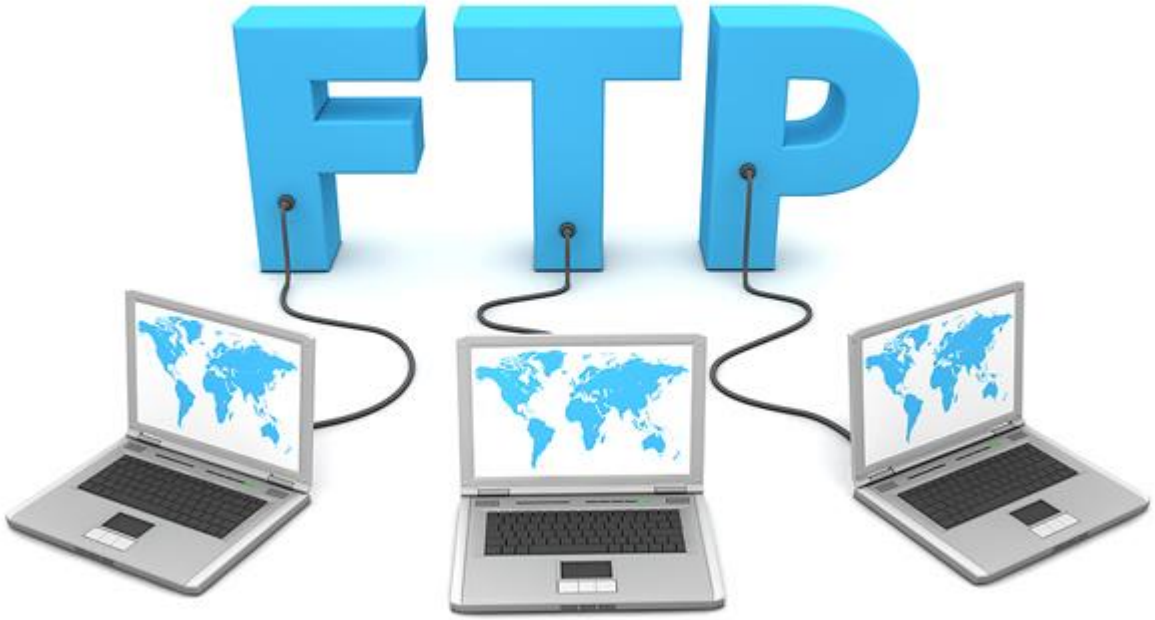
Assignment, part 2

Statement and concepts

INFO-0010

Objectives



1. Learn **on your own** the details of the FTP protocol
2. Implement a FTP server

img src : https://www.unixmen.com/install-configure-ftp-server-centos-7/

Outline

- Implementation of concepts
- Statement

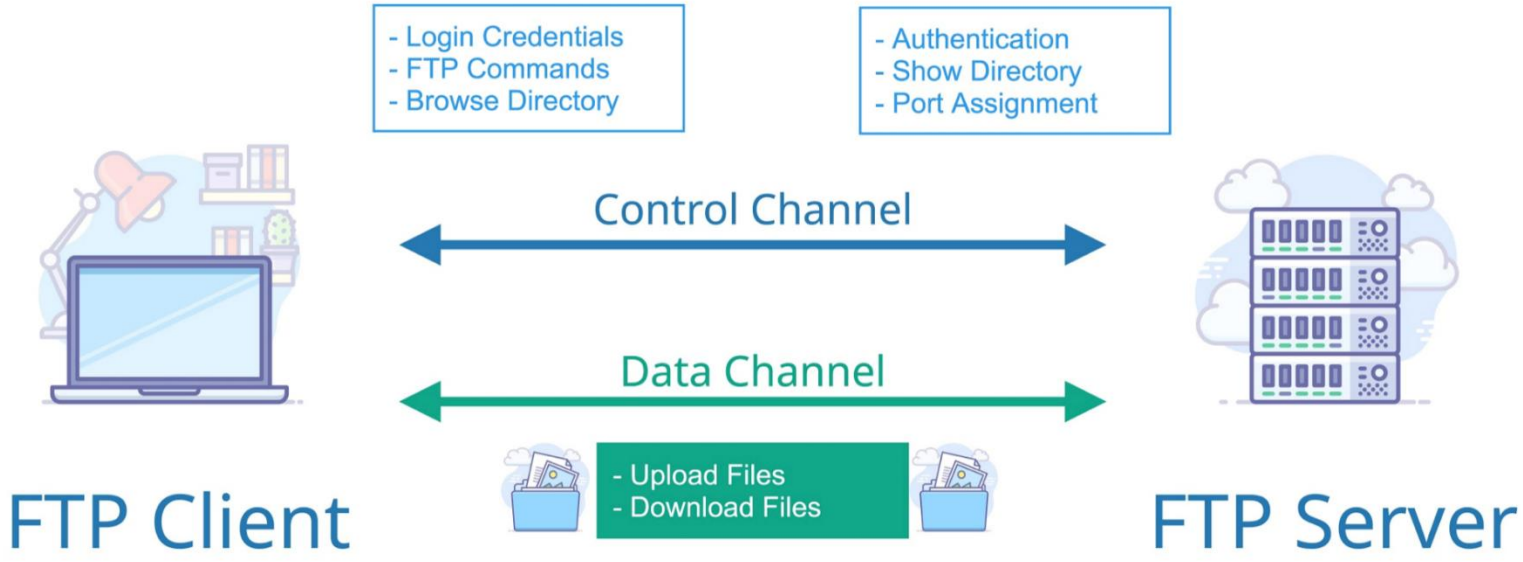
Learning FTP

Self-learning is one of the objectives of the assignment

Helpful resources :

- These slides
- RFC 959
- Free-to-use FTP server : ftp://speedtest.tele2.net

The FTP protocol



- Application protocol over TCP.
- Transfer files between machines
- Mostly text-oriented protocol
- Separate control and data channel

FTP requests

- FTP request = String of text, starting with a method in upper-case, ending with CRLF
