

Semantic Web Approach to Personal Information Management on Mobile Devices

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About the Semantic Web

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no, too narrow

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- the Semantic Web is a vision of the future of Personal Computing
[Berners-Lee, Hendler & Lassila 2001]

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- ~~• the Semantic Web is a vision of the next generation of the WWW~~
- the Semantic Web is a vision of the future of Personal Computing [Berners-Lee, Hendler & Lassila 2001]
- as such, it is very much centered around
 - Personal Information Management (PIM)
 - social relations
- subtext: transition from tools to systems working on our behalf
 - we have had tools for thousands of years, very little has changed so far...

Interesting Characteristics of the Semantic Web

- uniformity of data
 - simplifies information interchange
 - may simplify application development
 - note: uniform metamodel, data itself does not need to be uniform
- future-proofing
 - (because there will always be things you did not anticipate...)
- data integration
 - easier, when data carries its semantics (some things can be automated)
 - reasoning is important
 - provenance tracking is possible

Challenges in Adopting Semantic Web Technologies

- cultural resistance
 - religious beliefs, similarity to the “AI Winter”
 - “Semantic Web is a technology for problems yet to be articulated” (and no, I am not kidding...)
- lack of business models
 - Semantic Web is an interoperability technology, hard to put a price tag on (or to generate direct revenue from)
- difficult programming models
 - if you are using RDF data as a graph data structure, why bother?
 - reasoning is important (yet mostly unfamiliar to developers)
 - my solution: hide the reasoner

Interesting Characteristics of Mobile Computing

- always with you, always “on”, always connected
 - the true Personal Computer
 - trusted device
- location-awareness
 - if the device already knows where you are, you don’t need to tell it
- context-awareness
 - modern mobile devices come with many mechanisms for deriving context
- we think of mobile devices as being limited (in comparison to PCs)
 - small screen, awkward keyboard, etc.
 - true limitations are a result of usage situations (“attention-constrained”)

Changing Nature of Personal Information Management

- traditional PIM:
 - small number of schemata (contacts, calendar, etc.)
 - most – if not all – data created by the user
- “new” PIM:
 - lots of different types of data
 - most data created by other parties
 - social connection

Use Cases

- Prototypes of systems exploiting Semantic Web from NRC Cambridge
 - OINK – generic browsing-style access to data
 - Jourknow – effortless note-taking
 - Virpi – virtual personal assistant with speech/dialogue UI

Use Cases – “OINK”

- OINK is a generic data browser and a platform for SW applications
 - type-driven customization of presentation
 - makes use of data schemata (and reasoning) in determining how to render
 - “best-effort” rendering of unknown & unanticipated data
- built on the Wilbur infrastructure (PCs, Nokia tablets, Nokia S60 phones)
 - graph storage, query engine, reasoner
 - (also used by the Sedvice system you heard about in Dr. Oliver’s talk yesterday)

file:///Users/ora/Pictures/Lassila photos/aircraft/archive/1997/19970621-02/19970621+020010A.jpg

file:///Users/ora/Pictures/Lassila photos/...hive/1997/19970621-02/19970621+020010A.jpg

Identified as: file:///Users/ora/Pictures/Lassila photos/aircraft/archive/1997/19970621-02/19970621+020010A.jpg Load

Properties

type → IFD (exif:IFD)
operator → US Navy

type → Image (foaf:Image)
type → http://xmins.com/wordnet/1.6/Document
thumbnail → file:///Users/ora/dev/projects/infoman-misc/photo/thumbs/19970621+020010A.jpg

type → Resource (rdfs:Resource)
Subject → McDonnell Douglas F/A-18 Hornet
Country → USA
Province/State → MA
City → Bedford
Location → Hanscom Field
Rights → Copyright © 1997, 2007 Ora Lassila. All Rights Reserved.
Creator → Ora Lassila
Date Created → 1997-06-21 (xsd:date)
roll → file:///Users/ora/Pictures/Lassila photos/aircraft/archive/1997/19970621-02/

