Service Providers: Future Perspectives

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Gaining Independence With E-print Archives and OAI

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Outline

- History of the history of OAI-PMH
- (Traditional) public service providers not present for this meeting
- Why the OAI-PMH is not important
- Defining the OAI-PMH data model
- Abusing the OAI-PMH data model
- Current and nearly-current interesting services

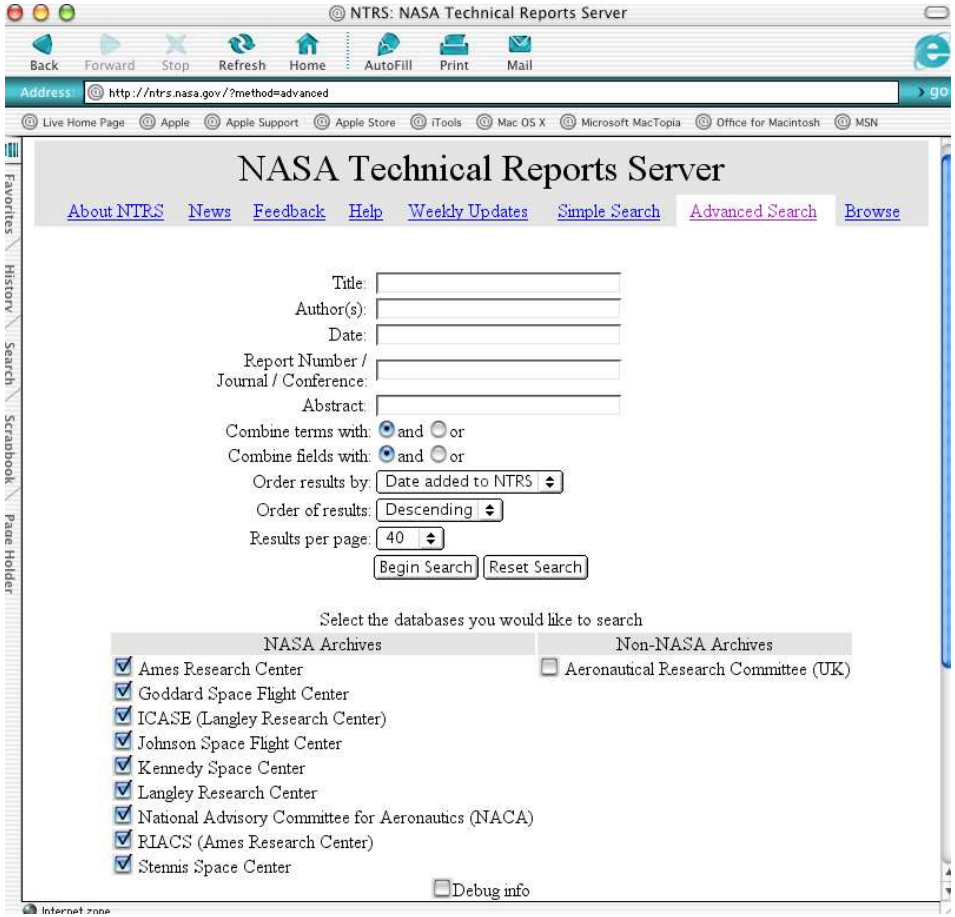
OAI-PMH Meeting History

OAI Open Day, Washington DC 1/2001		This meeting CERN 10/2002
4	Protocol definition, development tools	1
5	DPs, retrofitting existing DLs	4
1	SPs, new services	11
0	Socio-Economic-Political Issues	6