- Some requests take extra parameters, others are only the method + CRLF

- Example of valid requests :
  - CWD<CRLF>
  - RETR File.zip<CRLF>

- Operations may span over several requests (e.g. USER → PASS)
- Operations may also use both control and data connection (e.g. RETR or STOR)

FTP response codes

The first digit of the response code indicates success or failure:

- 1xx : Positive preliminary reply
- 2xx : Positive completion reply
- 3xx : Positive intermediary reply
- 4xx : Transient negative completion reply
- 5xx : Permanent negative completion reply

FTP response codes (cont'd)

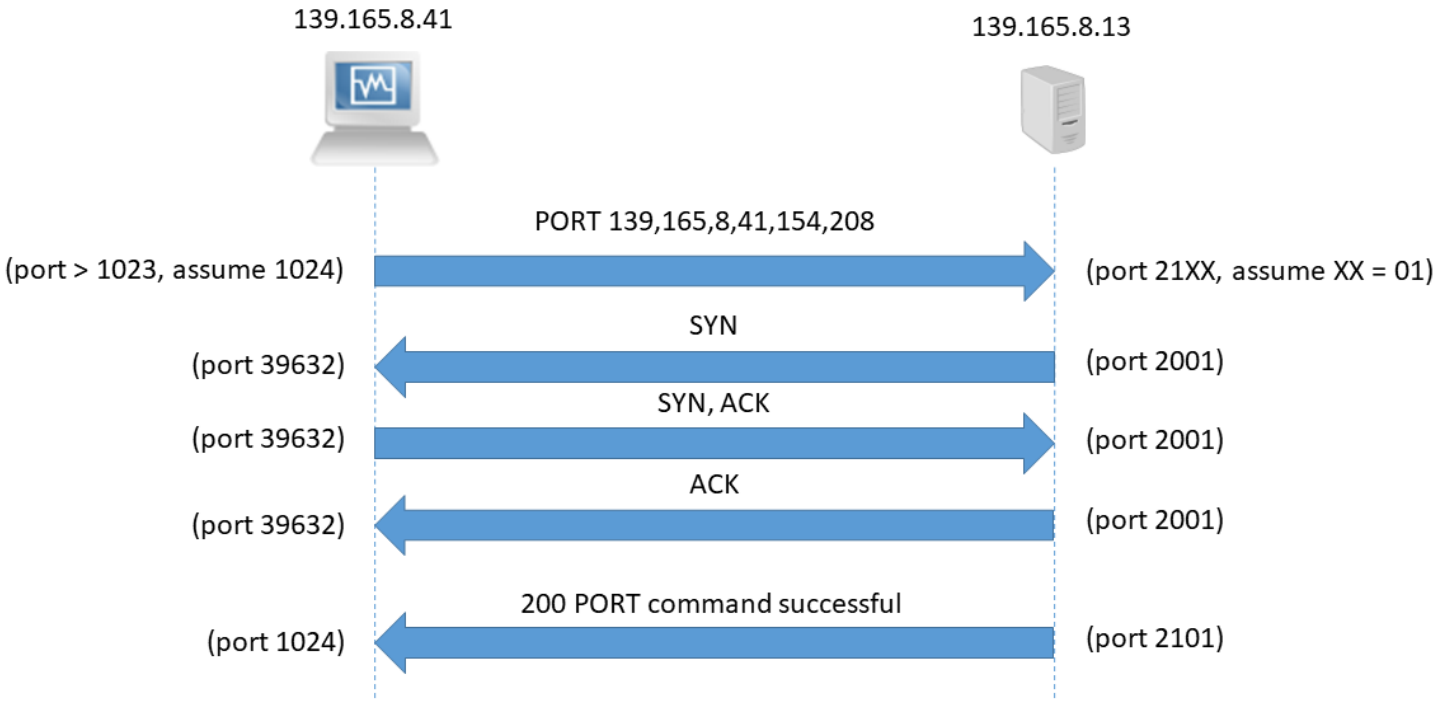
The second digit of the response code classifies the category of the response:

