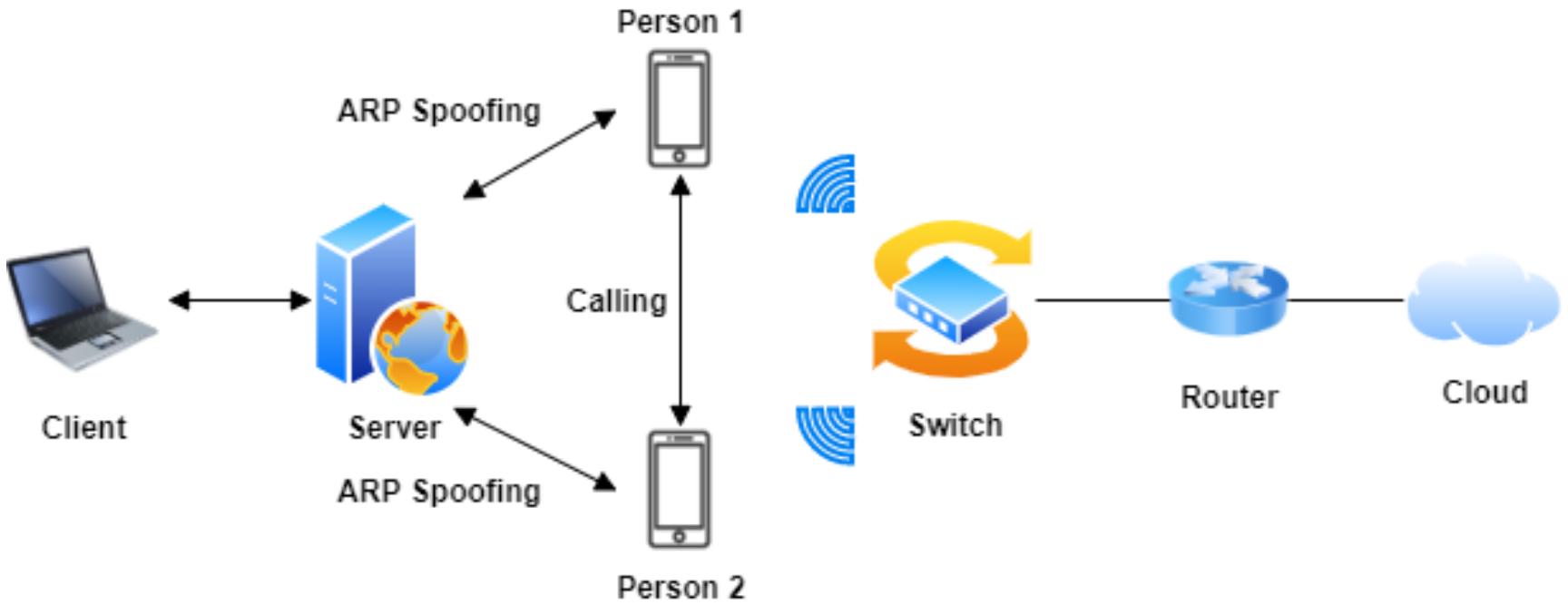
PURPOSE

- Provide VoIP phone call monitoring and management service to user.

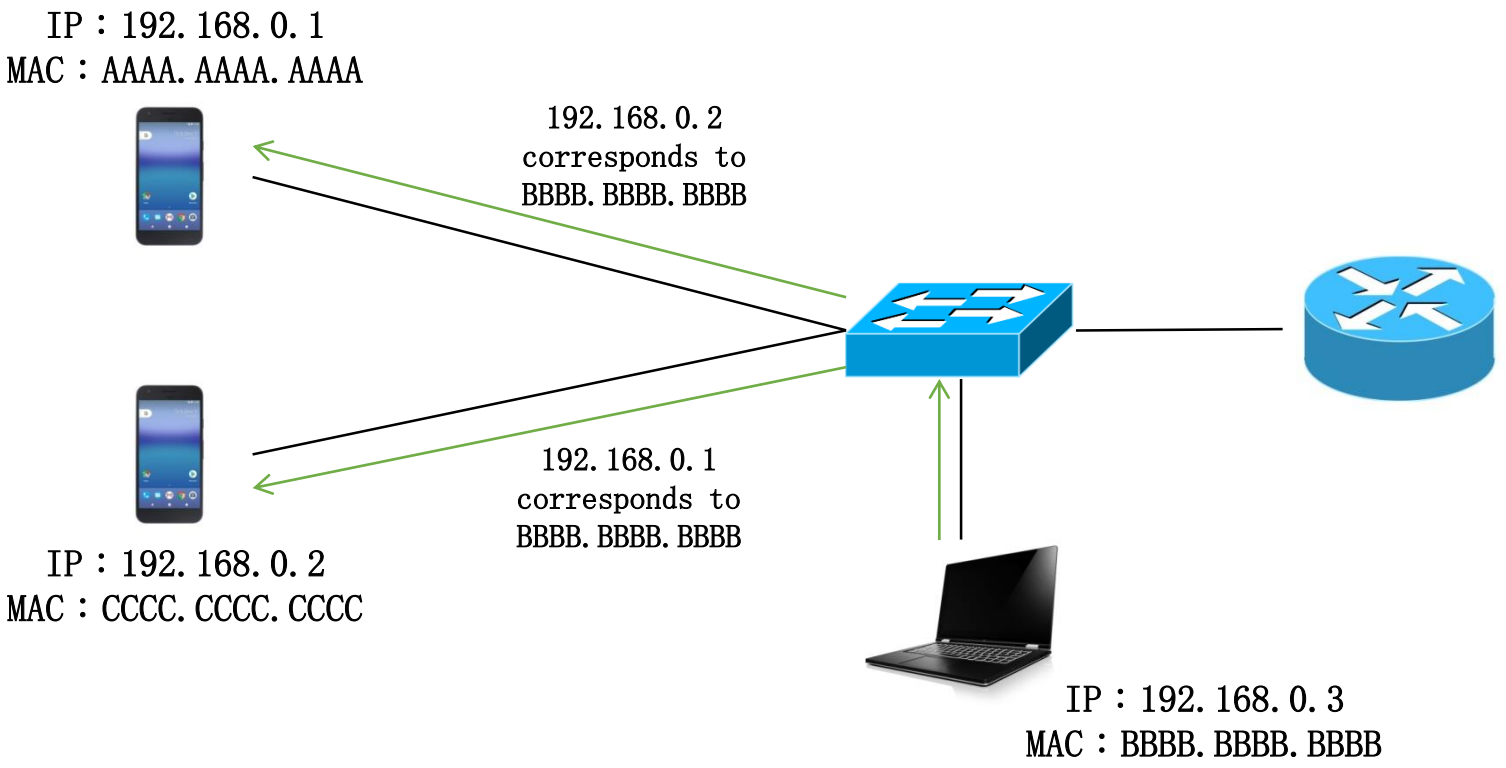
ARCHITECTURE



(1) VoIP Phone Call Monitoring Platform (Cont.)

