4TC-Architectures de Réseaux Mobiles
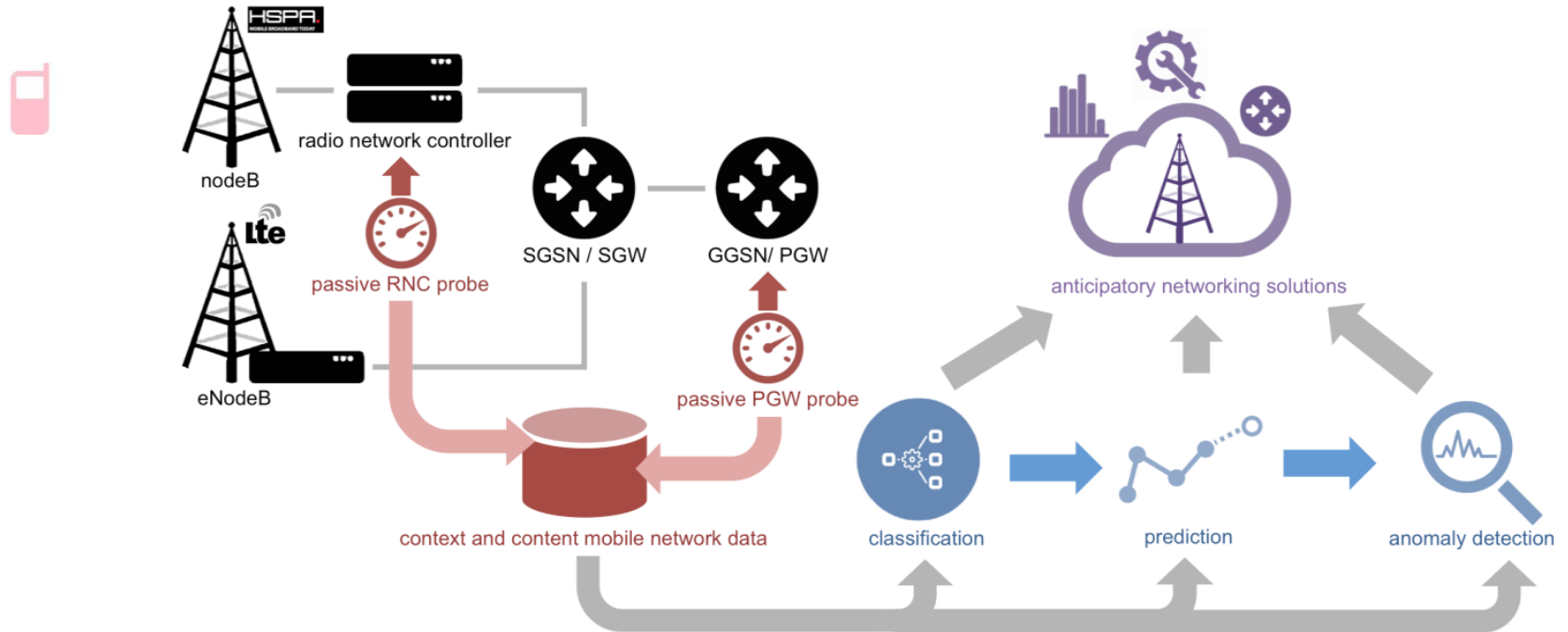**Mobile Network Architectures**

Part 5 – Mobile Data Analysis
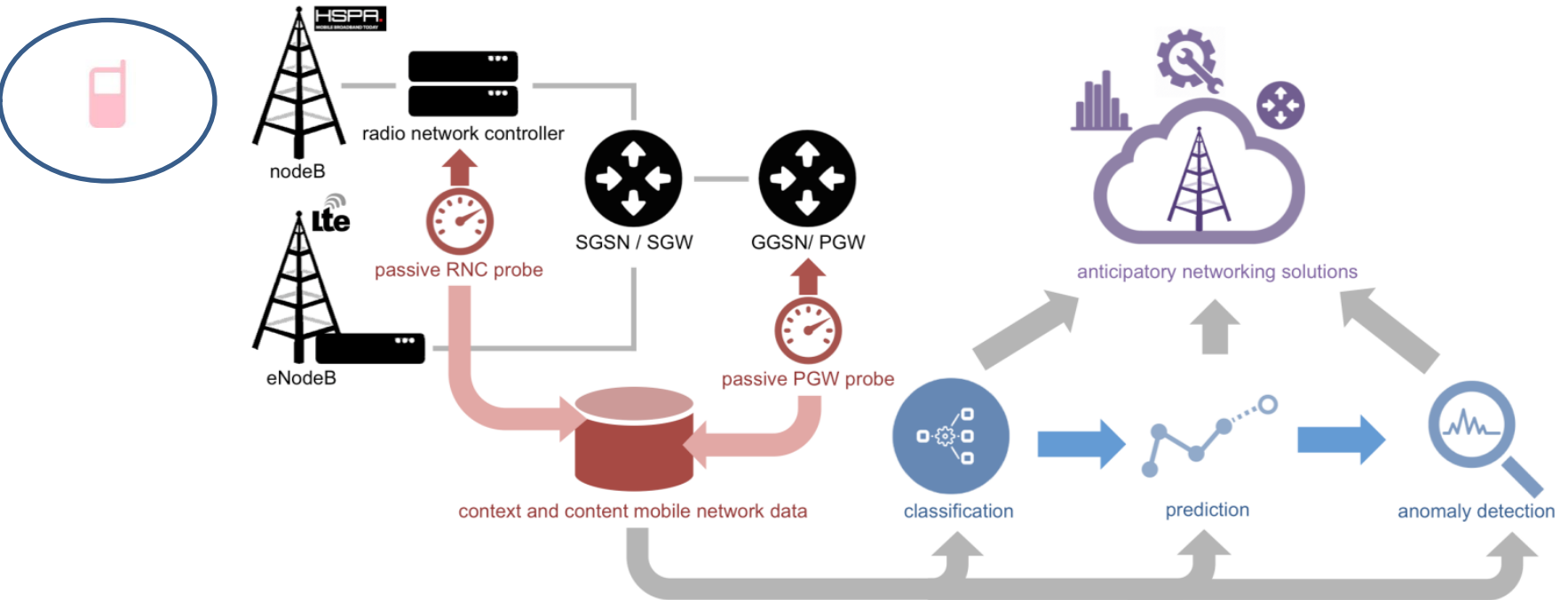
R. Stanica
Version 1.0, Mar. 2018

Two questions

l How to collect mobile data?

