A demo blog recommendation system for SmartScribo

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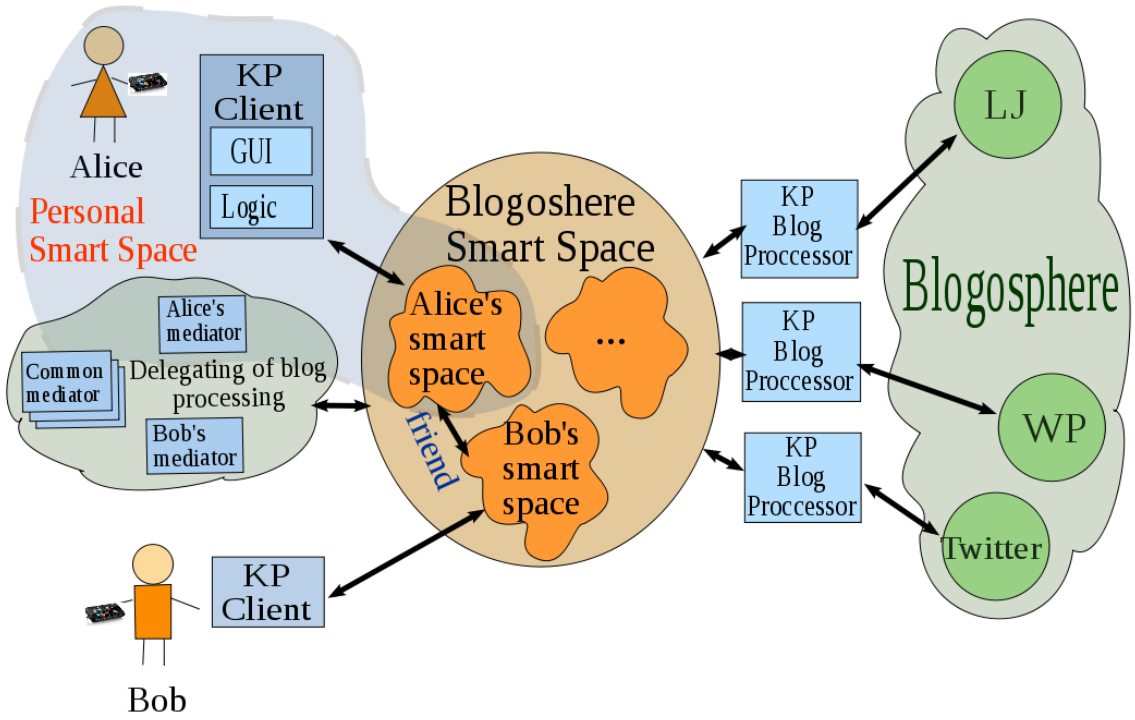
SmartScribo: Smart-M3 Application

- Distributed multi-agent architecture (clients, processors, **mediators**)
- Blogosphere is shared in the smart space
- Interaction with multiple blogs at many blog services
- Proactive blog retrieval, e.g., based on **recommendation**
- Personalization, e.g., user gets recommendation that is interested for him



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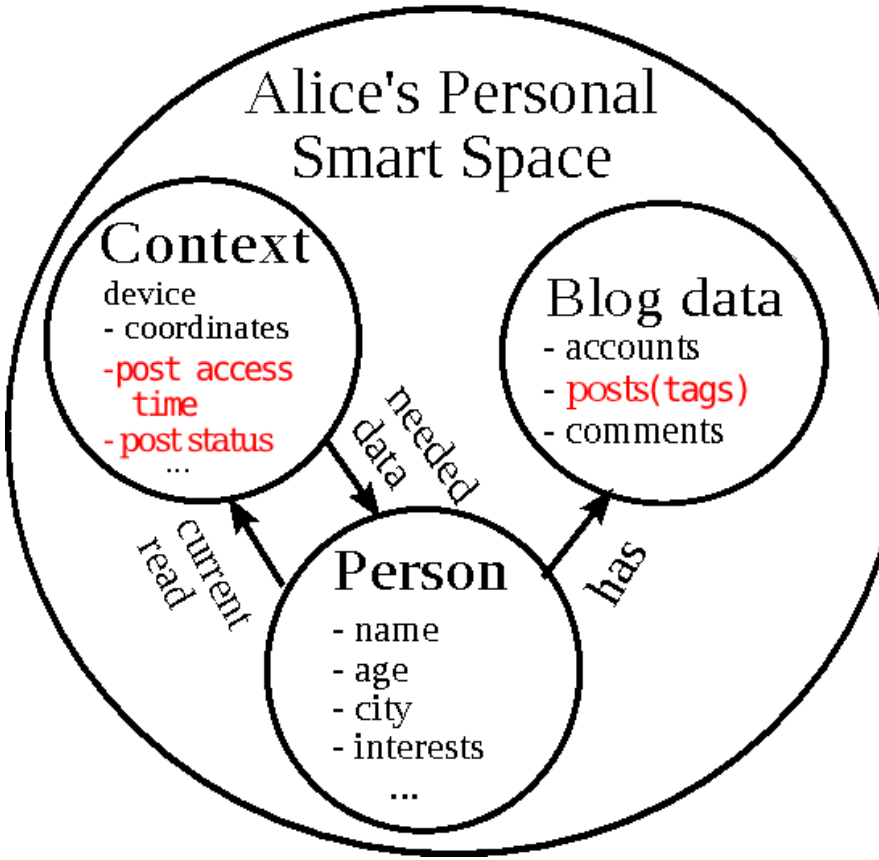
Blogging

