Lab 1

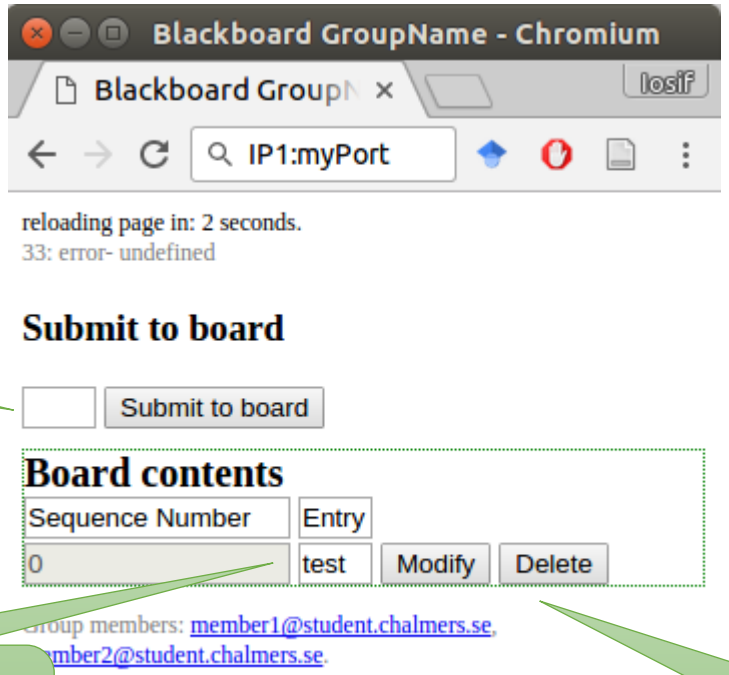
A First Distributed Blackboard

Distributed Blackboard

- Develop a program that runs on several machines
- Clients post to any server using a web browser
- Store all received data
- Propagate the newly received data
  - to all the other boards
  - in a peer-to-peer manner

