# Project2: rwg System

NP TA 垣佑

# 11/10 18:20

Project 2 Deadline

Demo: 11/12 Thu.

## rwg - Remote Working Ground

- Chat-like system
- Provide all functions in **project 1**
- New functions
    - **User pipe**
    - **who - get information of all users**
    - **name - rename**
    - **tell - send message to someone**
    - **yell - broadcast message**

## 2 Servers + 1 Bonus

- np_simple (Single user)
  - **Project 1**
  - **Concurrent connection-oriented**
- np_single_proc (Multiple users)
  - **Project 1 + User pipe + 4 functions + Broadcast message**
  - **Single-process concurrent**
- **(Bonus)** np_multi_proc (Multiple users)
  - **Project 1 + User pipe + 4 functions + Broadcast message**
  - **Concurrent connection-oriented + FIFO + Shared memory**

## Project 2: Submission

- Create a directory named as your student ID, put all files into the directory.
- You must provide Makefile. Two executable files named **np_simple** (server 1) and **np_single_proc** (server 2) should be produced after typing make command.
- You are **NOT** allow to demo if we are unable to compile your project with a single make command.
- Upload only your code and Makefile. DO NOT upload anything else (e.g. noop, removetag, test.html, **.git**, **__MACOSX**)
- zip the directory and upload the .zip file to new e3 platform

  **ATTENTION! We only accept .zip format**

## Project 2: About Bonus

- Submission
  - Same rules as previous slide
  - The executable file **np_multi_proc** (server 3) should be produced after typing make command
  - Submit to “**Project Bonus**”
- Deadline
  - **Two days before the additional demo time** at the end of this semester

## Project 2: Demo

- 11/12 Thu. 9:00 ~ 18:30
- We will announce demo slots 2~3 days before.
- Tasks:
    - correct format and compile
    - QA
    - Pass test cases
    - Implement 1 extra function with limit time

## Implementation

## Handle Function Failures !!

- **Fork** may failed
- **Create pipe** may failed
- **Select** may failed
- **Read** may failed

## Select May Failed

```
if (select(maxfd + 1, &read_set, NULL, NULL, NULL) < 0) {
    // may be interrupted by signal or other errors
    // handle error
}
for (fd = 0; fd < maxfd; ++fd) {
    if (FD_ISSET(fd, &read_set)){
        //handle fd
    }
}
```

## Read May Failed

```
if (read(cli_fd, buf, BUF_SIZE) < 0) {
	// may be interrupted by signal or other errors
	// handle error
}
```

## Don't Send Additional '\0' Through Socket

- char str[] = "Hello";
    - write(fd, buf, **sizeof**(str))                    // **sizeof(str) is 6**
    - write(fd, buf, **strlen**(str))                    // **OK**
- std::string str = "Hello";
    - write(fd, str.c_str(), str.length())     // **OK**