- Blog data
  - post starts discussion
  - discussion evolves with commentaries
  - tags describe post semantics
- Blogging context
  - post read&write: post status
  - given post p and user u, T_{pu} is the latest post access time



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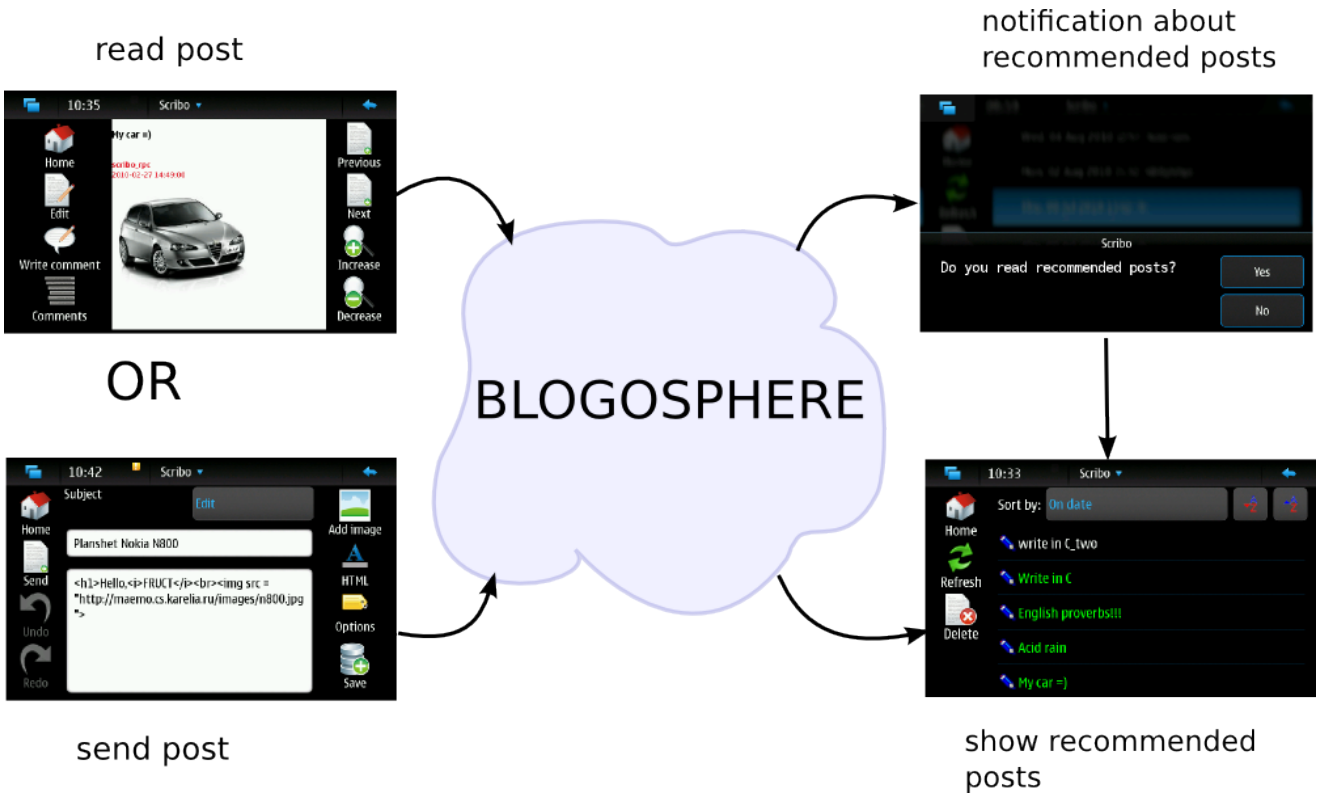
Blog Recommendation Service

