Universitatea
Ştefan cel Mare
Suceava

HARD&SOFT
Suceava 2016

SERVICE PERT

POLYTECH LILLE

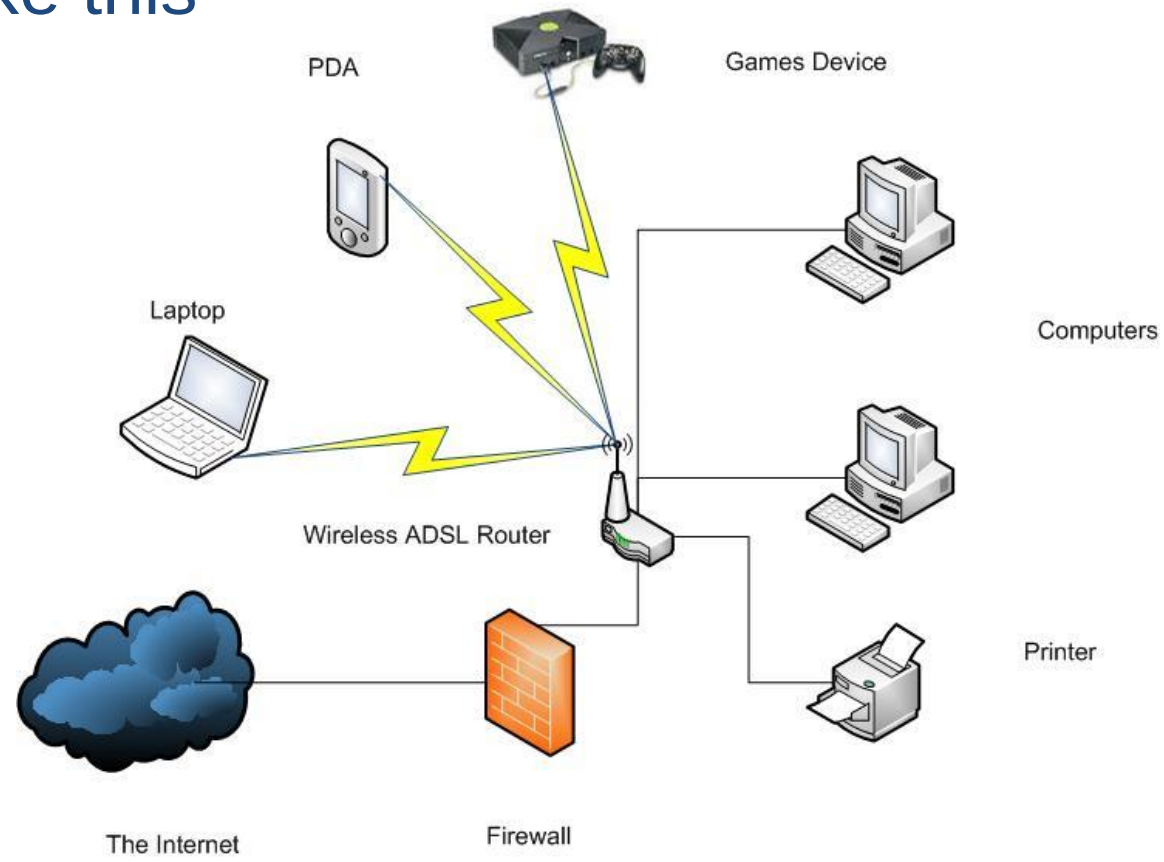
HARD&SOFT
Suceava 2016

IoT- Home Hub

Internet of Things – Home Hub

IoT- Home Hub

Existing home networks
Look something like this



IoT- Home Hub

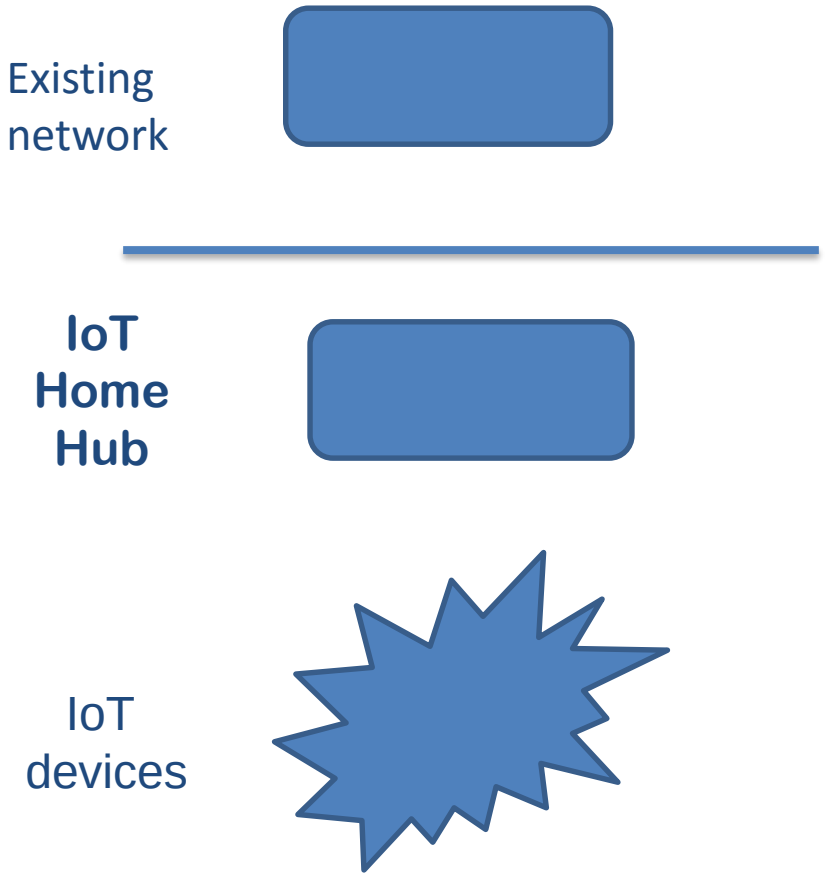
But IoT will demand to connect many more diverse items to our home network.
