A REST API for the groupware Kolab with support for different Media Types

Bachelor Thesis

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Kolab

media types

interactions

implementation

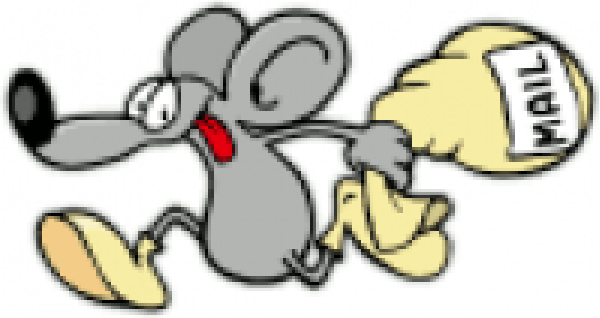
problems, findings, future work

Kolab

- started 2002
- free MS Exchange replacement for German BSI
- contacts, calendar, notes, tasks, journals
- IMAP server as storage and synchronization protocol

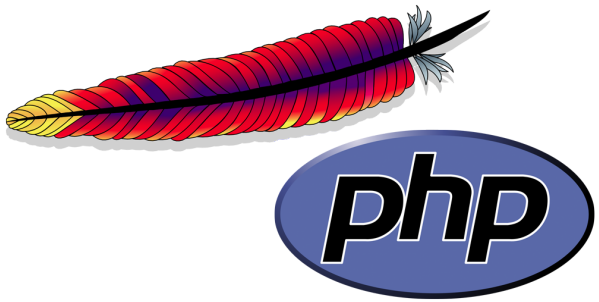
Kolab architecture

SMTP



POSTFIX

Web Interface



Apache+PHP mit
Horde/Roundcube

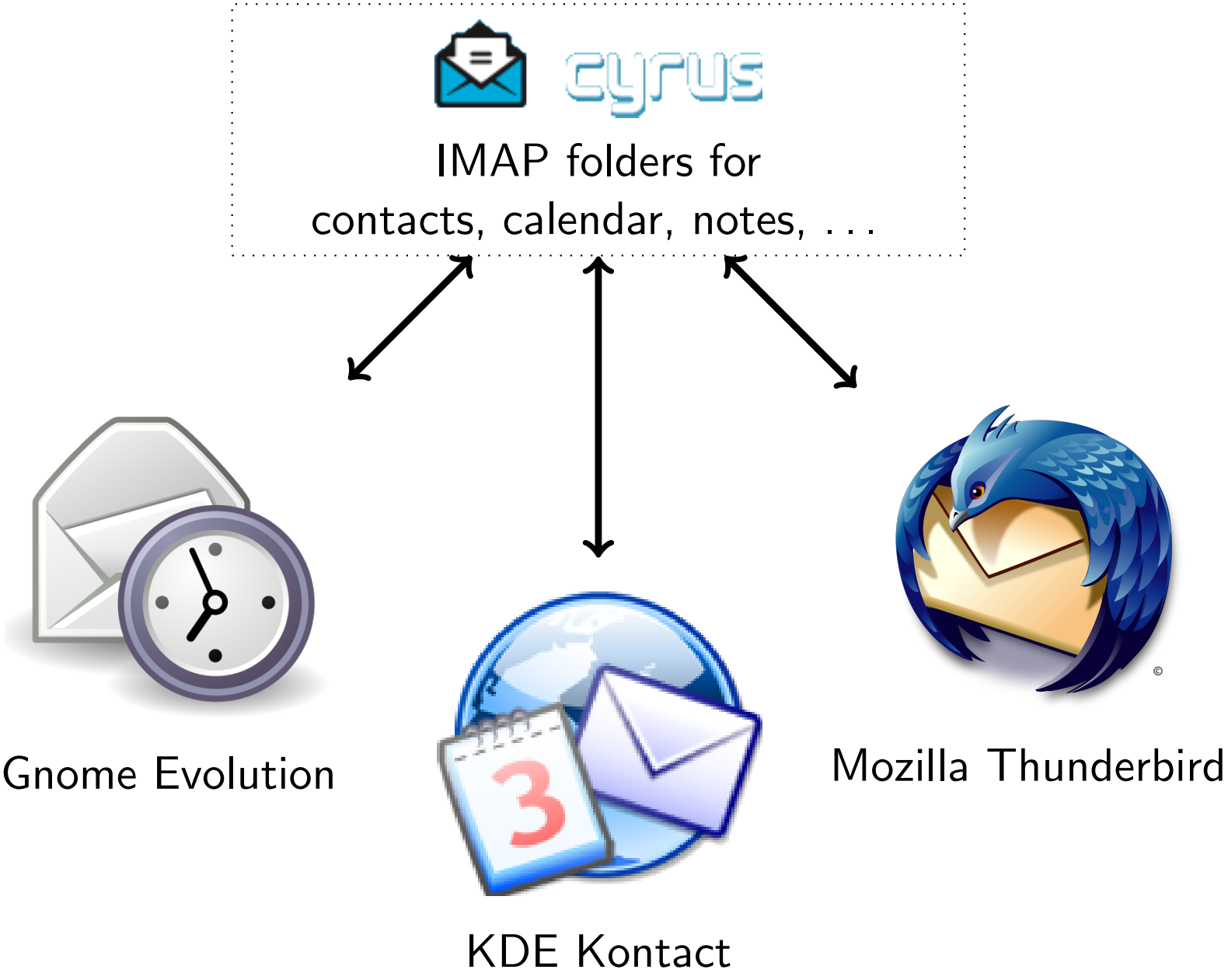
Kolab daemon,
Scripts:
Perl, Python

IMAP

cyrus

Verzeichnisdienst

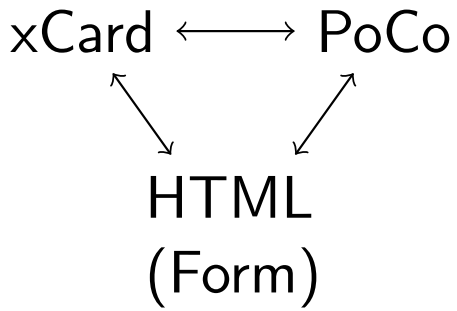
Clients need Kolab specific connectors



support for different client types

- desktop apps → `vCard (IMF) / xCard (XML)`
- `browsers` → `(X)HTML + semantic annotation`
- `js widgets` → `PortableContacts (JSON)`