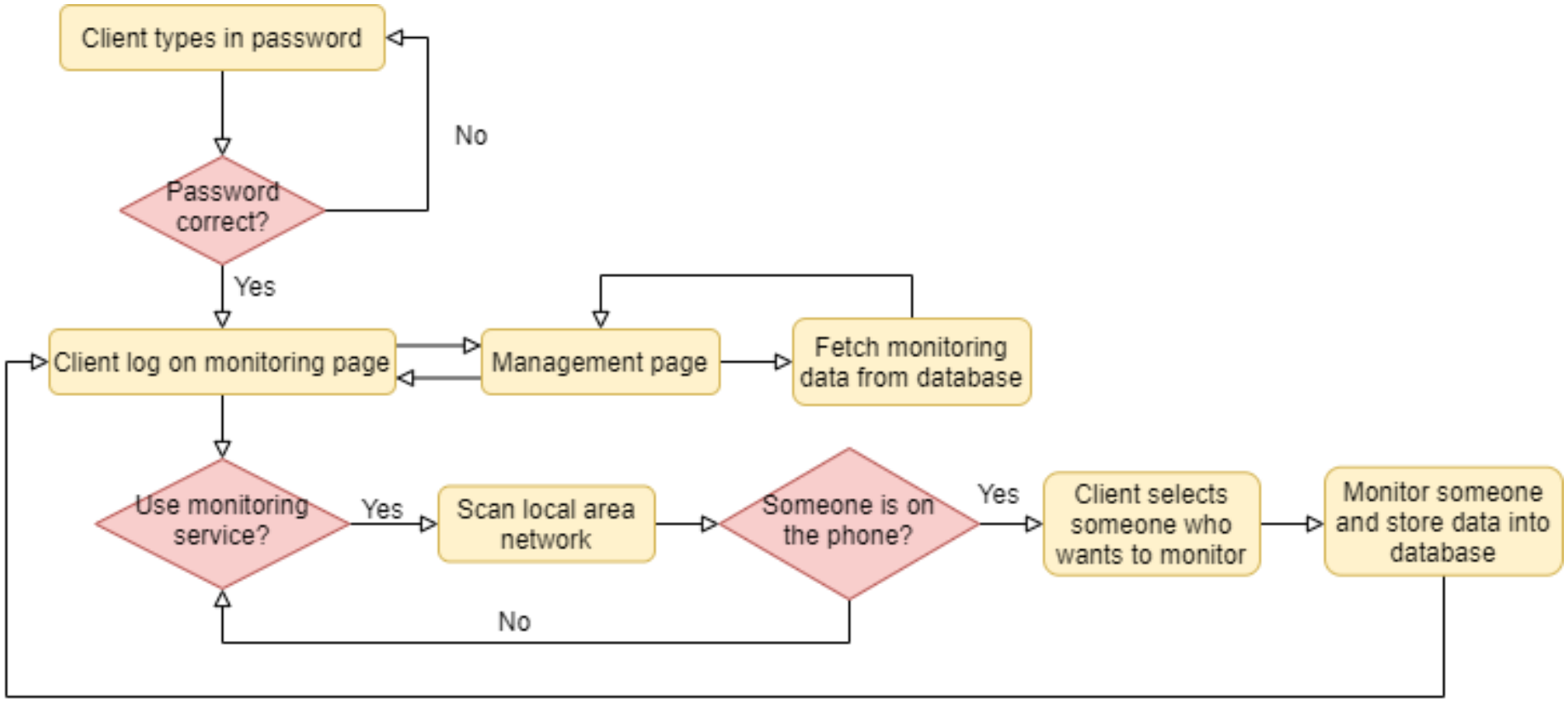
METHOD

- ARP Spoofing



(1) VoIP Phone Call Monitoring Platform (Cont.)

FLOWCHART



(1) VoIP Phone Call Monitoring Platform (Cont.)

RESULTS

Fig 1. Login page

Fig 2. Monitoring page

(1) VoIP Phone Call Monitoring Platform (Cont.)

RESULTS

Fig 3. Management page

(2) Blockchain Traceability System with HyperQL

(2) Blockchain Traceability System with HyperQL

What's Blockchain?

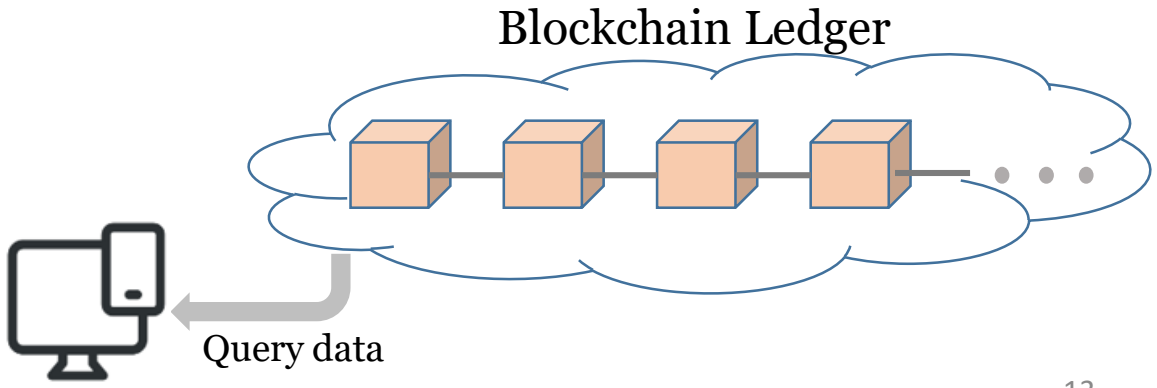
- Blockchain is a kind of decentralized database.

- **Advantage of blockchain technology :**

  Blockchain has immutable property that keep data secure.

- **Disadvantage of blockchain technology :**

  Query data from the blockchain ledger is complex and slow.

