

# Networks: from Transmission to Programming

AC 31008

## *Theory Recap & Project Introduction*



Ludovic Magerand  
l.magerand@dundee.ac.uk



University  
of Dundee

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## What you will learn

### How protocols are defined

- Being able to understand a RFC (IETF protocol specification)

### Programming & network, client side

- Connecting to a server (with TCP)
- Sending data to the connected server
- Receiving data from the connected server
- Reacting to commands in data

### Programming & network, server side

- Waiting for clients to connect
- Receiving data from client(s)
- Sending data to client(s)
- Reacting to commands in data

### Programming language, two choices

- Python (easier)
- C/C++ (more advanced)



## How you will learn

### Project Based Learning

- Practical content
- No theoretical lectures
- Documentation & references

### Labs & Drop-ins

- Dedicated slots for questions on the project
- Labs: practical & programming questions
- Drop-in: theoretical & conceptual questions

### 2 Debriefing Lectures

- You decide the content
  - ▶ Most frequent topics in labs
  - ▶ Topics received by emails (at least 3 days before)
- Based on your experience
  - ▶ Demo when appropriate
  - ▶ Concrete problems



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## The project, one protocol

### Internet Relay Chat

- A messaging protocol (application layer)
  - ▶ Allows private and channel messages
  - ▶ Real-time, no backlog delivery
- Uses TCP as transport (port 6667)
- Defined in RFC 1459 (original)
  - ▶ Updated in RFCs 2810 to 2813

### Why this protocol?

- Text-based
- Simple
- Interactive

### Real Servers

- UnrealIRCd
- miniircd

### Real Clients

- Hexchat (free)



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## Connection to a server

### Session Example

```
NICK Sleris
USER sleris sleris localhost :realname
:sateda.ida.magerand.fr 001 Sleris :Hi, welcome to IRC
:sateda.ida.magerand.fr 002 Sleris :Your host is sateda.ida.magerand.fr, running version miniircd-1.3
:sateda.ida.magerand.fr 251 Sleris :There are 1 users and 0 services on 1 server
:sateda.ida.magerand.fr 422 Sleris :MOTD File is missing
JOIN #test
:Sleris!Sleris@127.0.0.1 JOIN #test
:sateda.ida.magerand.fr 331 Sleris #test :No topic is set
:sateda.ida.magerand.fr 353 Sleris = #test :Sleris
:sateda.ida.magerand.fr 366 Sleris #test :End of NAMES list
PING LAG1571558241196
PONG sateda.ida.magerand.fr :LAG1571558271196
:Switch!Switch@127.0.0.1 JOIN #test
:Switch!Switch@127.0.0.1 PRIVMSG #test :This is a channel message!
:Switch!Switch@127.0.0.1 PART #test :Leaving
:Switch!Switch@127.0.0.1 PRIVMSG Sleris :This is a private message :)
QUIT :Disconnecting from server
```



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## The project, two software

### A simple bot

- Being able to connect to a server
- Being able to join a channel
- Respond to private messages
  - ▶ Random nonsense/fun fact
- Respond to simple commands
  - ▶ Giving the !time or !day
- Must run on Windows

### A simple server

- Clients can connect
- Clients can join channels
- Clients can talk in channels and/or private messages
- NO server connections
- NO channel/server modes
  - ▶ Everyone is a simple user
- NO extra features
  - ▶ Kick, ban, DCC, ...
- Must run on GNU/Linux



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## How you will be assessed

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### Group Work

- 35 groups of 3
- 1 EE student / group max

### Self-Assessment

- An overall group mark
- A modulation per student

### Deliverables

- Source code and executables
  - ▶ Including code comments and documentation
  - ▶ Will be tested in the VMs
- Group self-assessment sheet
  - ▶ What is working or not
  - ▶ Who implemented what
  - ▶ Proposed marking
- Group comment on delivered project
  - ▶ One A4 page maximum
  - ▶ Explain what is not working and why



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## Questions?

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