Searching personally-interesting discussions in the blogosphere

- personal service
  - track blog activity of user u: reading or sendind post p
  - latest post access time T_{pu}
- proactive service
  - user doesn't make some additional actions



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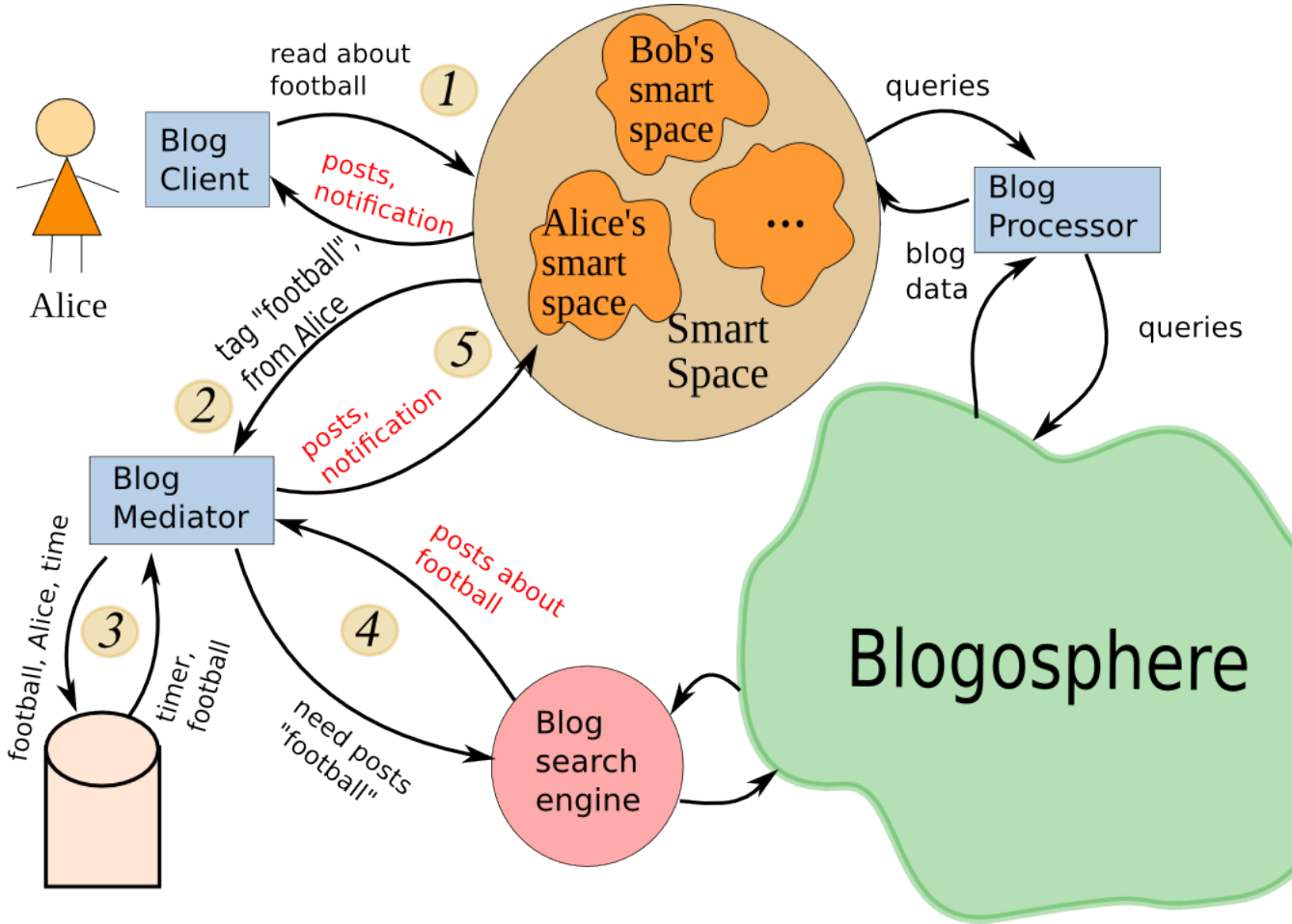
Basic Steps

1. User u activity: post access time and other attributes
2. Tracking post status
3. Tag index $\mathrm{data}(t, u)$ and rank R_{tu}
4. Blog discovery for top-ranked tags
5. Publishing blog recommendation



