TELEPALESTRA

A better way to share knowledge

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INTRODUCTION

- Sharing of information is important
- In University most of the knowledge that students learn is by sharing of knowledge!
- In the University is here professionals born…
  - Professionals that can save lives!
    - Mainly in the medical area
  - Excellent teaching of them is important!

EDUCATION OF GOOD PROFESSIONALS IS IMPORTANT!

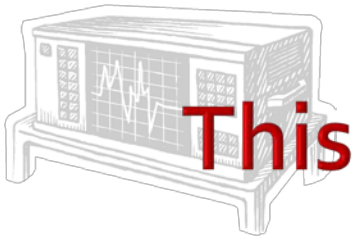
- Not only in the medical area
- But is in this one that more lives can be saved because of they knowledge

EDUCATION

- Theory

Books Internet ...

- Practice



This is the dificult thing!

Injections Auscultation ECG ECO ...

IS DIFFICULT TO

- Get the opportunity to collect the signals
- Share them
- Discus them with other students and teacher
  - Some times is need to focus on a particular moment of the signal
- Do all of this on the class!

This work tries to help with this

IS DIFFICULT TO

- Get the opportunity to collect the signals (ECGs, Auscultation, ECO, …)
  - **There is already technology to collect and send to a computer**
- Share them
  - **Dropbox, Moodle…**
- Discus them with other students and teacher
  - Some times is need to focus on a particular moment of the signal
    - **Moodle, Email?**
- Do all of this on the class!
  - **This is here this work comes in!**

WHAT THIS WORK TRIES TO ACHIEVE

- Help with sharing content in class
  - Fast
  - Secure
  - Easy
  - Reliable
  - Scalable
- Content can be:
  - Previously obtained
  - Live capture
- Teacher controls the session of sharing. It can:
  - Give students option to give feedback
  - Give permission to one of them share content

ONE OF MAIN OBJECTIVES: **SCALABILITY!**

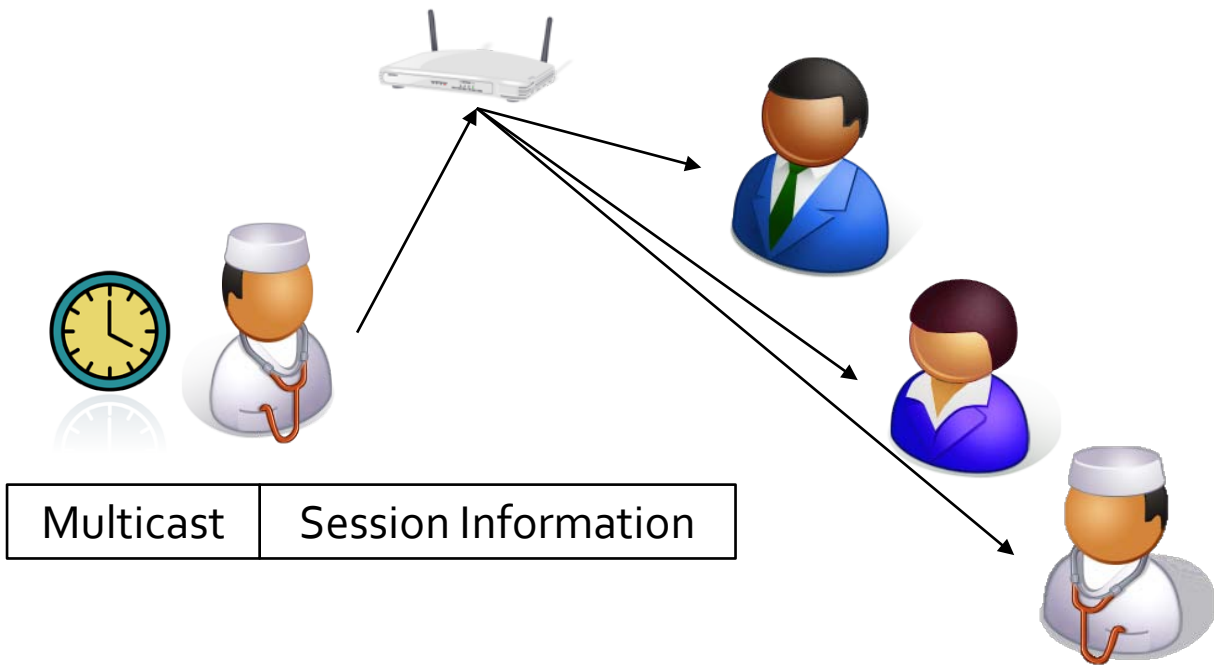
- Content to be send can't have loss with compression (in general)
  - Auscultation: important signals can be tenuous and be at risk with some compressions
  - ECG: huge quality images that over compression could disappear small but important variations
- A lot of content:
  1. Text (< 1MB ?)
  2. Huge quality images (>5 MB ?)
  3. Audio (> 10 MB ?)
  4. Video (> 30 MB ?)
- For a lot of people:
  - One lecture will have more than 20 students? 30? 40?
  - One lecture maybe achieves one hundred people?