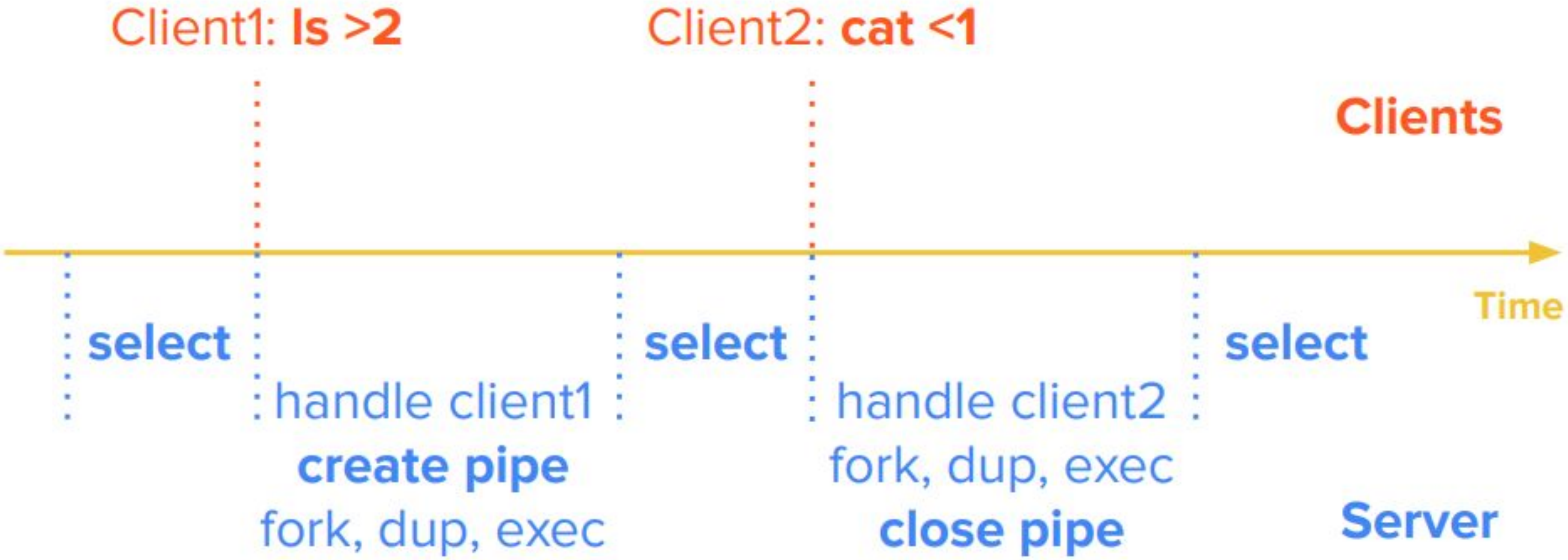
# Difference between Server2 and Server3

- Server2 (np_single_proc)
  - **Single-process concurrent**
  - Use **pipe** to implement user pipe
  - Use socket to send messages directory
- Server3 (np_multi_proc)
  - **Concurrent connection-oriented**
  - Use **FIFO** to implement user pipe
  - Use **shared memory** to save **clients infos** and **messages**

## Server2 (np_single_proc)

- Single-process concurrent (use **select**)
- Use **pipe** to implement user pipe
  - **DO NO**T use FIFO or temporary files
- Use socket to send messages directly
- Maintain environment variables for every user