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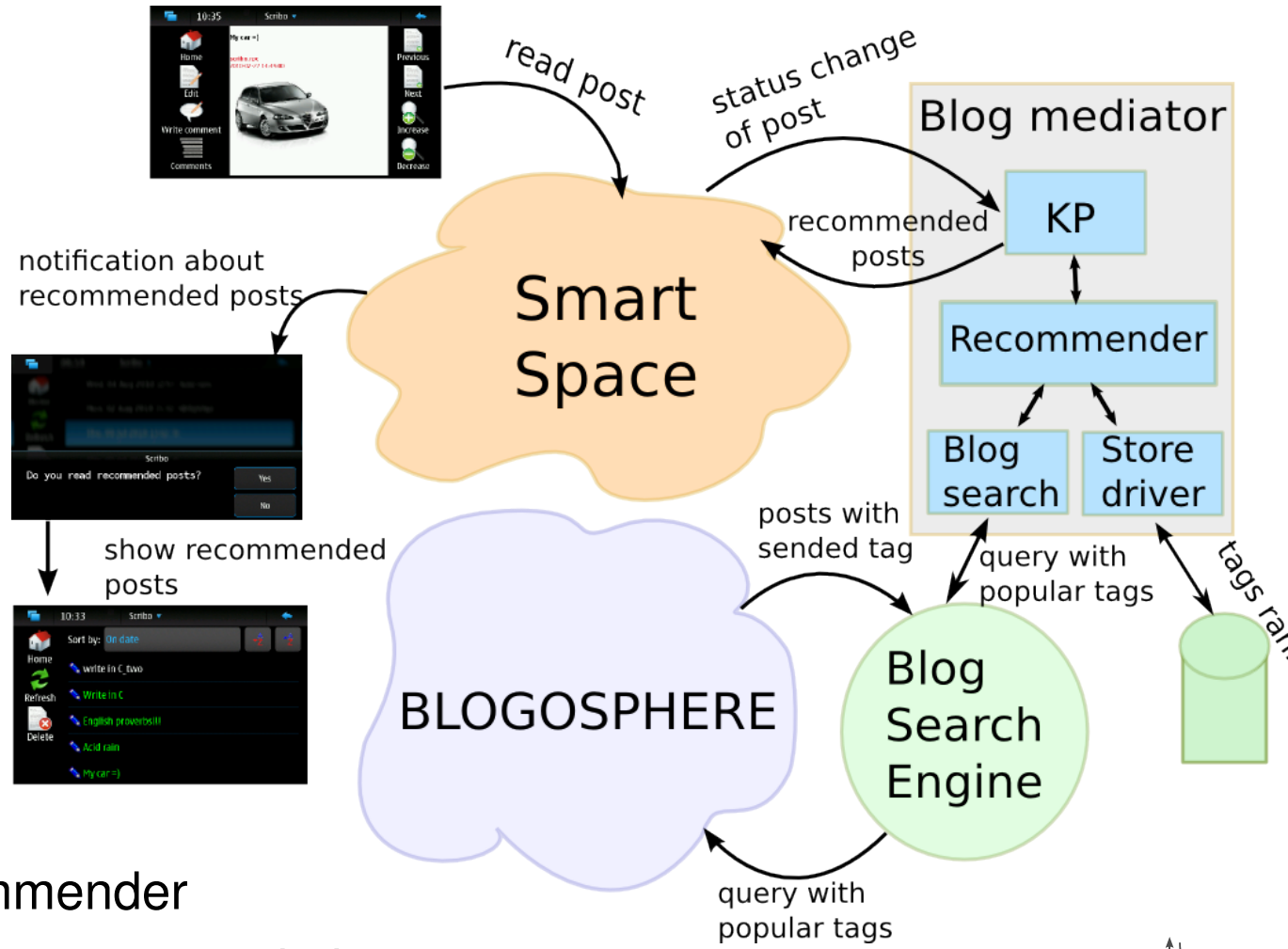
Architectural Design

Blog mediator

- subscribe to post status
- tags indexing and ranking
- query to blog search engine



Blog client

- subscribe to recommender
- proactively receive recommendations
- accept and enjoy

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Simple Model

User u, post p, tag t

$n_p \geq 1$ is the sum number of tags in p

- n_p is a post attribute kept in the blogosphere smart space

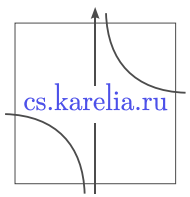
Blog mediator tracks status of p and updates tags index

- δ_t is the time elapsed from the latest update (discrete: 0,1, 2, . . .)

