They call us crazy, but we store Contacts in Tracker

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What is this about?

- **QtContacts** – easy to use, cross-platform address book API, Nokia uses it on Symbian and Harmattan

- **Tracker** – GNOME's version of a RDF tuple store

  “Semantic Desktop”
Traditional Desktop

Lots of interesting and useful information spread over many detached data sources.
Not accessible.
Miners and Harvesters

Aggregation: Many independent data stores. Harvesters monitor them and update an additional database.
Miners and Harvesters

Positive
- no changes to existing applications

Negative
- waste of CPU cycles, I/O cycles, and memory
- code duplication, unreliable miners
- latency and other synchronization issues
- only few applications actually use the collected data

Perception
“Beagle, Tracker, Zeitgeist, … are useless bloat”
Semantic Desktop

How about applications putting (relevant) information into one semantic data store?
Semantic Desktop

**Negative**
- applications must be changed

**Positive**
- lower resource usage
- less code duplication, perfect meta data
- minimal latency, no synchronization issues
- perfectly integrated applications

**Perception**
“This is awesome” - hopefully
RDF, Sparql

- Well defined, interoperable standards.
- It is science! Very smart people research it!
- Countless papers about properties, limitations, algorithms.

vs.

random, ad-hoc, NIH solution
RDF Data Model

subject predicate object.

e.g. <nco:default-contact-me> a nco:PersonContact

- resources identified by IRI
- classes organized in ontologies
- predicates and ranges defined by classes
- multi inheritance
RDF Contacts

- NEPOMUK ontology (with a few “bug fixes”)

<urn:uuid:1234...> a nco:PersonContact ;
    nco:nameGiven "Hans" ;
    nco:nameFamily "Zwergl" ;
    nco:hasAffiliation <urn:uuid:50da...> ;

<urn:uuid:50da...> a nco:Affiliation ; rdfs:label "Home" ;
    nco:hasPhoneNumber <urn:x-maemo-phone:...> .

<urn:x-maemo-phone:...> a nco:CellPhoneNumber ;
    nco:phoneNumber "+49-172-55443322" ;
    maemo:localPhoneNumber "55443322" .
Sparql Queries

- SPARQL Algebra – quite similar to relational algebra
  - projections, restrictions, filters

```
SELECT  
  ?contact nco:phoneNumber(?tel)

WHERE {
  ?contact a nco:PersonContact .
  ?contact nco:hasAffiliation [ nco:hasPhoneNumber ?tel ] .

  FILTER(fn:ends-with(maemo:localPhoneNumber(?tel), "334455")) .
}
```
Sparql Updates

- INSERT and DELETE, no update statement (well, tracker has INSERT OR REPLACE)

DELETE {
    ?contact nco:hasAffiliation ?affiliation
} WHERE {
    ?affiliation rdfs:label "Work"
}

INSERT {
    _:contact a nco:PersonContact ;
    nco:birthDate "1990-01-01"^^xsd:date ;
    nco:fullname "Example Contact" .
}
QtContacts API

- make the common use cases trivial, no point in learning SPARQL for them

- based on careful evaluation of libebook
- asynchronous and synchronous API, notifications
- contact manager and action plugins
- contacts organized as collection of details
- details described by POD classes and schema
- detail linking to mark (e.g. origin of presence or avatars)
- trivial to add new details and detail actions
  - contact filters, fetch hints
  - partial contact saving
  - contact relationships
Presence

- nco:hasIMAddress, nco:imPresence, nco:imCapability, …
- contactsd plugin mirrors presence status from Telepathy to tracker

Advantages
- we can have queries on presence status
- no additional step to apply presence status to contacts
  - applications only wake up from contact changes, not on each Telepathy change

Problems
- with direct tracker access we lost transient property support, presence data is written do disk – very bad!
Merging, Unmerging

```
INSERT {
    _:contact a nco:PersonContact .

    GRAPH <first-origin> {
        _:contact nco:hasEmailAddress <...> .
        _:contact nco:hasPostalAddress <...> .
    }

    GRAPH <second-origin> {
        _:contact nco:hasIMAddress <...> .
    }
}

SELECT ?g ?p ?v {
    GRAPH ?g { <contact> ?p ?v }
}
```
Phone number IRIs

**Wanted**
- content based IRIs for fast lookup, to avoid duplications

**Problem**
- on sync different variants of same contact with varying quality
- can't just store the “best” variant, since the origin might not support all details and such → sync, resync problems
- a data store shall store what you throw at it and not be too smart

```
urn:x-maemo-phone:voice,cell:+49-172-55443322
```
Scalar Selects

```
SELECT ... WHERE { ... OPTIONAL {
   ?contact nco:hasPostalAddress ...
} }

→ left join in sqlite, horrible performance

SELECT ?contact
   (SELECT fn:concat(nco:streetAddress(?a), '\x1f', nco:postalCode(?a), ...)
   b ?contact nco:hasPostalAddress ...)
WHERE {
}

→ scalar select in sqlite, awesome performance
```
Garbage Collection

- when updating or deleting contacts resource links get removed for performance, mainly nco:hasAffiliation
- leaves abandoned resources, wastes disk space, pollutes indexes, degrades performance

garbage collection plugin in contactsd:
- register a named GC query and increase its weight with each update
- upon weight threshold or timeout (often expensive) GC query is run
Links

https://gitorious.org/qtcontacts-tracker
https://gitorious.org/cubi

https://maemo.gitorious.org/maemo-af/qsparql
http://doc.qt.nokia.com/qtmobility-1.2/contacts.html

http://www.w3.org/RDF/
http://www.w3.org/TR/sparql11-query/
http://www.w3.org/TR/sparql11-update/

http://developer.gnome.org/ontology/unstable/