How it will look like

A blackboard looks like this



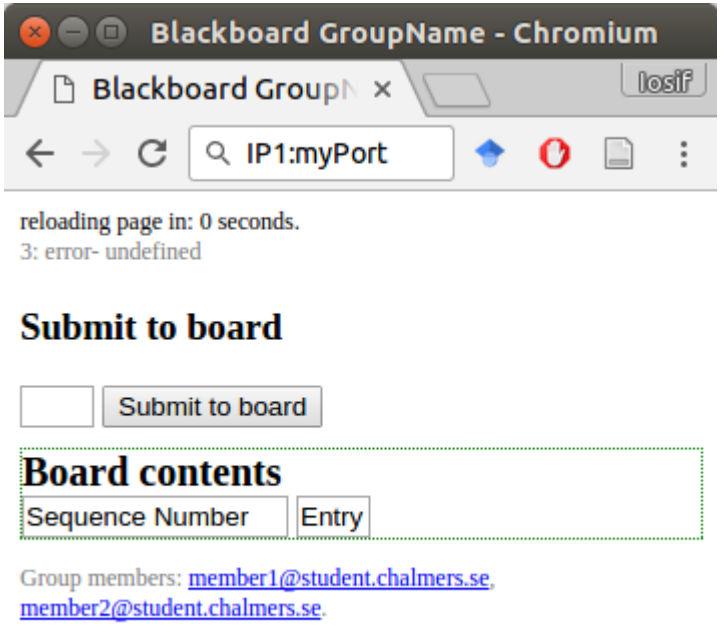
A form to submit text

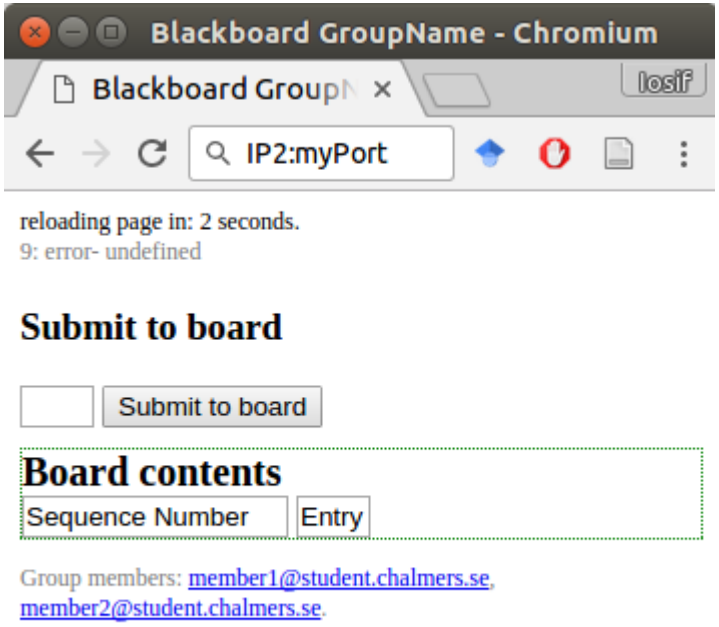
Some blackboard entries

Options for each entry

A small example

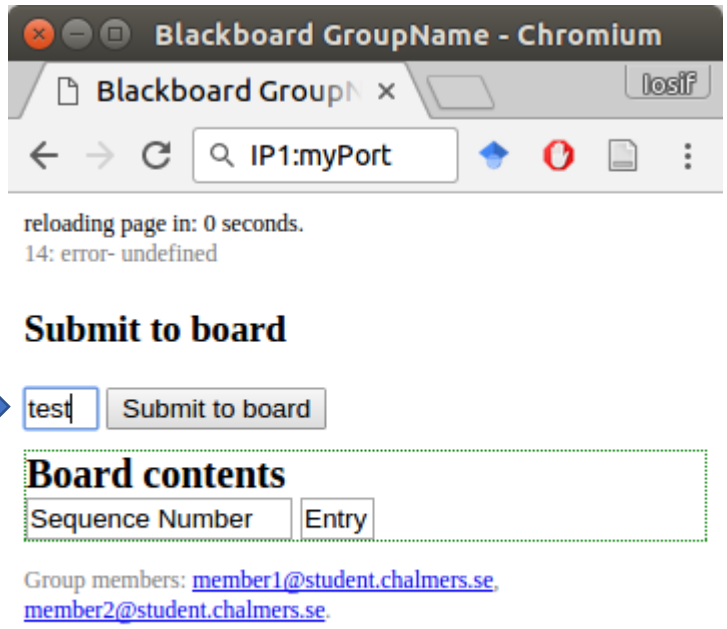
Initially: empty blackboard on all vessels



