SensOrLabs

a protocol validation platform for the IoT

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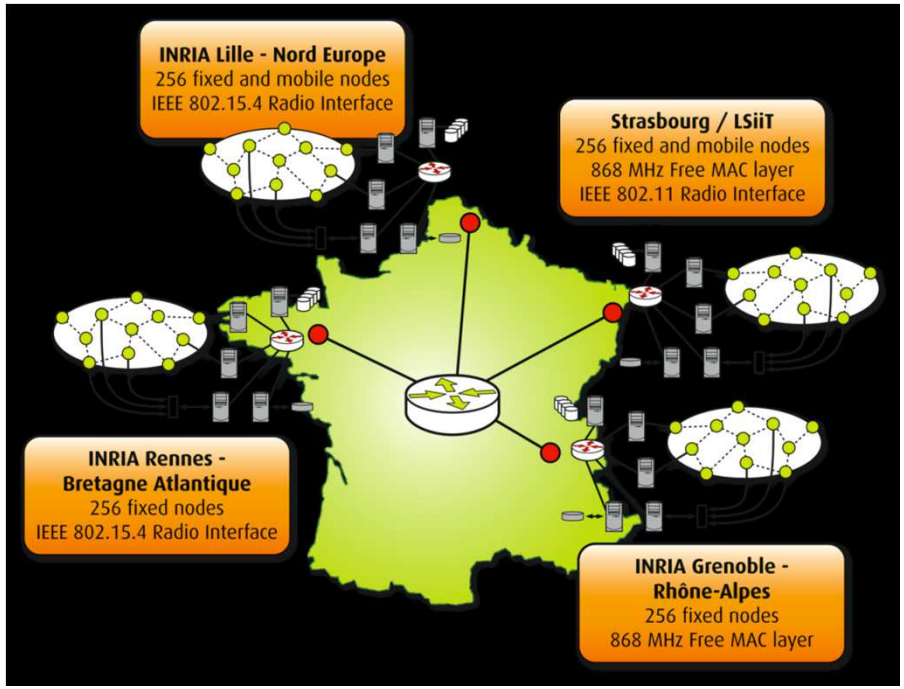
orange™

SensOrLabs

- inspired by the ANR Senslab project
  - http://www.senslab.info/
  - INRIA, UPMC/LIP6, LSIIT, Thalès
- consortium agreement for re-use of technology
- ended up re-doing most of it