l How to analyze mobile data?
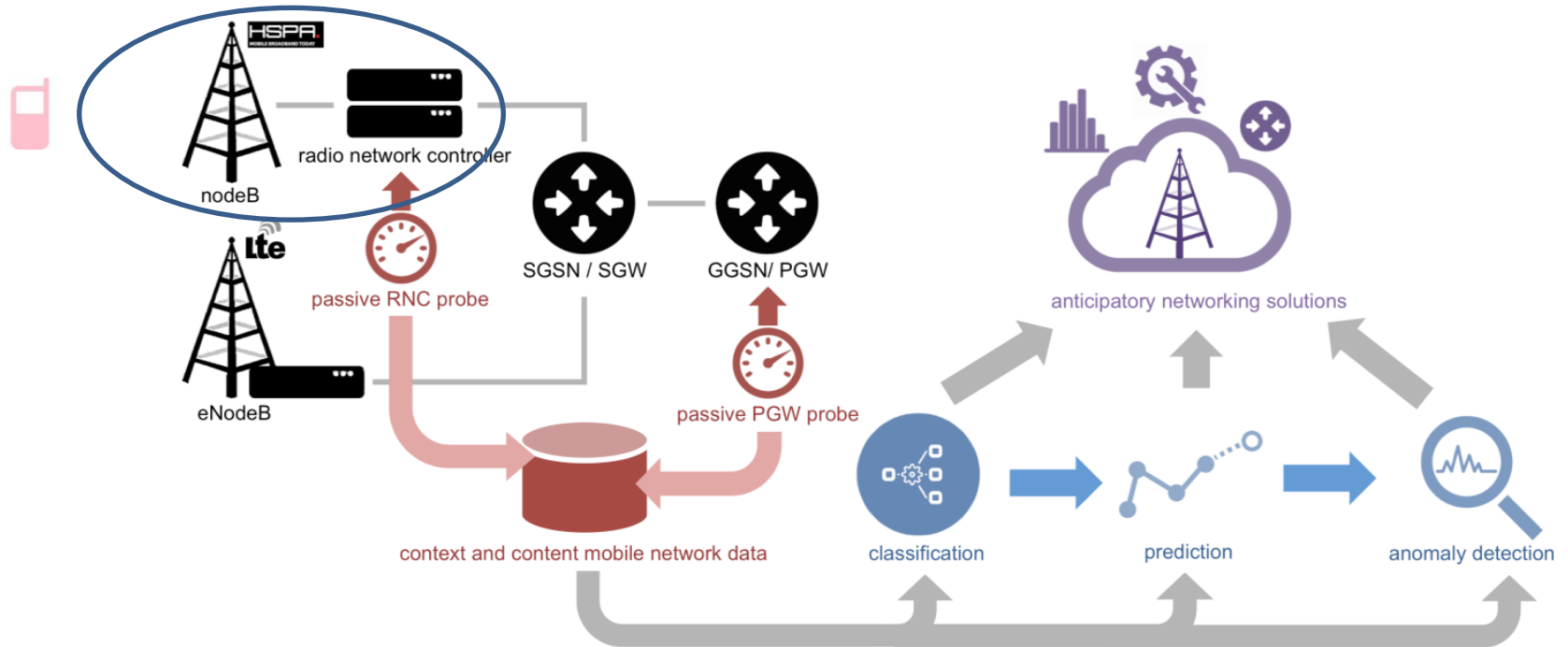
Mobile data collection

Mobile data collection

Mobile data collection

- Smartphone app
  - Orange Mon Compte
  - Access to smartphone sensors (e.g. localization)
  - External network interference measurement
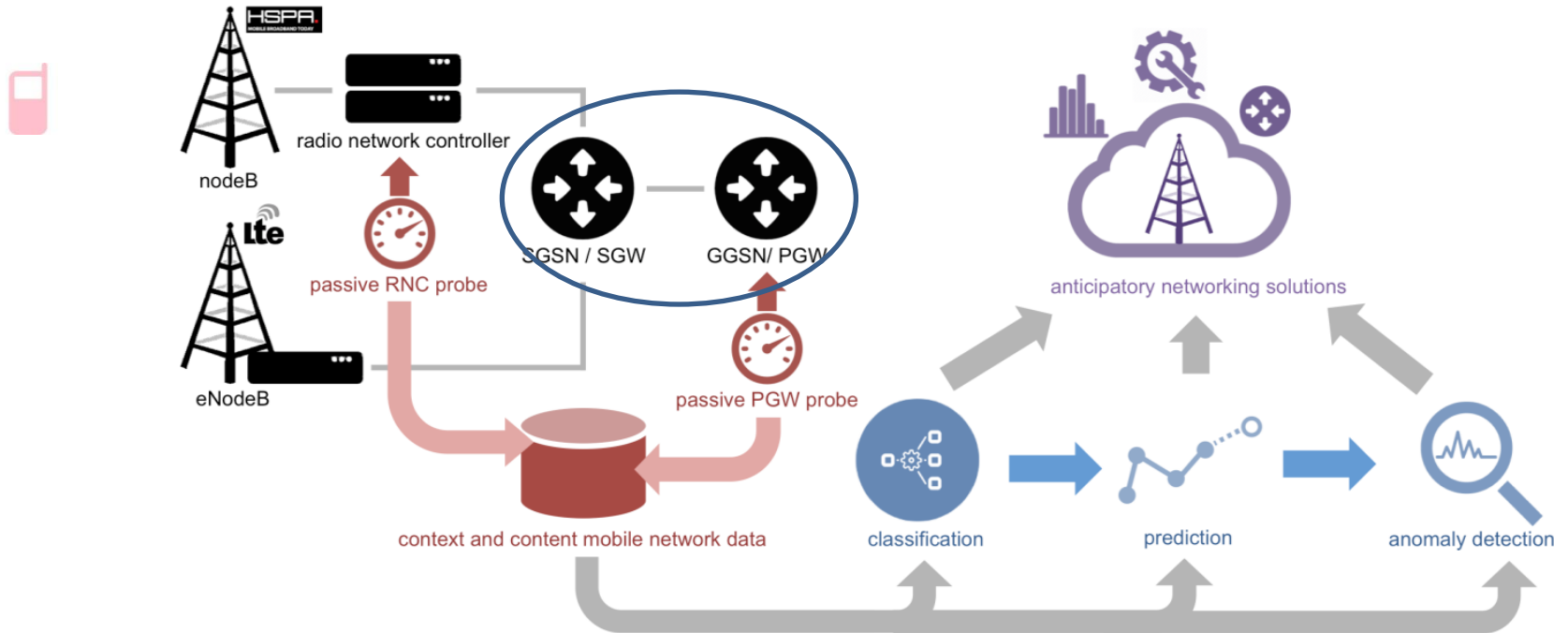 - User data consumption

Mobile data collection

Mobile data collection

- At the RAN level
    - Direct access to all radio measurements
    - An infinity of debugging possibilities
    - Manufacturer dependent KPIs
    - Really big data
    - Backhaul not dimensioned for data collection
    - Used for troubleshooting

Mobile data collection
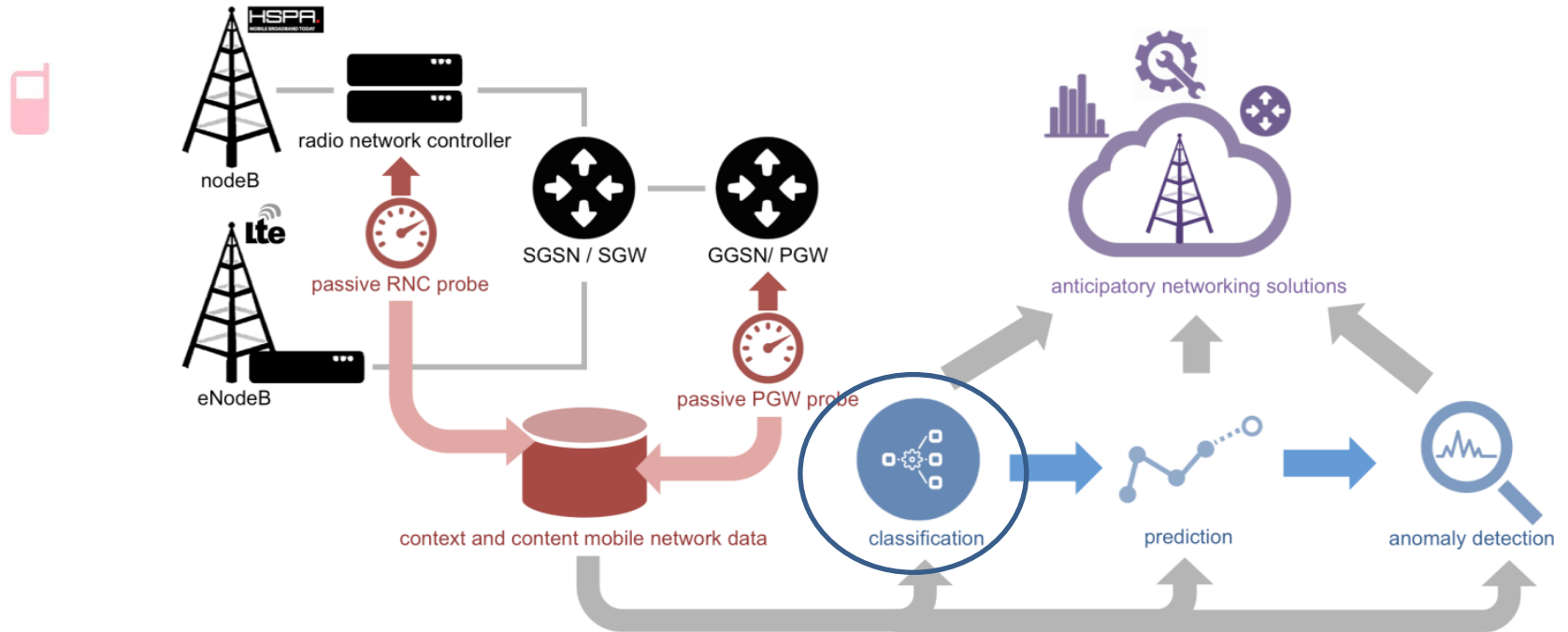
Mobile data collection