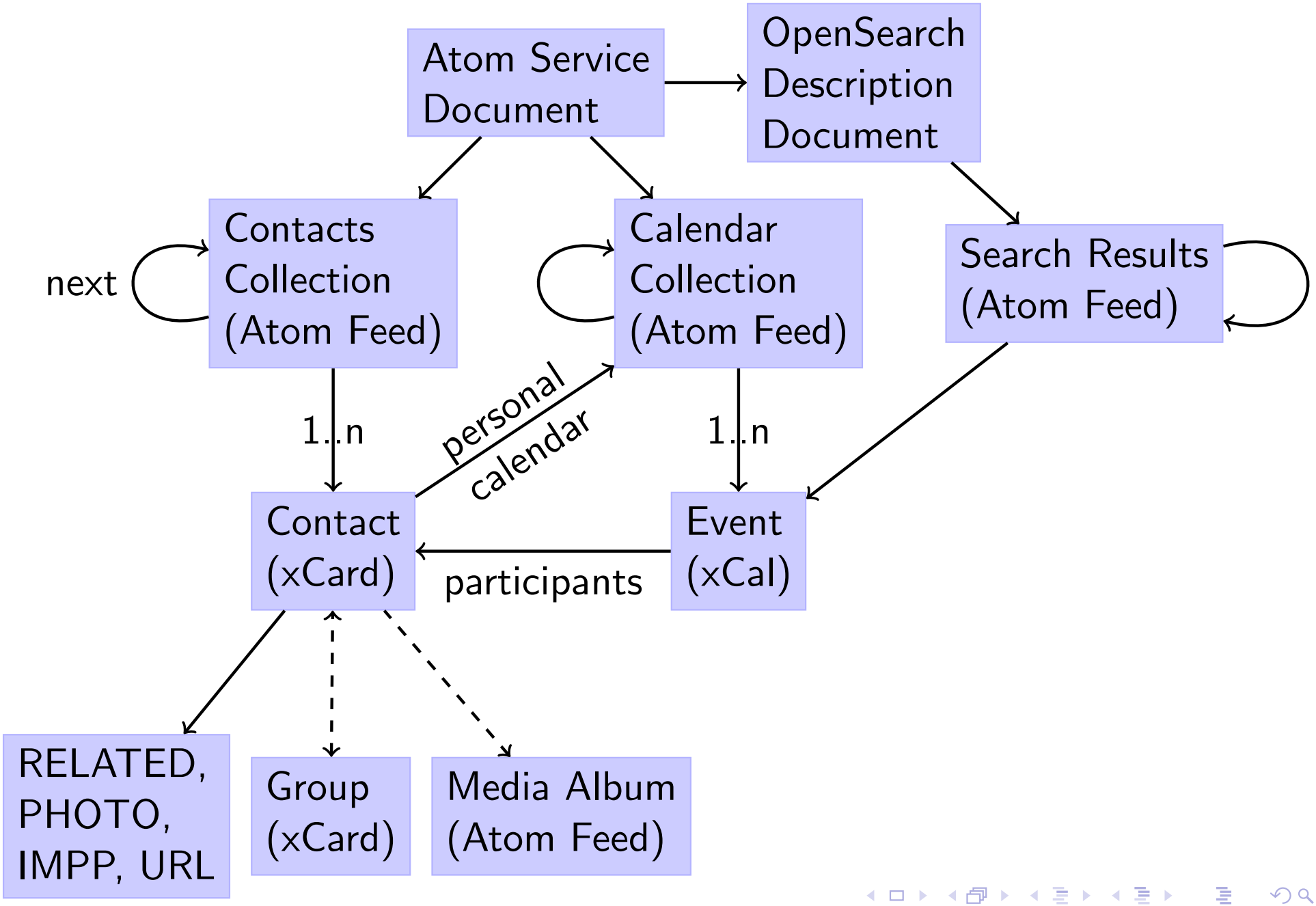
media type conversion and non-isomorphism



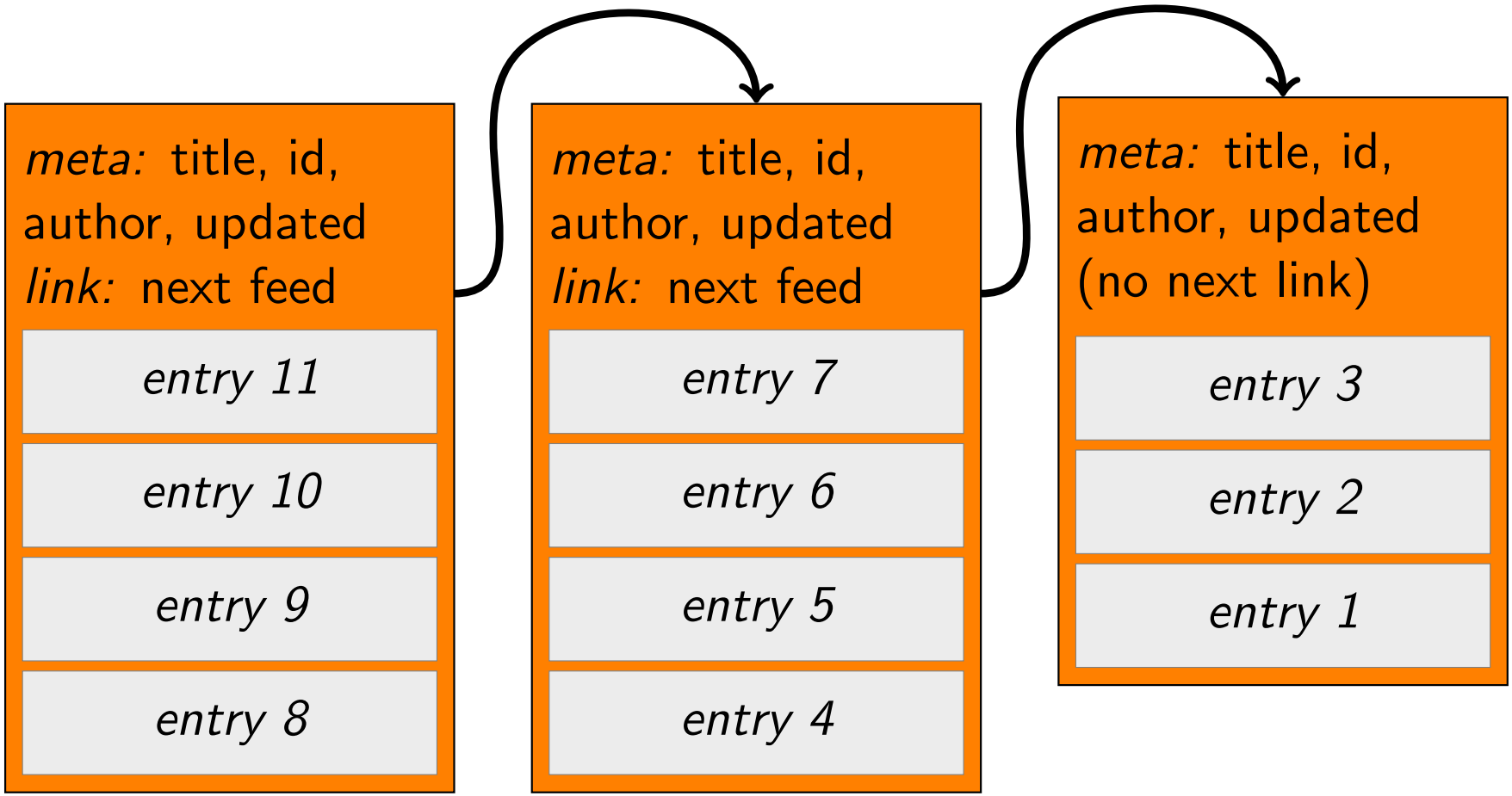
approaches:

- only one media type for writes
- special PATCH media types
- restrict types to common denominator
- extend media types to reach isomorphism
- ignore the problem, maybe do version control

Atom Publishing Protocol, hypermedia



feed after 11 POSTs

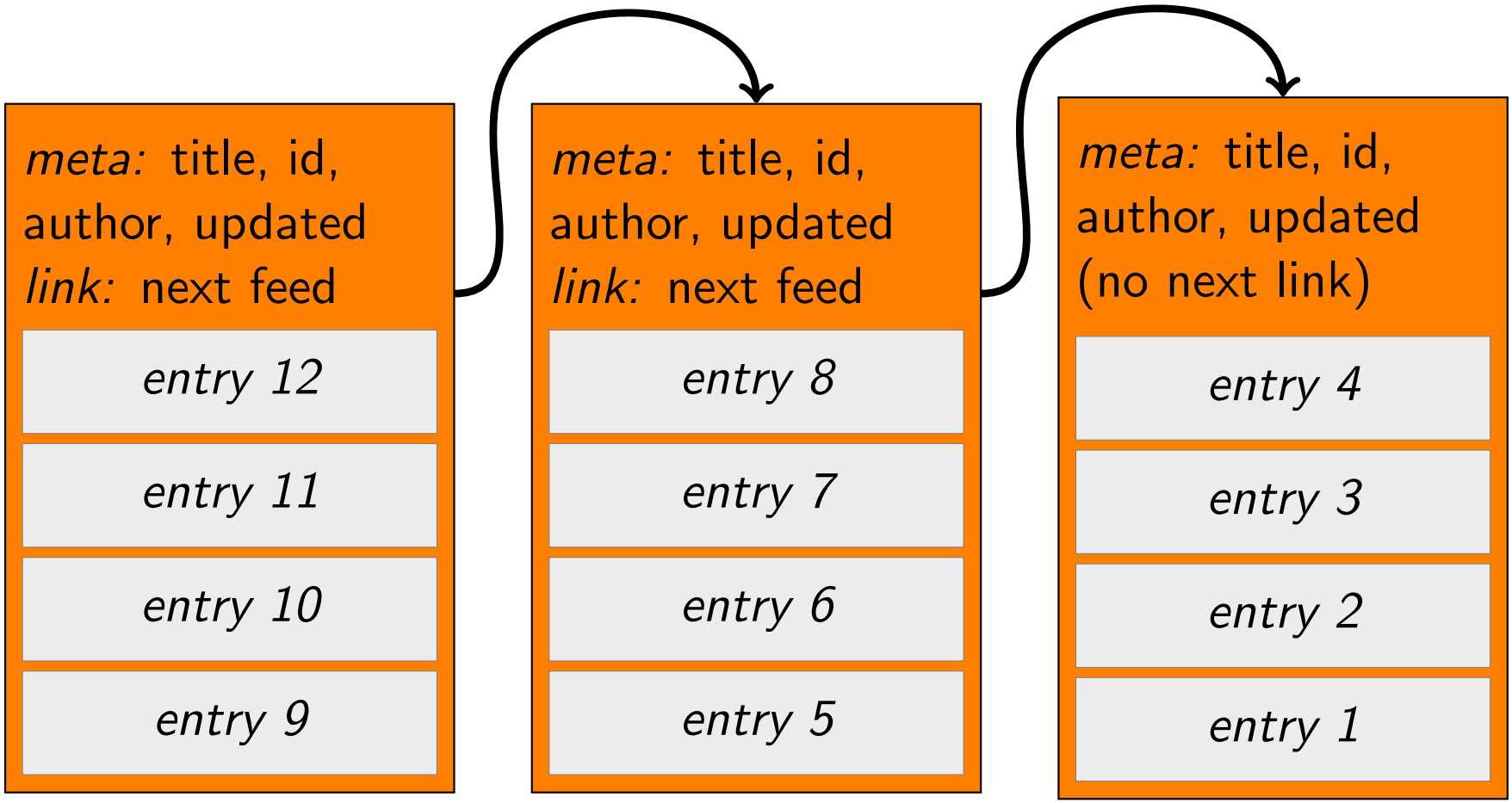


`http://myapi.org/.../contacts?offset=0|4|8`

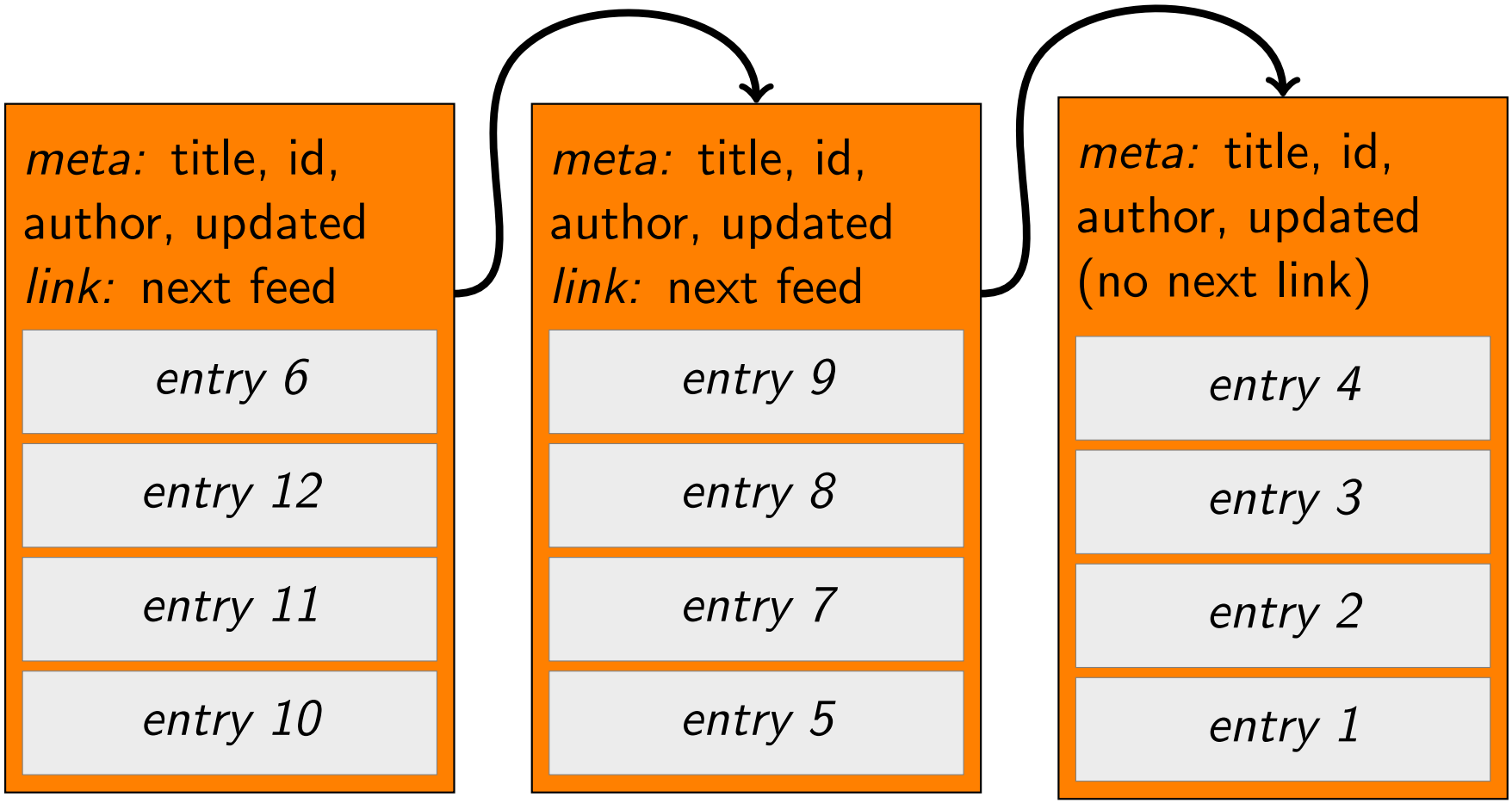
feed entries link to full representations