Query

OINK
NOKIA

John Smith
birthday
June 19 1970
participating in
SwapMe Teleconf
knows
Alexander Ran
knows
Tim Finin
Options

Tim Finin
name
Tim Finin
family_name
Finin
Given name
Tim
Company
UMBC
Options Exit

NOKIA
Connecting People

RDF++ – extending RDF

- working with social networks revealed some interesting shortcomings
- identity in RDF is heavily reliant on URIs

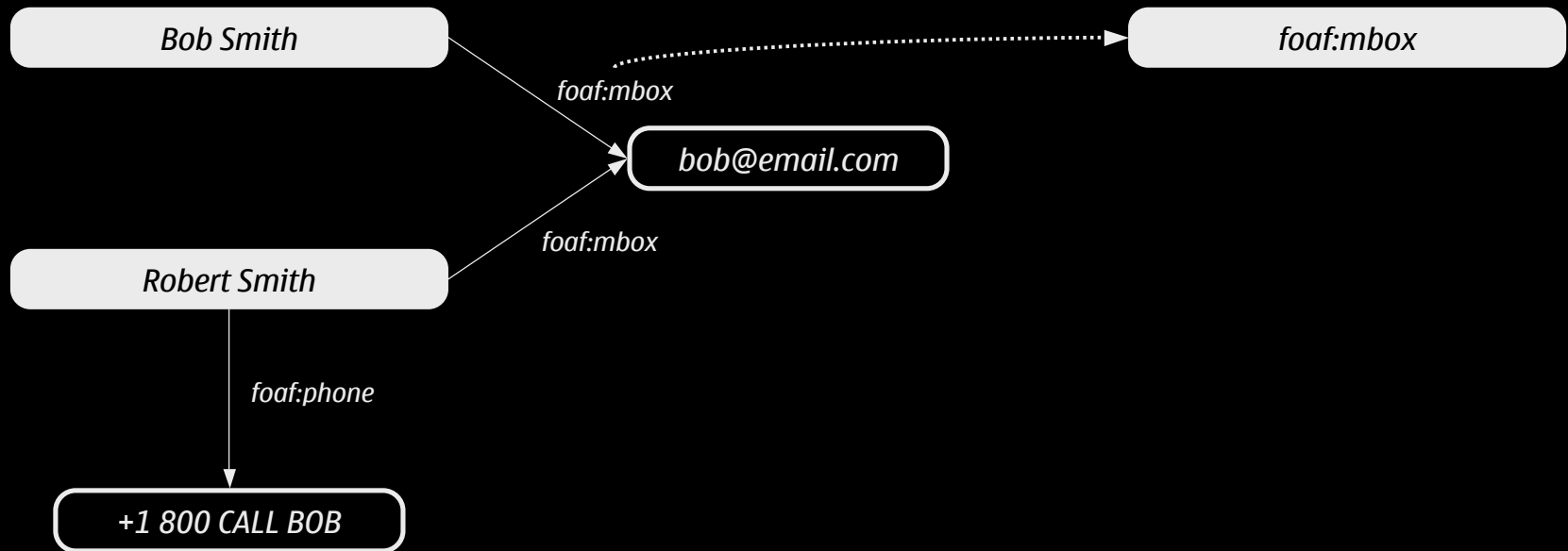
RDF++ – extending RDF

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- RDF++ borrows owl:InverseFunctionalProperty