- At the CN level
  - Direct access to storage infrastructure
  - No access to radio level KPIs
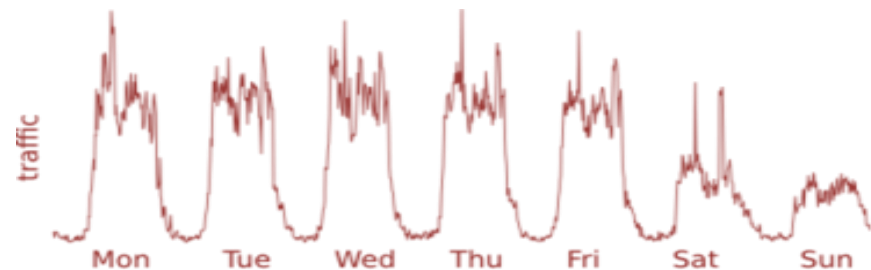 - Used for prospection, marketing and new services
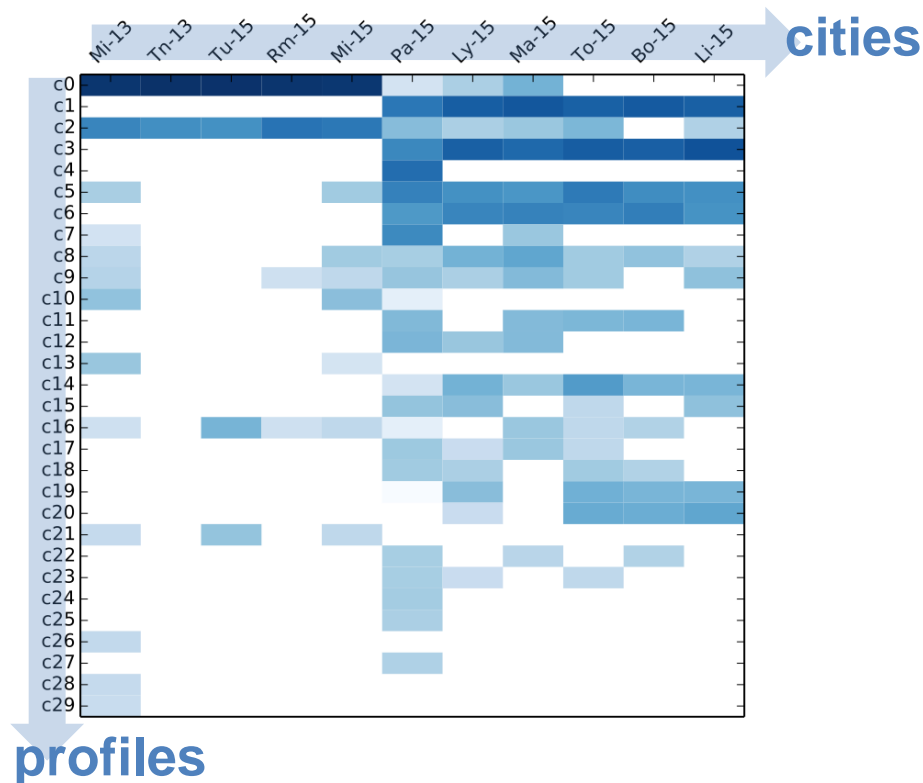
Mobile data analysis

Mobile data analysis

- Based on individual data
  - Human mobility studies
  - Epidemics
  - Post-disaster follow-up
  - Sociological and marketing studies

- Based on aggregated data
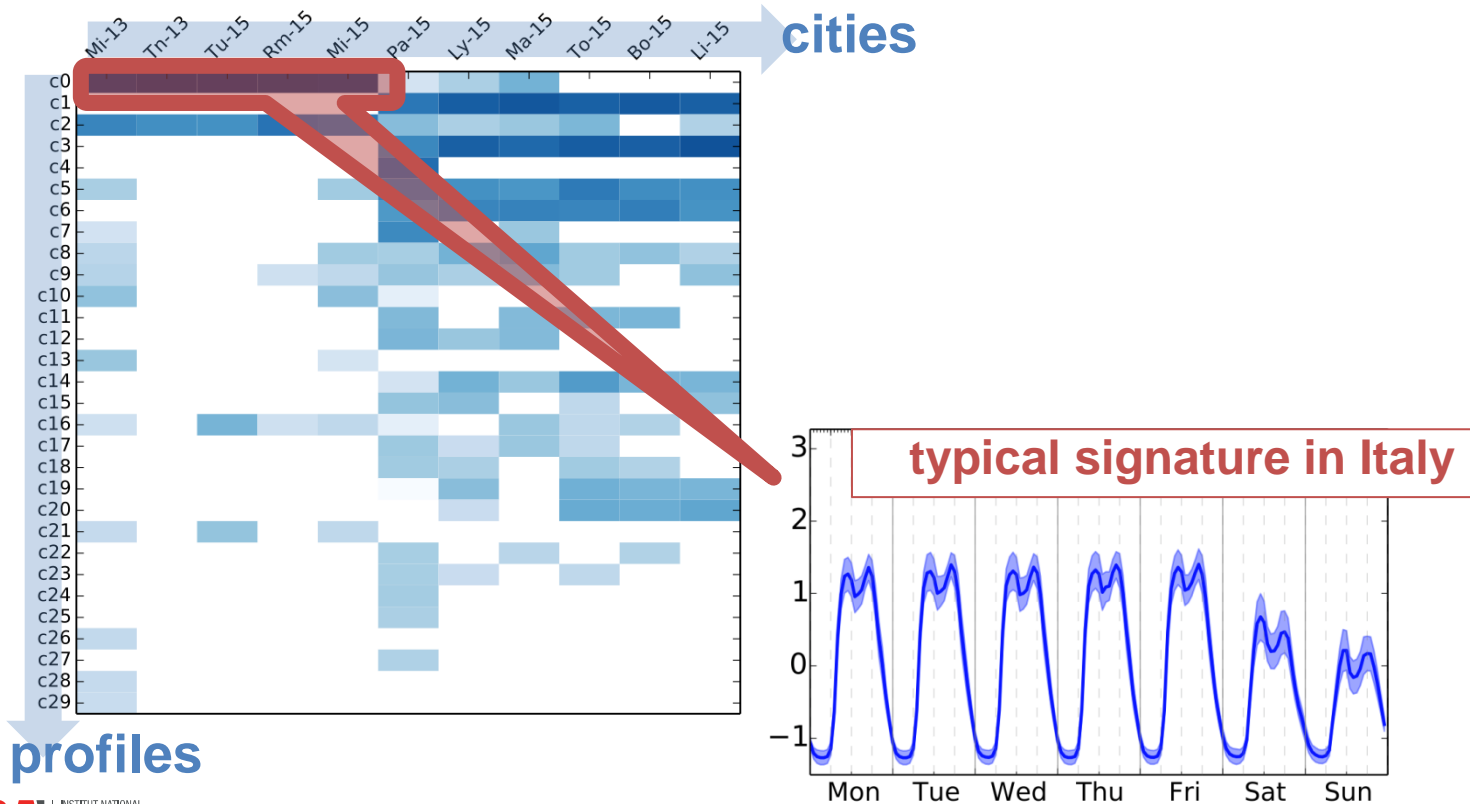 - Network dimensioning
  - Peak hours
  - Hotspots

