Supporting Mobility in a Pub/Sub Architecture
Publish Subscribe Internet (PSI - Ψ) in mobile environments
BACKGROUND
Mobility Support in PSI

- **PSI architecture can support mobility with** no adjustment/modifications

- **Goal:** Present a scenario that supports mobility
  - With no adjustment/modifications
  - Applies **optimizations** for mobile agents.
Mobility Support in PSI

- **Smart Caches (SC):**
  - An Optimization
  - In-network caches

- **Study Assumptions:**
  - **micro-mobility,** where mobility is deteriorated, thus mobile agents are not expected to move to far distant access points
  - Publishers and RVPs: fixed **Vs.** Subscribers: mobile
Mobility Scenario
Smart Cache Selection

SMARTCACHES
Step-by-step Mobility Scenario

Issuing publications, submissions to RVP

1. The publisher (Bob) issues a publication: <Bob_Sid, Bob_Rid, [metadata]>
2. RVP records the publication
3. A Subscriber (Alice) issues a subscription for <Bob_Sid, Bob_Rid>
4. RVP matches publication and subscription based on SID, RID
Step-by-step Mobility Scenario

*Smart cache comes in*

5. **RVP selects a smart cache (SC)**
   - based on topological knowledge
   - Goal: to better facilitate the delivery of data to subscribers thought SC

6. **The RVP records the SC** as both a publisher and a subscriber for Bob_Sid/Bob_Rid

7. **2 Fids used** upon a matching subscription:
   - $Fid(Bob, SC)$
   - $Fid(SC, Alice)$
8. Data sent
   - SC caches data for at least as much time as the time required for Alice to move to another access point AP
Step-by-step Mobility Scenario

Alice moves.. while receiving data

9. Alice sends a new subscription <Bob_Sid, Bob_Rid> from the new position
10. 2 different matching publications in RVP.
   - One corresponding to Bob
   - One corresponding to the SC
   - RVP selects the best suited publisher (anycast), e.g., the closer one to Alice
     • in this case most probably the SC
Smart Cache Selection

1st case: Based on topological knowledge

- RVP forecasting (RVPf)
  - Forecast the next possible positions of mobile agent Alice (micromobility)
  - Possible to even assign a SC before Alice “handovers” to another AP.
    - Data sent via multicast tree to all the SCs.
Smart Cache Selection

2\textsuperscript{nd} case

- The AP detects Alice’s movement
- Sends a control message to RVP
  - Triggers the creation of an new SC, suitable for the prospective new AP for Alice
- initiates the assignment of SC before Alice is detached from the current AP (smooth handover)
- Cost
  - additional control message (small overhead).
  - Yet, it mitigates the load at RVP.
Conclusions

- **Ψ architecture supports mobility in any case**
  - Asynchrony,
  - ID are independent from the current location

- **Optimization for mobility of subscribers**
  - **Without** modifying the PSI architecture

- **By products:**
  - **Smart Cashes SCs** enhance anonymity as intermediates/proxies
  - SCs could also be used for transport layer reliability
  - Acts as a local rendezvous point
    - useful for new coming subscribers who can receive data by anycast immediately

- **SCs feeding other SCs: Multicast trees.**