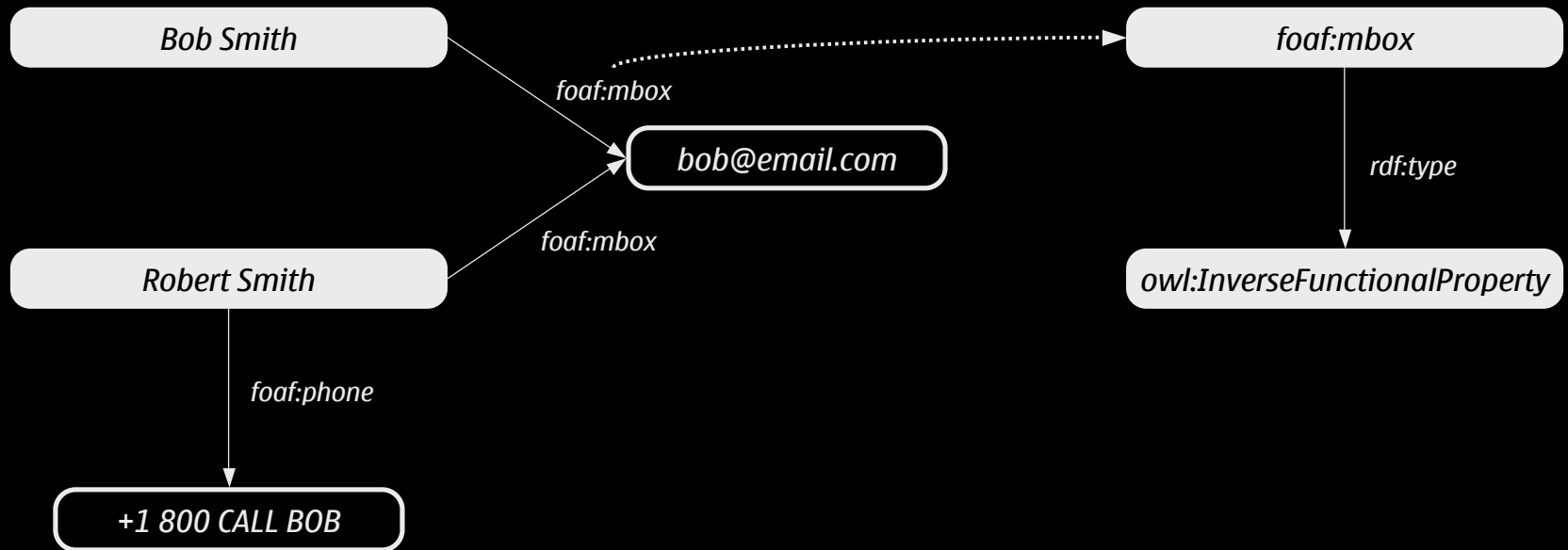
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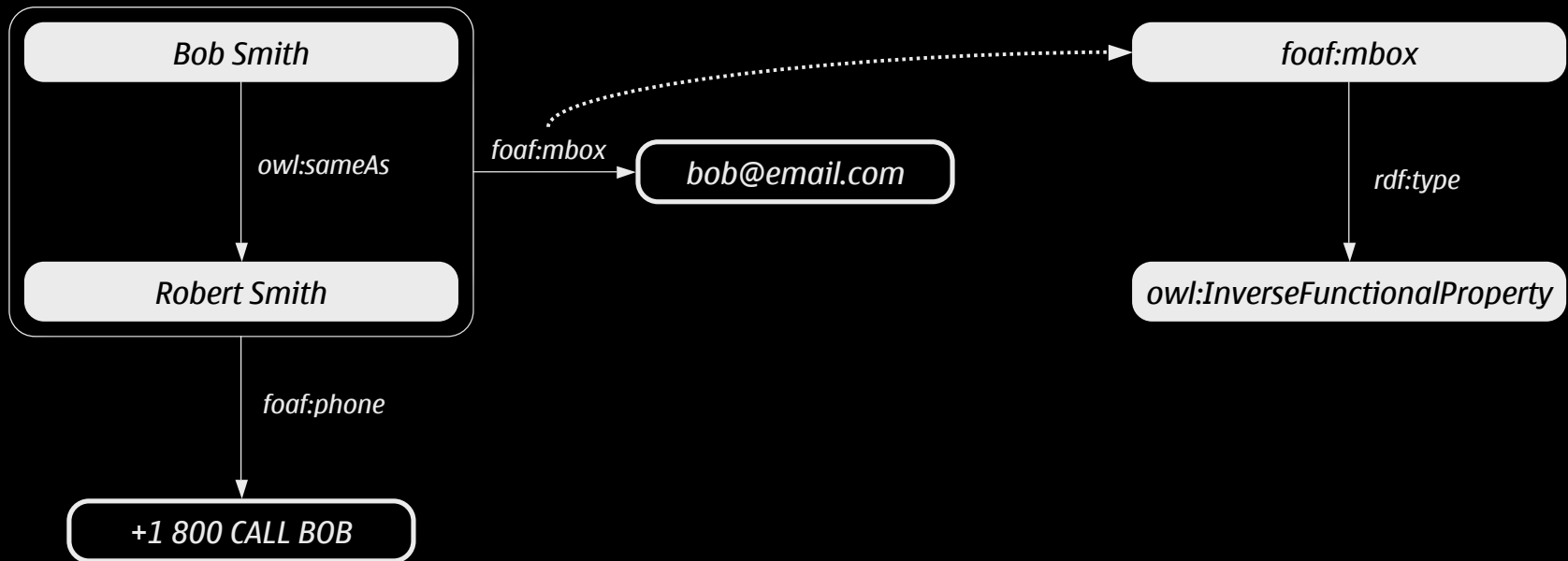
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Use cases – “OINK”