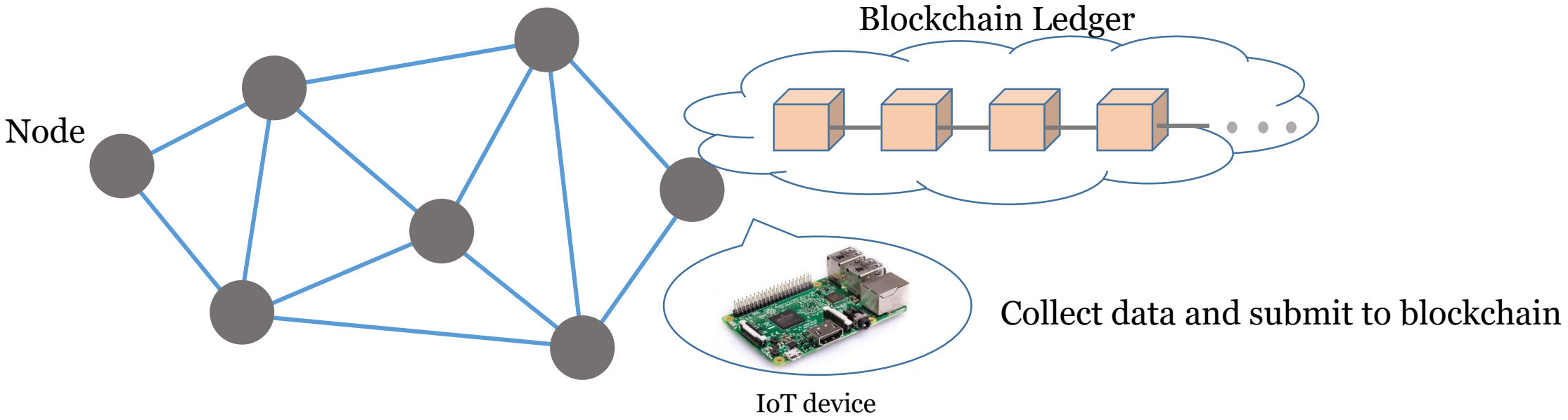


(2) Blockchain Traceability System with HyperQL (Cont.)

PURPOSE

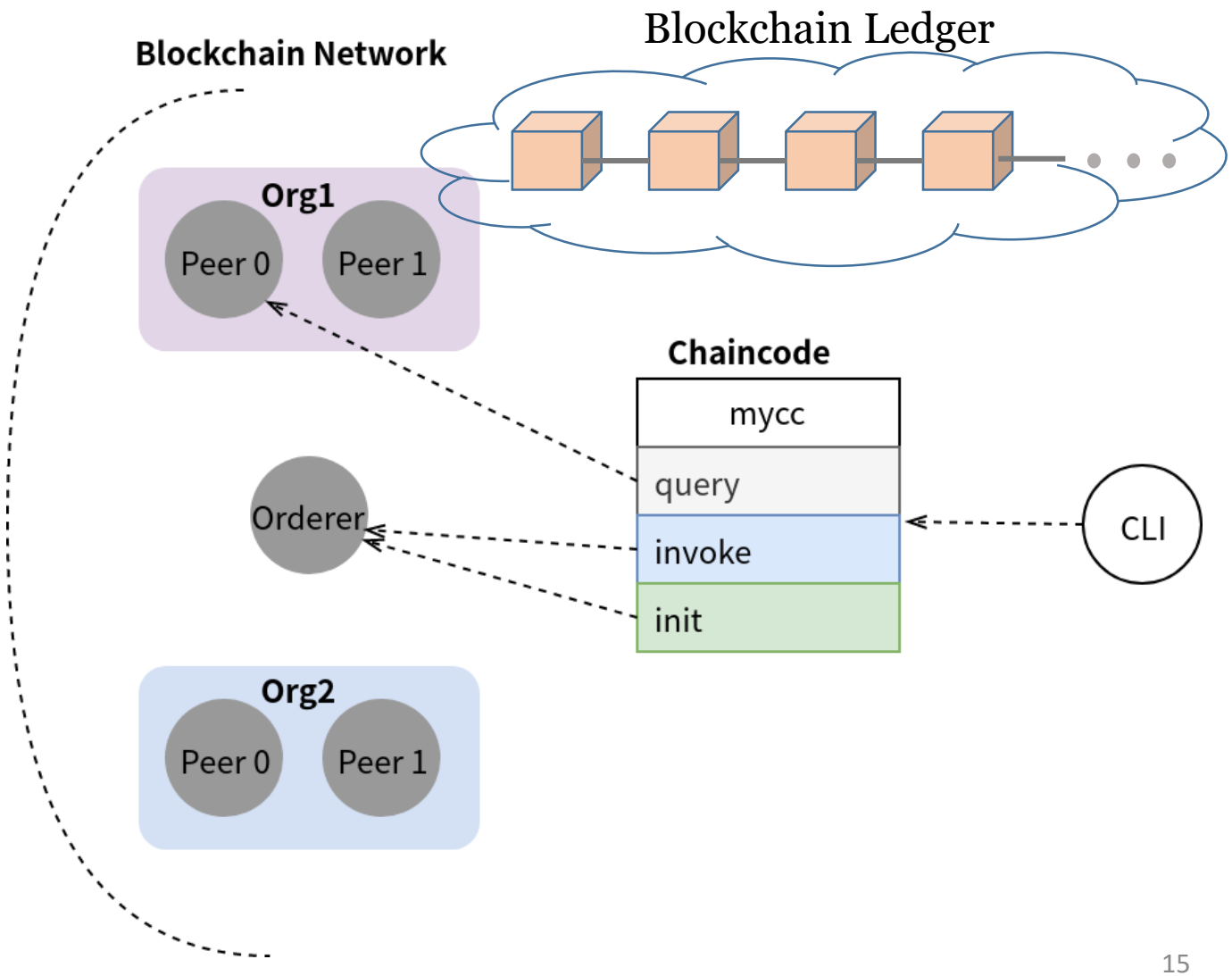
- Create a blockchain-based IoT system and propose an architecture, named “HyperQL”, to speed up the query speed.