feed entries sorted by edited time

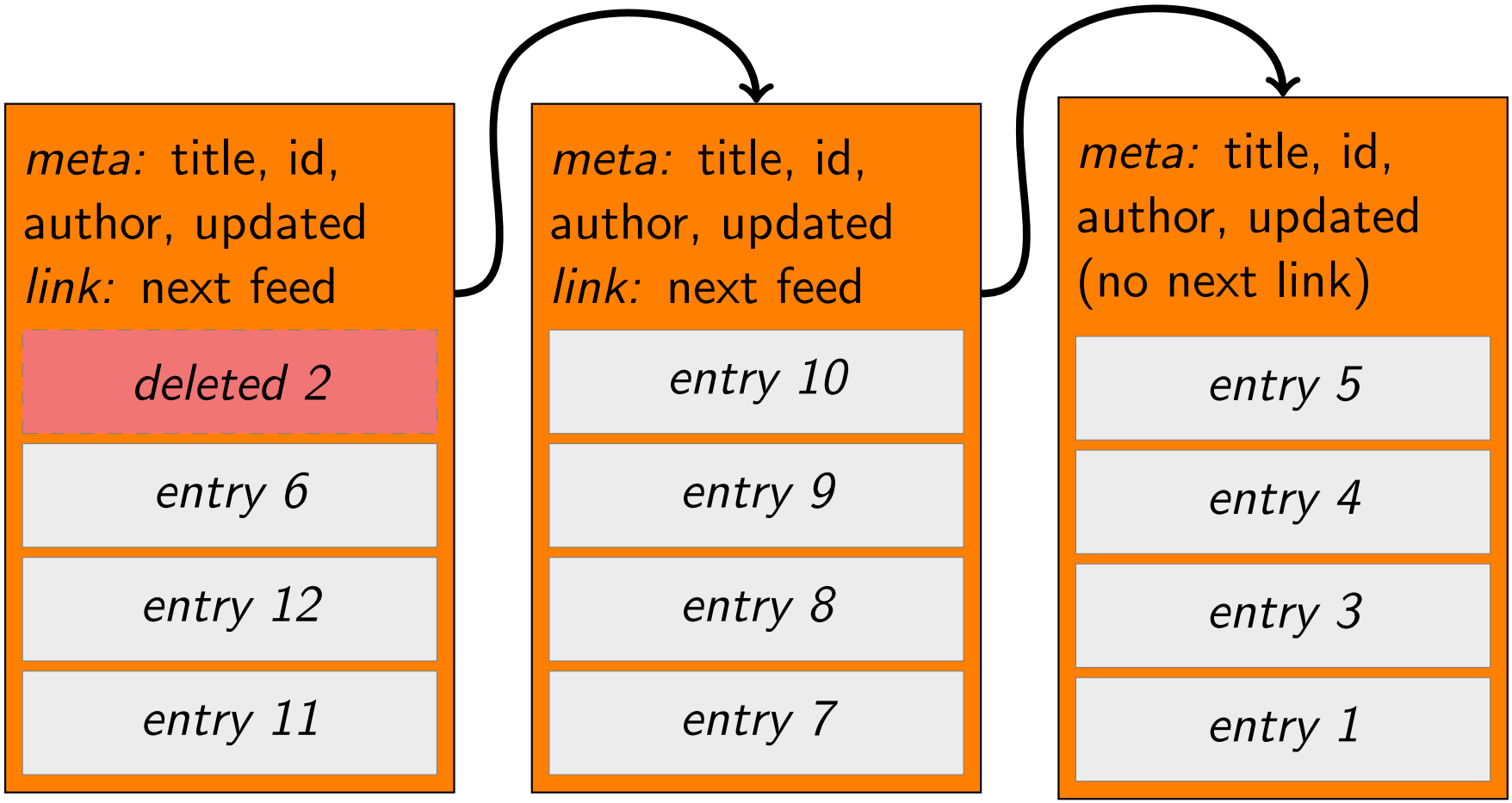
POST new entry to feed



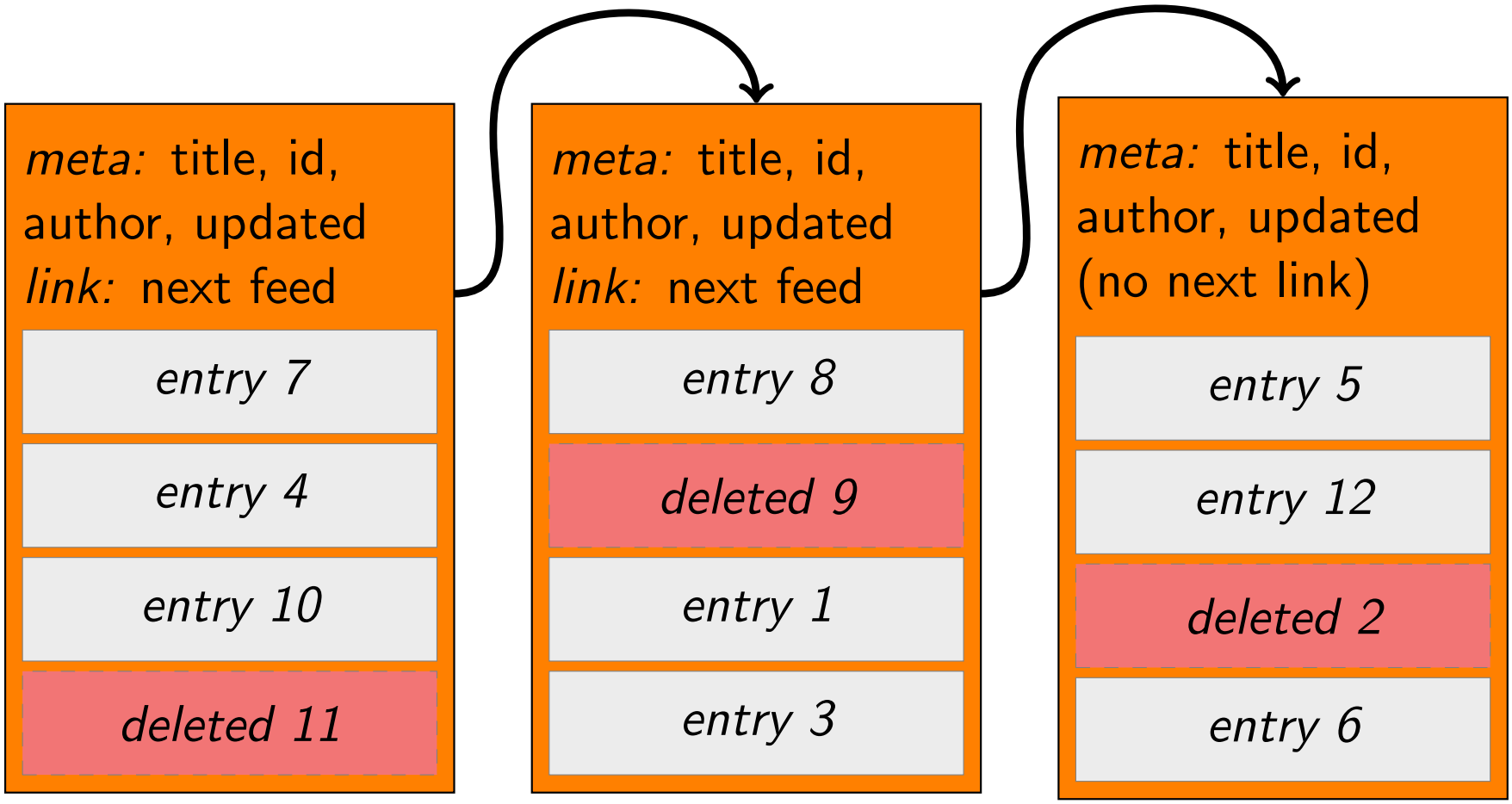
PUT updated entry 6



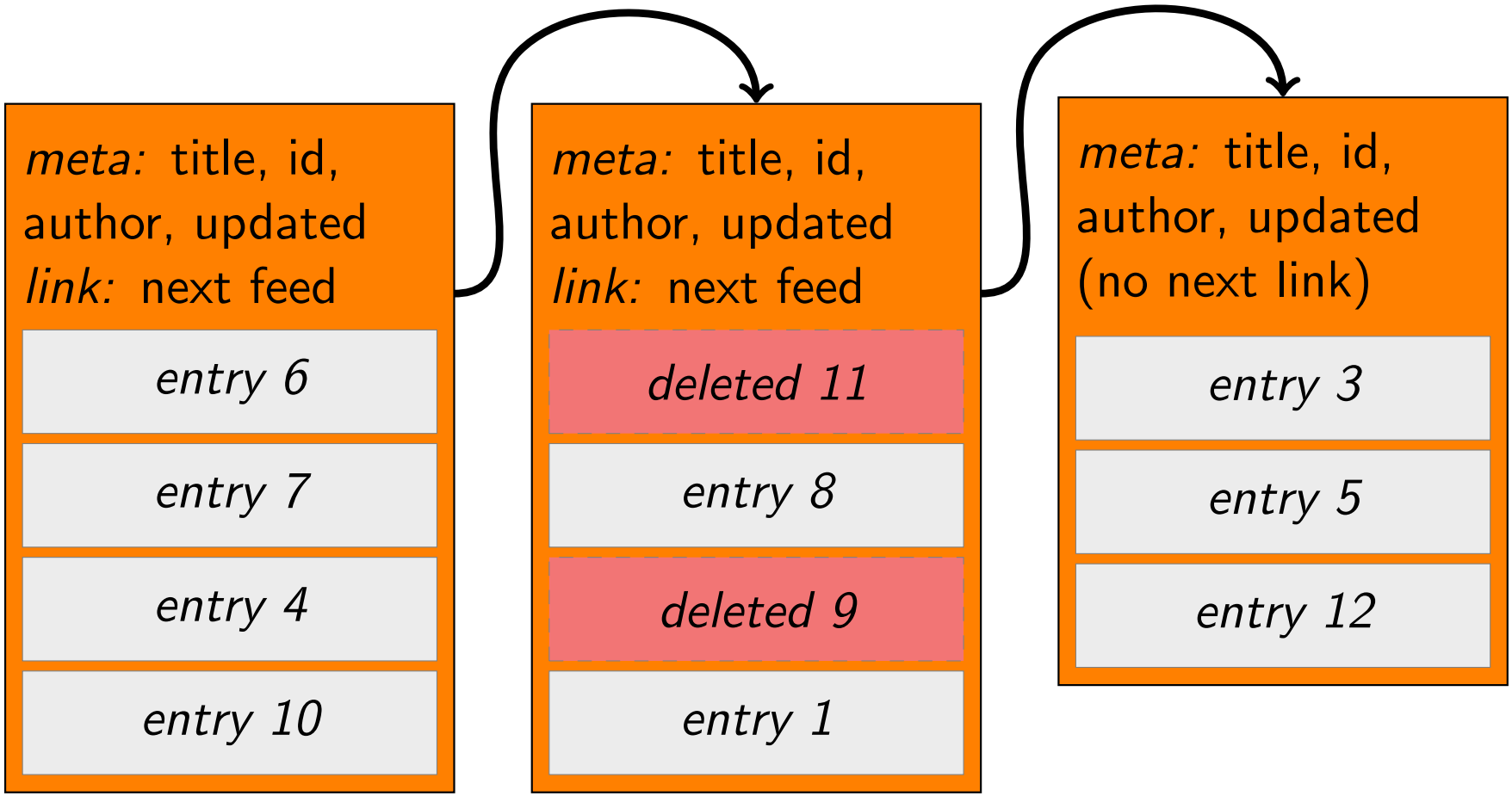
DELETE entry 2



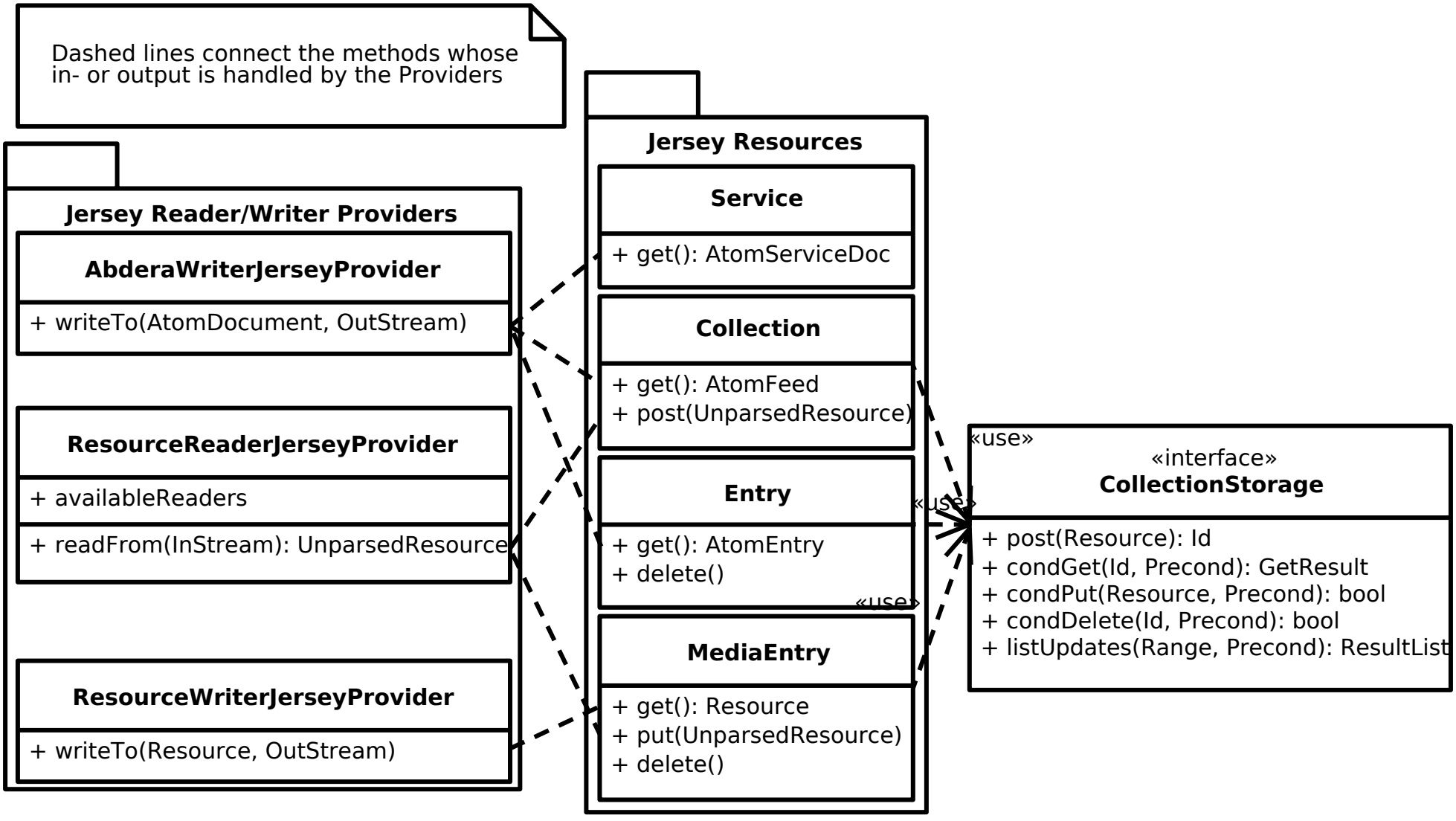
Many more changes



update of entry 6



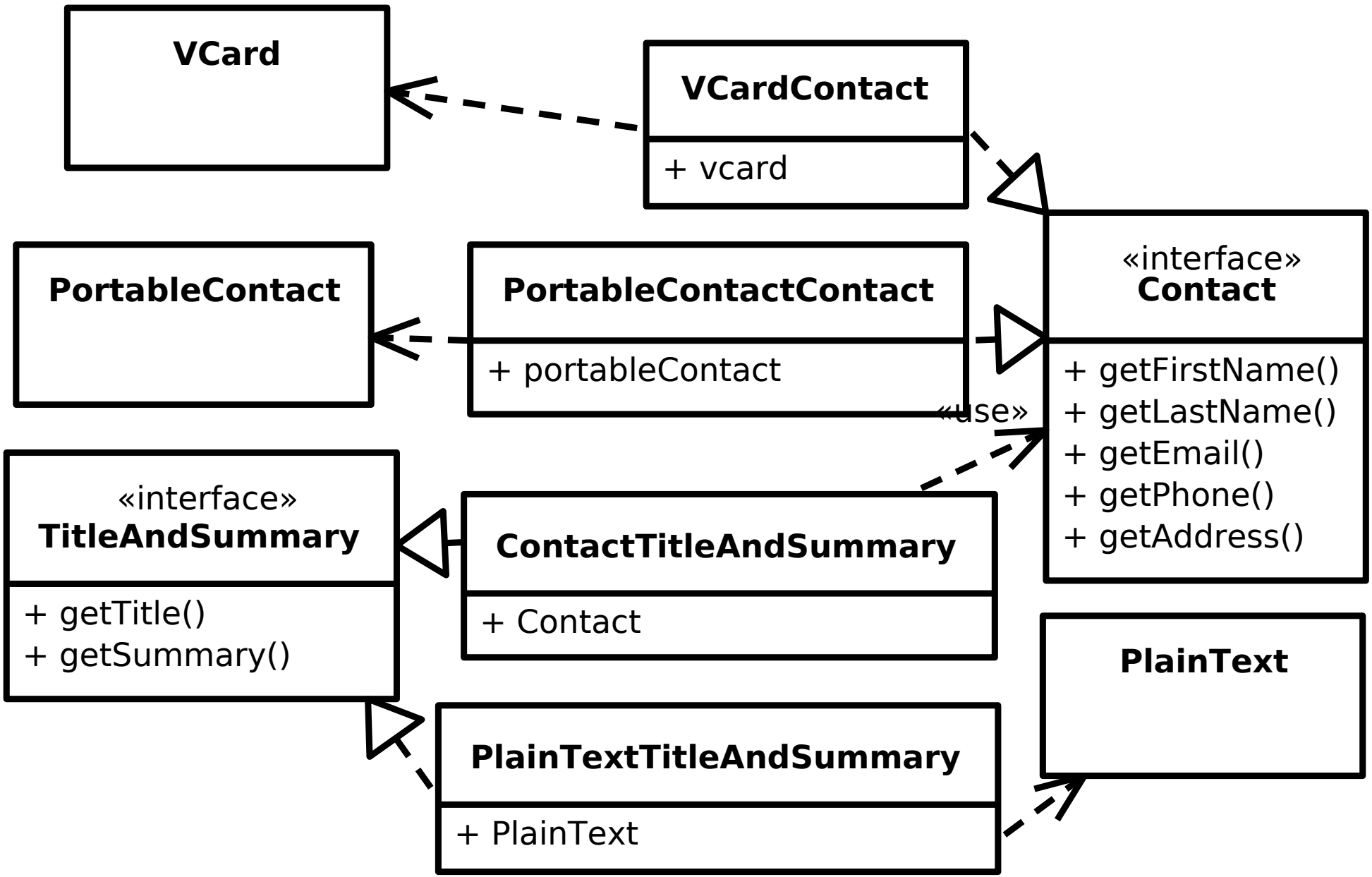
Execution flow overview



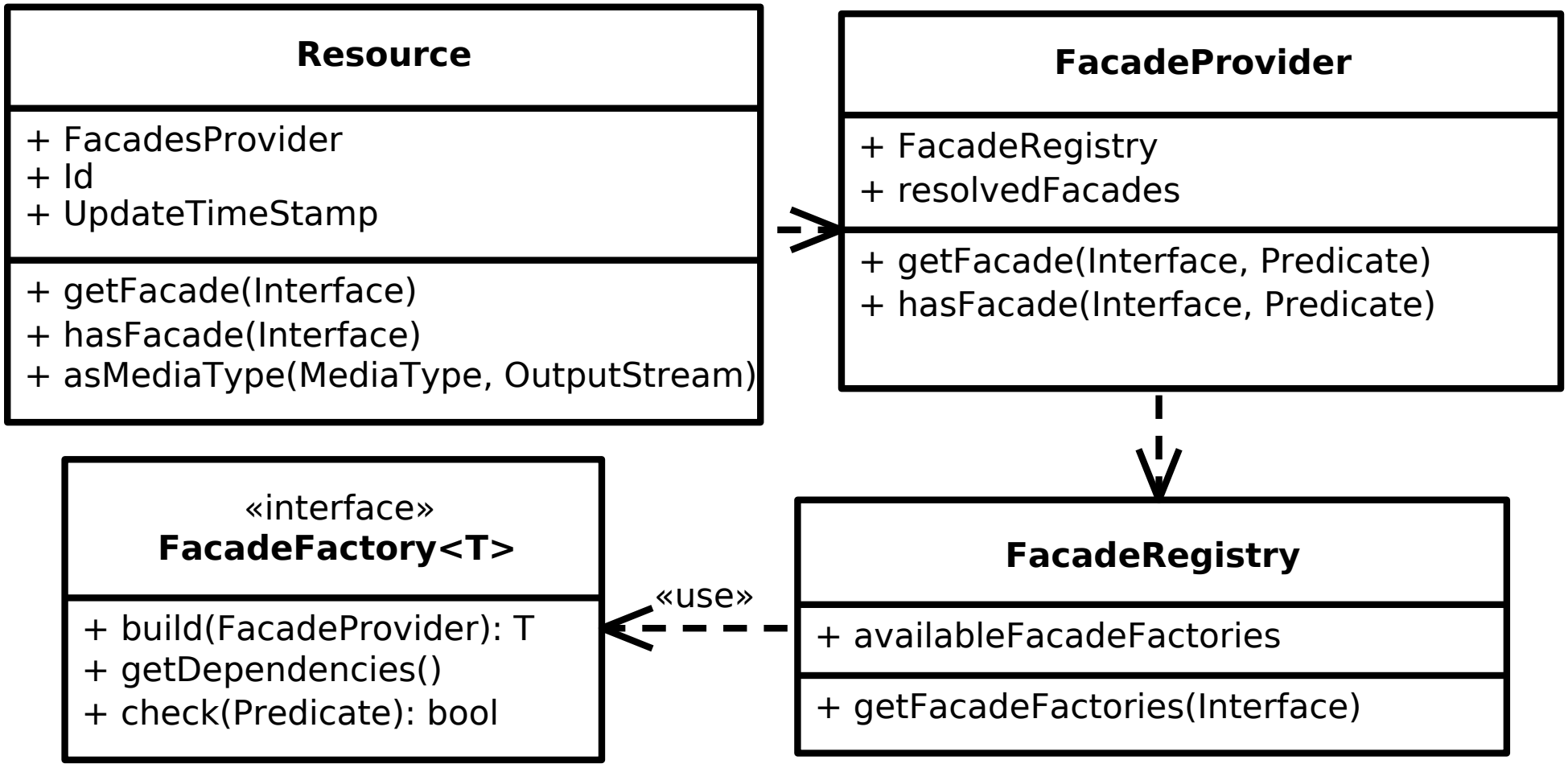
