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Privacy-by-design in Federated Social Web Applications

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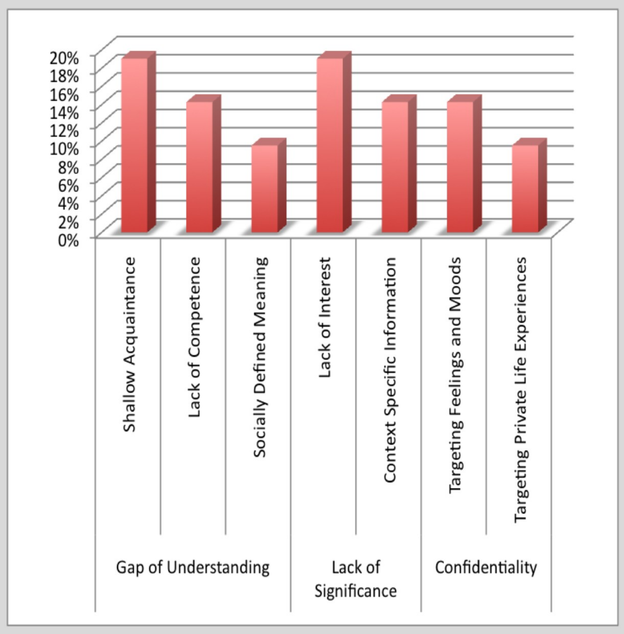
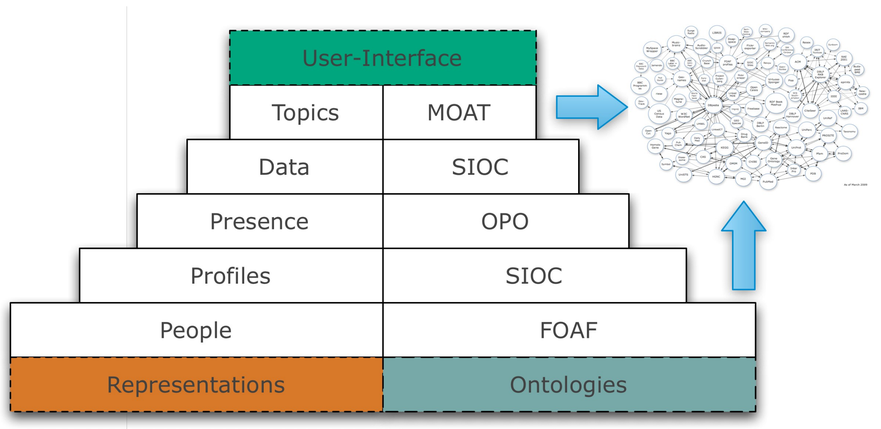
What's wrong with microblogging platforms ?

- Close-world architecture
- Lack of machine-readable meta-data
- Lack of semantics **in** microblog posts
- Information overload



Ontologies for microblogging

SMOB relies on and extends popular ontologies, providing an ontology stack for microblogging, and more widely for any Social Semantic Web application. It also focuses on integrating microblog posts into the Linking Open Data cloud.

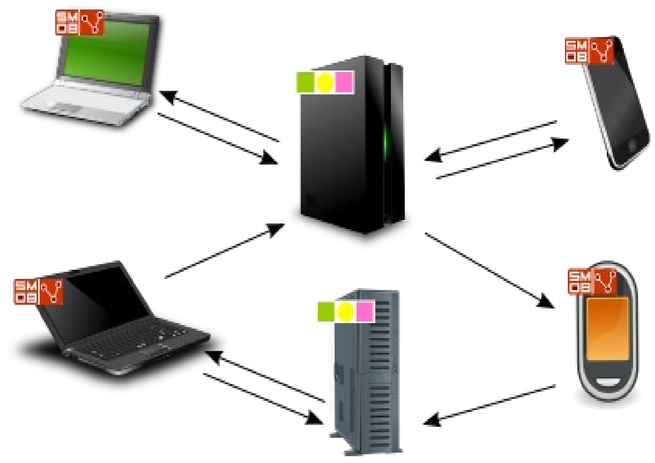


Microblog posts are modelled with this stack, and made available in RDFa for further reuse by Semantic Web enabled software agents.

Decentralized real-time architecture

SMOB hubs are spread on the Web, owned and managed by users.

Hubs publish messages and/or subscribe to other hub feeds using PubSubHubBub (PuSH), an open server-to-server (publish/subscribe) pubsub protocol.



In addition, SMOB can also run on mobile or laptops thanks to Web Socekts.