- x0x : Syntax
- x1x : Information
- x2x : Connections
- x3x : Authentication and accounting
- x4x : *Not defined*
- x5x : File system

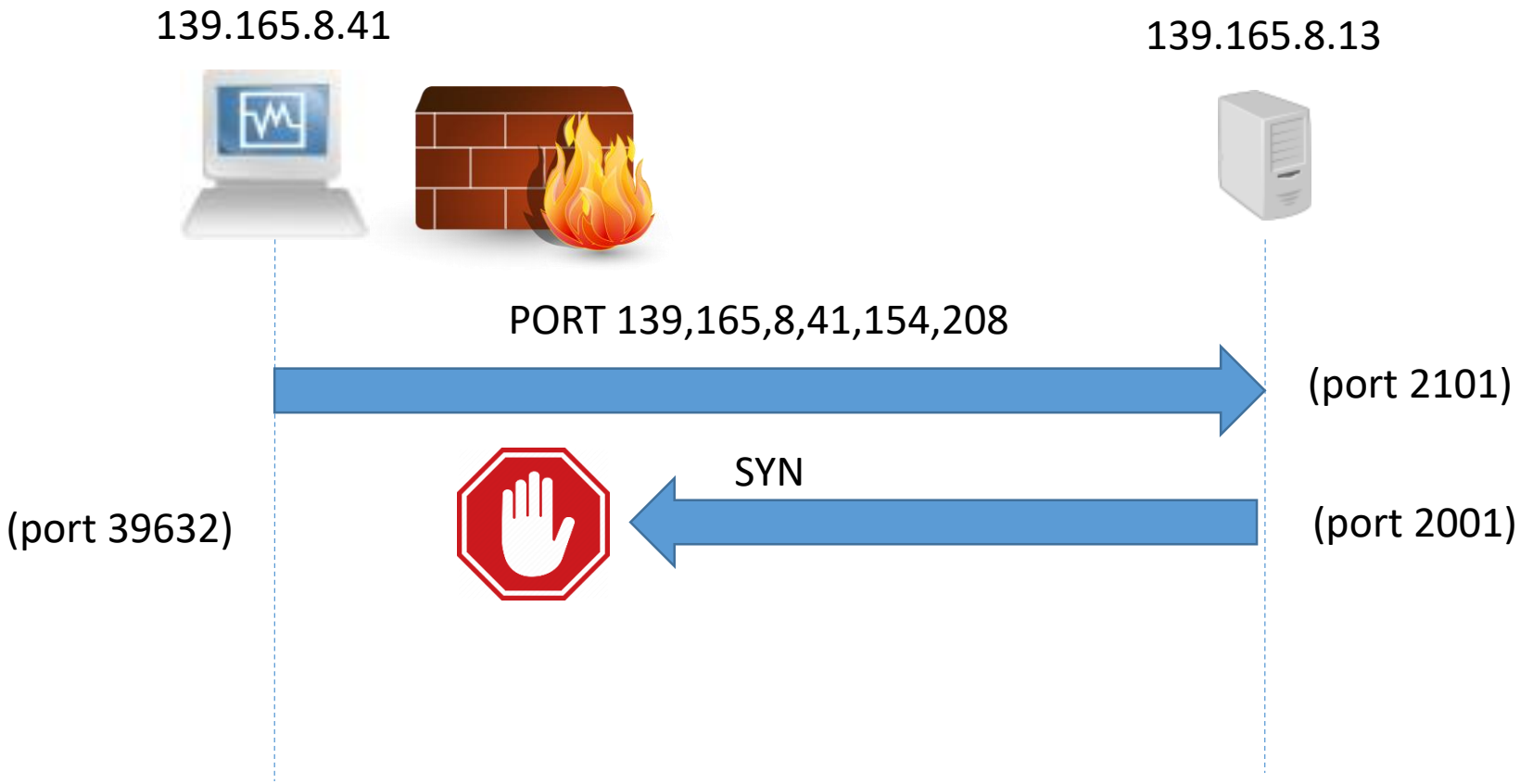
FTP response codes (cont'd)