- part of the new work done under ANR ARESA2

agenda

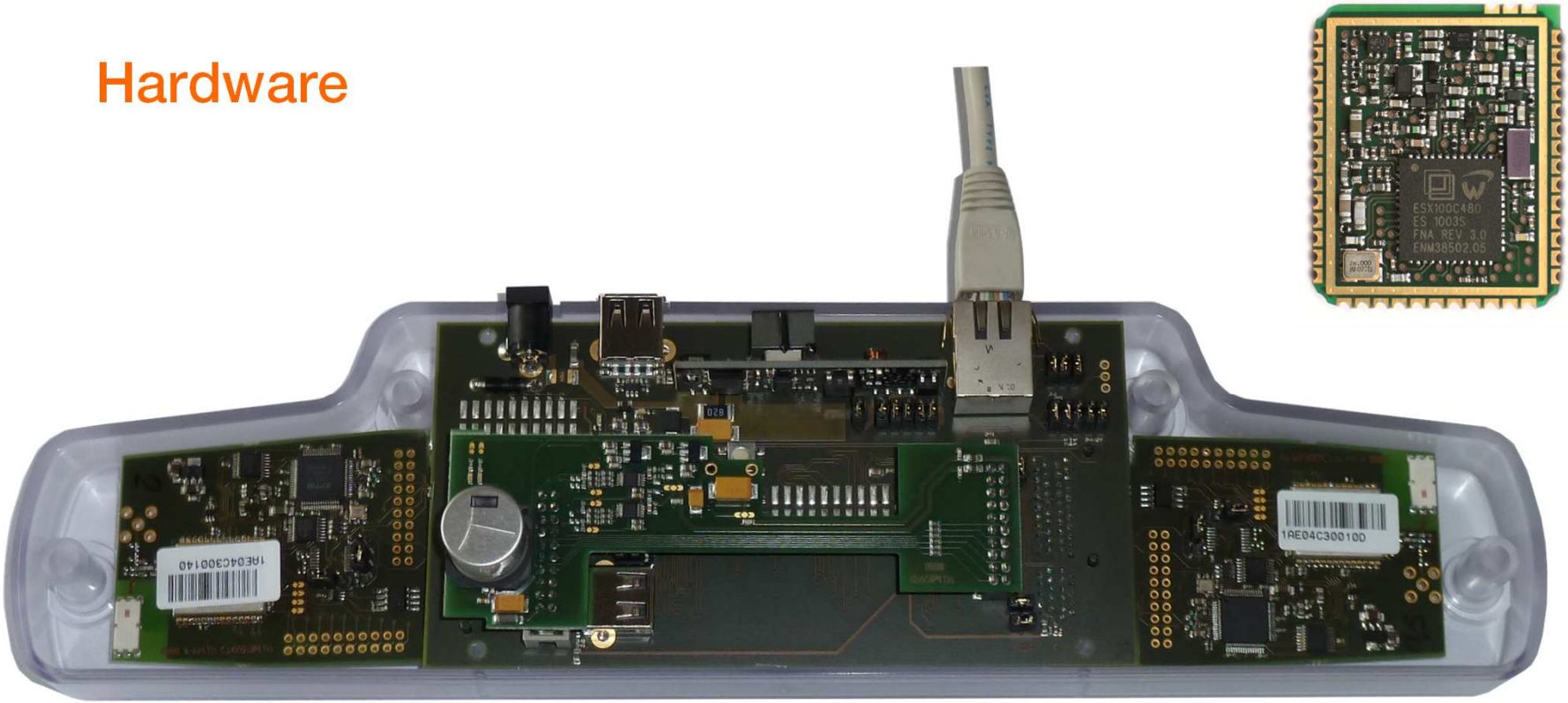
part 1 hardware

part 2 software

part 3 evolutions

Part 1: hardware

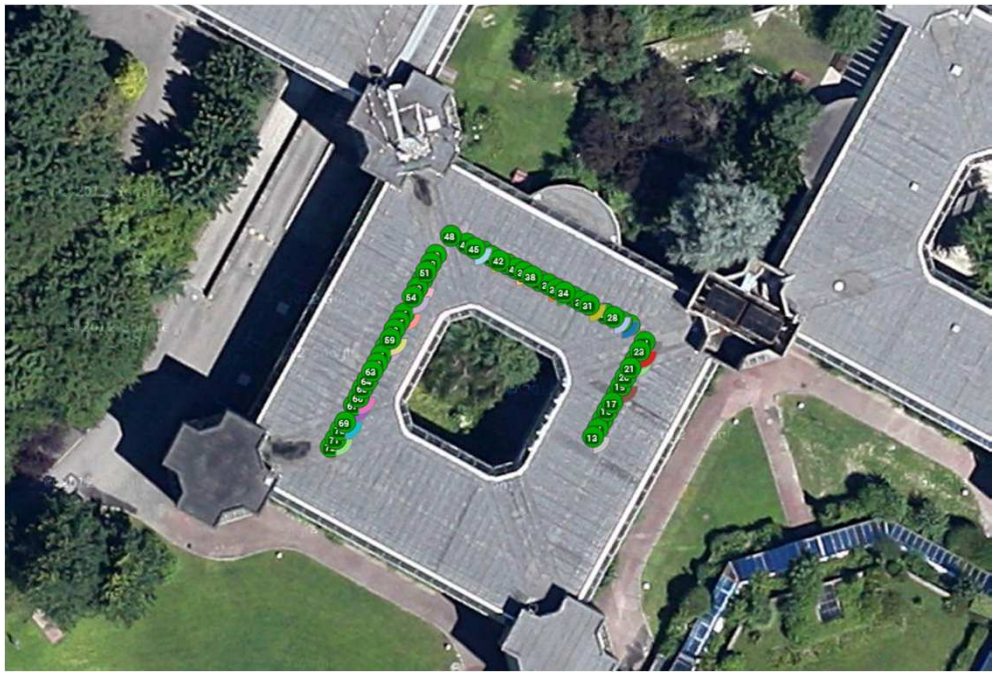
Hardware



- Changes compared to SensLab
  - Elster/Coronis Excelyo SoC module, 868 MHz
  - improved gateway with Pragmatec computer board
  - improved current monitoring board with TI INA226 chip and analog filter

Deployment

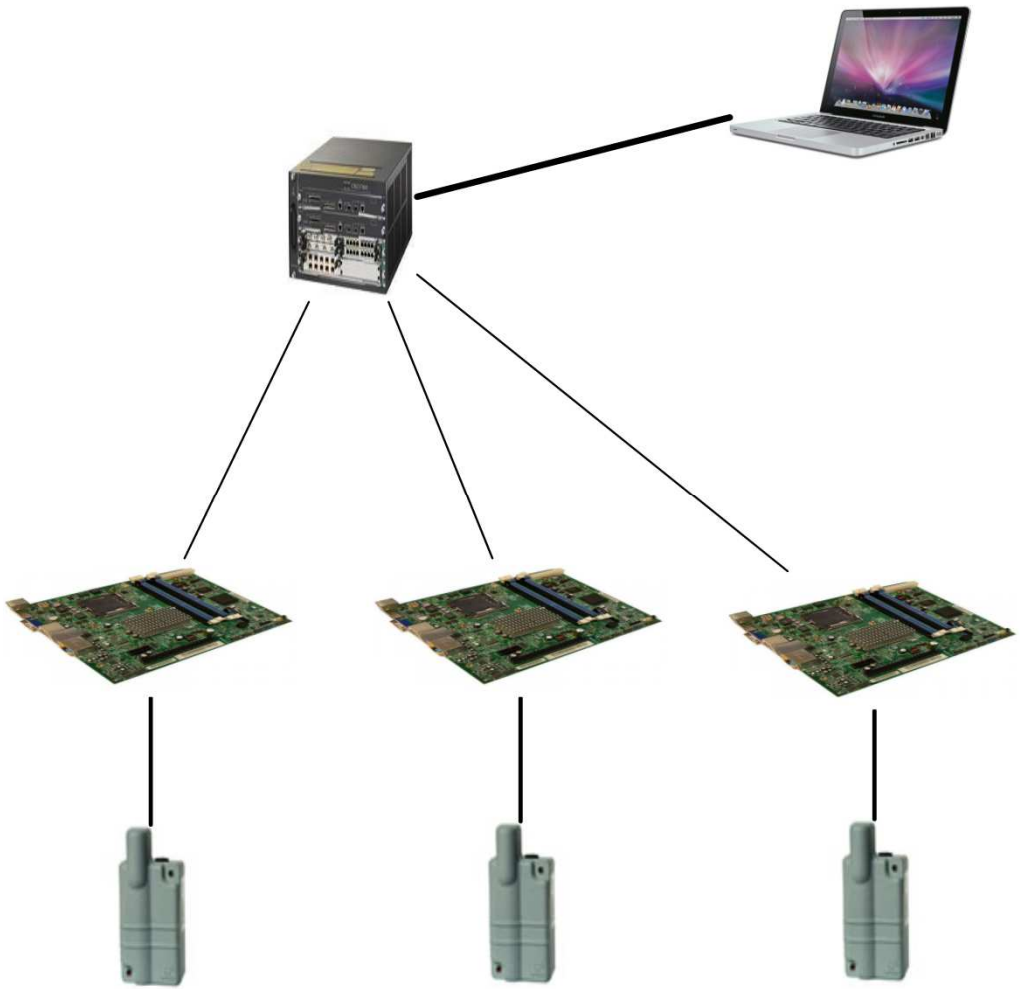
- 82 devices, indoor, at Meylan
- portable to any site Ethernet socket



Part 2: software

Logiciel infrastructure

- Retour d'expérience démonstrateur ARESA (2009) et SensLab
  - Peu ou pas d'observabilité sur le fonctionnement des protocoles réseau déployés.
  - Difficulté à valider le respect des spécifications des protocoles.
  - Analyse de performance impossible.
- Besoin
  - Outils pour observer de manière systématique le fonctionnement du réseau.
    - communs à tous les utilisateurs (arrêter le bricolage ad-hoc)
    - génériques (indépendants des protocoles étudiés)