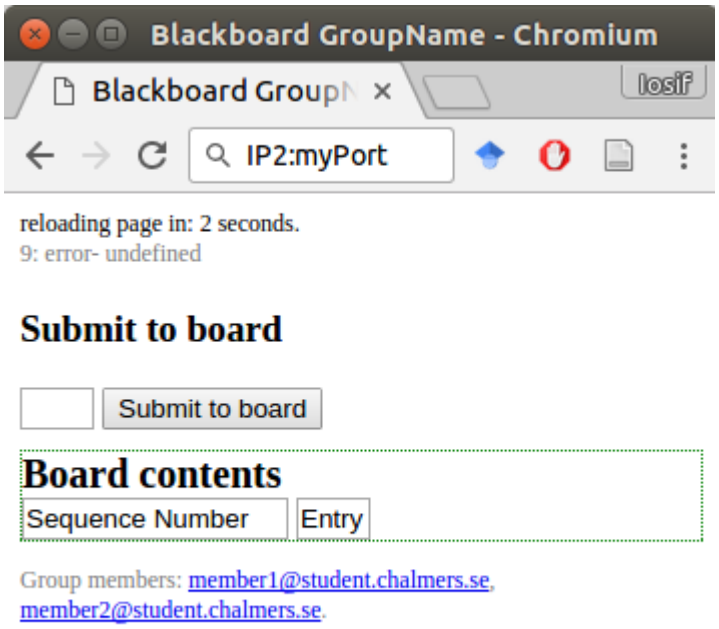


A small example

On vessel 1:
Write text and submit

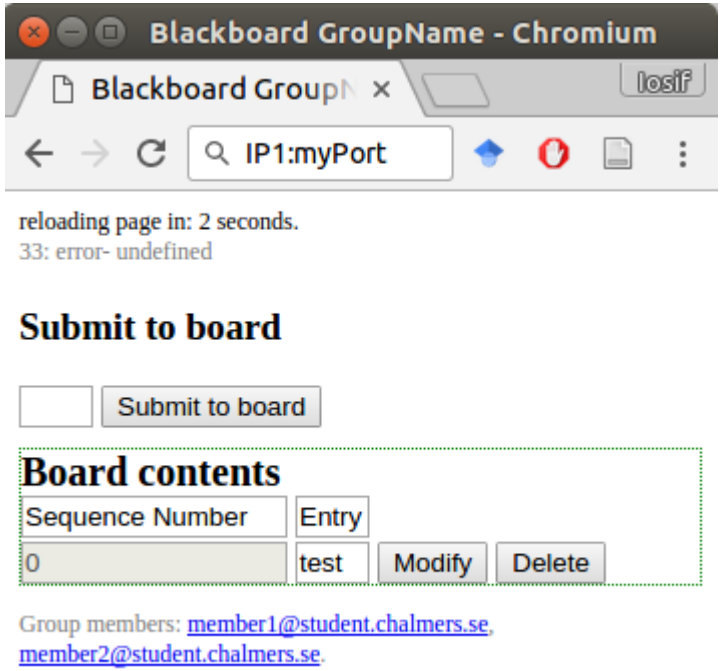


On vessel 2:
No action on the browser

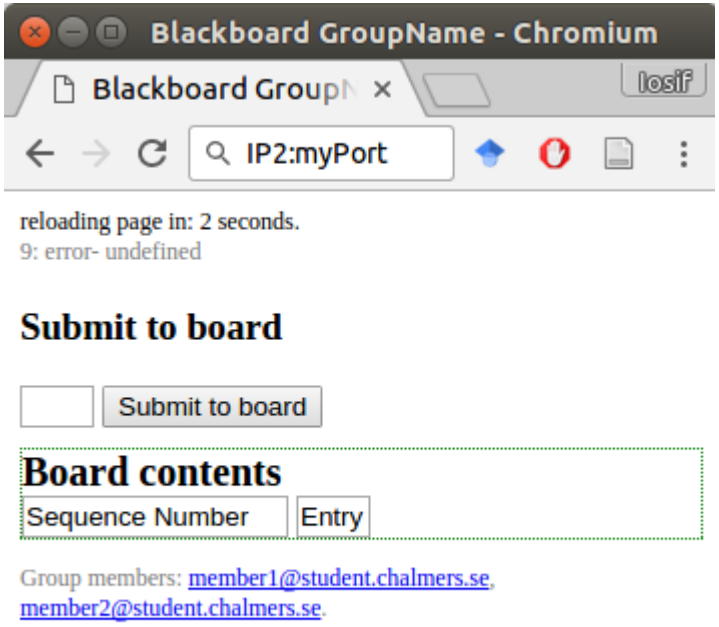