- FTP uses a few dozens of codes, and considering all of them is outside the scope of this assignment.
- It's up to you to find out which requests/response codes are mandatory given your objective.
- A complete list of requests/responses codes can be found on the internet.

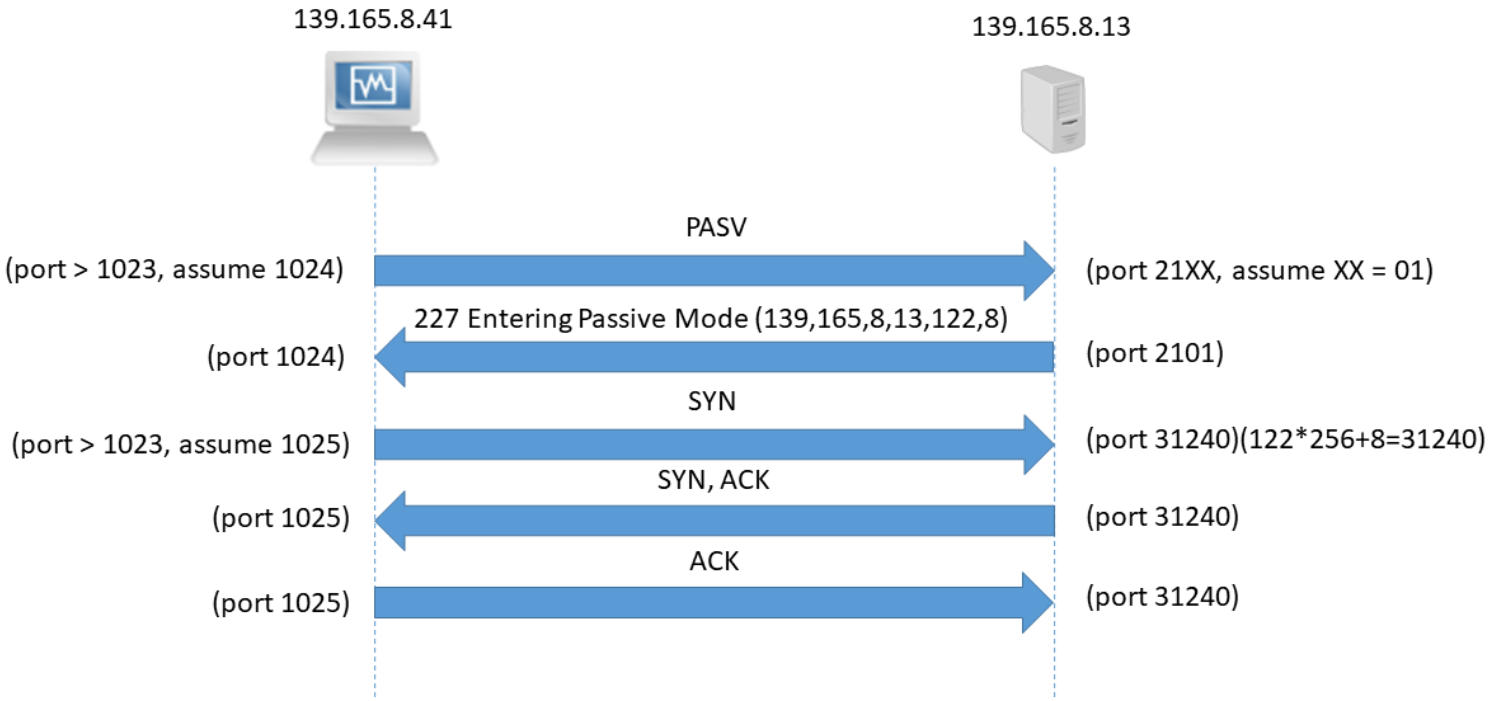
Data connection establishment (active mode)