poste client

serveur

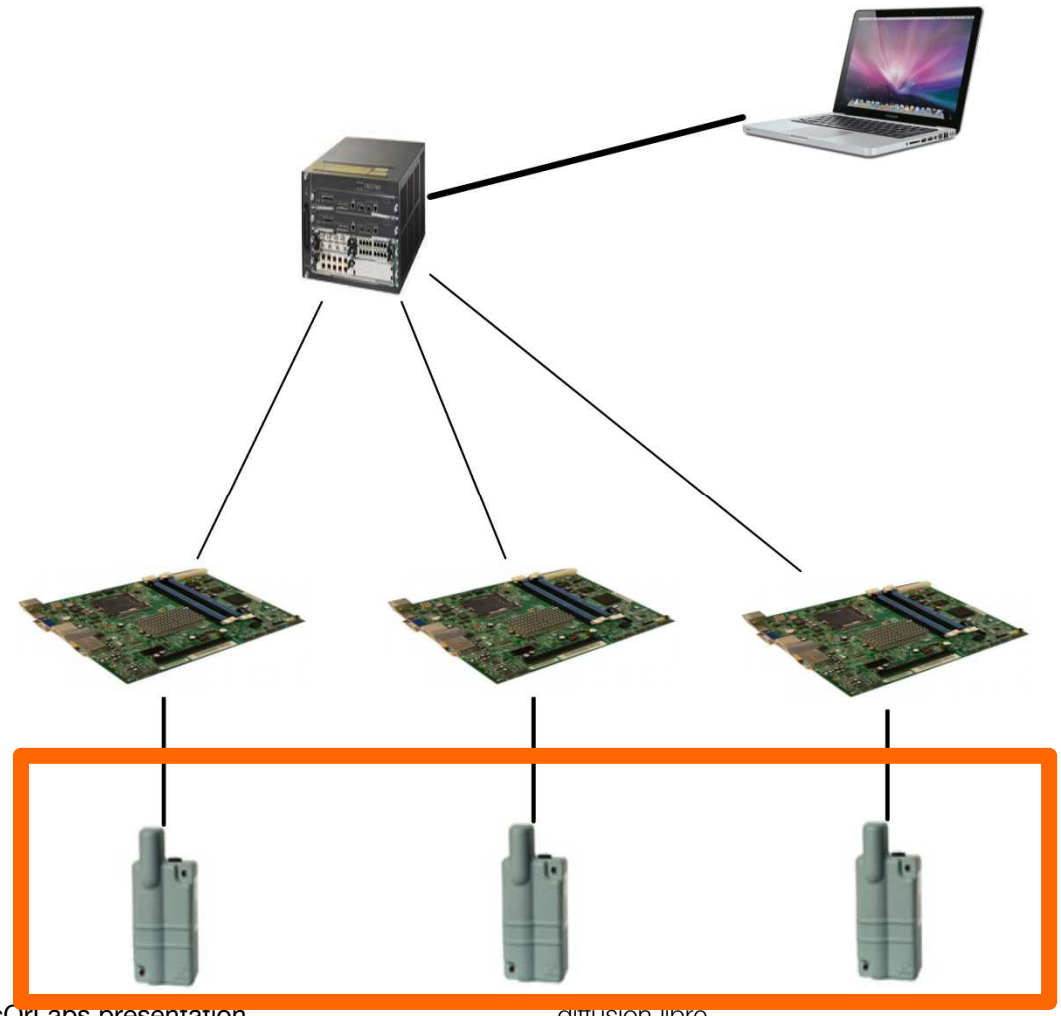
ethernet

gateway

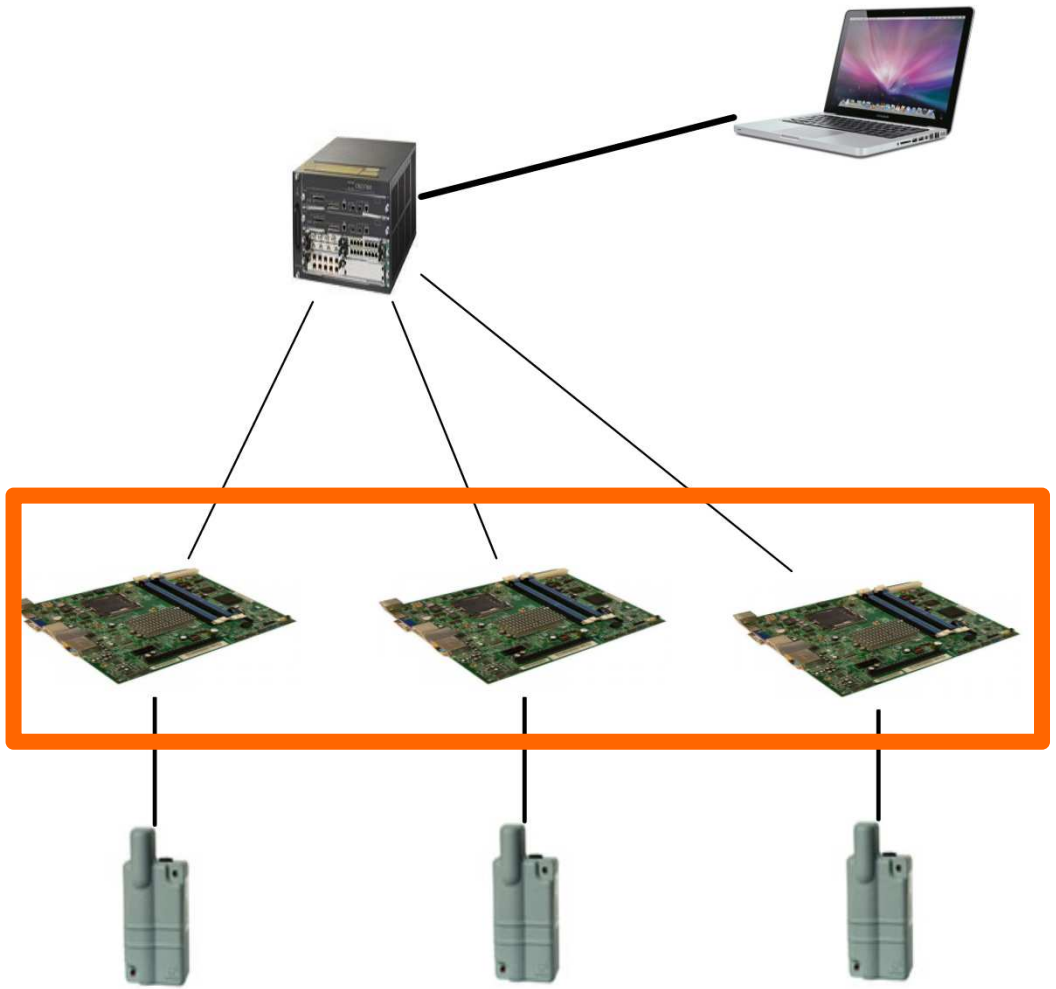
port série :
115200bauds

noeud ouverts

Développement librairie de log