Shift of Topics

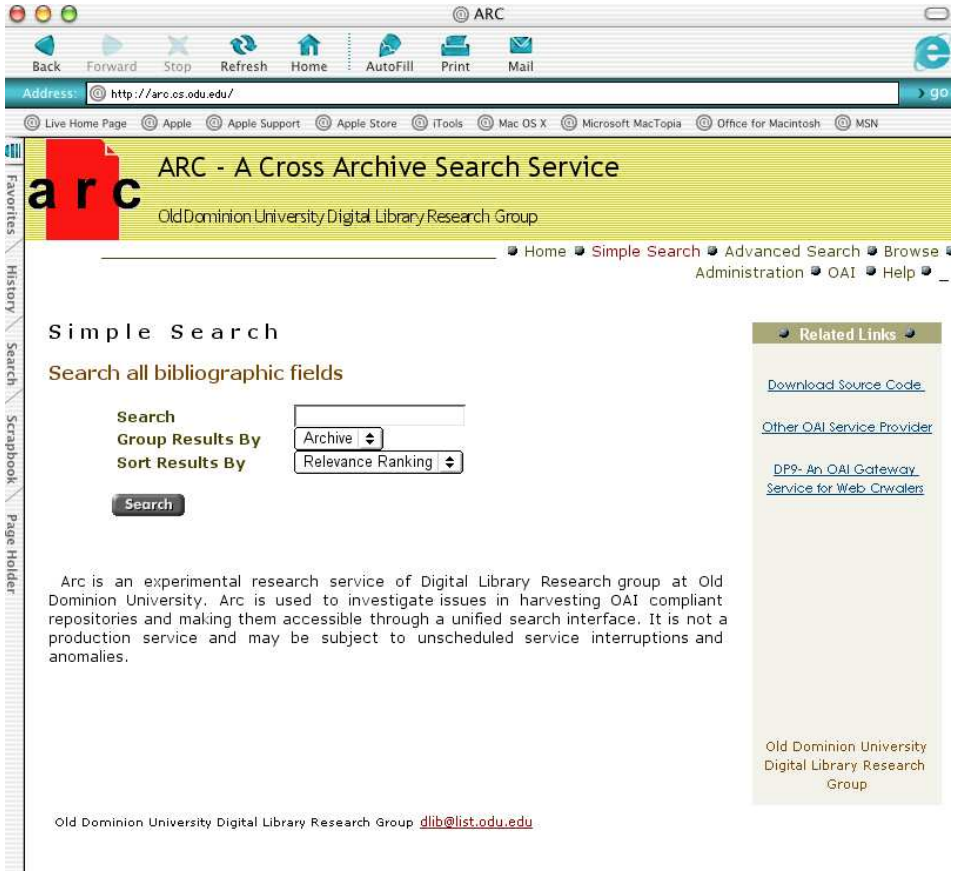
- From the protocol itself, supporting & debugging tools and how to retrofit (existing) DLs…
- …to building (new) services that use the OAI-PMH as a core technology and reporting on their impact to the institution/community

NTRS



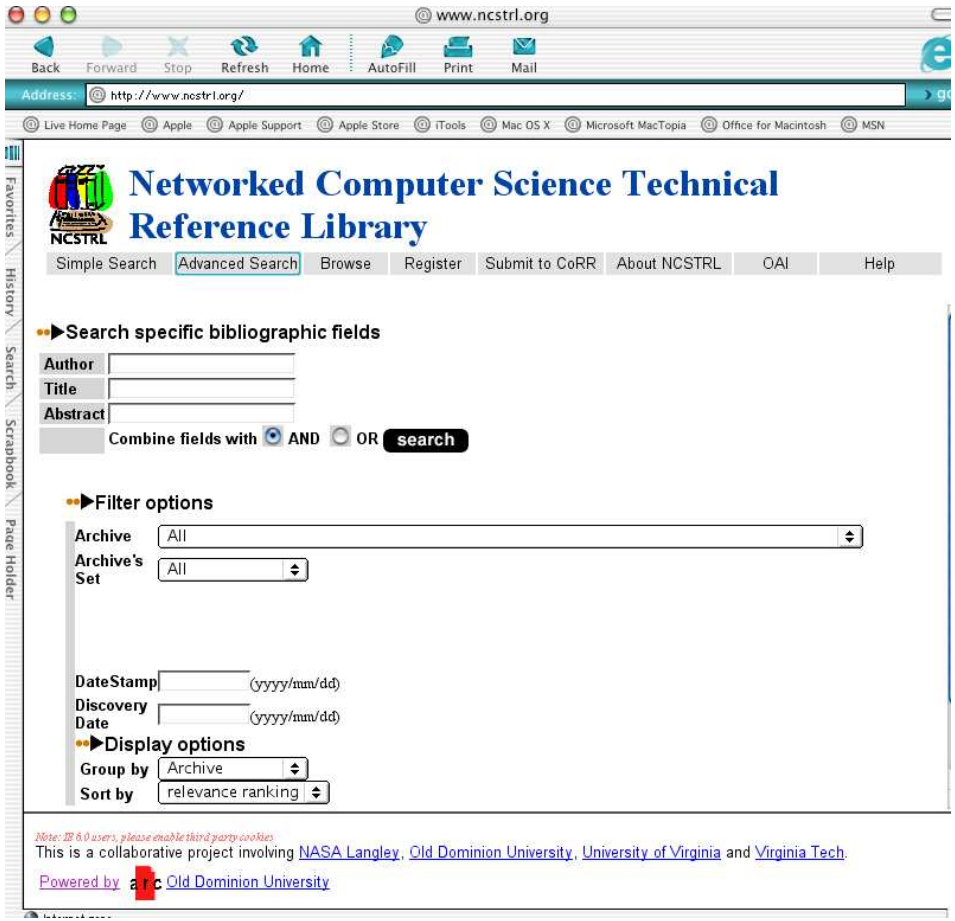
- http://ntrs.nasa.gov/
- metadata harvesting replacement for http://techreports.larc.nasa.gov/cgi-bin/NTRS
  - previous NTRS was based on distributed searching
  - hierarchical harvesting
- (nigh) publicly available