A small example

On vessel 1:
Text appears on the board

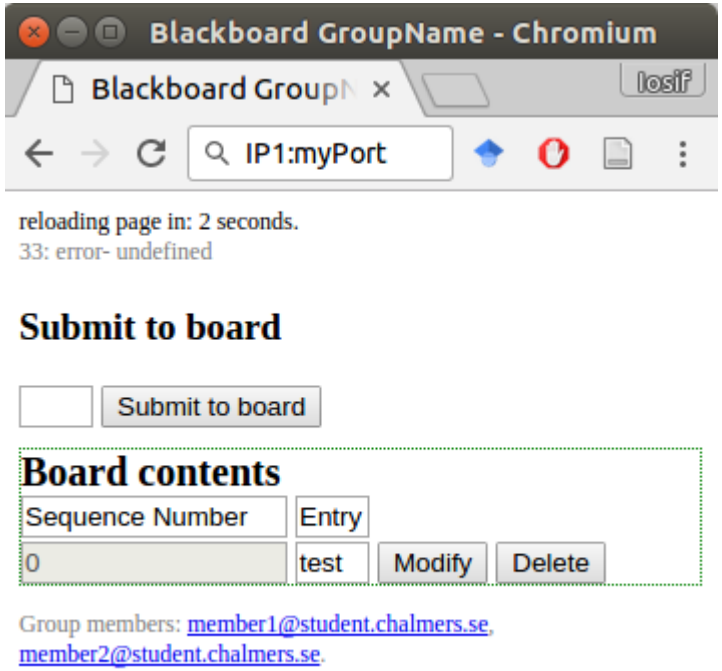


On vessel 2:
No action on the browser

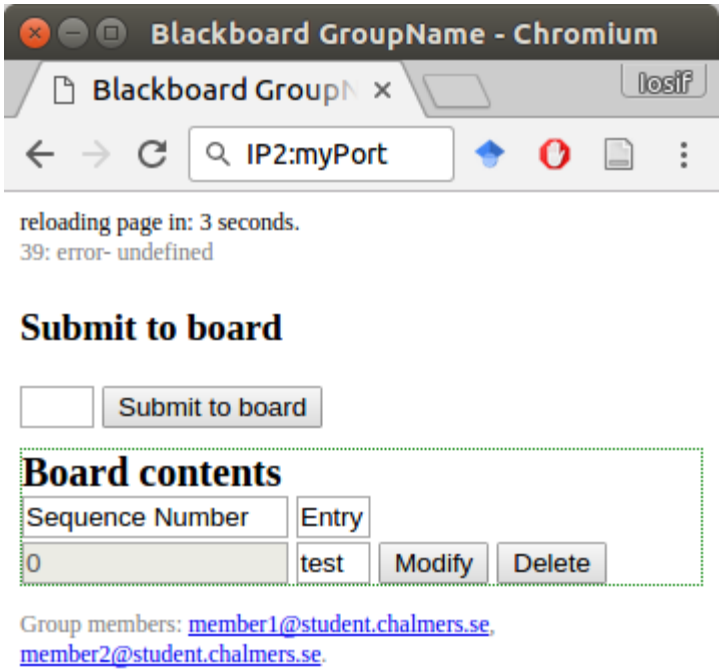


A small example