Formatage log et horodatage



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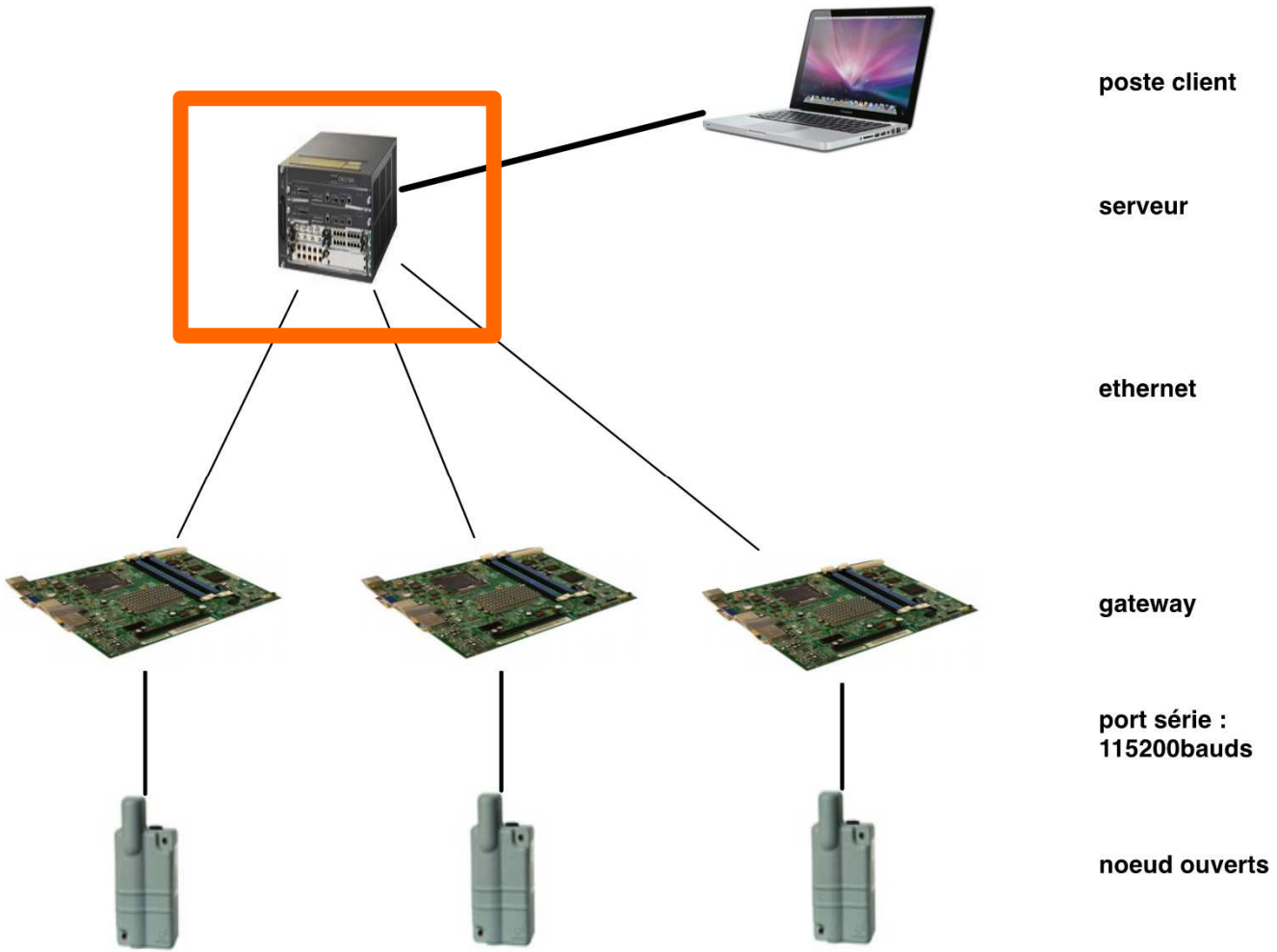
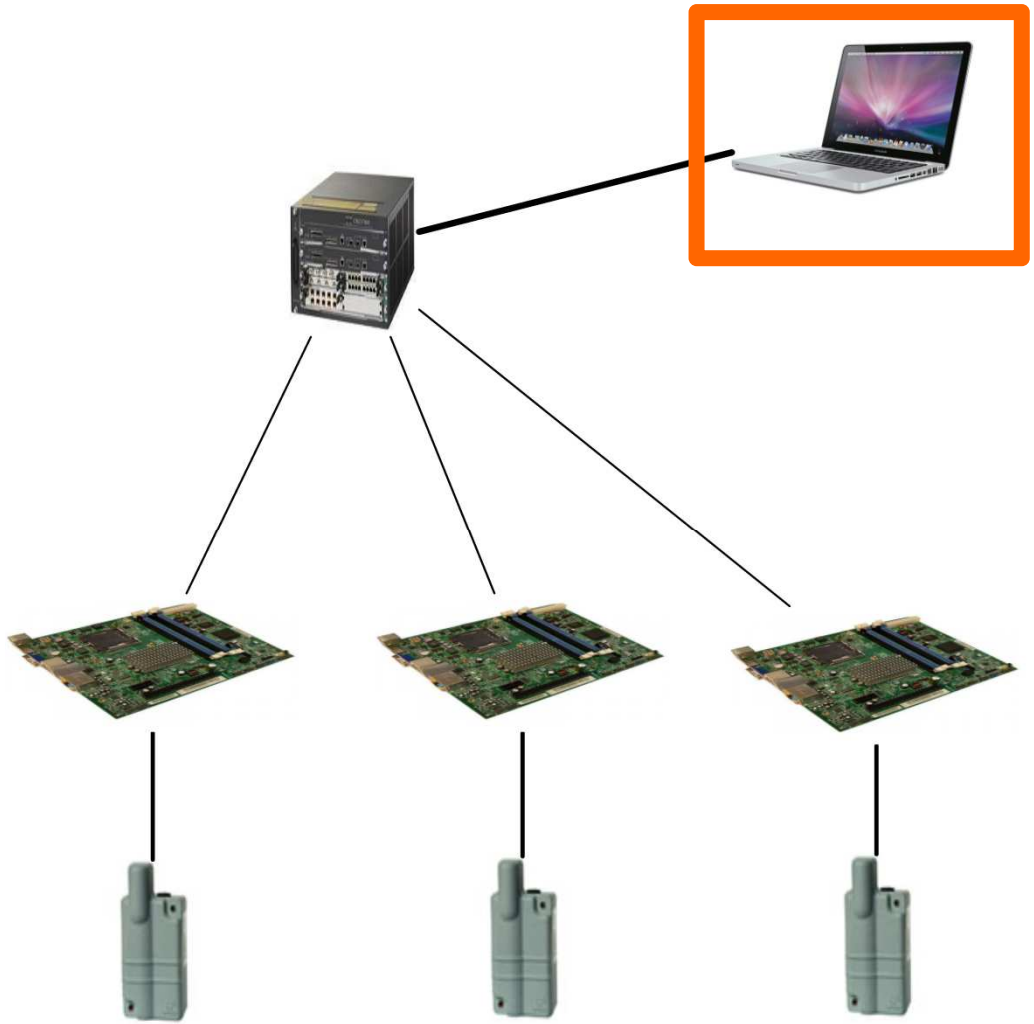
Formatage, ordonnancement et multiplexage