What are they and how to modify the network architecture to accommodate them?

HARD&SOFT
Suceava 2016

will explore possible solutions.

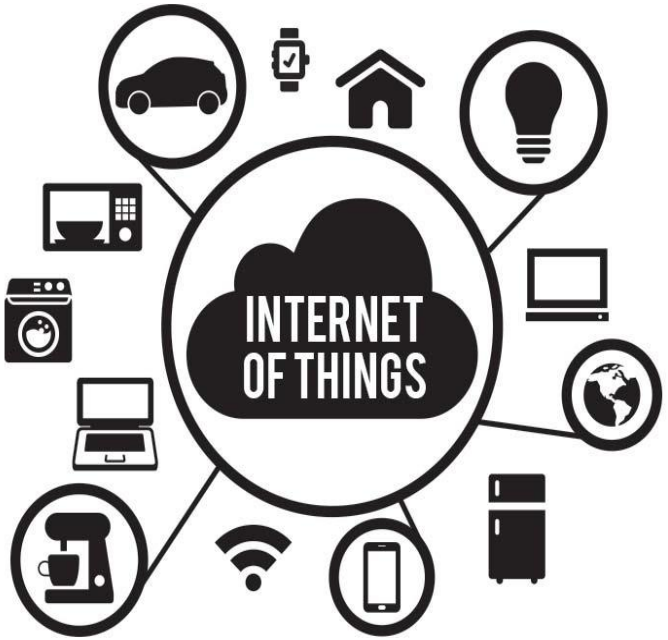
IoT- Home Hub

IoT- Home Hub will adds a second router to the home network that communicates with IoT devices via WiFi.



IoT- Home Hub

IoT applications are characterised by clusters, or networks, of simple microprocessor based circuits that sense, report, and respond to physical stimuli.