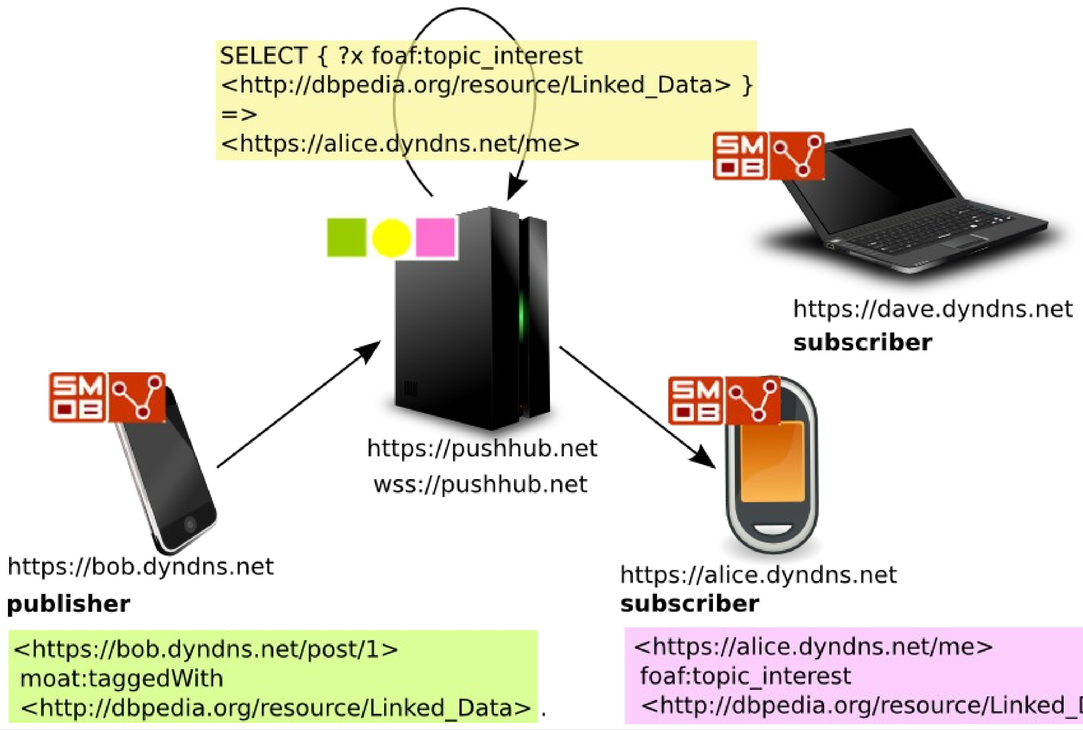
Semantic broadcasting

The SPARQL 1.1 Update queries are encoded in the RSS feeds

```
<item rdf:about="http://example.org/post/2011-04-27T14:26:46+02:00">
  <title>publisher112</title>
  <link>http://example.org/post/2011-04-27T14:26:46+02:00</link>
  <description>publisher112</description>
  <dc:date>2011-04-27T14:26:46+02:00</dc:date>
  <content:encoded><![CDATA[
    <http://example.org/> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type> <http://smob.me/ns#Hub> .
    <http://sws.geonames.org/2964180/>  <http://www.w3.org/2000/01/rdf-schema#label> "Galwaycity, Ireland (seat of a se
administrative division)"^^<http://www.w3.org/2001/XMLSchema#string> .
    <http://example.org/post/2011-04-27T14:26:46+02:00> <http://www.w3.org/1999/02/22-rdf-syntax-ns#type>
<http://rdfs.org/sioc/types#MicroblogPost> .
    <http://example.org/post/2011-04-27T14:26:46+02:00> <http://rdfs.org/sioc/ns#has_container> <http://example.org/> .
    <http://example.org/post/2011-04-27T14:26:46+02:00> <http://rdfs.org/sioc/ns#has_creator> <http://example.org/me> .
    <http://example.org/post/2011-04-27T14:26:46+02:00> <http://xmlns.com/foaf/0.1/maker> <http://example.org/me#id> .
    <http://example.org/post/2011-04-27T14:26:46+02:00> <http://purl.org/dc/terms/created> "2011-04-
27T14:26:46+02:00"^^<http://www.w3.org/2001/XMLSchema#dateTime> .
    <http://example.org/post/2011-04-27T14:26:46+02:00> <http://purl.org/dc/terms/title> "Update-2011-04-
27T14:26:46+02:00"^^<http://www.w3.org/2001/XMLSchema#string> .
    <http://example.org/post/2011-04-27T14:26:46+02:00> <http://rdfs.org/sioc/ns#content>
"publisher112"^^<http://www.w3.org/2001/XMLSchema#string>
```

The WebID protocol and the Privacy Preference Ontology (PPO) allow authentication and access control.

Publishers can decide which subscribers are allowed to access the posts.



The Privacy Challenge

We are currently working on privacy-aware SMOB + PuSH architecture. Our aim is to integrate WebID in PuSH and to implement a privacy preference system within the hubbub that forwards messages to relevant subscribers.

The publisher uses the light weight vocabulary PPO to define his/her privacy preferences.

The following example shows how a publisher, using PPO, can restrict a microblog post to users that are interested in the same concept used to tag the post.

```
 <http://www.example.org/pp3> a ppo:PrivacyPreference;
ppo:appliesToResource <http://smob.me/user/xyz/post1>;
ppo:assignAccess acl:Read
ppo:hasCondition [
ppo:hasProperty tag:Tag;
ppo:resourceAsObject
     <http://dbpedia.org/resource/Linked_Data> ];
ppo:hasAccessSpace [
ppo:hasAccessQuery
"ASK {
?x foaf:topic_interest
<http://dbpedia.org/resource/Linked_Data> }"
].
```

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