SCIENCESPRINGDAY

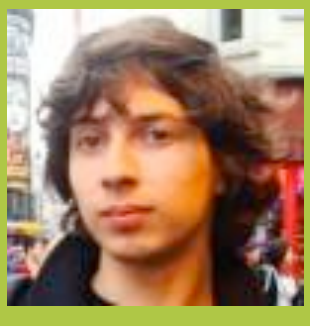
FACULDADE DE CIÊNCIAS E TECNOLOGIA UNIVERSIDADE NOVA DE LISBOA

DEPARTAMENTO DE INFORMÁTICA

Incremental Computation in the Cloud

COMPUTER SYSTEMS / CR4 team

CENTER FOR INFORMATICS AND INFORMATION TECHNOLOGIES



David Navalho

(PhD Student)

Currently working on Participatory Sensing and Cloud Computation

Advisors:
Nuno Preguiça
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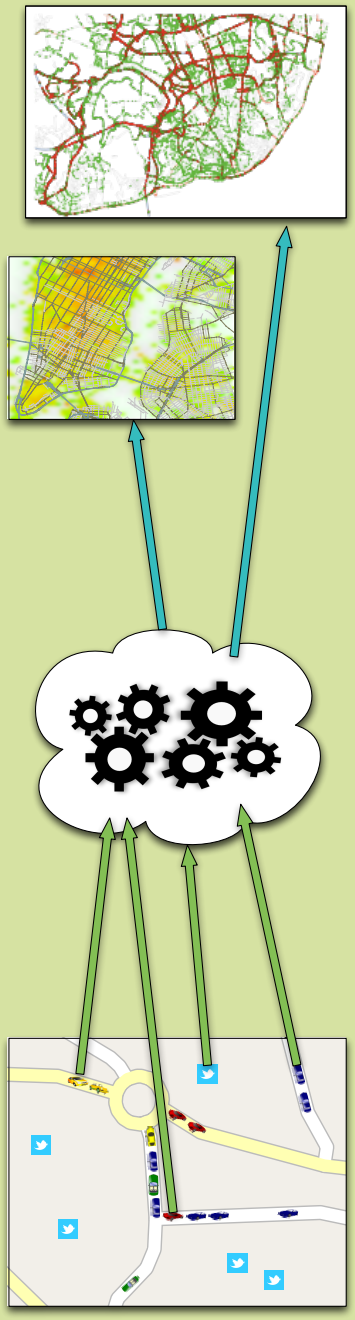
Objectives

- **Efficient Cloud Data Processing**
  - Fast: real-time computations
  - Incremental: update computations as new data arrives
  - Deterministic & fault-tolerant: computations resume from the last saved state in the presence of failures
- **Novel applications**
  - Mobile devices as ubiquitous sensors are massive sources of information
    - Traffic monitoring, location systems, information merging
  - Analytics, financial data, etc

Methodology

- **Leverage of C-CRDTs to support and express computations**
  - Computational logic captured as a graph of C-CRDTs
  - Uncoordinated C-CRDT updates for parallelism
  - Assured convergence for determinism and fault-tolerance
- **Data persistence for historical data computations**
- **Case-study driven design and experimental evaluation**



Expected Results

- **New modeling and abstraction techniques for parallel and distributed incremental computing**
  - Incremental Stream Processing using Computational Conflict-free Replicated Data Types. David Navalho, Sérgio Duarte, Nuno Preguiça, Marc Shapiro. CloudDP'13
  - Inforum 2011, Mobiquitous 2011, Monet 2013
- **Deployment of a Cloud Data Processing System**
- **Application to Case Studies**
  - Participatory Sensing, Real-time analytics

Funding:

FCT Fundação para a Ciência e a Tecnologia

PEst-OE/EEI/UI0527/2011

Research Projects:
- PTDC/EEI-SCR/1837/2012 (SwiftComp)

Research Grants:
- SFRH / BD / 65070 / 2009 (PhD Scholarship)