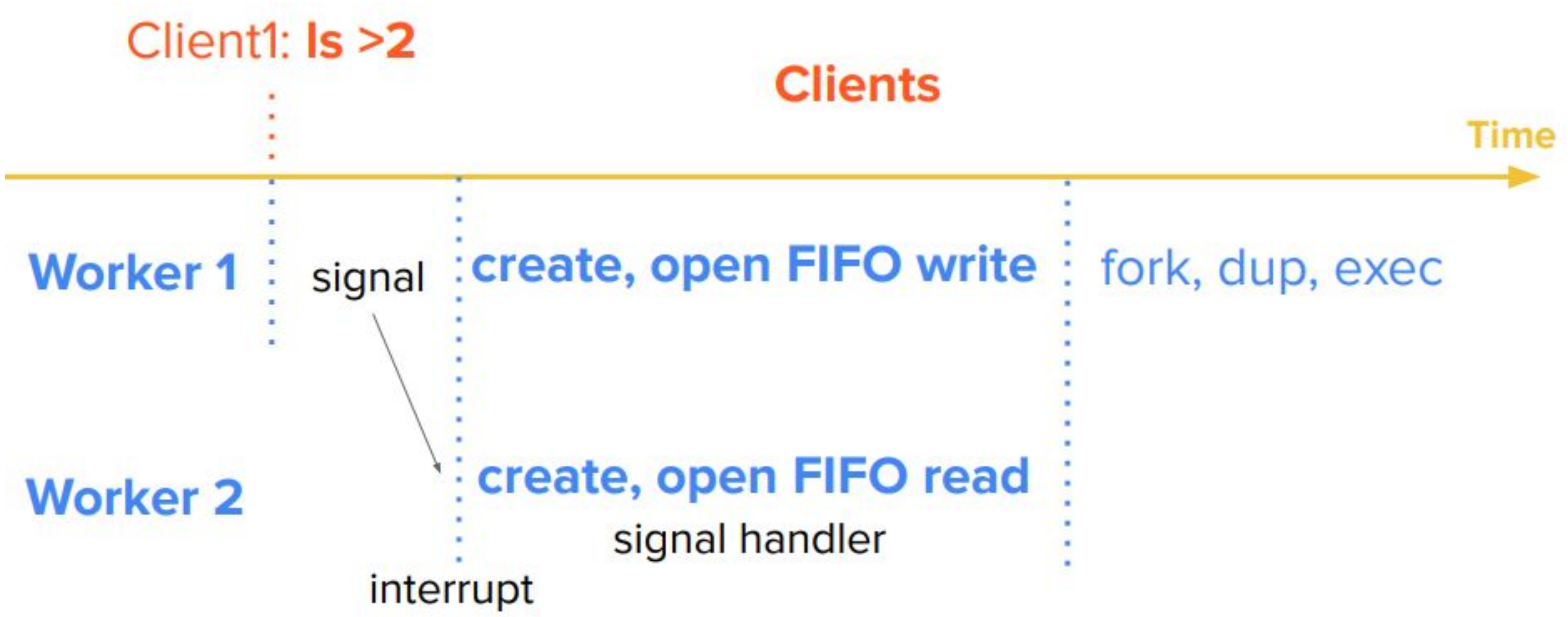
## Server2 (np_single_proc) - User Pipe



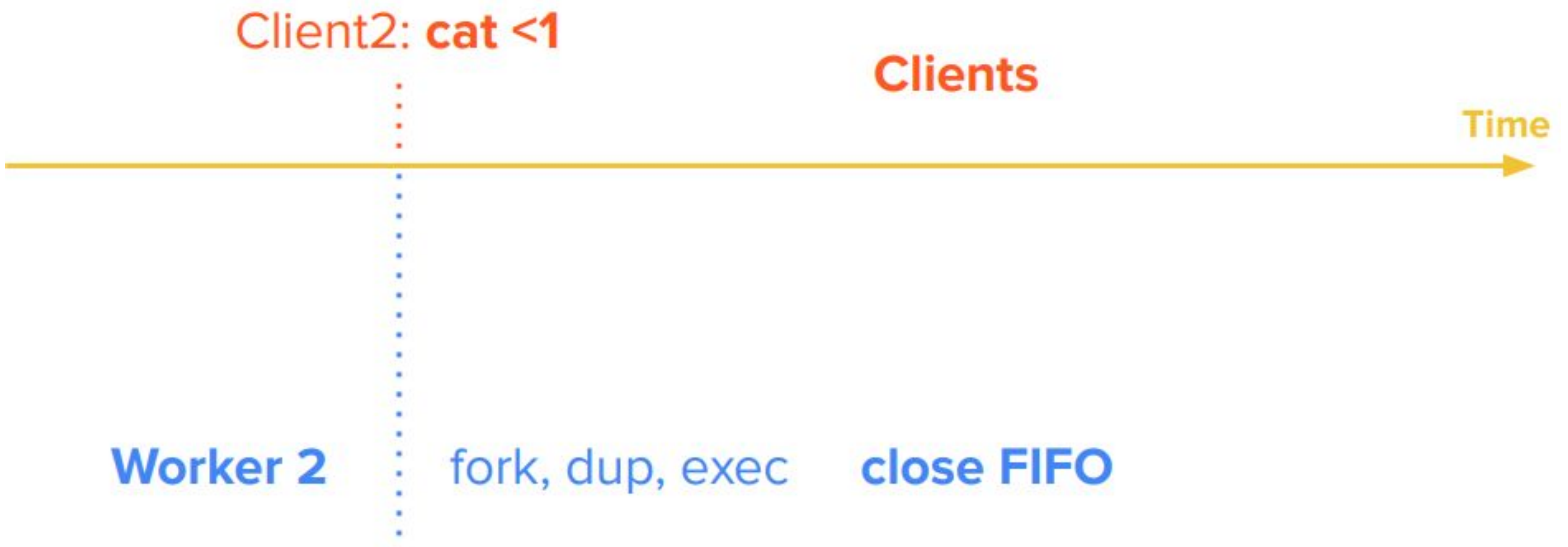
## Server3 (np_multi_proc)