The problem of active mode

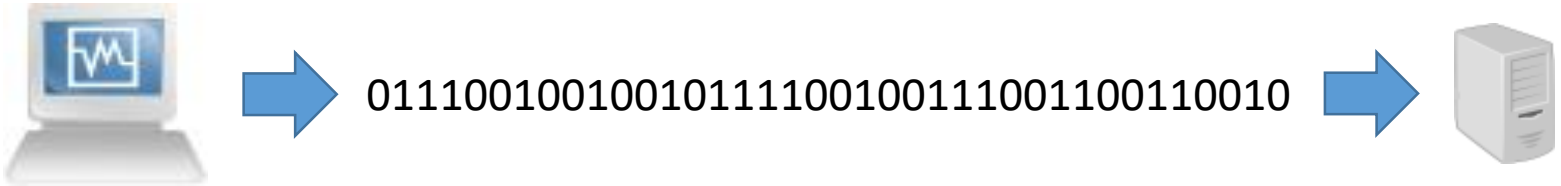


Data connection establishment (passive mode)

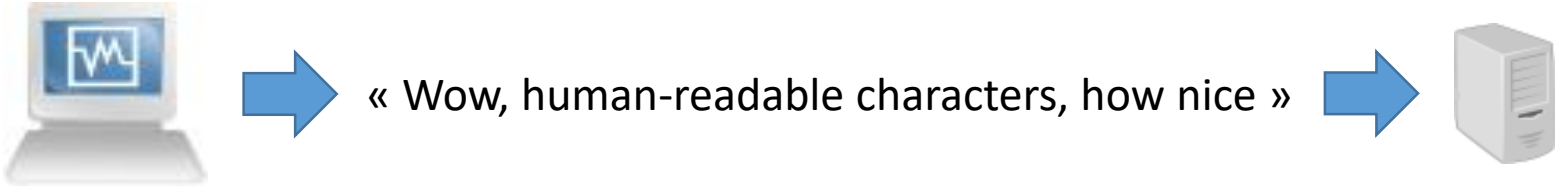


Binary vs ASCII

- « TYPE I » : Binary mode



- « TYPE A » : ASCII (text) mode

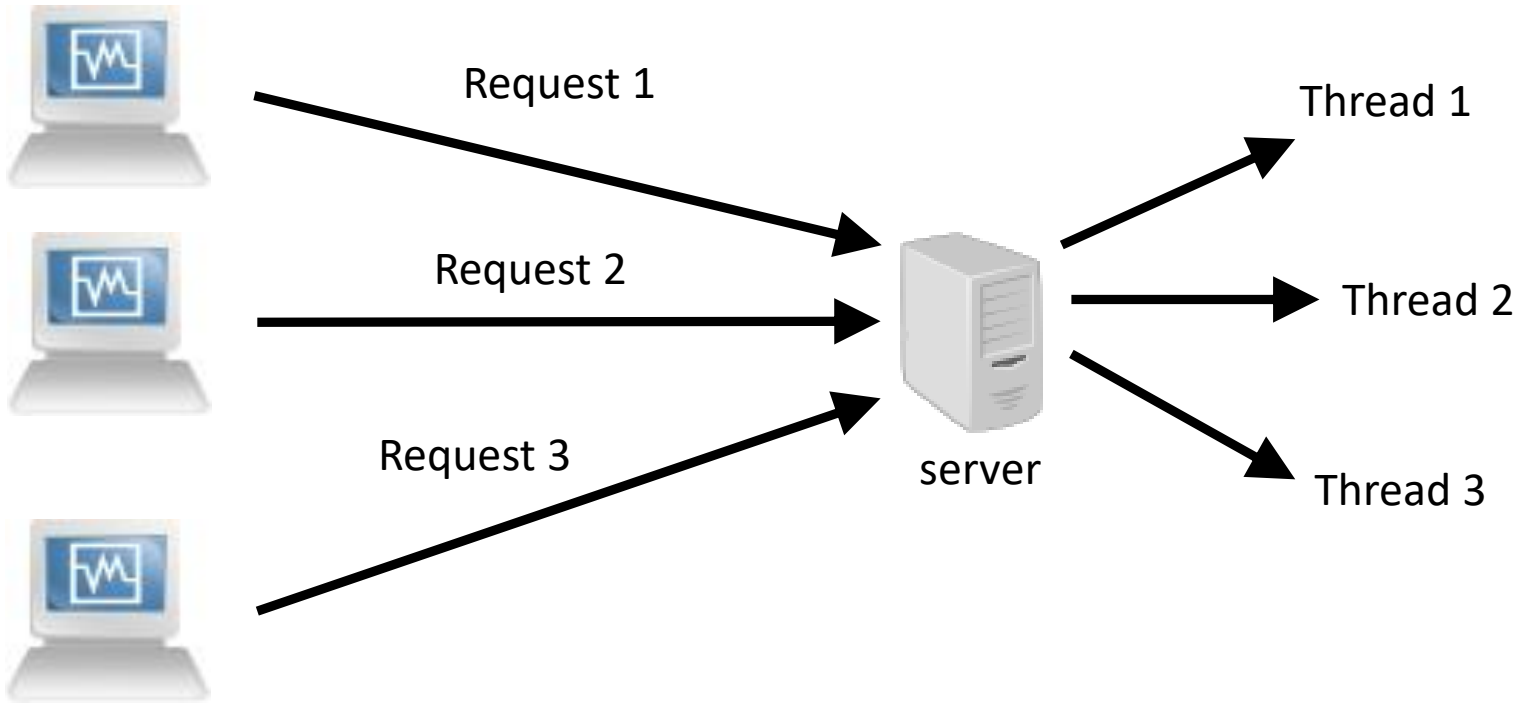


Directory navigation