ARCHITECTURE



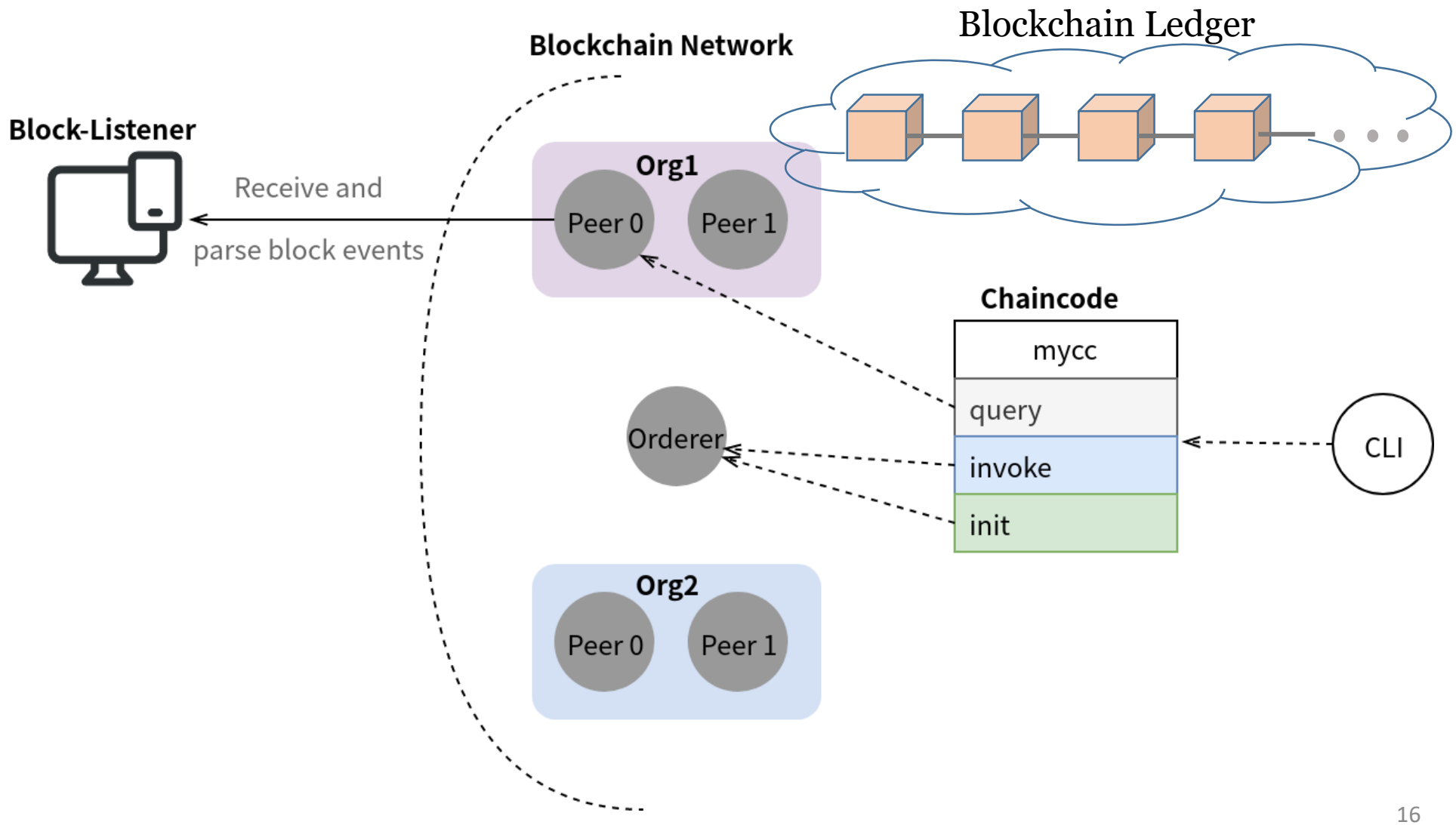
(2) Blockchain Traceability System with HyperQL (Cont.)

METHOD



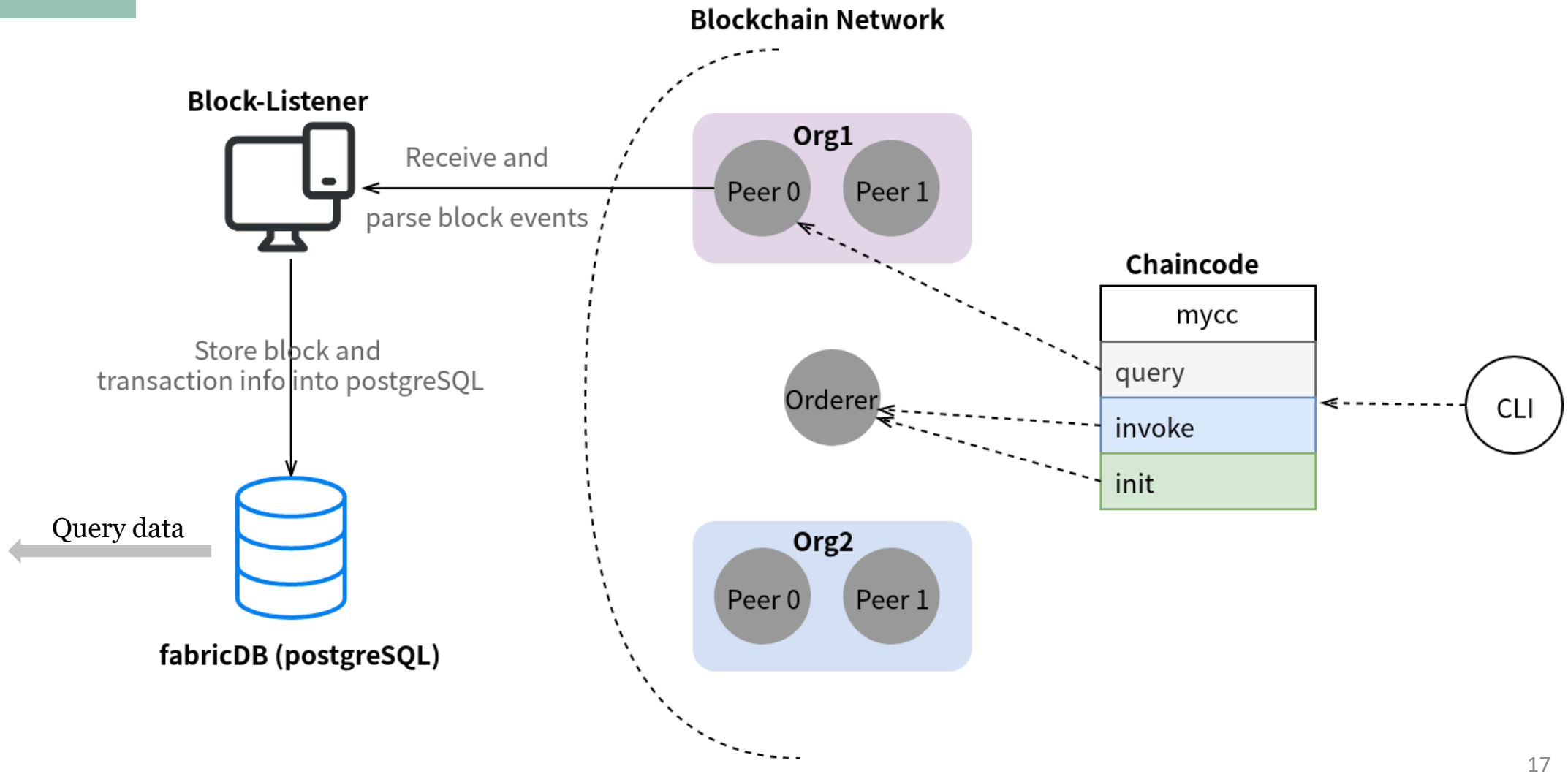
(2) Blockchain Traceability System with HyperQL (Cont.)