Analyse de log, visualisation



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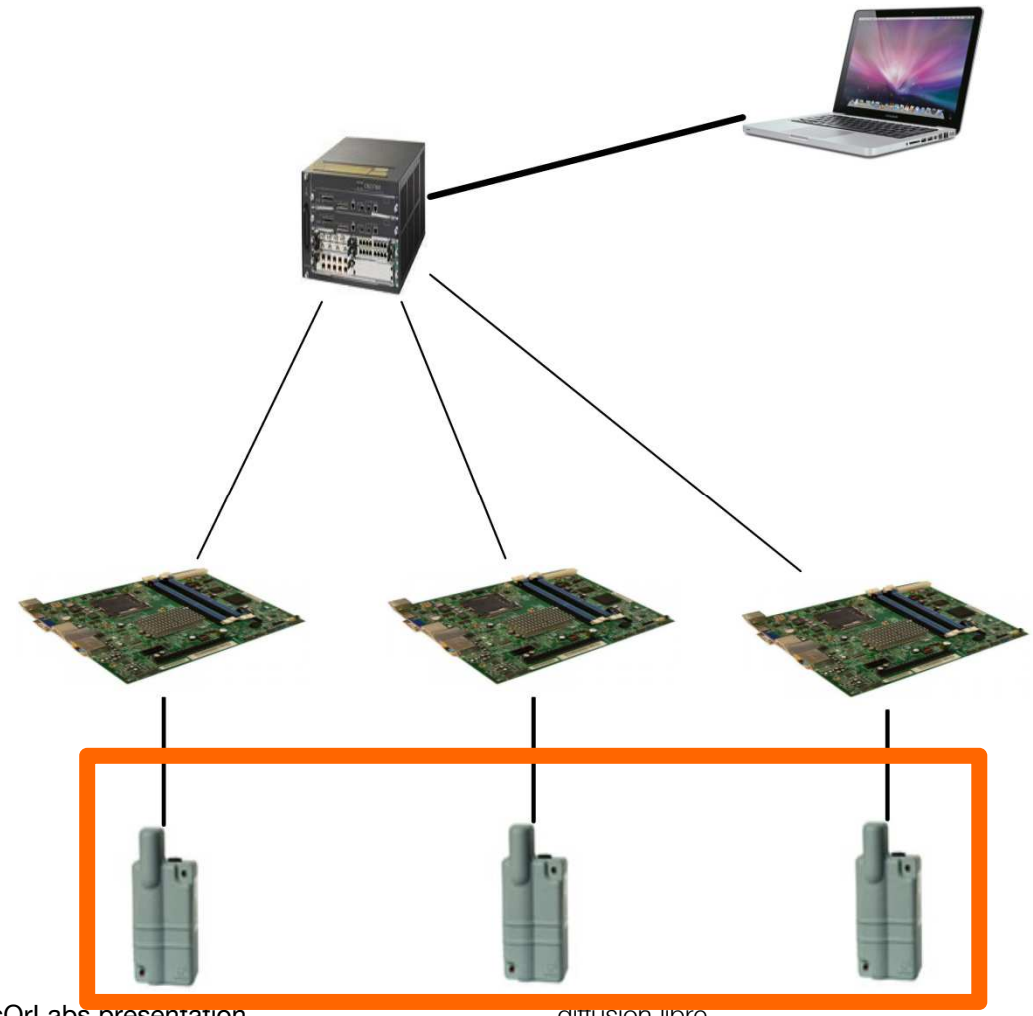
Exemple 1 : modéliser fonctionnement des noeuds



poste client

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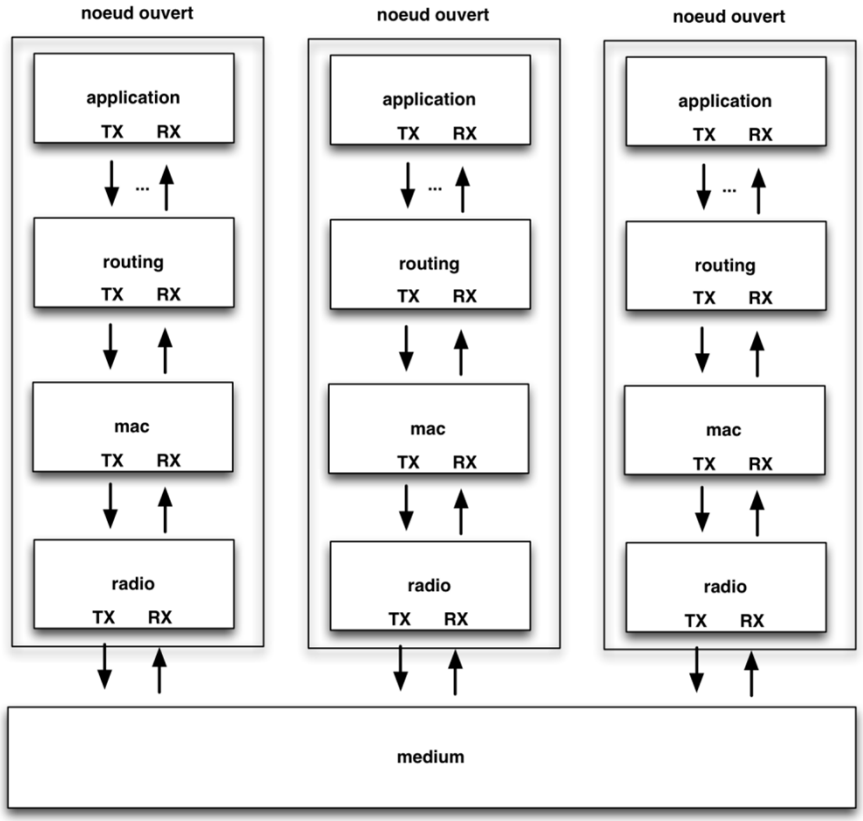
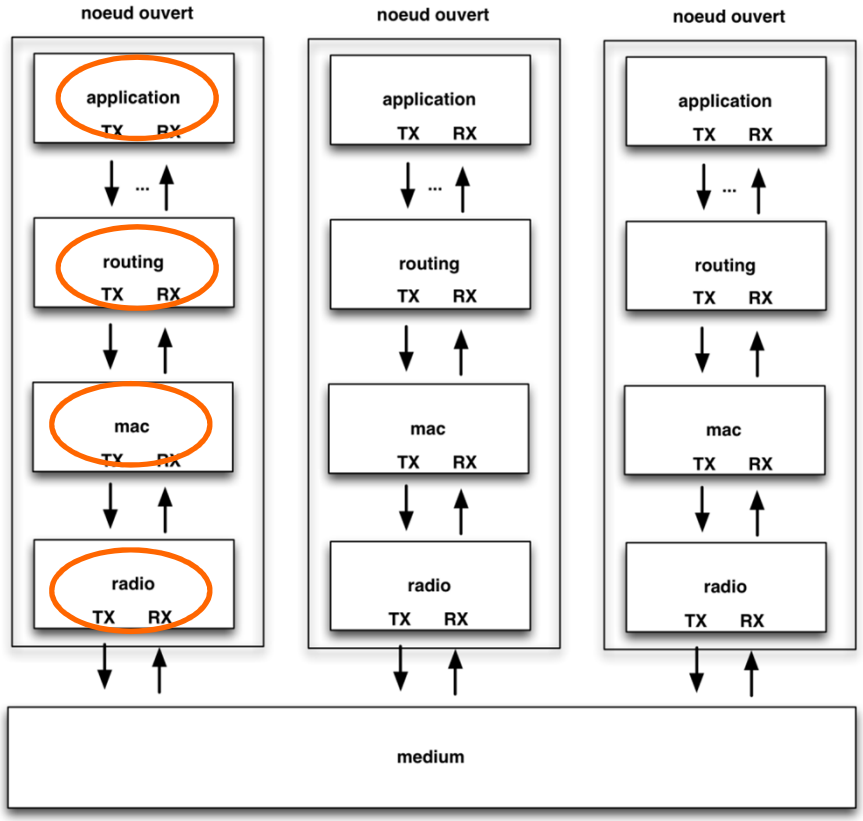
Modéliser les noeuds