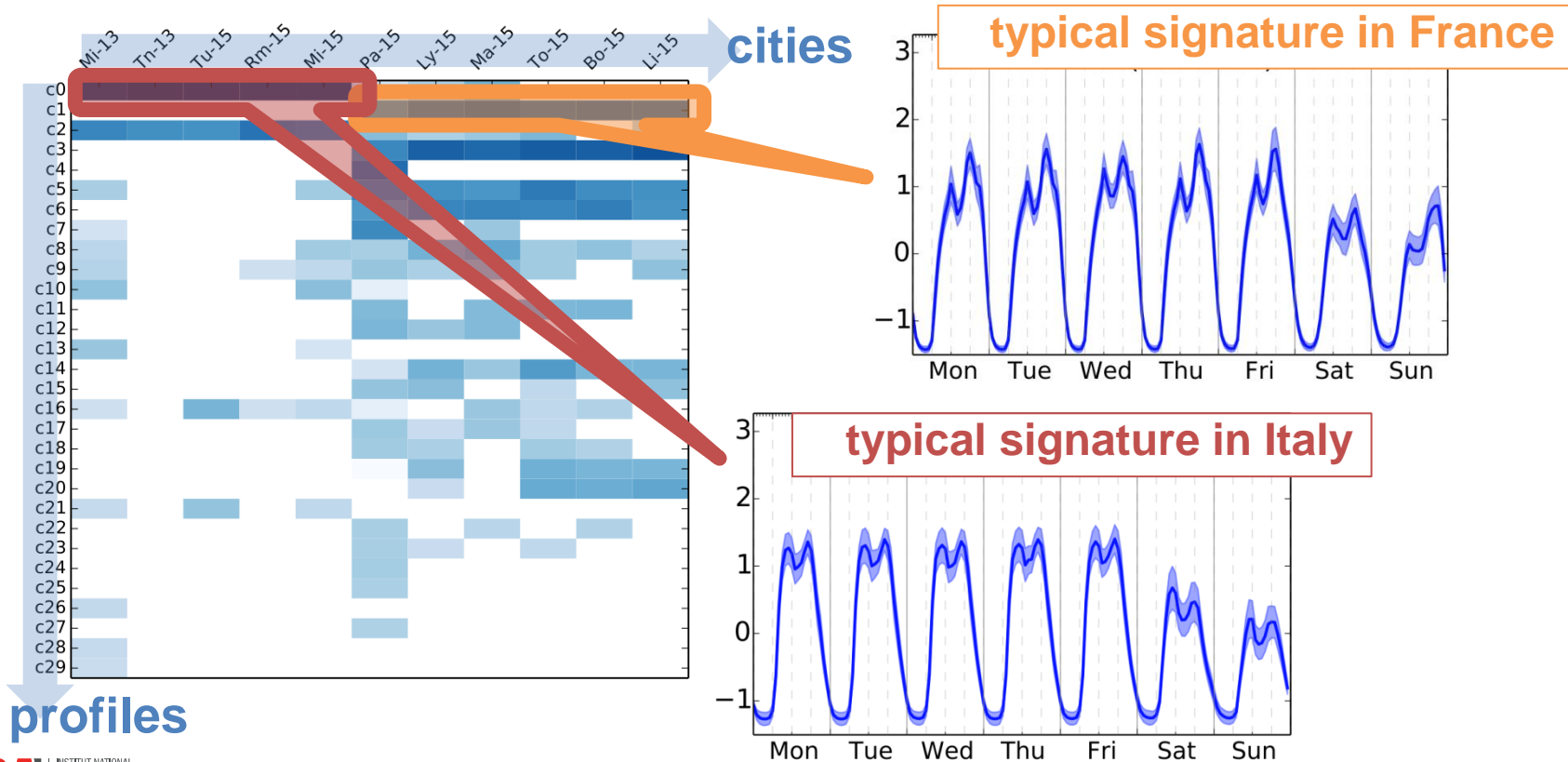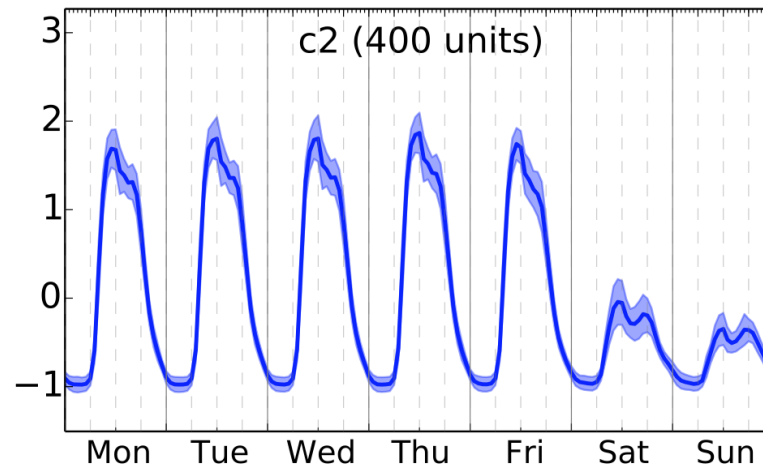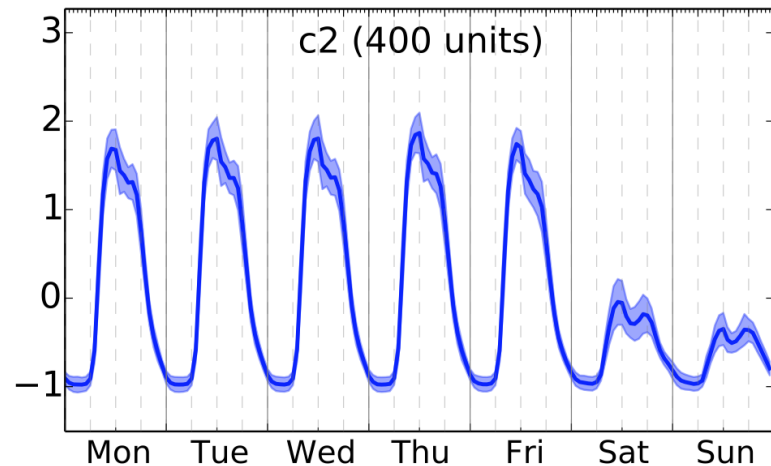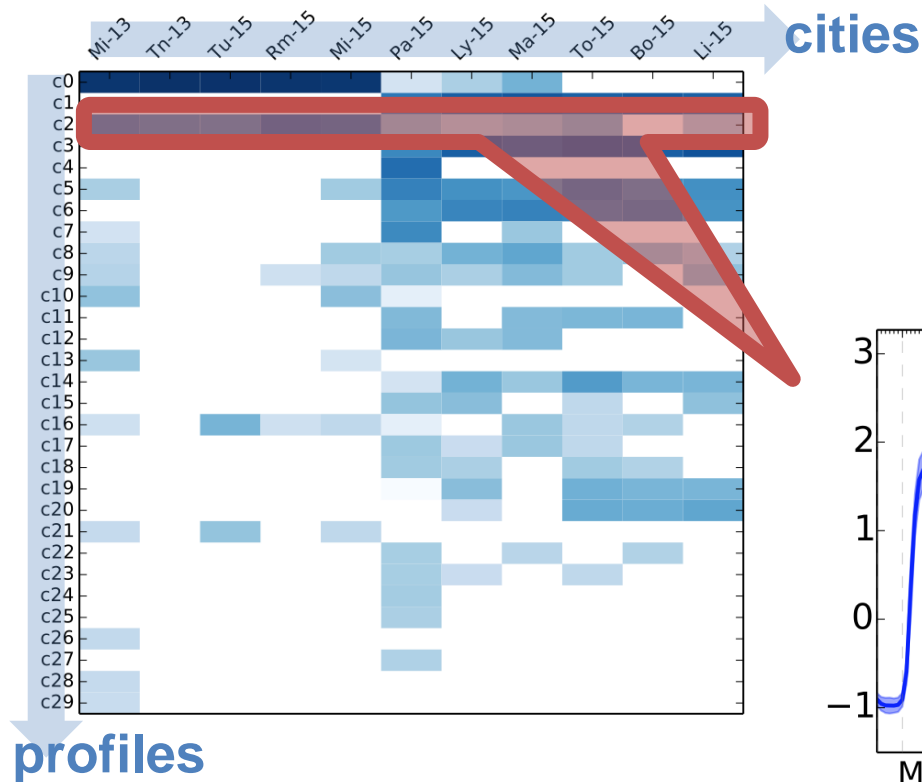# Mobile data analysis