Resource Properties

- essential administration properties: unique ID, last update time, HTTP entity tag
- generic meta properties: title, summary, author
- a media type independent interface corresponding to the concept represented by the resource, e.g., a person, location, event, product, ...
- a media type specific serialization (representation) of the resource

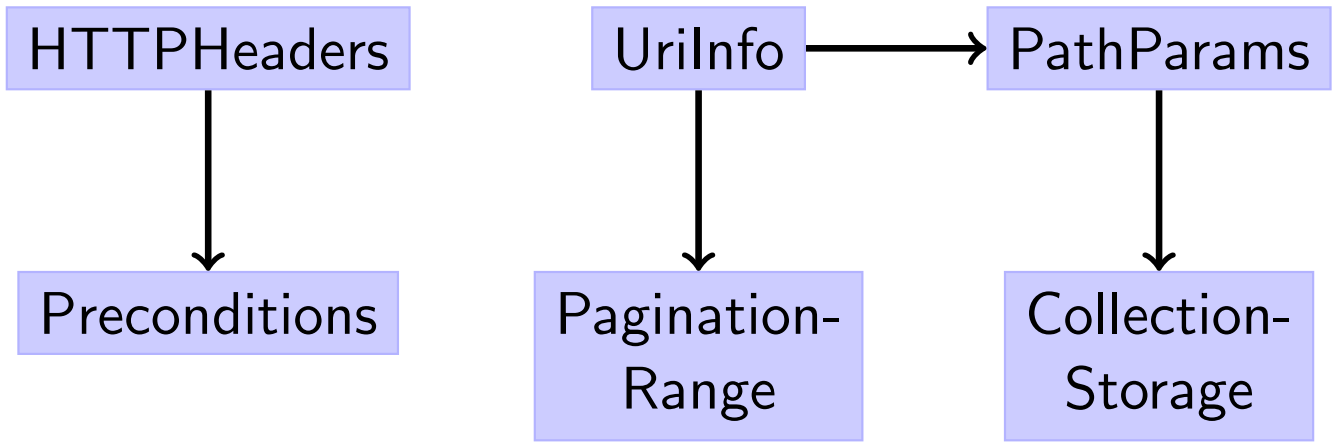
Facades and their dependencies



Facades implementation



Dependency Injection



isolate URI handling

- processing: PaginationRange, PathParam, Router class
- construction: LinkBuilder
- URI details are classified information $\rightarrow$ enforce hypermedia

no @Path, @PathParam, @QueryParam annotations!

problems: media type libraries

- only vCard 3, no vCard / xCard 4
- 2 dead PortableContact libraries
- no existing conversion code
- no helper for semantic annotation

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. . . but dozens of HTTP libraries

Semantic annotation helper

```
div( itemscope itemtype="http://schema.org/Person"
     itemid=#{vcard.getProperty("uid")} )
  span( itemprop="name" )
    #{vcard.getProperty("fn")}
  span( itemprop="telephone" )
    #{vcard.getProperty("tel")}
```

let md be a MicroData aware helper object:

```
= md.scope
  div
    = md.prop("name")
      span( style="color:red" )
    = md.prop("telephone")
    = md.prop("email")
```

Kolab

- ANNOTATEMORE (draft) → METADATA (RFC 5464) → Special-Use Mailboxes (RFC 6154)
- vCard 3 → Kolab XML → xCard 4
- documented by code
- works only with Cyrus, not with Dovecot

- concentration on media types
- JAX-RS not helpful
- ATOM is versatile