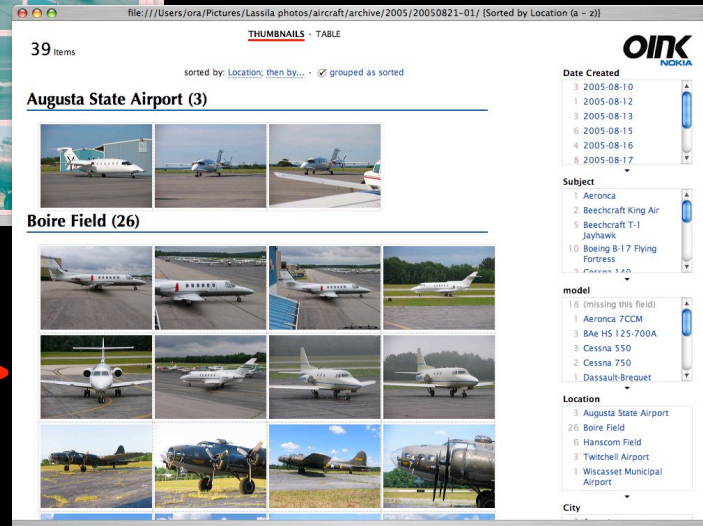
Customized interface for photo browsing

Use cases – “OINK”



Customized interface for photo browsing

Automatically generated faceted search tool



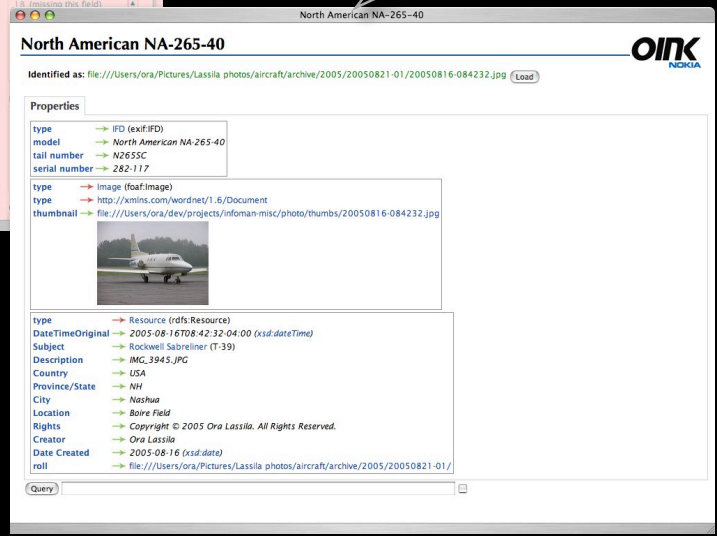
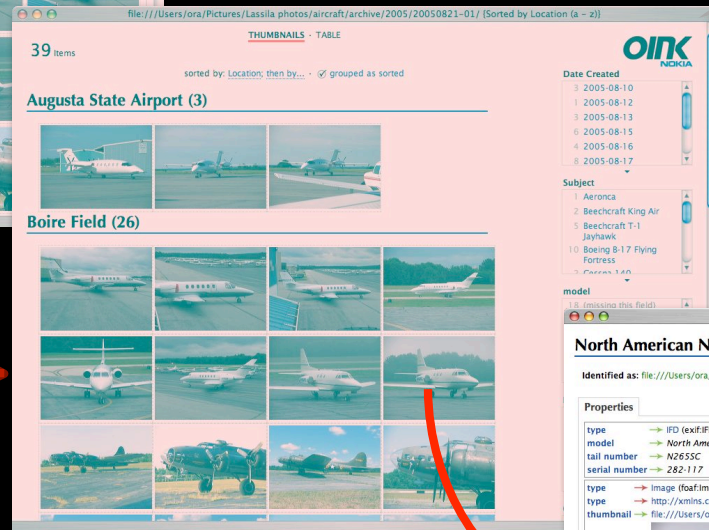
Use cases – “OINK”