- Case studies
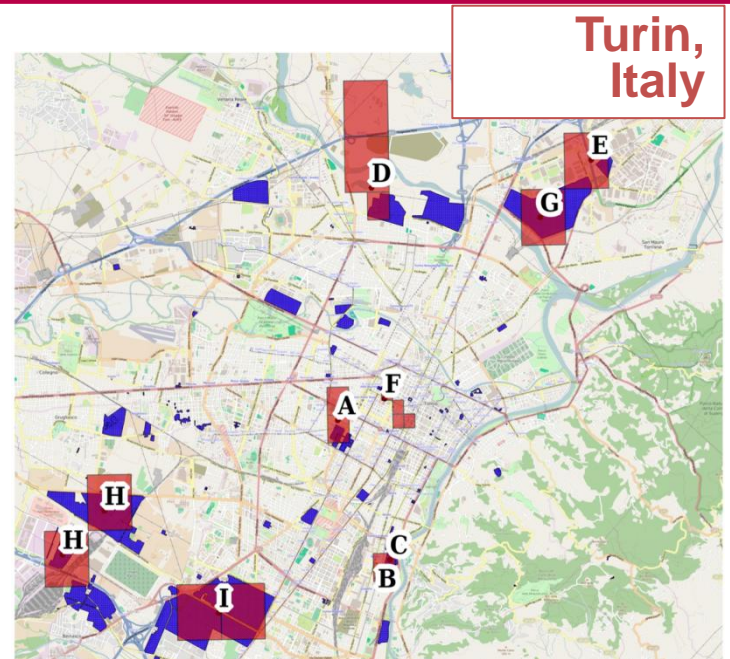   - 6 cities in France
    - 4 cities in Italy

Mobile data analysis
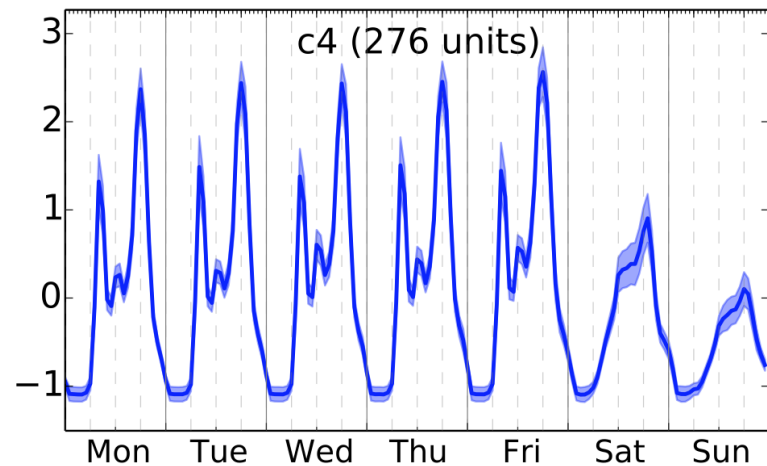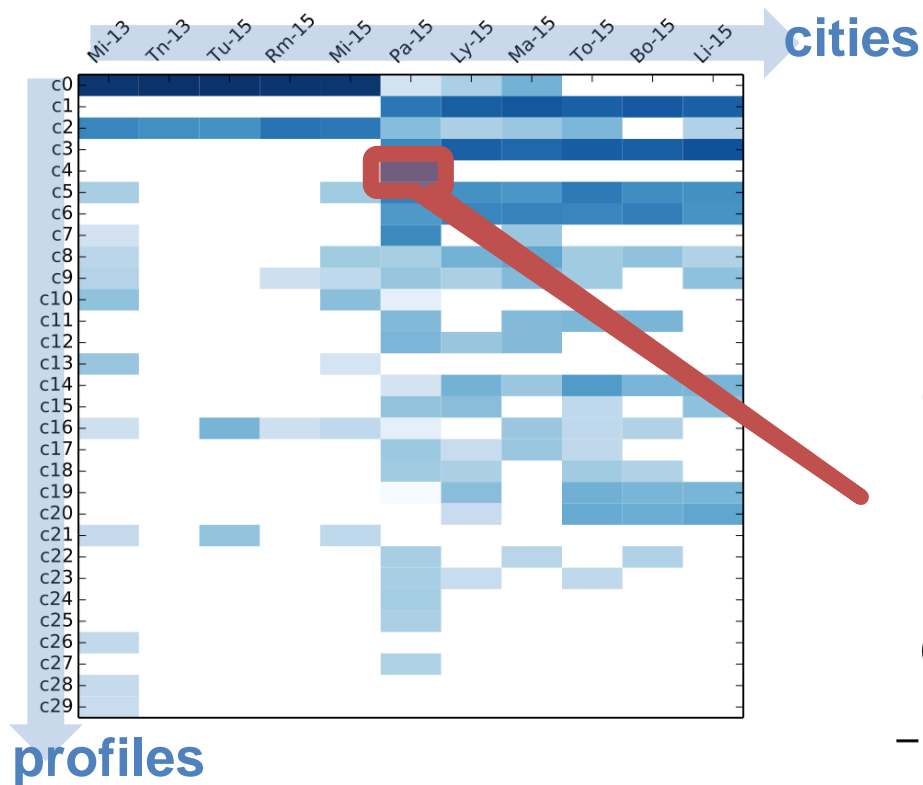
- Case studies
  - 6 cities in France
  - 4 cities in Italy