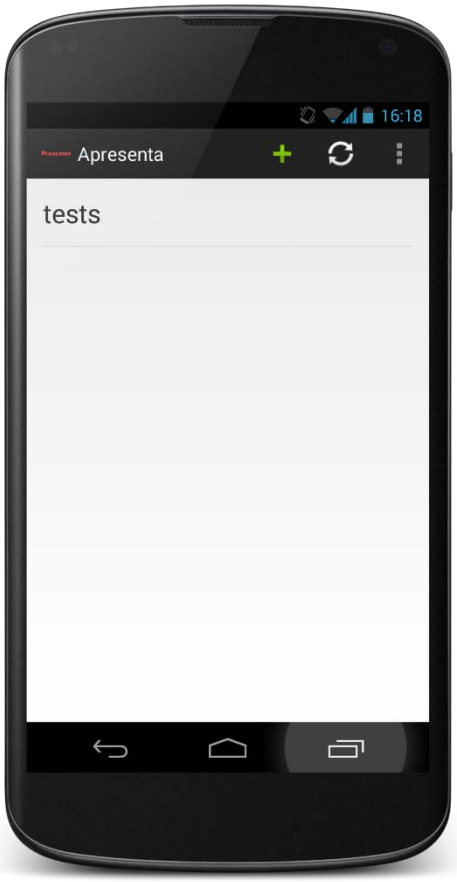
RESULT

- One *framework* that can be used in already existing Android applications
- Wireless 802.11
  - Capable of elevated number of users and distance

RESULT

- Easy way to discover sessions
  - The creator (teacher) creates the session
  - Others can discover it and connect to it





RESULT

- Secure
  - Authentication of the session
    - The authentication of the users is optional
  - Data sent is encrypted
    - Same key used all the session between the entrance or exit of users

RESULT

- Who to get scalability?
  - **Multicast**

- Problem: Has no reliability!

RESULT

- Possible solutions:
  1. Mimic TCP:
     - To each received package sends one *Acknowledge* (ACK)
     - Problem: doesn't scale ☹
       - If all terminals answer with one ACK to each package (even if doing ACK suppression) the network is flooded by them!
  2. Doing the symmetric:
     - Send a message only if he don't receive a package (NACK – *Not Acknowledge*)
     - But needs improvements!