R_{tu} shows importance of blogs with t to u

$$R_{tu} = \begin{cases} R_0/n_p, & \text{if } \delta_t = 0 \text{ (i.e., } t \text{ is new)} \\ (1-\alpha)R_{tu}^{\text{old}} + \dfrac{\alpha * \beta_0}{\delta_t n_p}, & \text{if } \delta_t \geq 1 \end{cases} \quad (1)$$

- $1/n_p$ is topic-focus level of p
- $1/\delta_t$ is freshness of t (tag relevance)
- $0 < \alpha < 1$ is a tradeoff parameter
- R_0 - initial constant, β_0 constant for normalize time



Tag Relevance

Factor $1/\delta_t$ shows access activity for posts with t

The higher δ_t the less interest to u in such posts

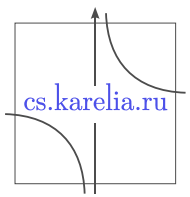
- Individual activity of u

$$\delta_t = \delta_t(u) = T_0 - \max_{t \in q, q \neq p} T_{qu}$$

- Collective activity: group C influences u's decisions

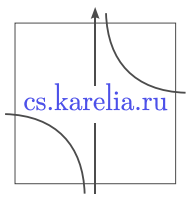
$$\delta_t = \delta_t(C) = T_0 - \max \left\{ \max_{t \in q, q \neq p} T_{qu}, \max_{v \in C \setminus \{u\}} \max_{t \in q} T_{qv} \right\}$$