- **CDUP**: change to parent directory;
- **CWD**: change working directory;
- **LIST**: list the content of a given directory, or the current one if no parameter;
- **PWD**: gives the path of the current directory.

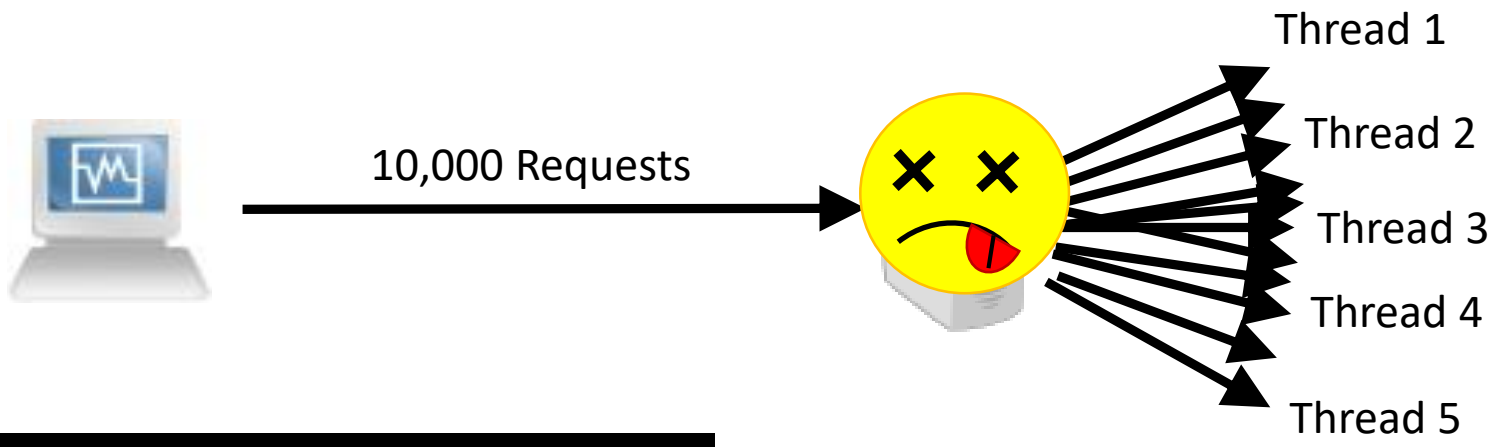
Thread pools

Previously:



Thread pools

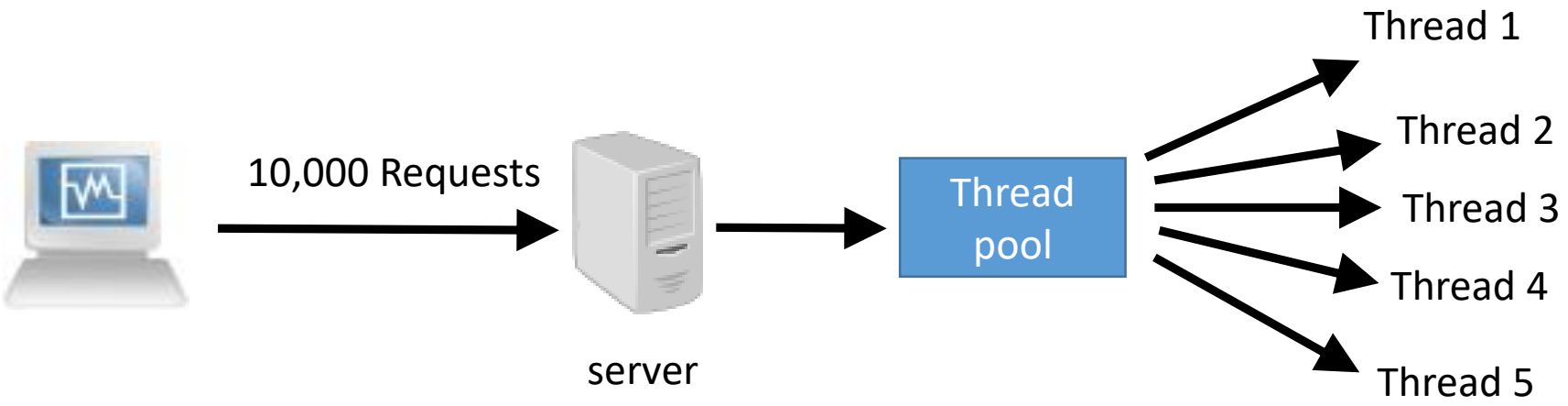
Imagine the following attack:




```
Socket[] s = new Socket[10000];
for(int i = 0; i < 10000; i++)
{
     s[i] = new Socket("100.100.100.100",80);
}
```

Thread pools

With a thread pool:



1. Handle the first 5 requests (9,995 remaining)
2. As soon as a thread finishes, it returns to the pool and receives a new task
3. When all tasks are done, each thread is back in the pool, ready for new tasks

Possible loss of speed performance, but increased robustness

Outline

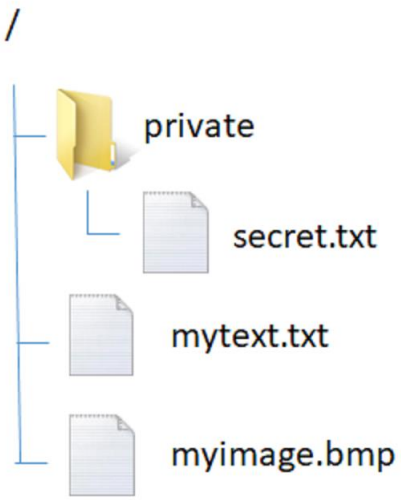
- Implementation of concepts
- Statement

Mandatory features

- Work with Filezilla (installed on ms8** machines)
- Download/Upload file
- Rename file
- Delete file
- Navigate through the directory
- List the content of current directory

- **Don’t** handle creation/renaming/deletion of folders

Directory content



« UPUPDOWNDOWNLEFTRIGHTLEFTRIGHTBASTART »

« Irasshaimase »

Note :
- All files are virtual, in the sense that they are only stored in memory, not on disk
- « myimage.bmp » will be provided.

User authentication

Anonymous login must be possible
User « Sam » with password « 123456 » is also allowed.

Anonymous users and Sam have the same rights, except that Sam can see and handle the « private » folder.
Note: this differs from the usual FTP authentication which is more binary

Guidelines

- Deadline : 15th of December.
- Work by groups of two students.
- Check that your program works on ms8** machines with Firefox (Don't have an account? Contact Marc Frédéric). Launch the server on a given machine, and try to access it from a different machine.
- Guidelines of the first part still apply (Java 1.8, no package instructions, no file manipulation, don't intercept CTRL-C, …).