Arc



- http://arc.cs.odu.edu/
- harvests all known archives
- first end-user service provider
- source available through SourceForge
- hierarchical harvesting

NCSTRL

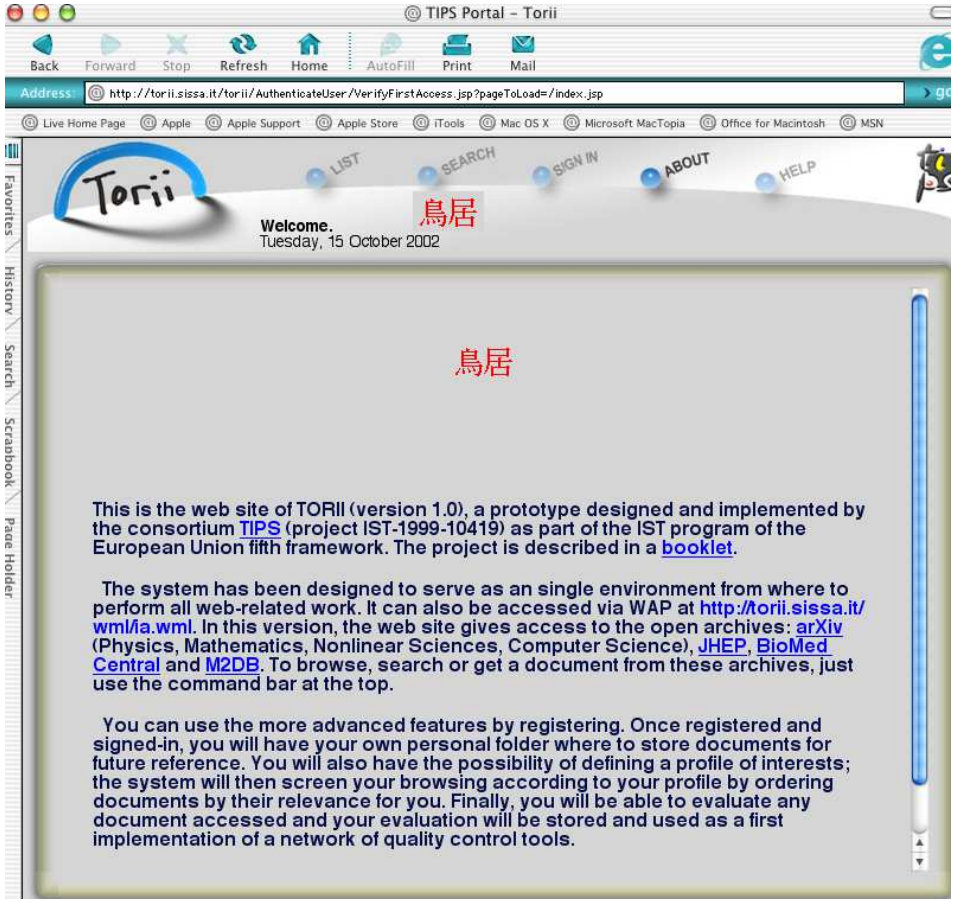


- http://www.ncstrl.org/
- metadata harvesting replacement for Dienst-based NCSTRL
- based on Arc
- computer science metadata