METHOD



(2) Blockchain Traceability System with HyperQL (Cont.)

METHOD



(2) Blockchain Traceability System with HyperQL (Cont.)

ISSUES

- **Advantage :**

  Query data from the database is nearly 50 times faster than query from blockchain.

- **Disadvantage :**

  The data in the database is not immutable.

- **Future work :**

  Design an algorithm to efficiently synchronize the data in blockchain and database.
  With this, we can keep the data secure while having faster query speed.

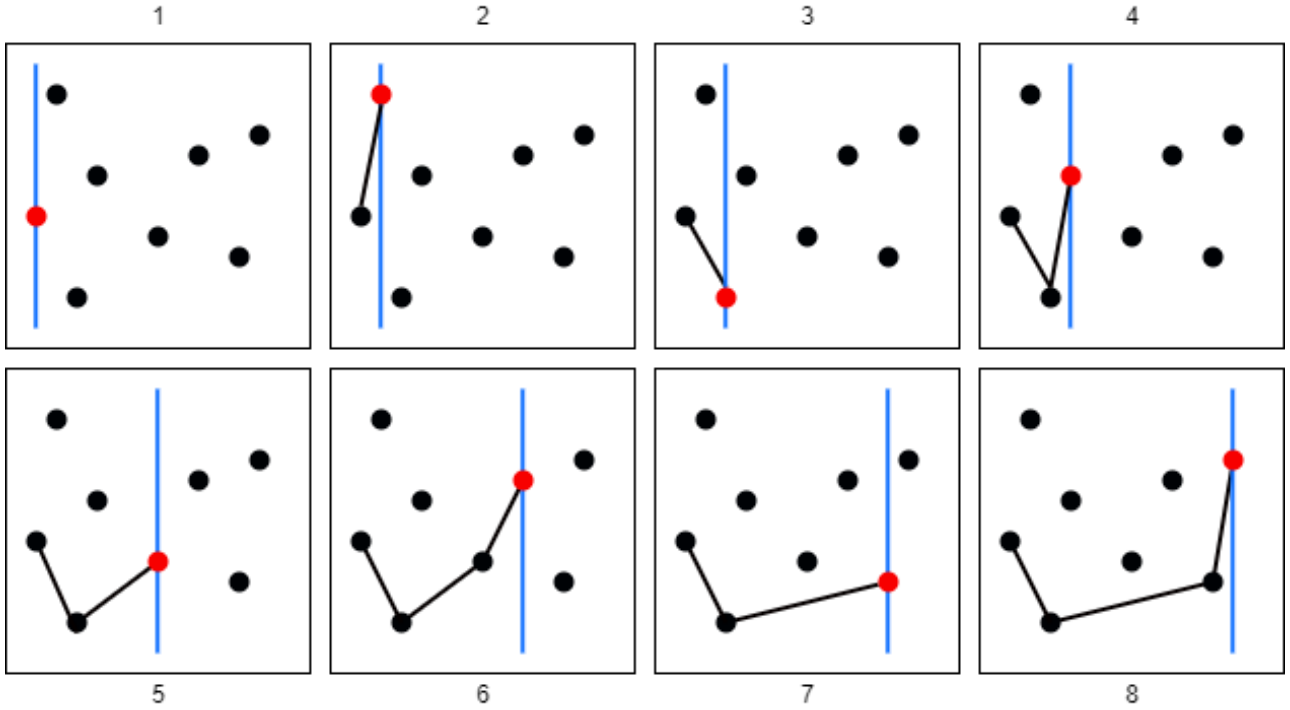
(3) Convex Hull Algorithm

(3) Convex Hull Algorithm

PURPOSE

- Can be applied to some fields such as image processing.

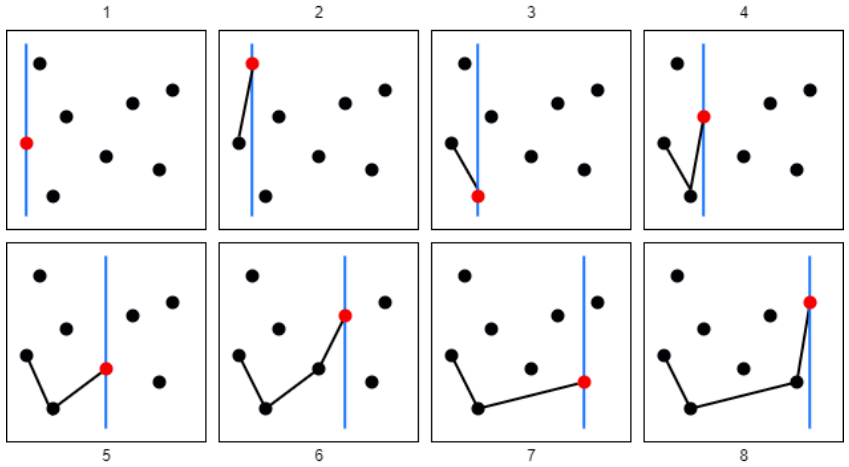
METHOD



My way of thinking :

1. Find the bottom-left point first.
2. Iterate the others from left to right to find the point that can form the smallest slope.
3. If the same slope occurs, take the longer one.
4. Do step 1 2 3 until reaching the far right
5. Then do the same thing from right to left.

(3) Convex Hull Algorithm (Cont.)



ANALYZE

- **Time Complexity :**

  Since we need to use double loop to iterate all the points, the time complexity is $O(n^2)$.