On vessel 1:
No action on the browser

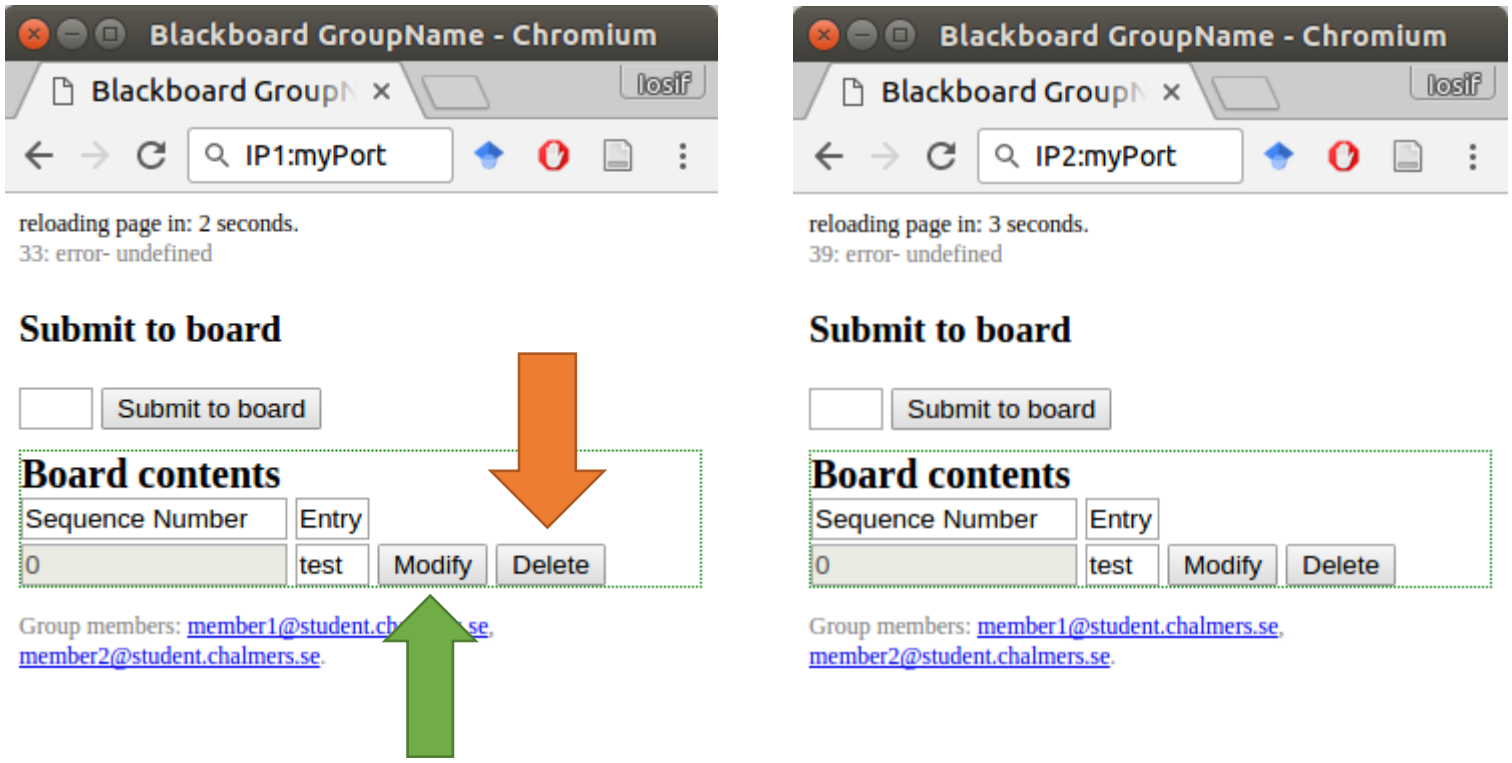


On vessel 2:
Hit refresh and see post!



A small example

A user should also be able to **modify** and a **delete** each post.