They communicate by WiFi with each other and to Apps in Pcs/tablet/smartphones where parameters are set and control is fedback in response to user input.

Some references to get you started:

http://postscapes.com/internet-of-things-examples/
https://pdfs.semanticscholar.org/da55/03dc7f8d696cd3592c865c1b66f964fb5dbb.pdf
http://www.europarl.europa.eu/RegData/etudes/BRIE/2015/557012/EPRS_BRI%282015%29557012_EN.pdf

IoT- Home Hub

IoT applications cover many fields, some of those that apply to the home are:-

- home and property security (e.g. intruder alarm, entry/exit control)
- domestic system control (e.g. heating, air-con)
- domestic appliance control (e.g. washing machine, freezer)
- media and entertainment systems (e.g. music, gaming)
- ambience creation and lighting
- monitoring vulnerable family members (e.g. baby alarm)
- eHealth (e.g. fitness, calorie audit)

(Not an exhaustive list nor a rigid classification)

IoT- Home Hub

HARD&SOFT
Suceava 2016

What will you do?

- design a Universal Home Hub system
- build a Home Hub based on given hardware
- choose two home application areas and build demo IoT networks for them
- carry out a compulsory task that represents a typical home IoT application
- report your work to the Jury (demos, reports, Q&A)
- show your work at a public fair on the last day

Universal Home Hub Design

Your first task is to design a Universal Home Hub system, part of which you will implement.

Your design should be capable of working with any home IoT application, be reconfigurable and expandable.

[Submit this design by email and on paper to the Jury by 10:00 am Tuesday.
Approx 2000 words, and diagrams, 8 pages total]

IoT- Home Hub

HARD&SOFT
Suceava 2016

Build your Home Hub it should be accessible locally preferably through its own GUI, through the house router by WiFi to Android devices via an App, and to PCs and other devices across the internet via a web browser.

There should be a remote secure “service mode” for software updates and for future sensor calibration and configurations.

IoT- Home Hub

HARD&SOFT
Suceava 2016

Home Application Networks

Choose two home application areas, for each design and build demo networks of IoT WiFi connected objects.

Each network should adequately show the possibilities for the application area, within the limits of available hardware.

Where batteries are used pay proper attention to low power Design and carry out a power audit.

If your applications involve mains driven devices consider simulating them using leds or other means.

You may need to reconfigure your system to demonstrate each application, design so that you can do this quickly.

Compulsory Task

This is in addition to your two application areas.

Design an application to detect a fall by a vulnerable family member, report it to a carer, and confirm their response.

Demo of this will be part of the final Judging on Friday.

IoT- Home Hub

What are we giving you?

- for the Home Hub:
  - choice of RaspberryPi or Intel Edison (or both)
- for the Home Application Networks:
  - ASPDuino (Arduino UNO with ESP8266 WiFi)
  - Arduino sensor kit (30+sensors)
  - RFID, camera, PIR, ultrasound , smoke/gas sensor, gyro/accelerometer, 2line LCD display
- you may use any open source or free software
- you may use your own smartphone/tablet/laptop/webcam
- you may use other hardware/software in a minor role (ask the Jury first)