IMPROVEMENTS

- Wait before send NACKs
  - Each terminal before send a NACK waits a random time (maybe the package can still be received or had already being resend)
- NACKs compression
  - Multiple NACKs are sent in the same package
- NACKs send by UDP
  - Can be lost! (Need of *time out* and send again)
- Extra information to the session
  - Each terminal regularly informs the session owner of the last successful received package for each data channel

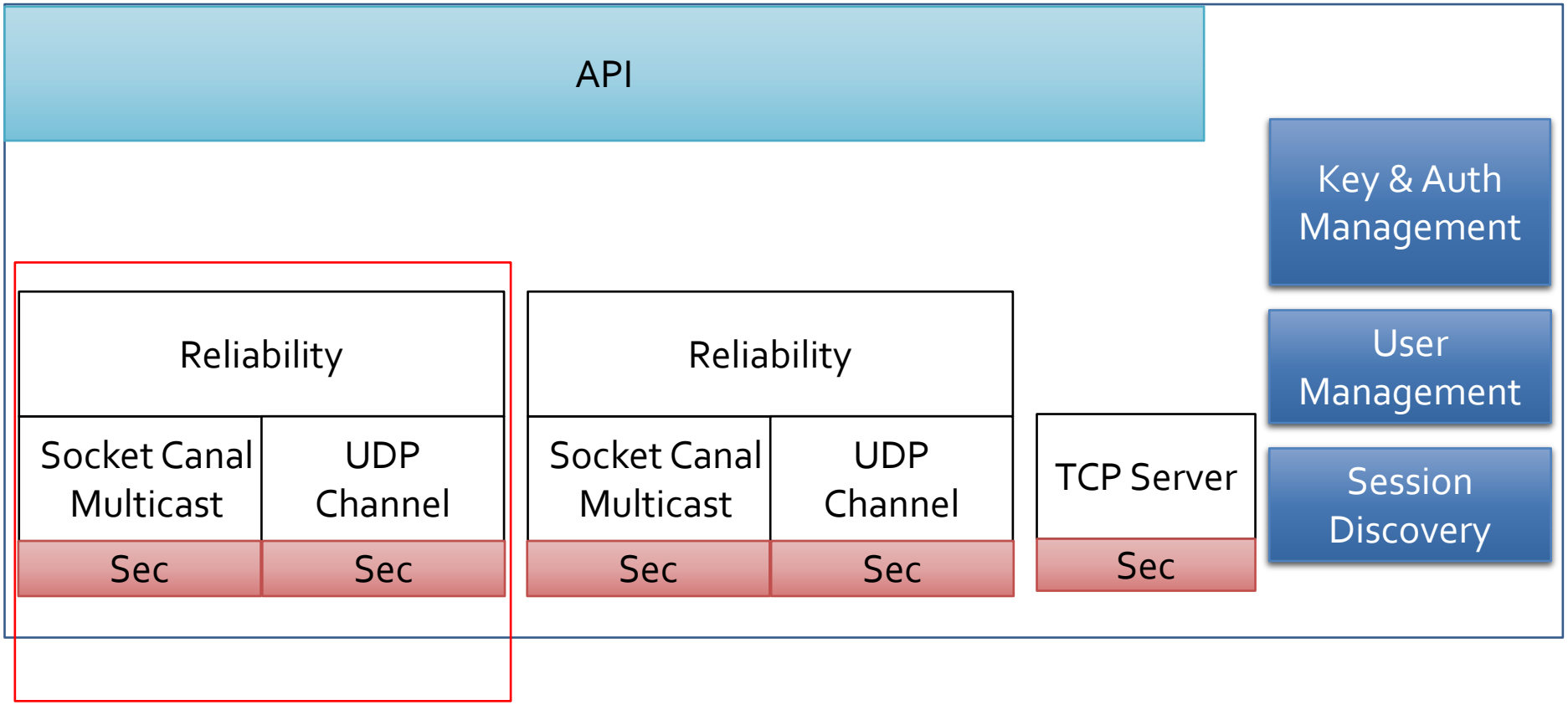
IMPROVEMENTS

- Not always there is a need for total reliability!
  - Example: real time transmission
- Have a *time out* over the attempt to get the missing packages

SUMMARY

- Total reliability over **multicast**
- Reliability with *time outs* over **multicast**
- **Multicast** without reliability

RESULT INFRASTRUCTURE



CONCLUSIONS

- Creates a secure, reliable, efficient and scalable connection
- Tries to help with the sharing of important data at the moment

THANKS FOR LISTENING ☺