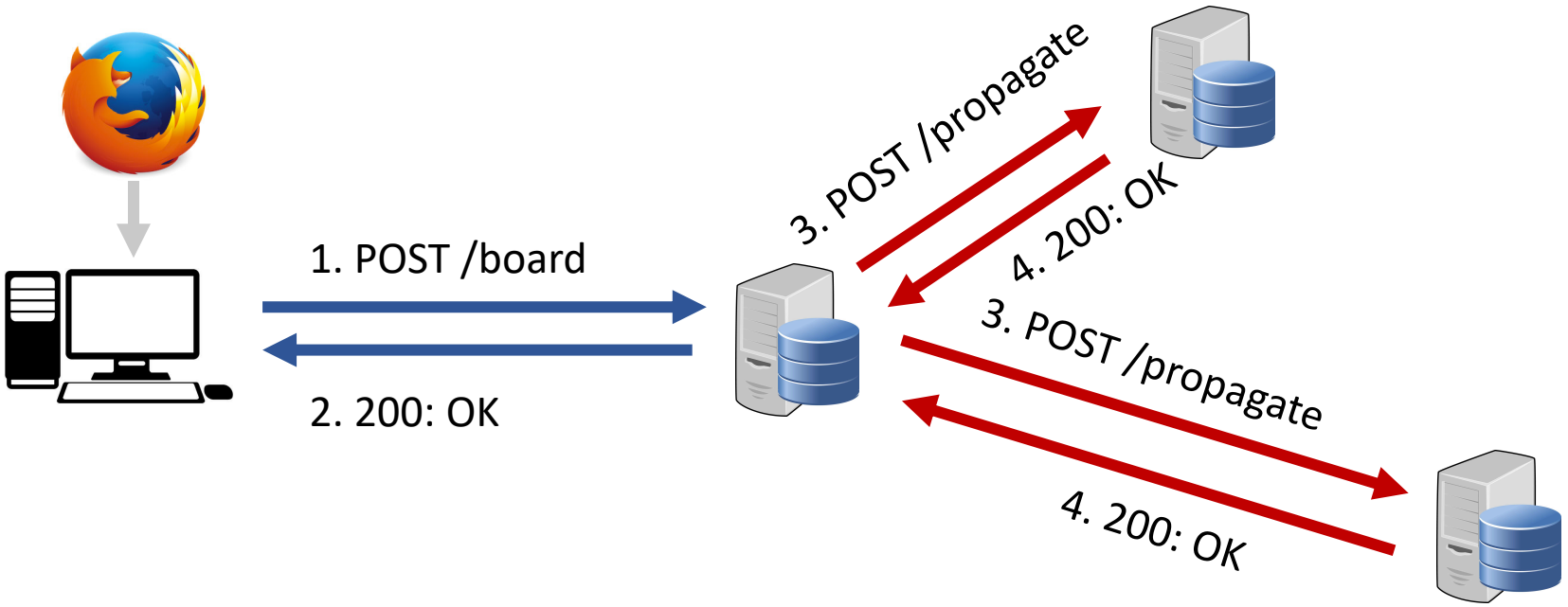


Communications between a client and any server

- HTTP requests
  - GET / -> display the page
  - GET /board -> display the content of the board (the data)
  - POST /board -> add a new value to the board

- HTTP Status
  - We can inform the client upon a request
  - 200: OK
  - 400: Bad Request (But this should never happen!)

Another way to view it



You'll test on more servers, but the principle stays the same!

Some hints to help you

- Keep a list of all vessels in each vessel
  - (We know, this is not a scalable design, you will work on this aspect in the following labs)

- Upon a post
  - Send the update to all other vessels
  - But don’t wait for the other to reply before responding to the client!
  - Store the value, it should be shown at the next refresh

Some hints to help you (2)

- HTTP formatting
  - We do not care how it looks as long it is usable
    - Don’t lose too much time on formatting, ‘hello world’ and ‘hello+world’ are both valid entries

- The mininet script we are giving you directly calls a python script called *server/server.py*
  - You should implement your code there
  - The script also provides the server IP as input to the script, if you want it (and you should)

What we give you

- A sample HTML file
  - Change it if you want (totally optional)
- A skeleton Python file
  - A very simple HTTP server
- A Mininet script
  - Everything is ready, run it with *sudo python lab1.py*
- Answers to your questions in the labs
- Demo slots

What you will give us

- Your code
  - Well structured
  - Well documented
- For EACH task
  - A video or a report for each task
  - In total, 3 videos or 3 reports!

Surprise!

- You do not need to write a report for the tasks
  - But you need to submit a video / screencast
  - either a report or a video
- Do not spend time to make it look and sound great Good is enough.
  - Aim for 2-3 minutes per task
  - Do not waste time trying to fit in. (5 minutes is okay too).
  - The goal is to have n fun and efficient alternative to a report

Hints for videos

- We want something useful that
  - shows a demo
  - explain the algorithm
  - explain how the interesting parts of the code work
  - answer the questions we pose in the tasks
- Software hints:
  - screenomatic
  - you can borrow a microphone
  - you can use your mobile phone if your PC does not like screencast.

Lab tasks

The important stuff

Task 1: make it work

- Demonstrate that your distributed blackboard by submitting a 1-2 minutes video (or report)
  - Use at least 8 vessels/blackboards
  - Do 3 posts and show them on the other blackboards
  - Hint: show the browser windows and (optionally consoles) next to each other on your screen
  - Record your screen and document what is happening by using your mouse and your voice
    - No video editing, cutting, etc. required
    - Do not waste your time

Task 2: Modify and Delete values

- A user must be able to delete or modify a post
  - See the code provided
- Once a post is either modified or deleted, a vessel should propagate this change to other vessels

- Submit a 1-2 minutes video/report that demonstrates this functionality

Task 3: Is our system consistent?

- Can it happen that two vessels show different blackboards? Why?
  - Even when all data was reliably send to all vessels, and then we hit refresh afterwards
  - Hint: Use a script to do “concurrent posts” to your blackboards! (use the curl command)
  - Submit 1-2 minutes video or a report
    - Explaining your thoughts
    - If you can make it happen: document it in your video or report