IoT- Home Hub

How will the Jury assess your work

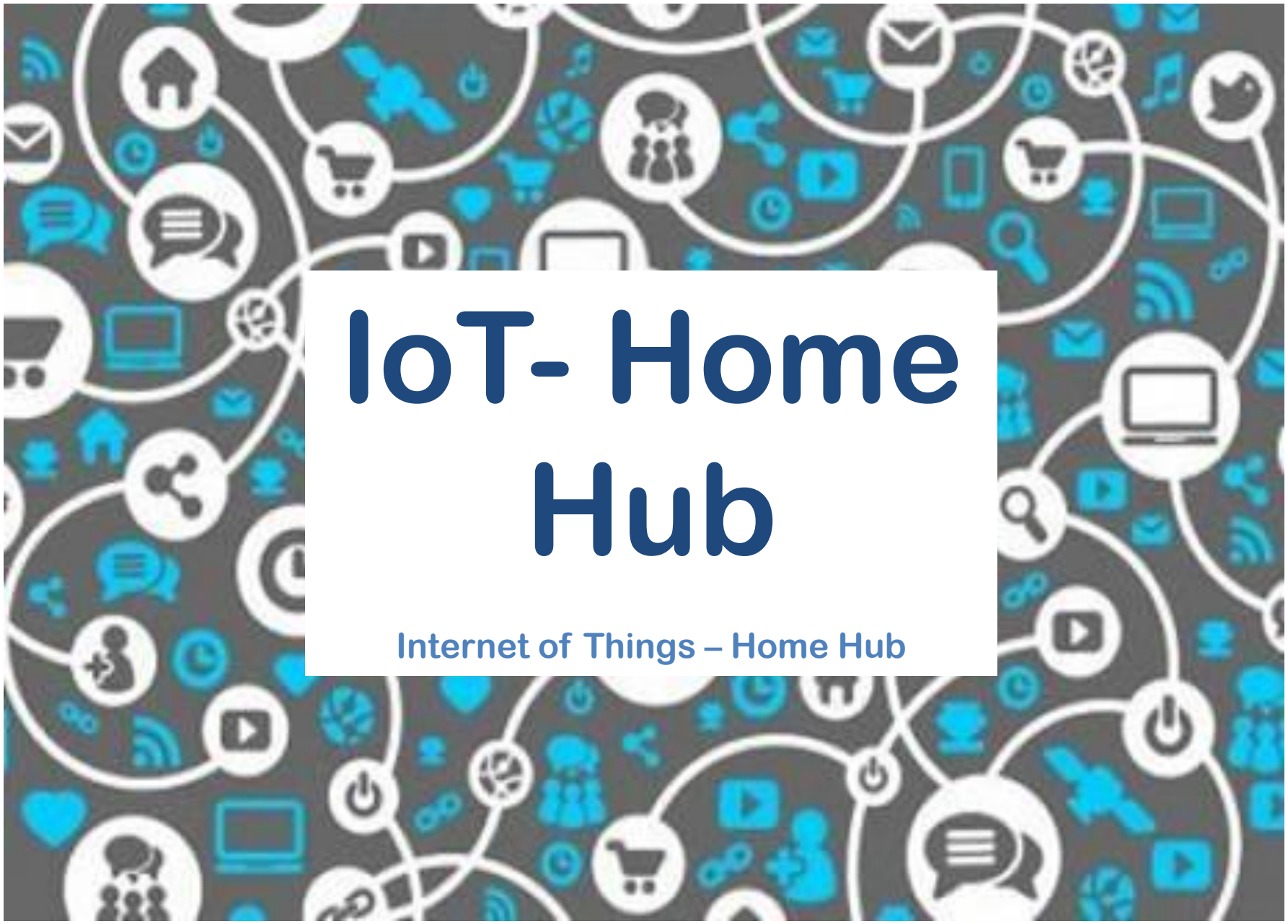
- Your design report (pdf) submitted by 10:00 am Tuesday on paper and by email
- Jury visit of about 15 minutes to your lab on Wednesday, timetable published later
- Amended design report detailing achievement and explaining any major changes by 8:00 am Friday
- Final Judging at a “Fair” on Friday morning: poster display, demo and compulsory task, details later

IoT- Home Hub

HARD&SOFT
Suceava 2016

Jury

Prof Timothy Hall, President
Dr Ciaran MacNamee, University of Limerick, Ireland
Dr Dorel Picovici, Institute of Technology, Carlow, Ireland
Prof Jean Michel Duthilleul, Polytechnic University, Lille, France
Stephan Pfenninger, ServiceXpert, Munich, Germany
Sorin Bulceag, ServiceXpert, Munich, Germany



IoT- Home Hub

Internet of Things – Home Hub