They call us crazy, but we store Contacts in Tracker

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Desktop summit

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”

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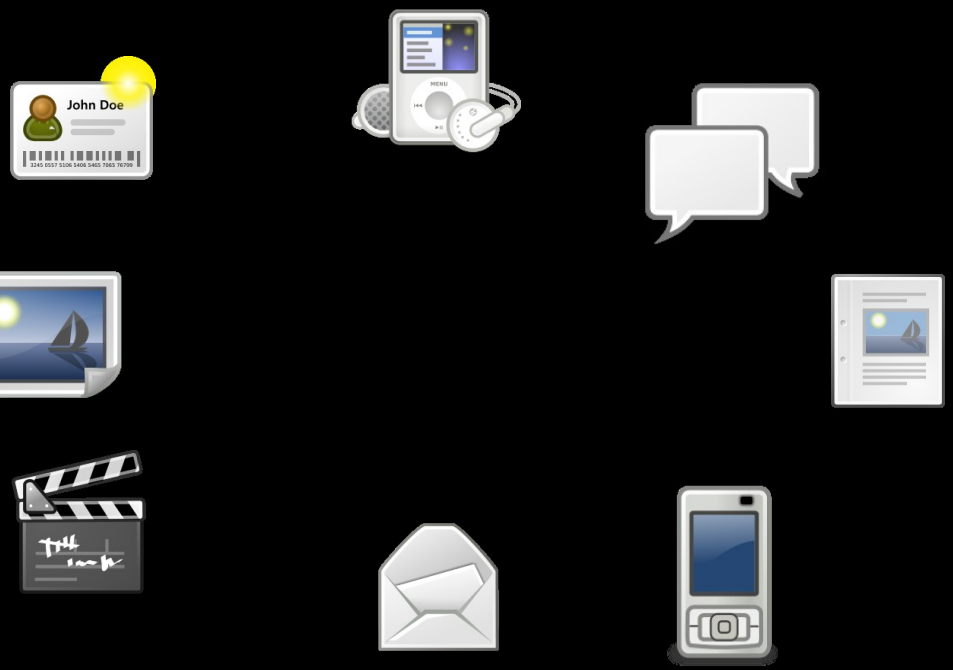
Traditional Desktop

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



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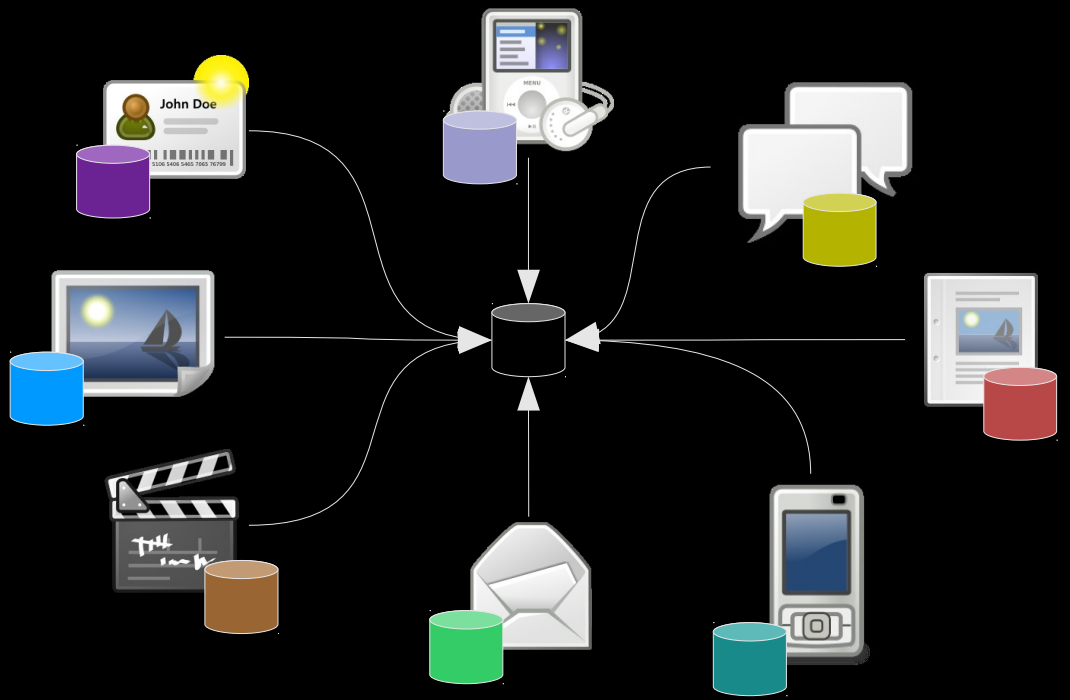
Miners and Harvesters