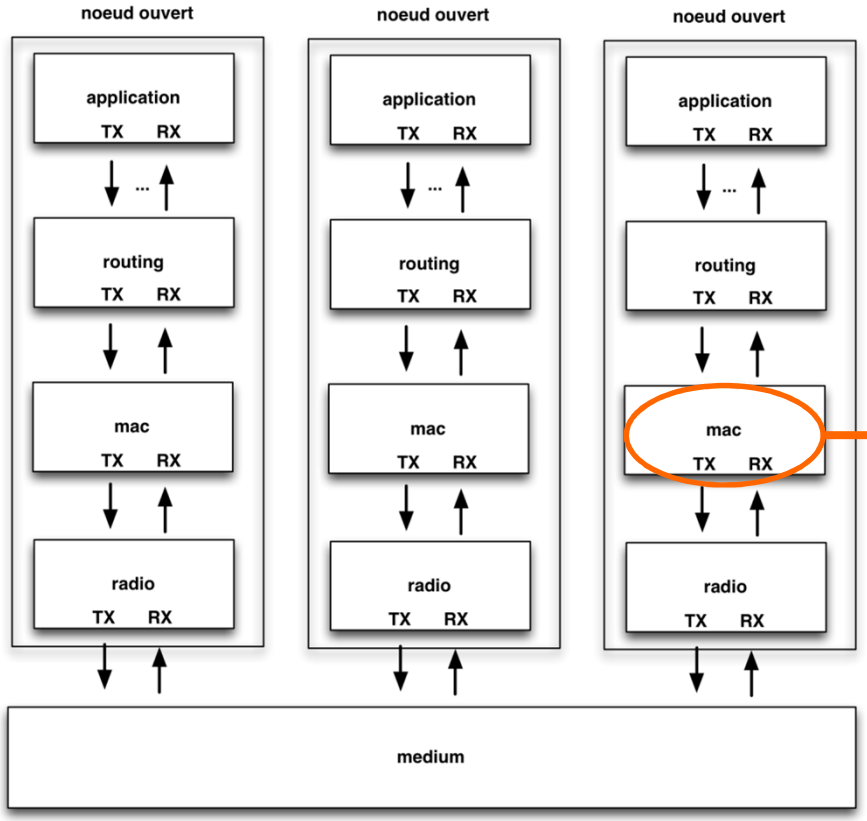
- Représentation sous forme
  - d'entités (couches) ou machines à états
  - d'échanges d'information entre entités
- Log ?