- **Space Complexity :**

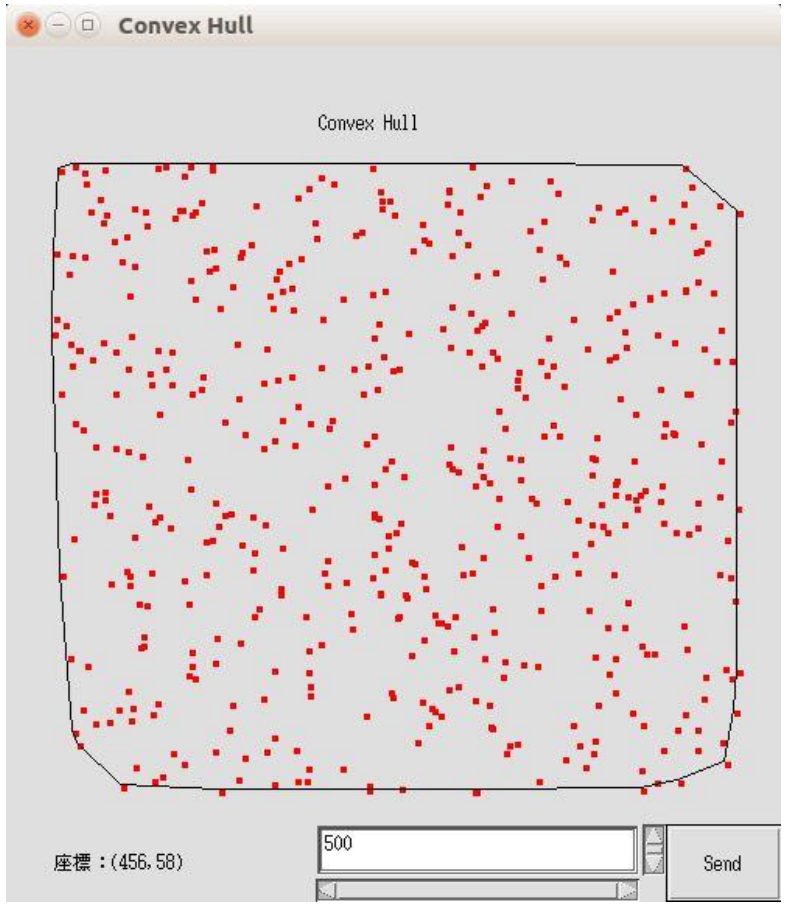
  We don't need any additional space to store all the points, so the space complexity is $O(1)$

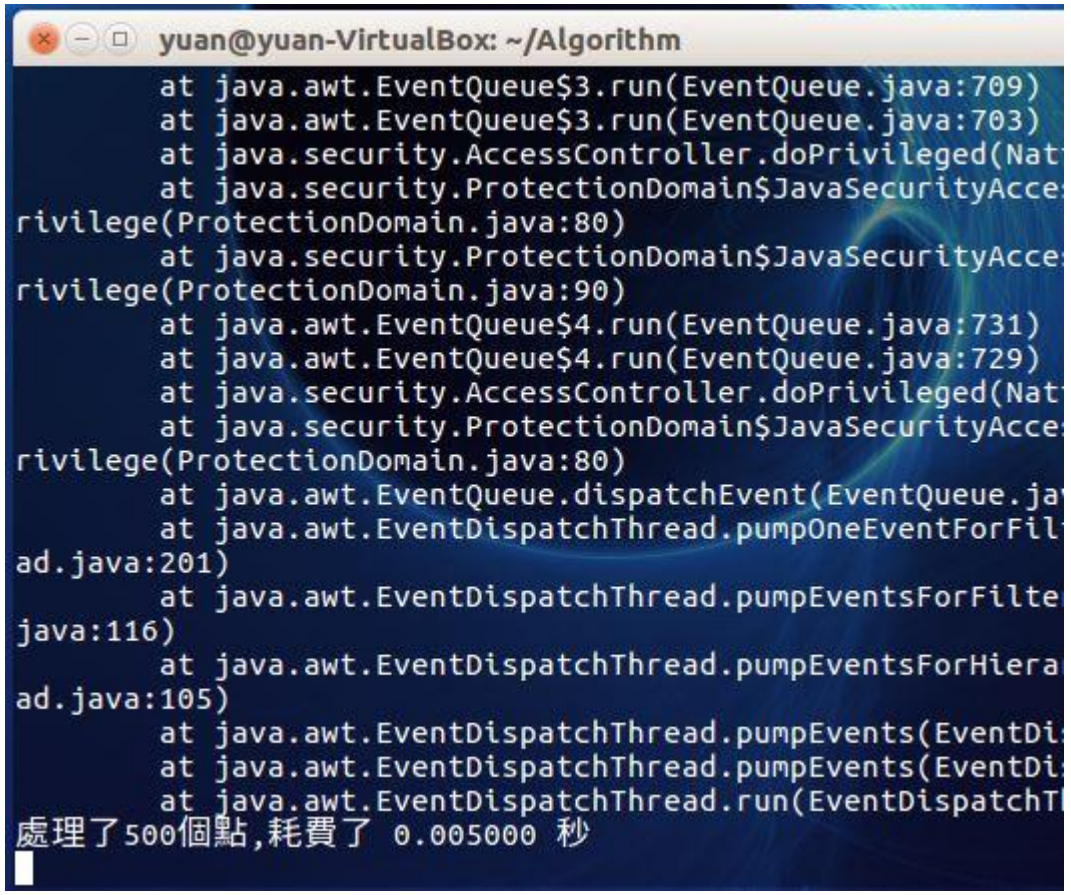
- **Discuss :**

  Although the time complexity is $O(n^2)$, but we don't have to sort all the points first.

(3) Convex Hull Algorithm (Cont.)

RESULTS





(4) Simple TCP Communication (IPv4)

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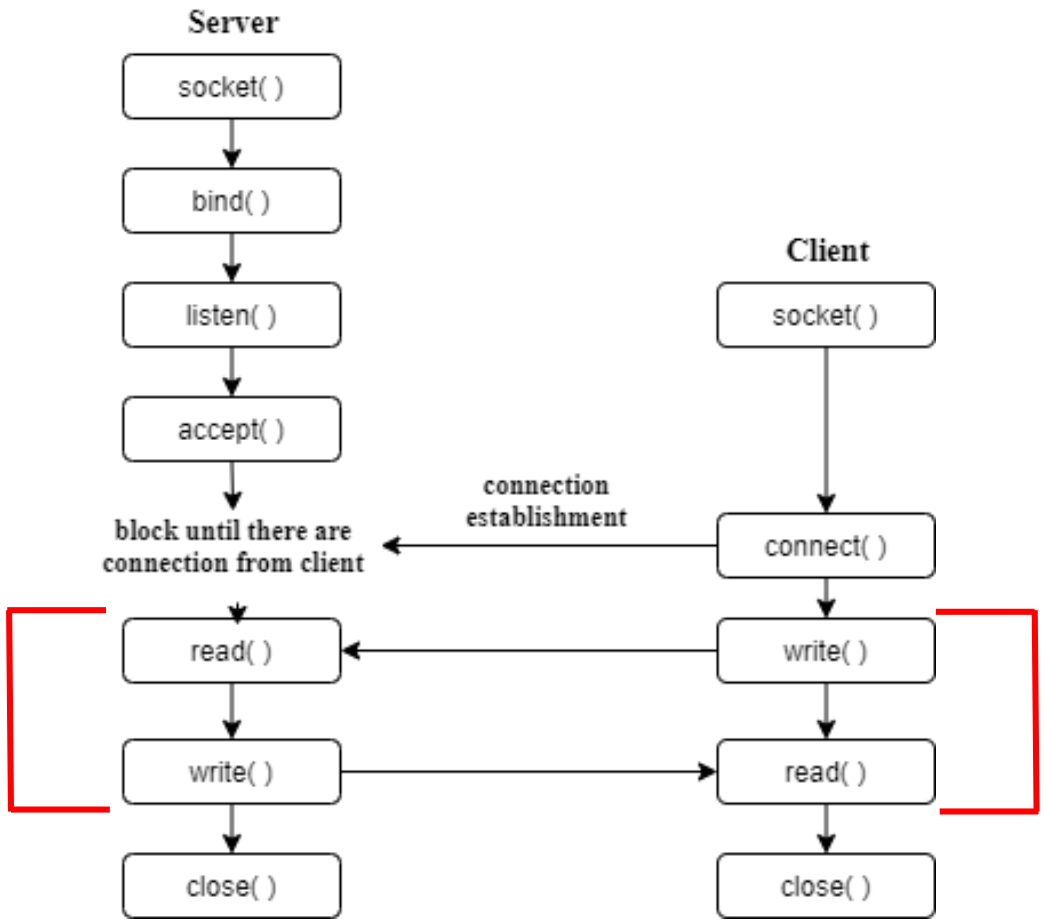
PURPOSE