cities

profiles

typical signature in Italy

Mobile data analysis

- Case studies
  - 6 cities in France
  - 4 cities in Italy

typical signature in France

typical signature in Italy
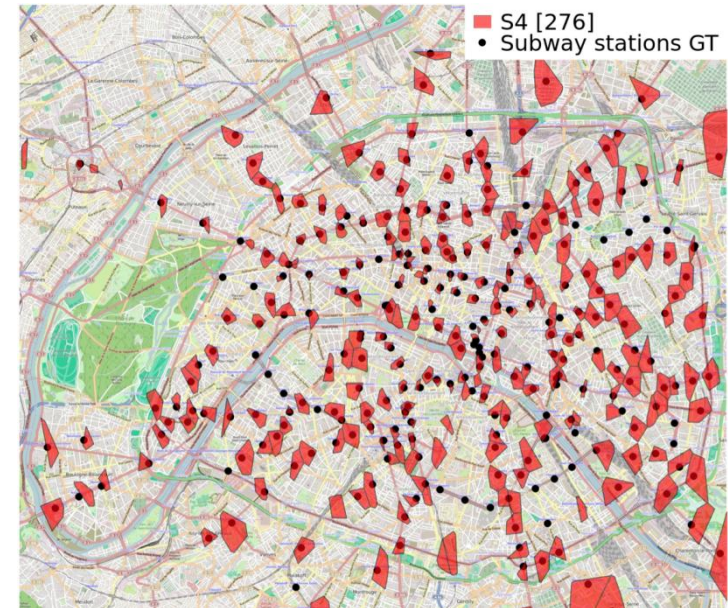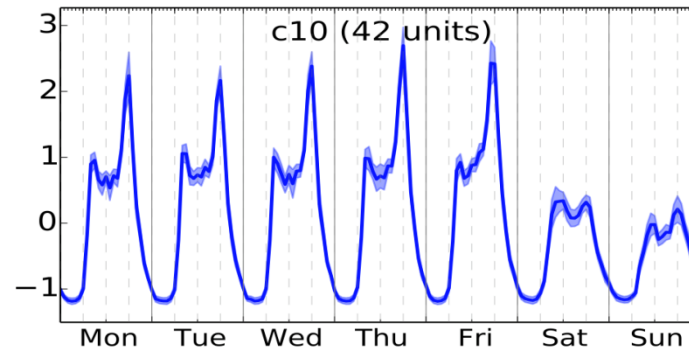
cities

profiles

Mobile data analysis

Mobile data analysis

Turin, Italy

cities

profiles

c2 (400 units)

Mobile data analysis

Mobile data analysis

cities

profiles

c4 (276 units)

S4 [276]
Subway stations GT

Mon Tue Wed Thu Fri Sat Sun

Mobile data analysis

cities

profiles

Mobile data analysis

cities
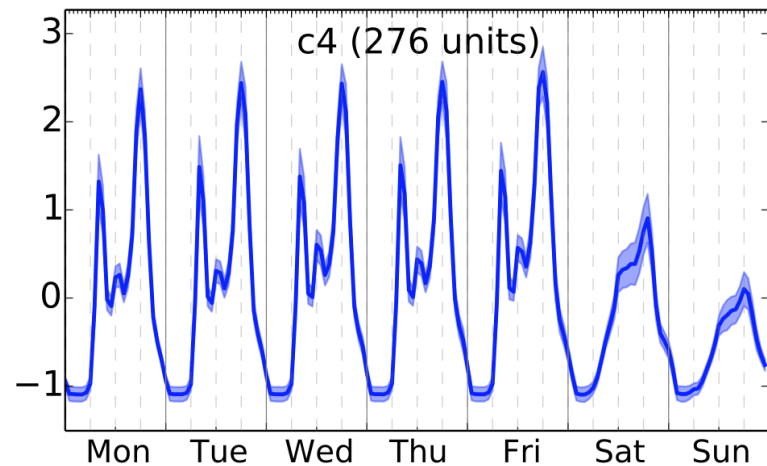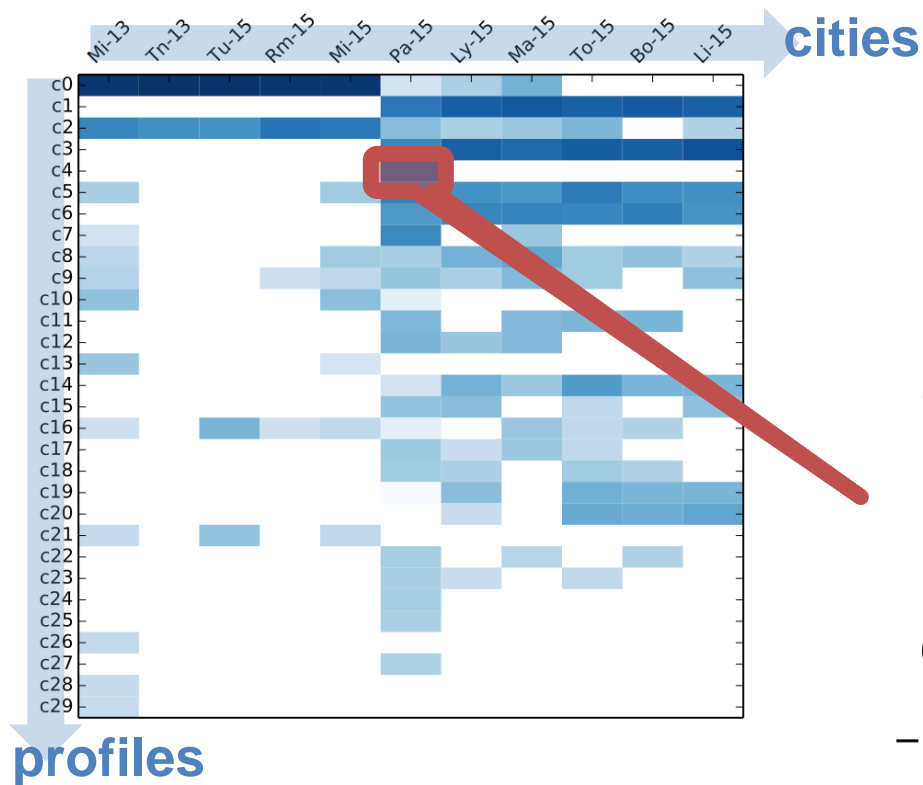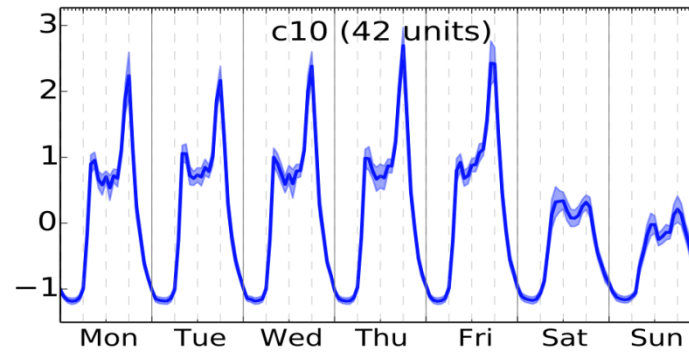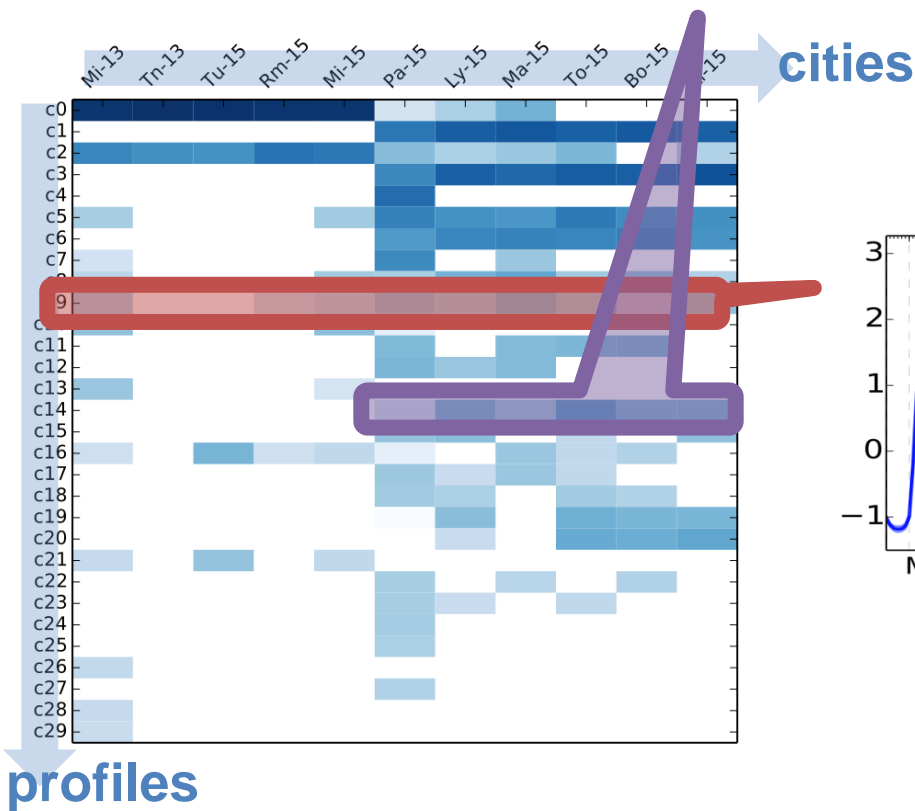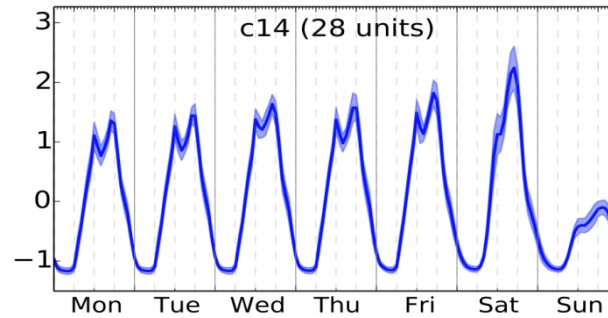
profiles