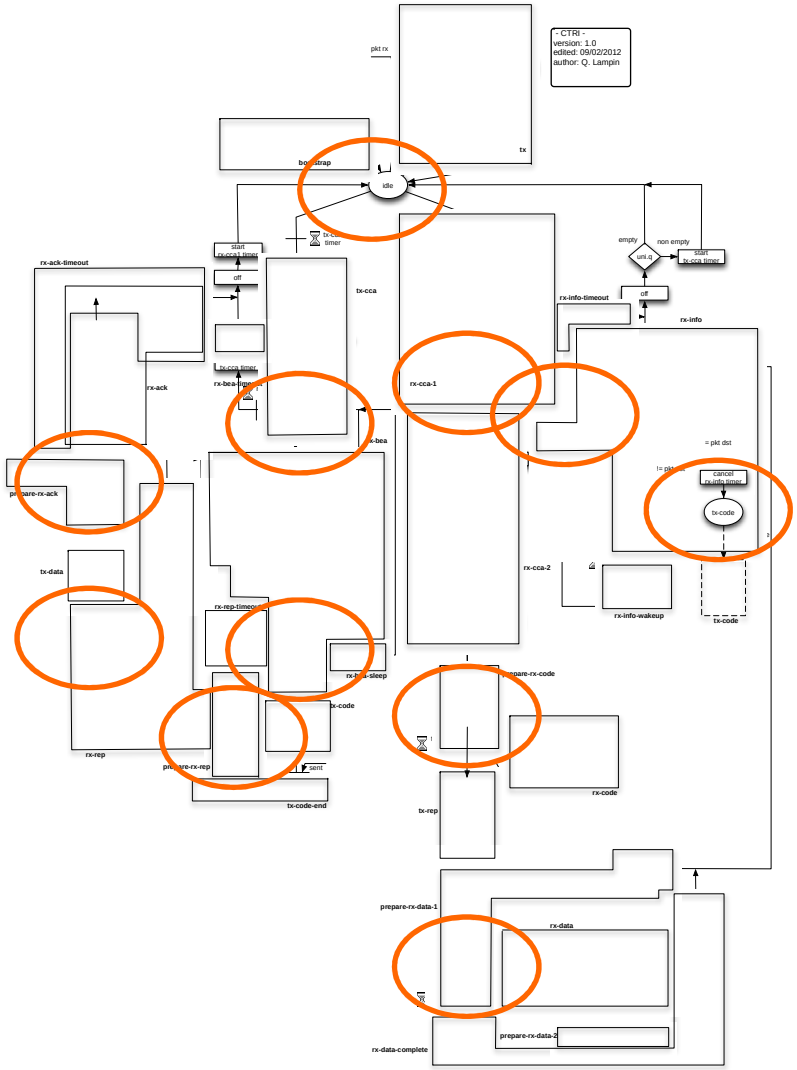
Modéliser les noeuds



- Log
  - échanges inter-entités
  - états internes des entités

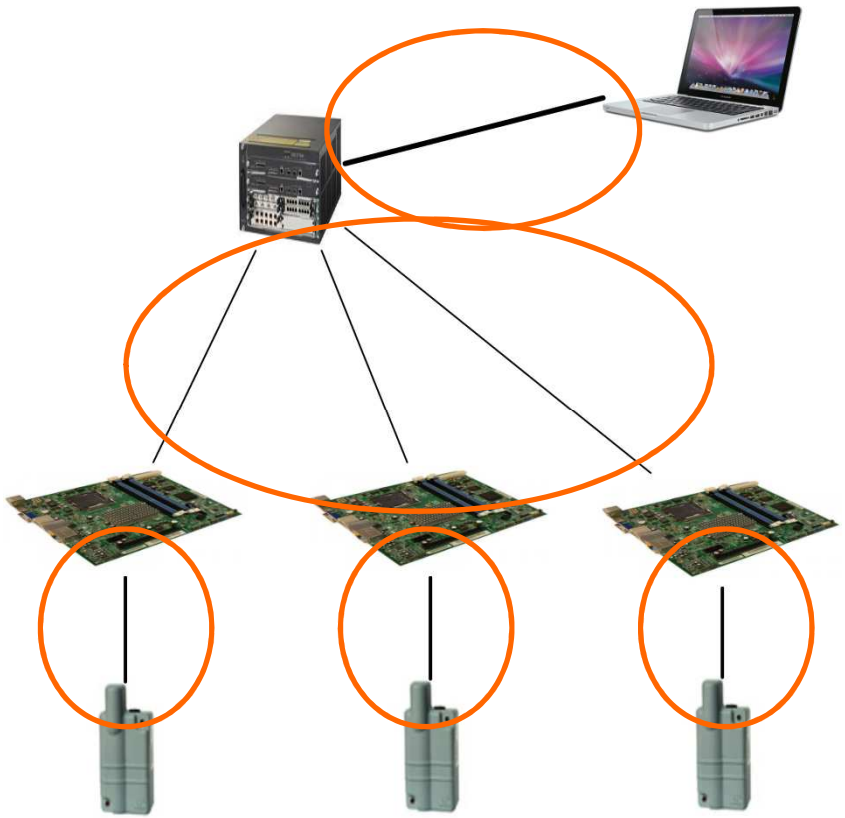
Modéliser les noeuds





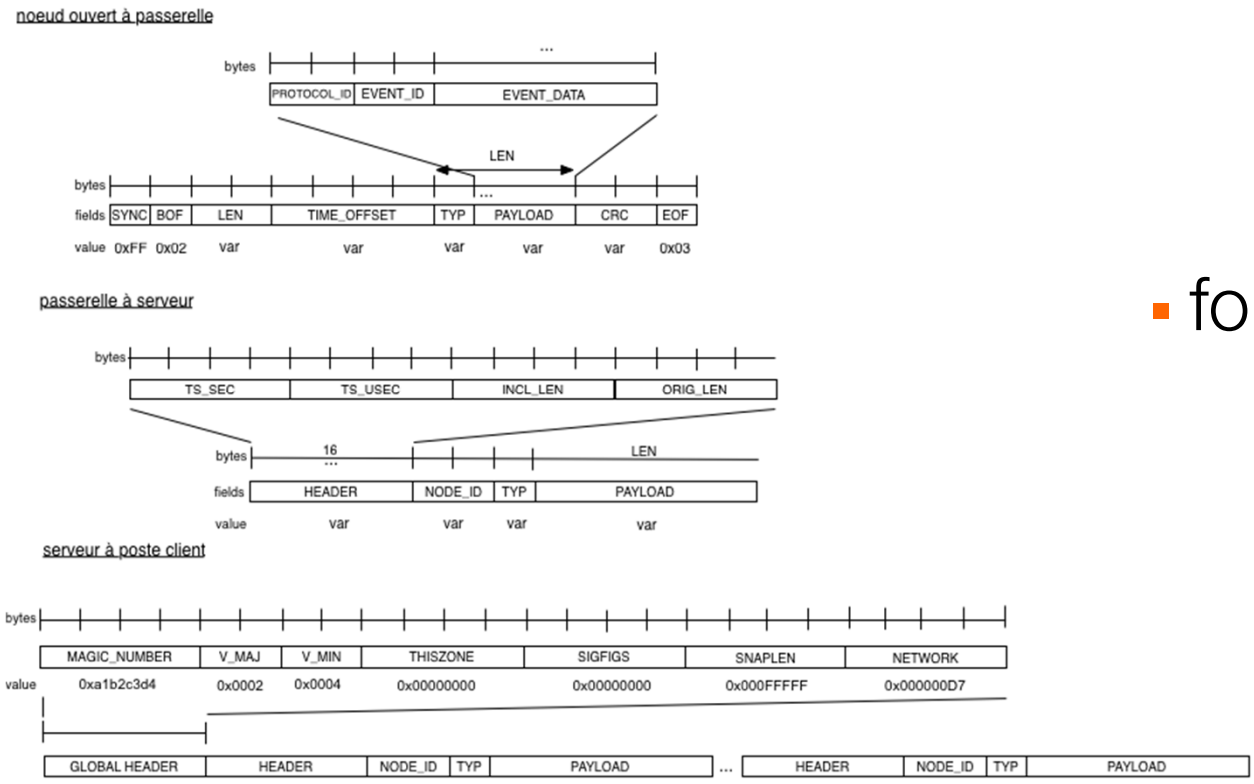
- informations utiles ?
- instrumentation code

Exemple 2 : usage d'outils standards



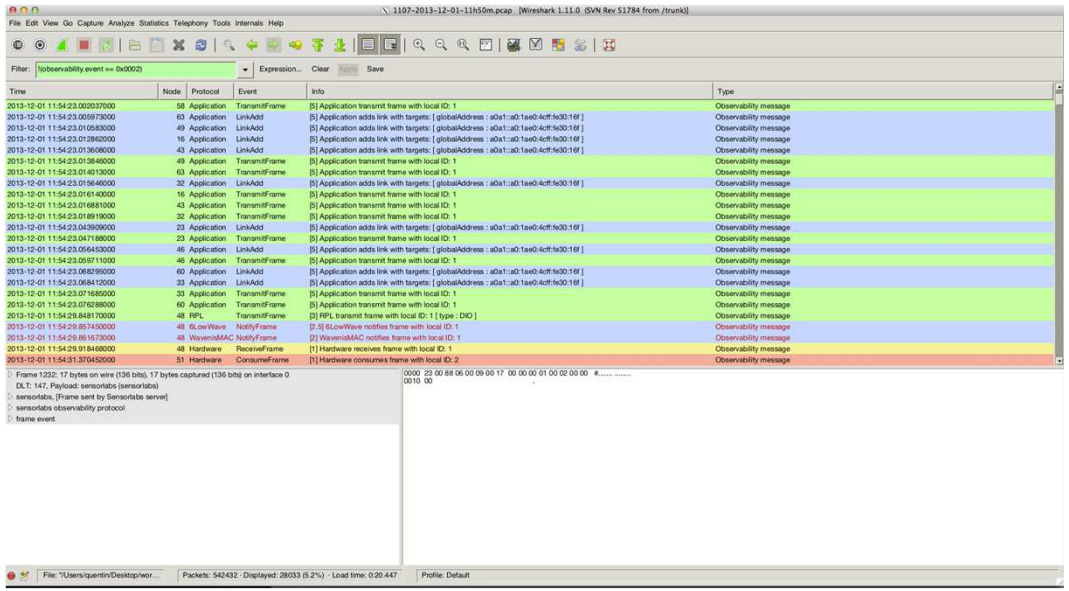
- quel format de log ?
- quels outils d'analyse ?