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



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Miners and Harvesters

Positive

- no changes to existing applications

Negative

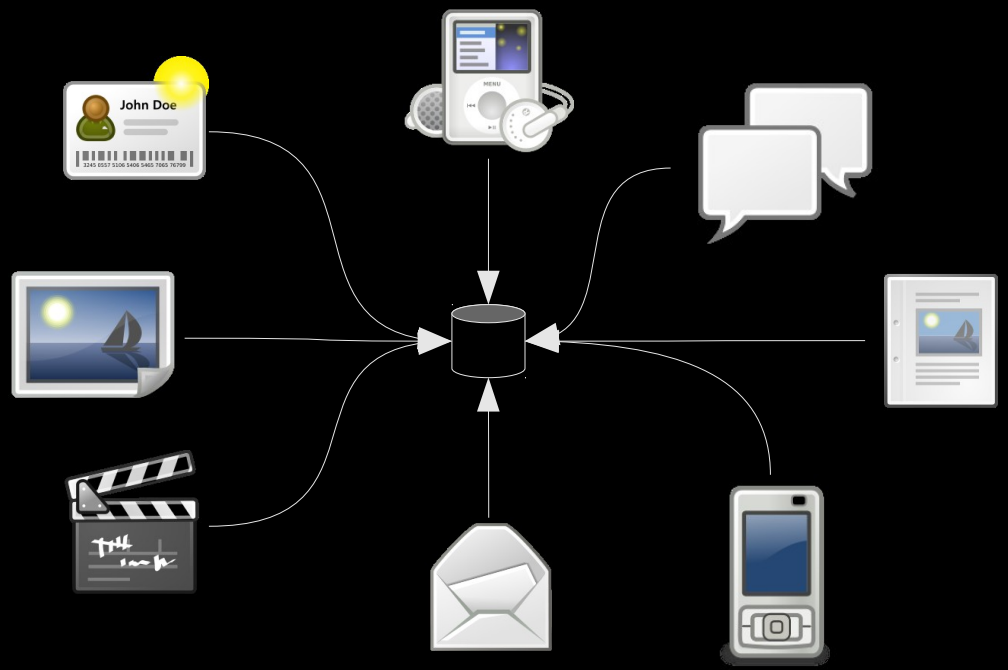
- waste of CPU cycles, I/O cycles, and memory
- code duplication, unreliable miners
- latency and other synchronization issues
- only few applications actually use the collected data

Perception

“Beagle, Tracker, Zeitgeist, … are useless bloat”

Semantic Desktop

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



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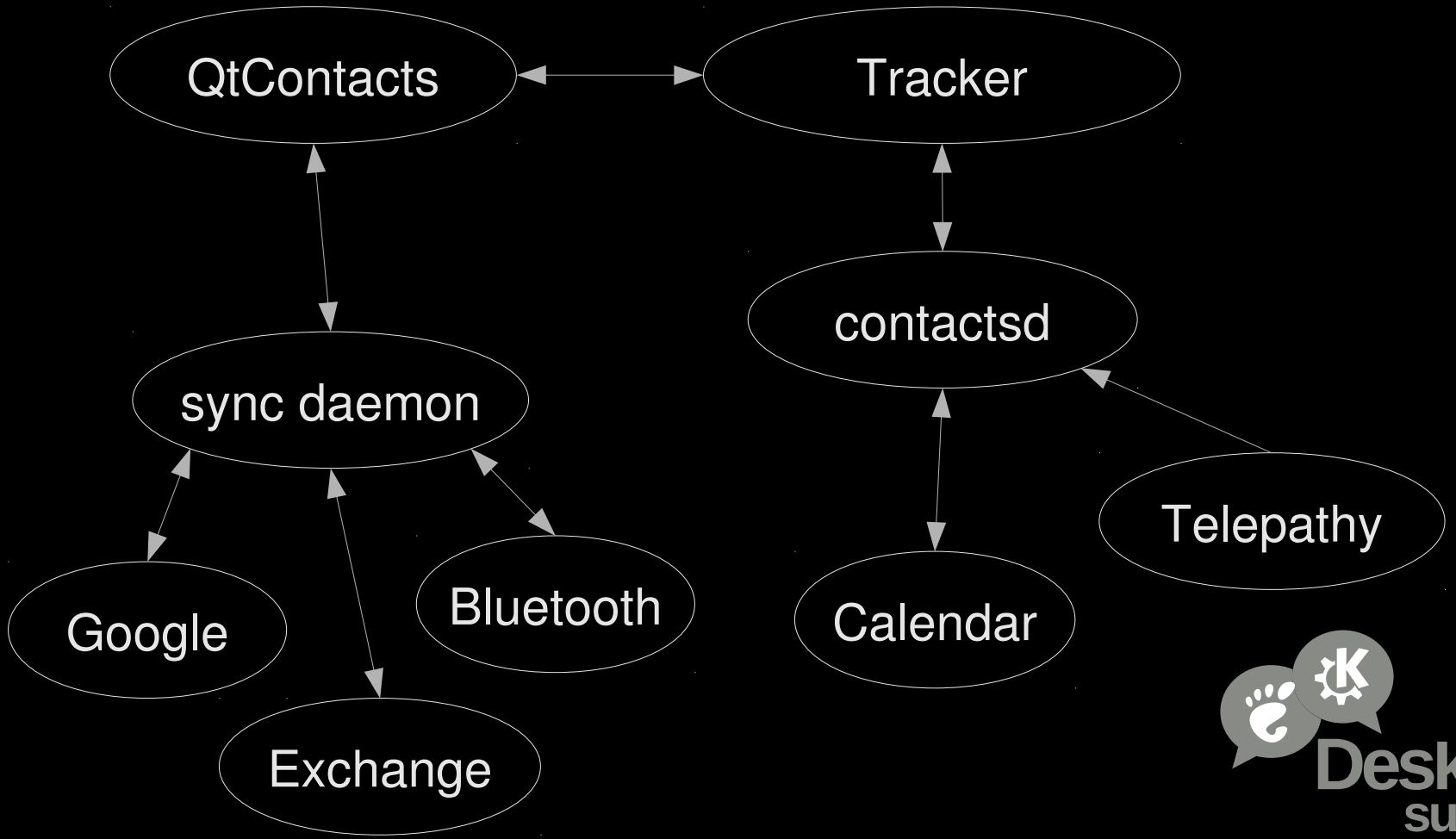
Semantic Desktop

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


QtContacts
Tracker
contactsd
sync daemon
Telepathy
Google
Bluetooth
Calendar
Exchange
Desktop
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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...> ;
    nco:websiteUrl <http://zwer.gl/> .

<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/