Mobile data analysis

Mobile data analysis

l Expected temporal profiles
  l Working hours
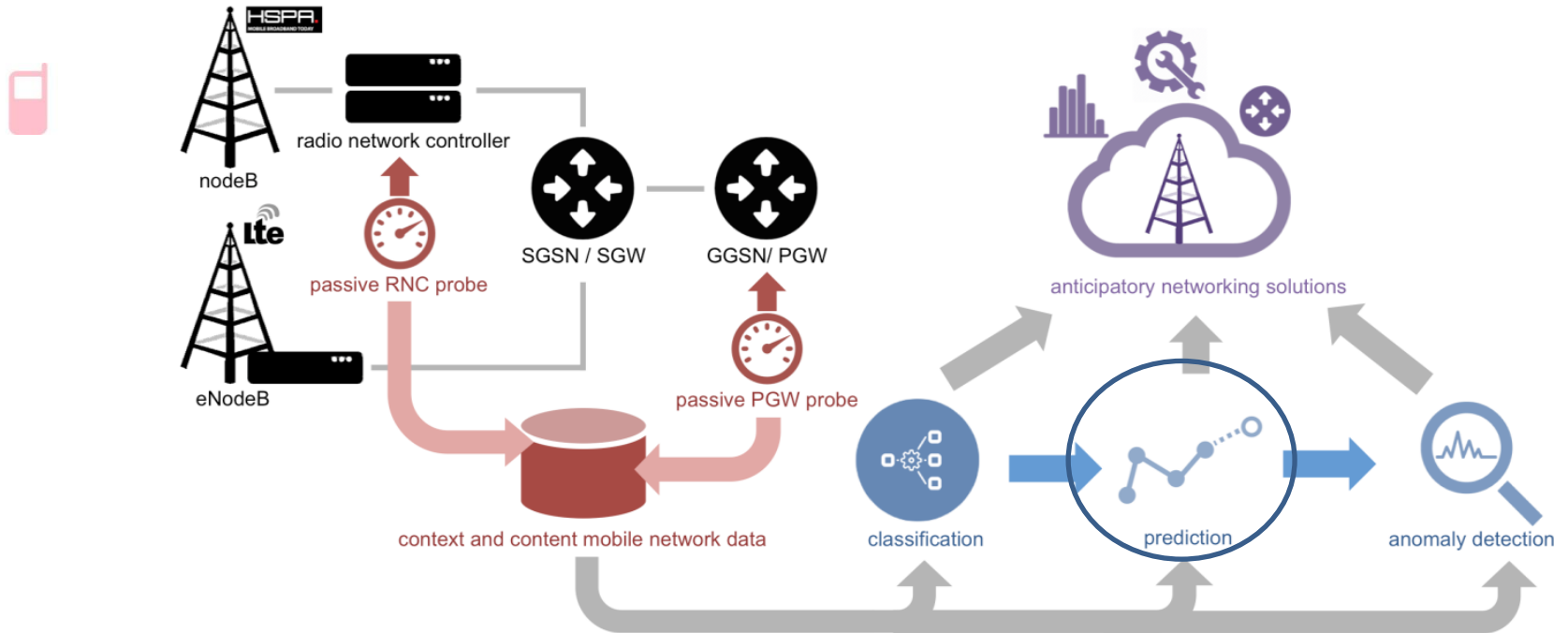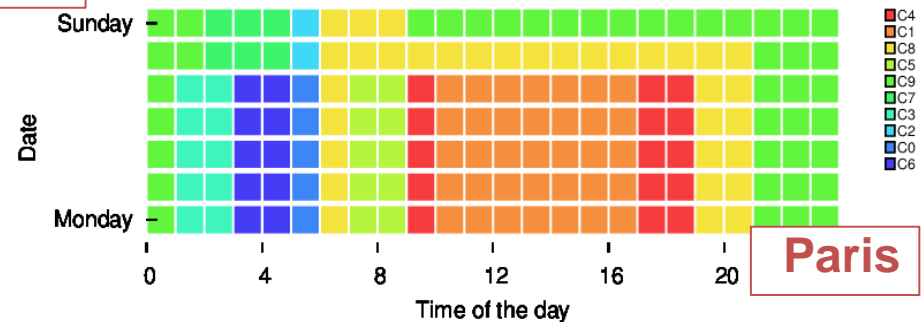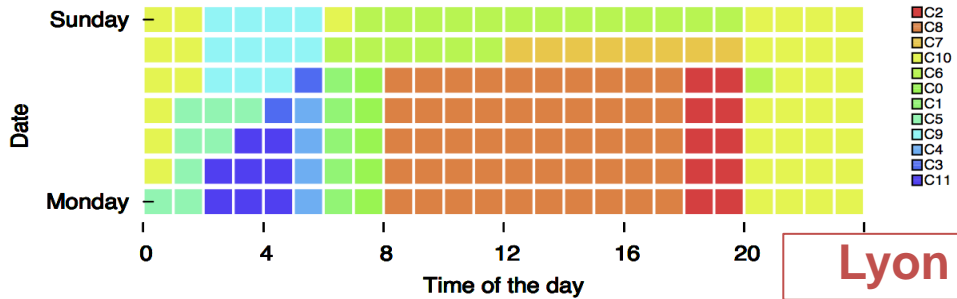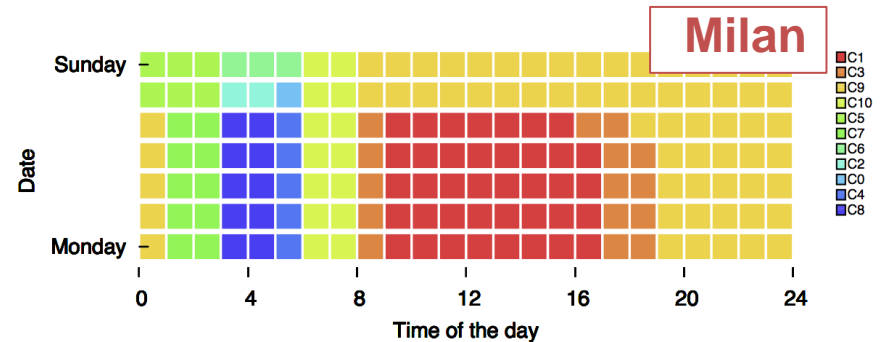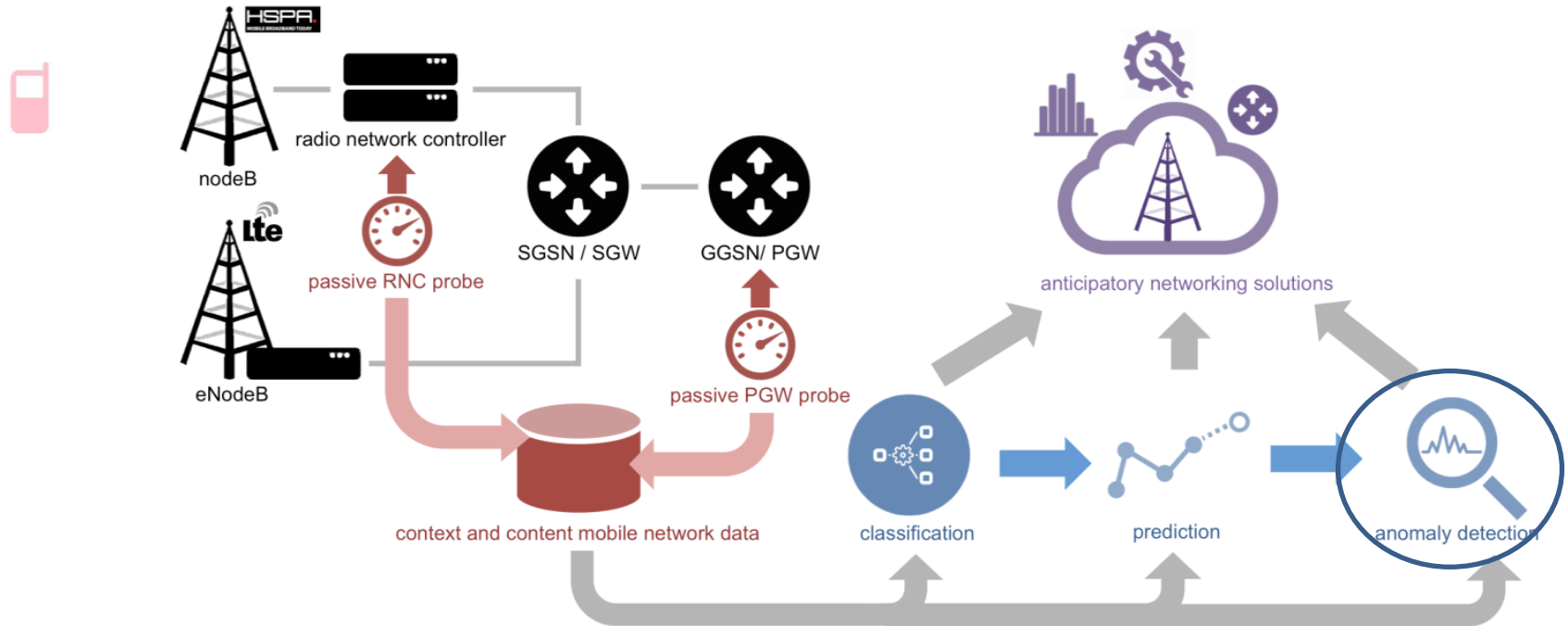 l Evening
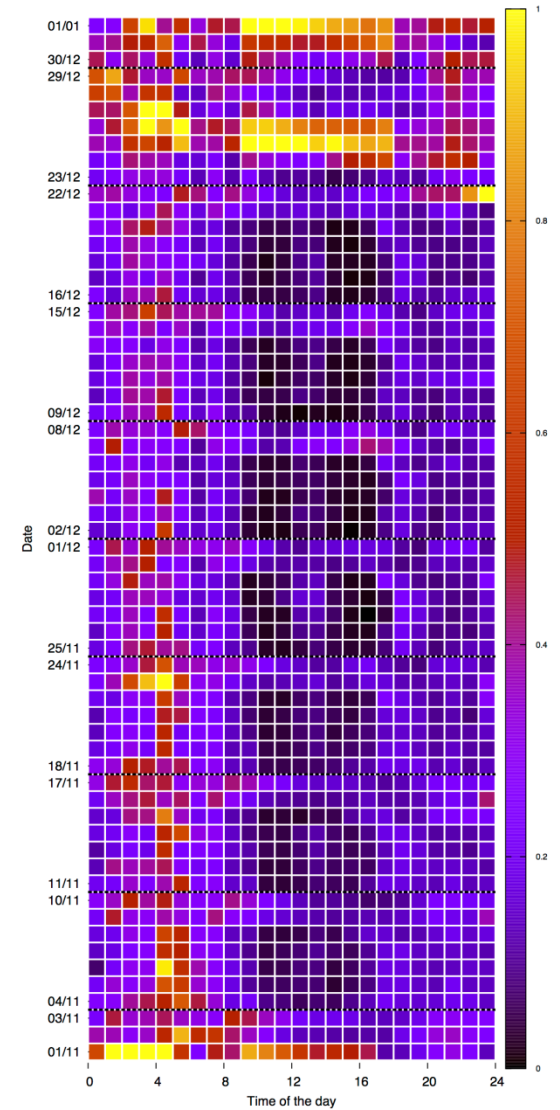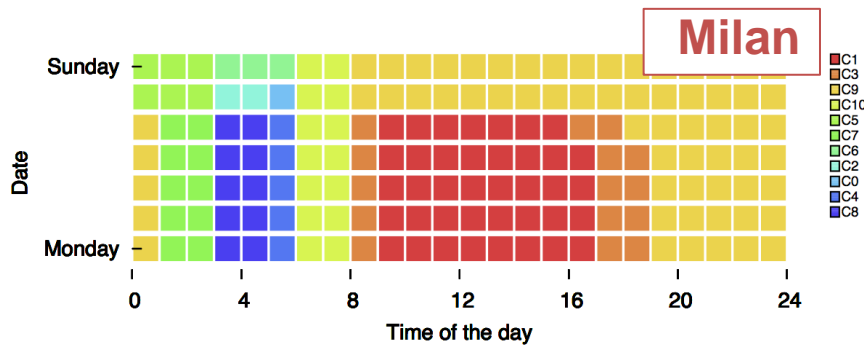 l Week-end