where T_0 is the current time at blog mediator



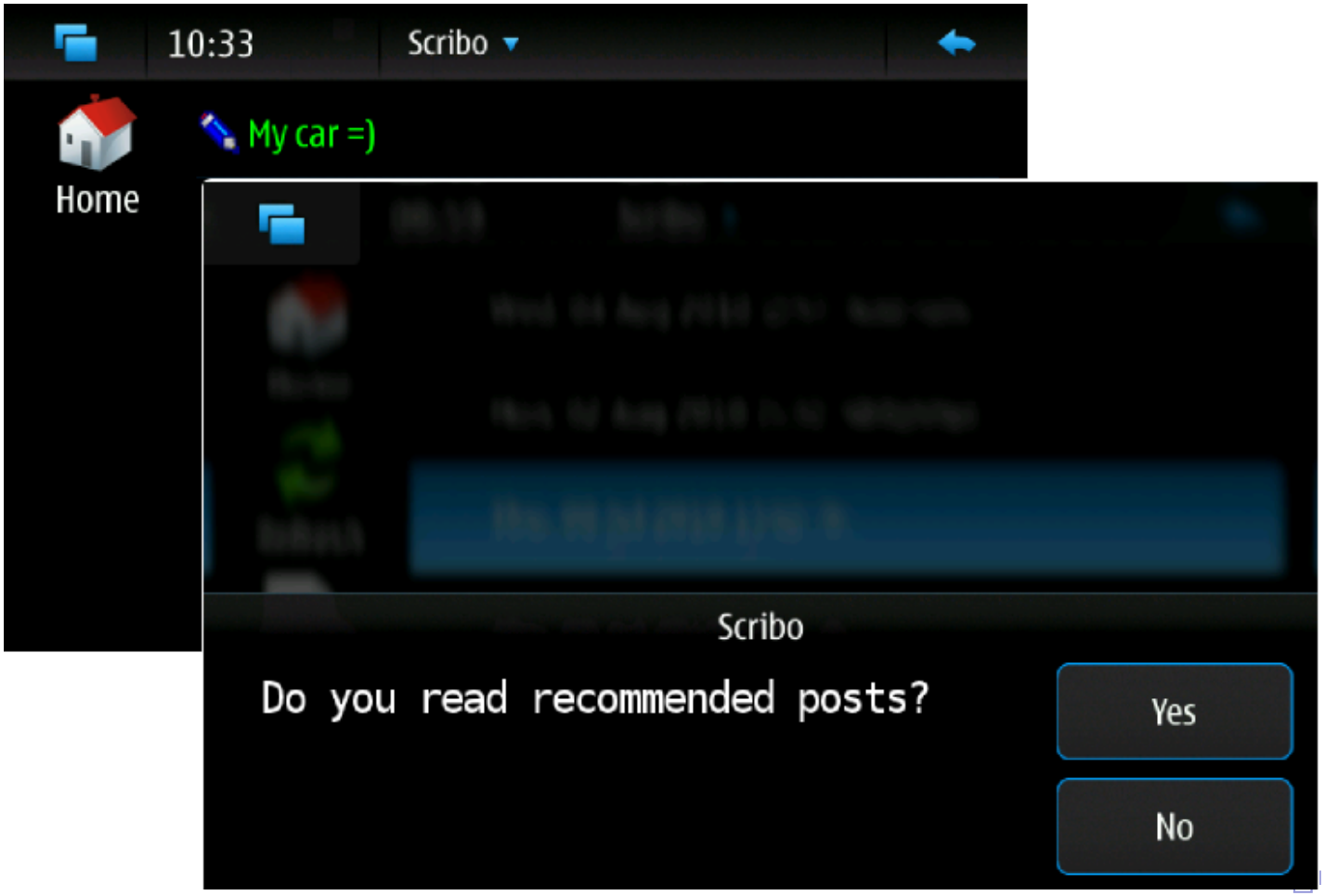
Implementation

- Blog Mediator:
  - 4 modules on python with Smart-M3 Python KP Library
  - sqlite3 as database for ranks
- Test KP Client: console client, python, Smart-M3 Python KP Library
  - console client on python, Smart-M3 Python KP Library
  - file with test scenario
- Blog Client:
  - blog client on maemo5 platform,
  - implementation on PyQt, Smart-M3 Python KP Library

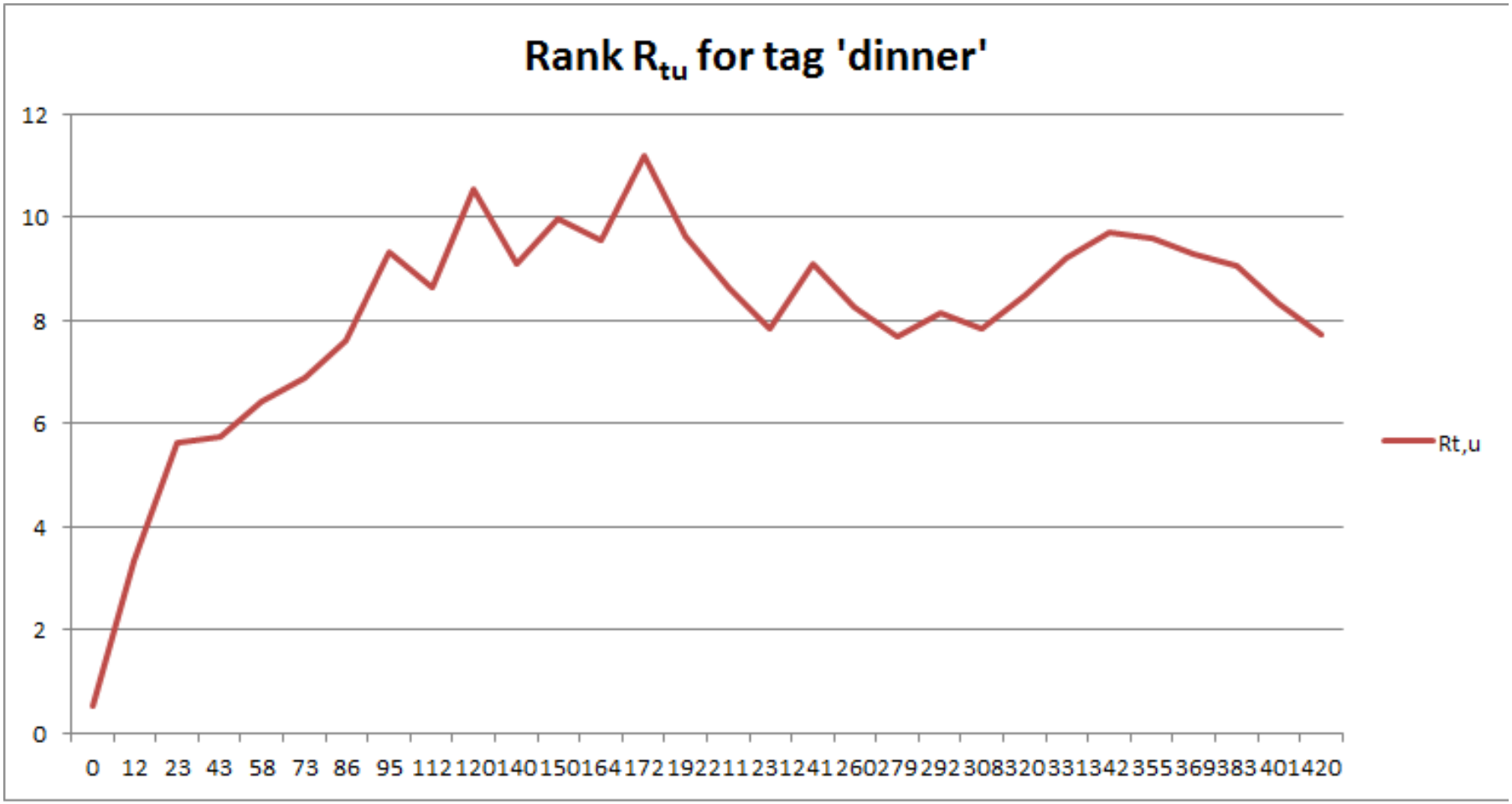


Test scenarios

- with 100% interest in topic
- with constant interest
- with variable interest



Running tests: 100% interest



- 30 reading posts with tag ’dinner’