Usage d'outils standard



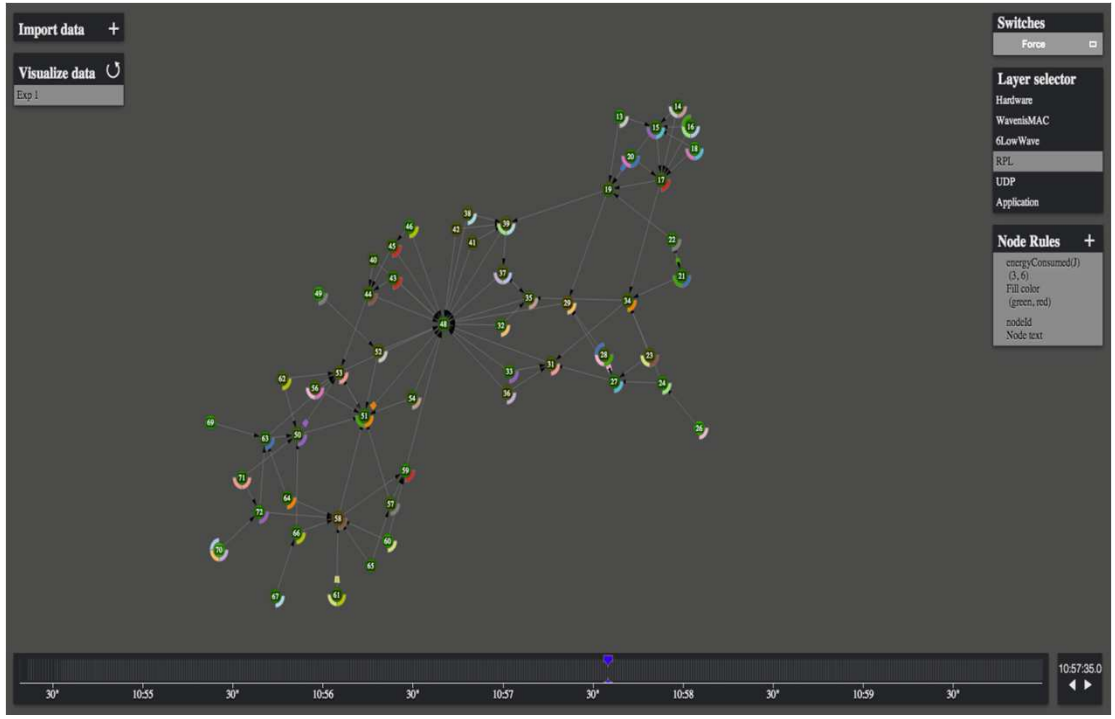
- format de log PCAP

Usage d'outils standard



- outil de capture et d'analyse Wireshark
  - nombreux protocoles supportés
  - notamment IPv6
- dissectors, taps et personnalisation

Usage d'outils standard



- outil de visualisation
  - développé en interne
  - basé sur librairie standard D3.js

Démo

Part 3: evolutions

Hardware evolution

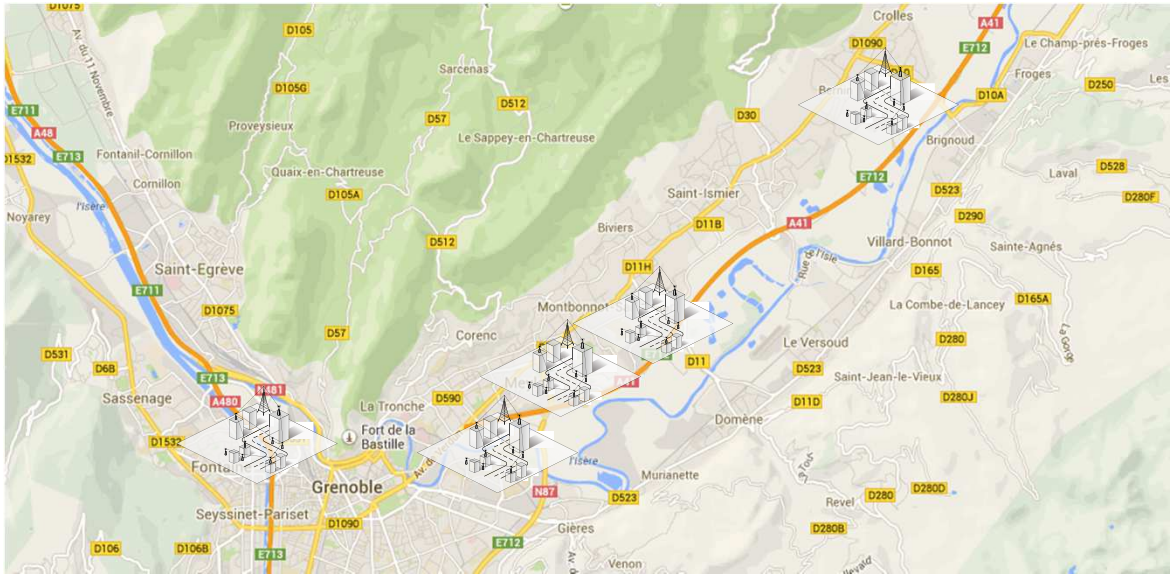
- replace Coronis module by
  - newer radios: aim for 15.4 e radio to start with, k/g next
  - flexible interface (USB) + supply shunt resistor ?
- replace gateway computer board?
  - our Pragmatec board too little-known
- re-use IoT-Lab gateway?

Software evolution

- leverage our observability tool chain
  - improve network analysis tools
- improve our graphical visualization tool
  - scalability in node number, event number
  - visualization modalities

Team-up with other users

- share best practices, create local expertise center
- collaborative development, maintenance
- multi-site platform (Crolles, Montbonnot, Meylan, SMH, Grenoble)
  - long range radio network validation



Questions ?