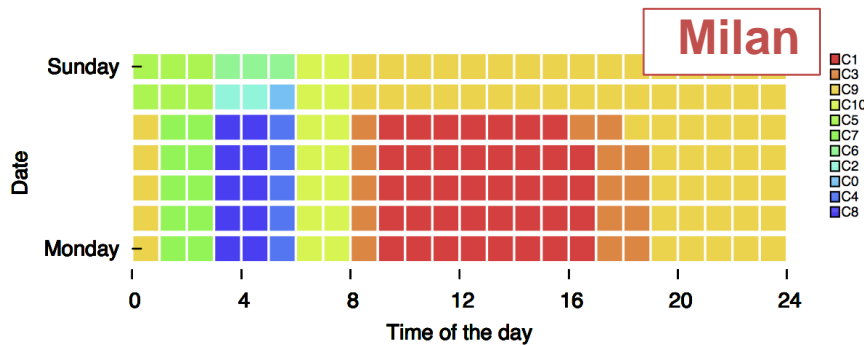 l Night

Mobile data analysis

Mobile data analysis

Unexpected behavior

Mobile data analysis

Unexpected behavior

Milan

*Halloween night, Milan patron saint day, **opening of opera season** at "La Scala" theater, Christmas holidays and events, several public holidays, several football matches of AC Milan and Inter Milan, one collection **probe crash**, etc.*