Archon

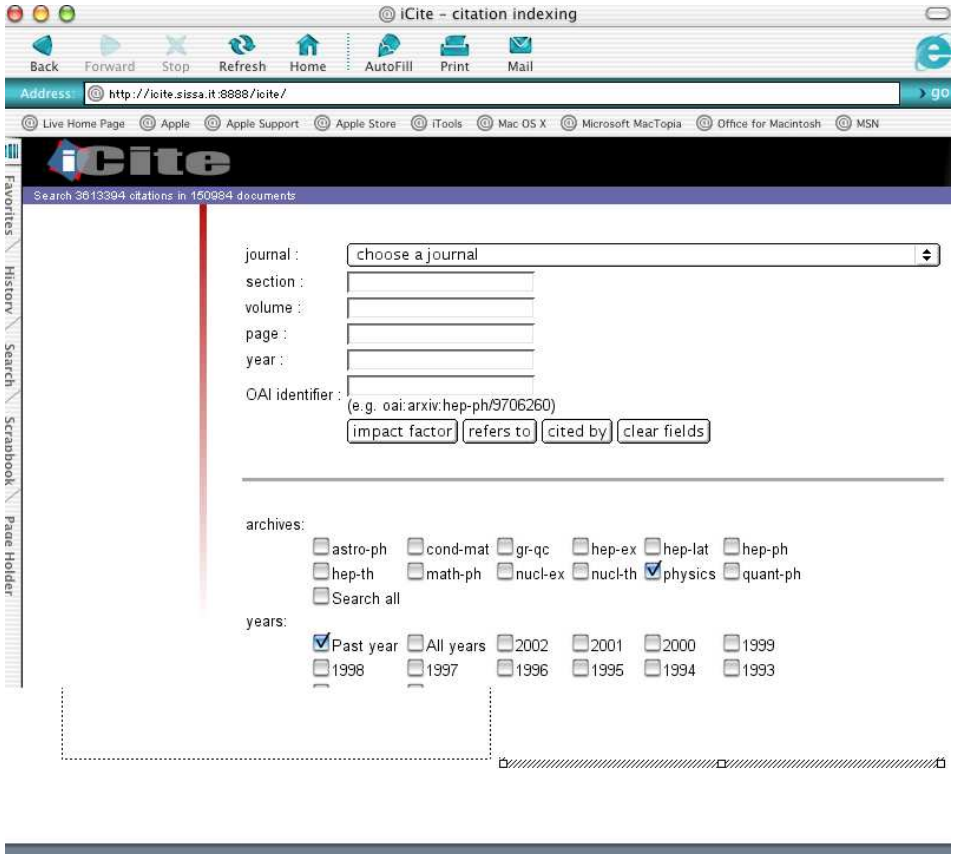
- http://archon.cs.odu.edu/
- physics metadata
- based on Arc
- features:
  - citation indexing
  - equation-based searching