- Implement TCP message communication using select( ) in C language.

ISSUES



(4) Simple TCP Communication (IPv4) (Cont.)

METHOD

- **Server uses select( ) function (Non-blocking):**

  select( ) function privileges you to monitor multiple file descriptors at the same time.

- **Client uses multi-thread (Non-blocking)**

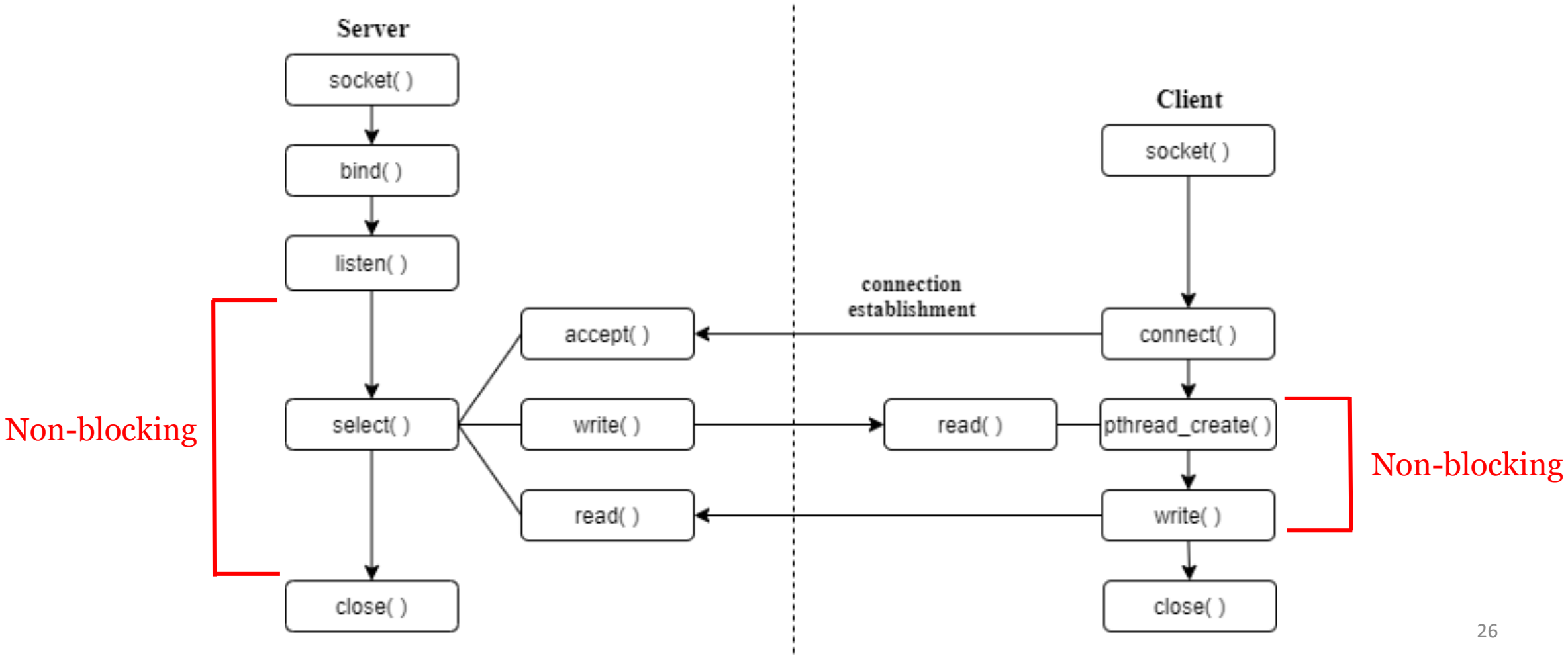
  The thread is in charge of reading data which created by pthread_create( ). The main process is in charge of writing data.

- **Handle SIGPIPE signal**

  If a Client is disconnected, but the Server keeps sending data to the client, it will cause SIGPIPE signal produced.

(4) Simple TCP Communication (IPv4) (Cont.)

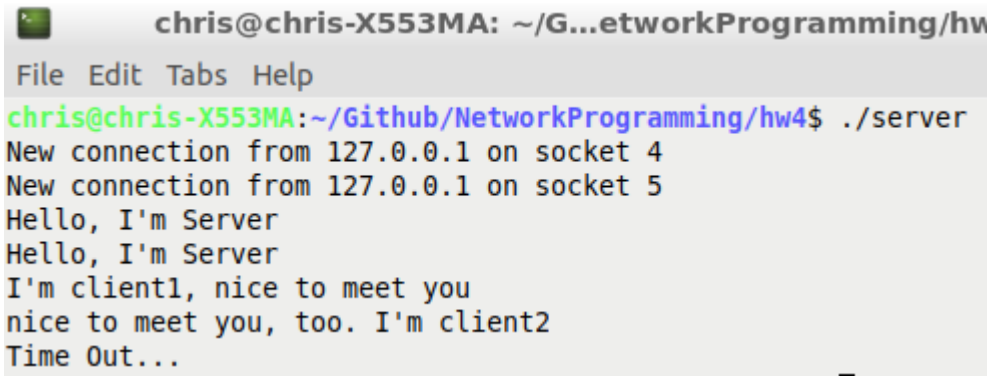
ARCHITECTURE



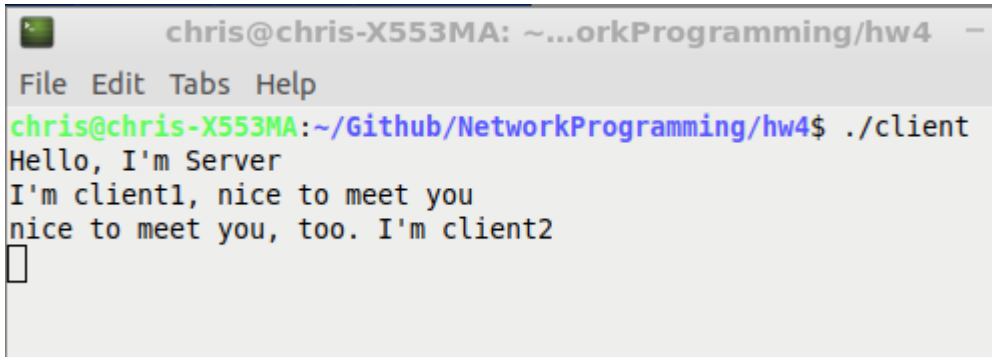
(4) Simple TCP Communication (IPv4) (Cont.)