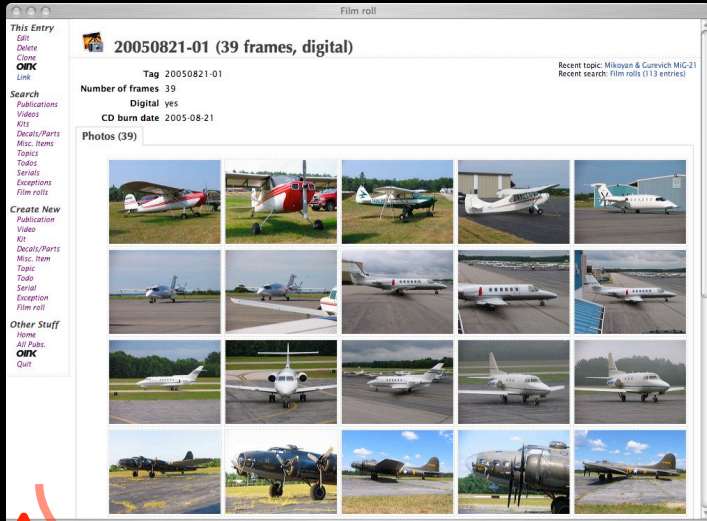
Customized interface for photo browsing

Automatically generated faceted search tool

Automatically generated metadata view



Use cases – “OINK”



Customized interface for photo browsing

Automatically generated faceted search tool

Automatically generated metadata view



Automatically generated query from browsing history

Use Cases – “Jourknow”

- tool for effortless note-taking
 - inspired by our user study on how people take notes and manage information
 - “lightweight” interpretation of user’s notes → structured data (RDF)
- relies on our context-capture infrastructure
 - contextual “cues” (also RDF data) are associated with every note
 - make it easier to find notes afterwards
- versions for PCs, Nokia tablets, Nokia S60 phones

Use Cases – “Virpi”

- speech and dialog based user interfaces
 - dialog behavior based on a rich data model
- mitigation of the “attention-constrained” situations
- ultimate goal: speech access to unlimited domains
 - challenge: currently, speech solutions are carefully crafted and fine-tuned for specific application and data domains
 - we need “best effort” rendering of data in speech also

What's Missing...?

- we need fine-grained control over data ⇒ “policy-awareness”
- our relations to other people often “define” us, but software applications typically do not make use of these relations ⇒ social awareness
- our observation: policy-awareness is heavily reliant on social awareness
 - typical policies are written in a “social vocabulary”

What Is Our Ultimate Goal?

- (not technology...)
- perhaps we just want to simplify our lives

Questions?

- <mailto:ora.lassila@nokia.com>

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