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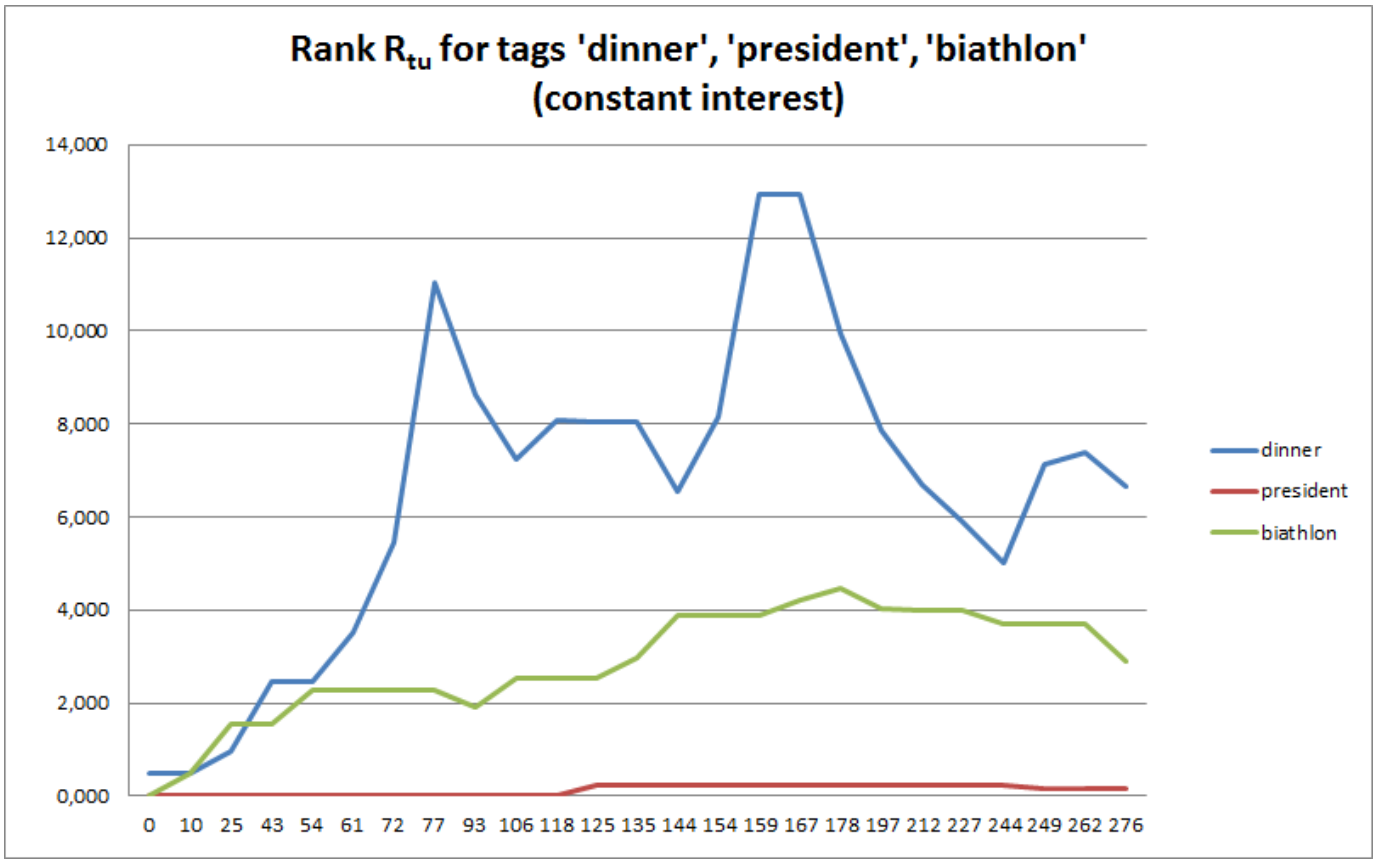
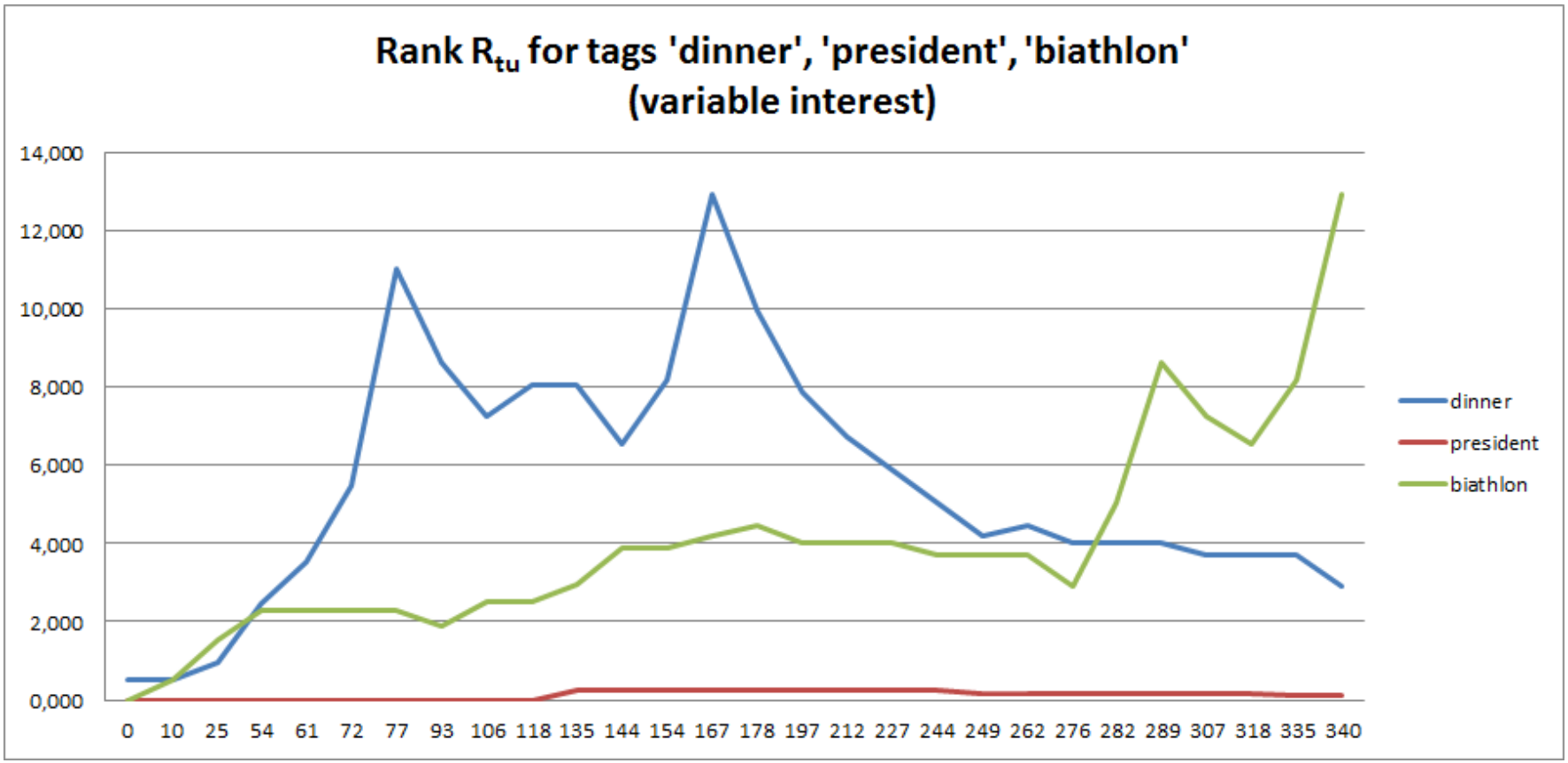
Running tests: constant interest



- 20 reading posts with tag ’dinner’, ’president’,’biathlon’
- ’dinner’ was about 65% cases, ’president’ - 10%, ’biathlon’ - 25%
- recommendation is post with tag ’dinner’

Running tests: variable interest



- first 20 posts: ’dinner’ was about 65% cases, ’president’ - 10%, ’biathlon’ - 25%
- next 10 posts: ’dinner’ was about 25% cases, ’president’ - 10%, ’biathlon’ - 65%
- recommendation is post with tag ’biathlon’

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Proactive and personalized retrieval of blogs can be implemented on the Smart-M3 platform in computationally effective manner. Although the ranking model is simple, the approach allows discovering relevant blogs

- SmartScribo project wiki (in Russian)
  `http://oss.fruct.org/wiki/SmartScribo`
- Open source
  `http://gitorious.org/smart-scribo/smart-scribo`
- Mailing list
  `smart-scribo@cs.karelia.ru`

Q&A