- Concurrent connection-oriented
- Use **FIFO** to implement user pipe
- Use shared memory to save clients infos and messages
- Handle signal
- Server3 will be terminated by SIGINT (Ctrl-C)
  - Receive SIGINT ➡ Clean up shared memory ➡ exit

# Server3 (np_multi_proc) - User Pipe send



# Server3 (np_multi_proc) - User Pipe recv



## User Pipe detail

- Pipe **stdout** only
- Whole command line should be printed in broadcast message

```
[termianl of user1]
% cat test.html | removetag0 >2
*** user1 (#1) just piped 'cat test.html | removetag0 >2' to user2 (#2)
Error: illegal tag "!test.html"            // error message from removetag0
%
[terminal of user2]
% cat <1
Test ...
%
```

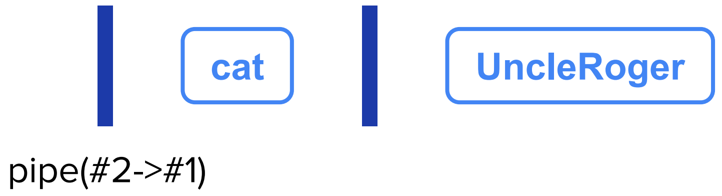
## User Pipe - error handling

- When user pipe error, each command should still be executed
  - some command prints something itself
  - prevent stuck when pipe large file

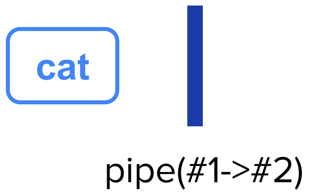
```
% cat test.html | removetag0 >999
*** Error: user #999 does not exist yet. ***
Error: illegal tag “!test.html”              // error message from removetag0
% UncleRoger <999                            // UncleRoger prints input message and HAIYAA!!
*** Error: user #999 does not exist yet. ***
HAIYAA!!
% cat LargeFile | cat | cat >999
*** Error: user #999 does not exist yet. ***
```

## User Pipe - error handling

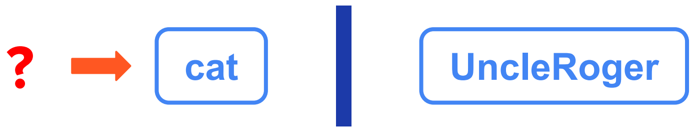
```
% cat <2 | UncleRoger
```



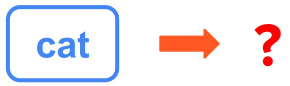
```
% cat LargeFile >2
```



```
% cat <999 | UncleRoger   // user pipe error
```



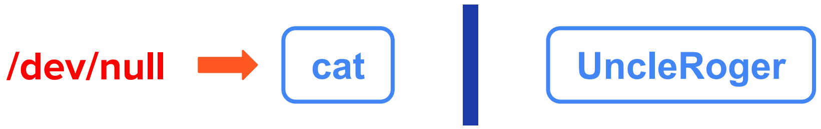
```
% cat LargeFile >999  // user pipe error
```



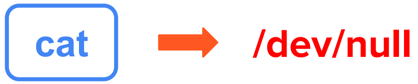
# User Pipe - error handling

- Redirect stdin/stdout to **/dev/null**
  - stdin: EOF
  - stdout: dump everything

**% cat <999 | UncleRoger   // user pipe error**



**% cat LargeFile >999  // user pipe error**


cat
/dev/null