RESULTS

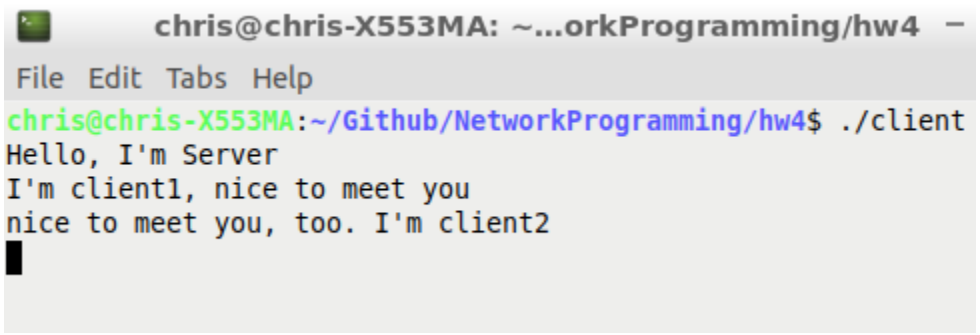
- **Server :**



- **Client 1 :**



- **Client 2 :**



(5) Simple LED Driver on RPI

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PURPOSE

- Create a simple device driver on RPI.

DRIVER

- In first step, we have to initial the kernel module.

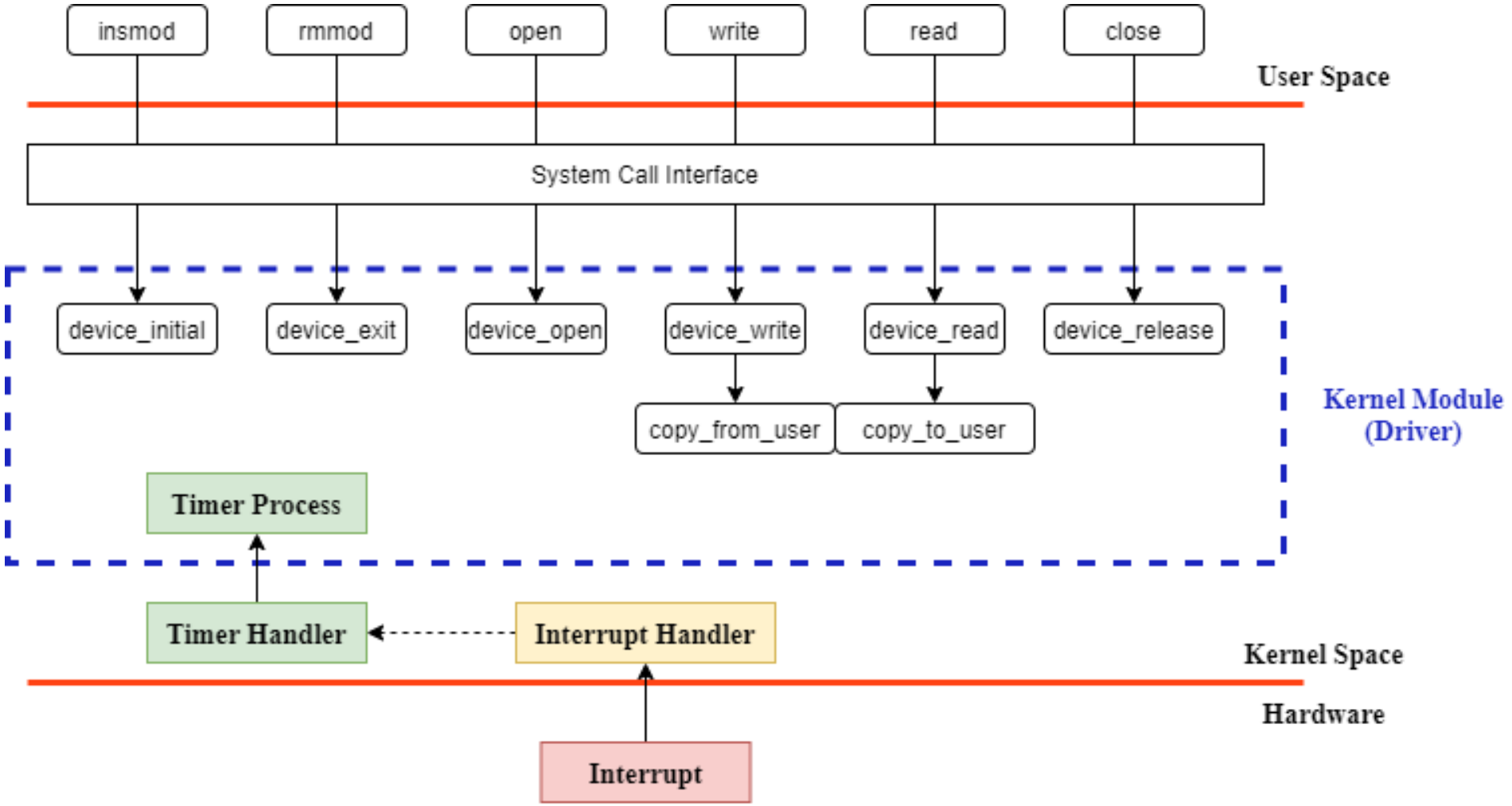
```
static int hello_init(void) {
    misc_register(&misc);
    printk(DEVICE_NAME" initialized\n");

    return SUCCESS;
}
```

```
static struct miscdevice misc = {
    .minor = MISC_DYNAMIC_MINOR,
    .name = DEVICE_NAME,
    .fops = &fops,
};
```

```
static struct file_operations fops = {
    .owner = THIS_MODULE,
    .read = device_read,
    .write = device_write,
    .open = device_open,
    .release = device_release,
};
```

(5) Simple LED Driver on RPI (Cont.)

ARCHITECTURE



(5) Simple LED Driver on RPI (Cont.)

RESULTS

Thank you for your time!