Torii



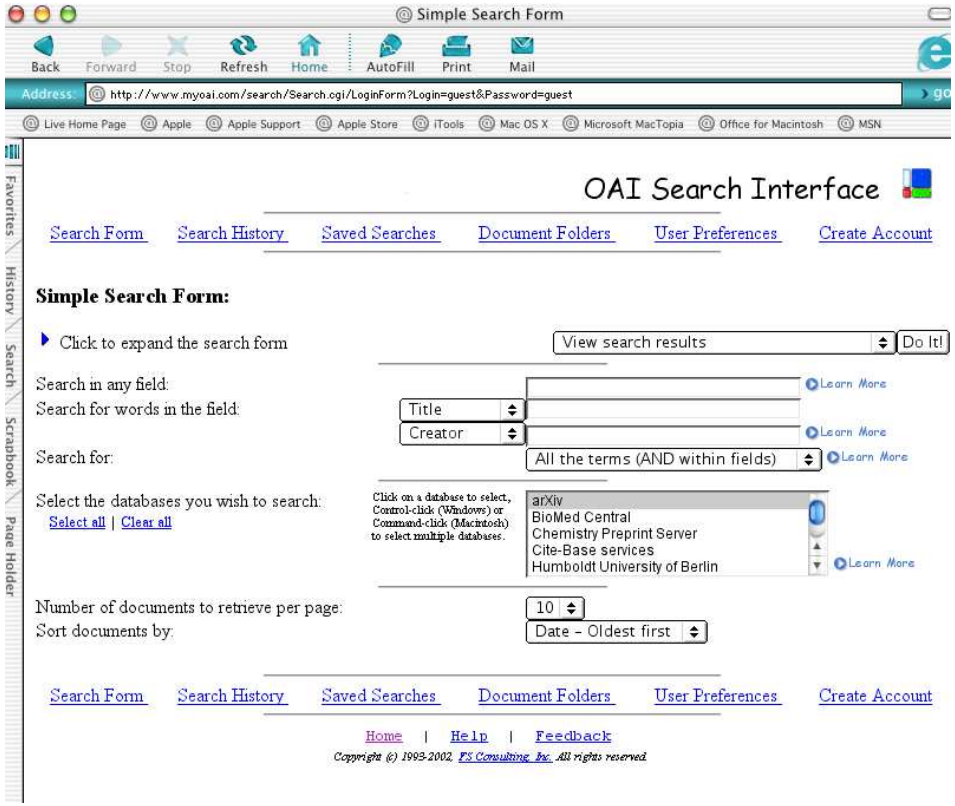
- http://torii.sissa.it/
- physics metadata
- features
  - personalization
  - recommendations
  - WAP access

iCite



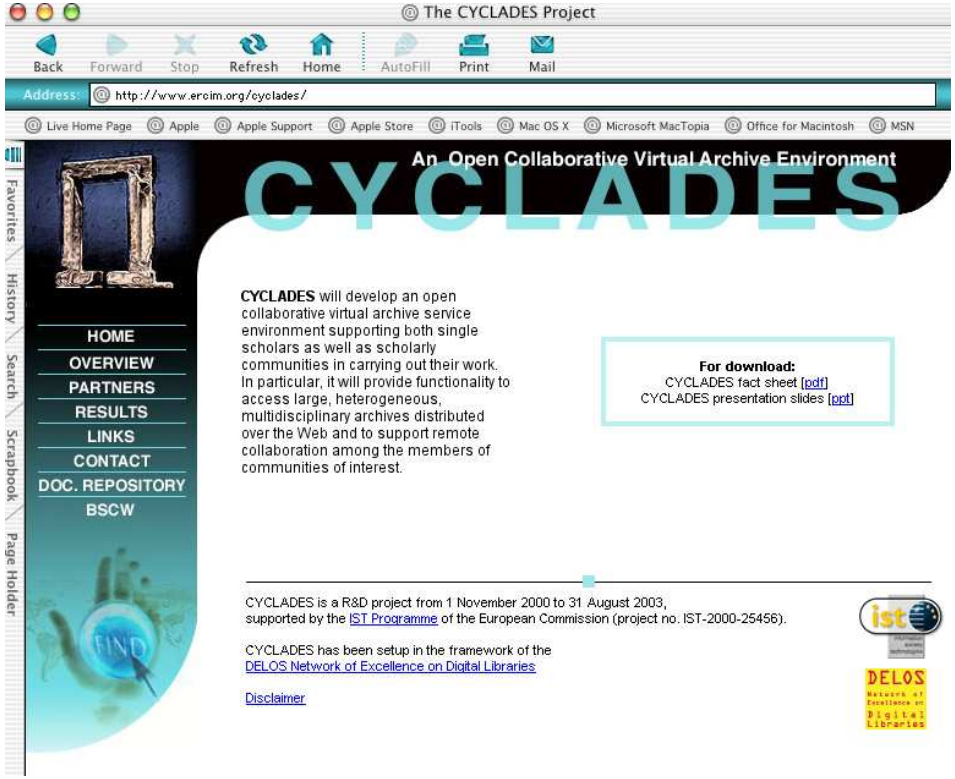
- http://icite.sissa.it/
- physics metadata
- features
  - citation based access to arXiv metadata

my.OAI



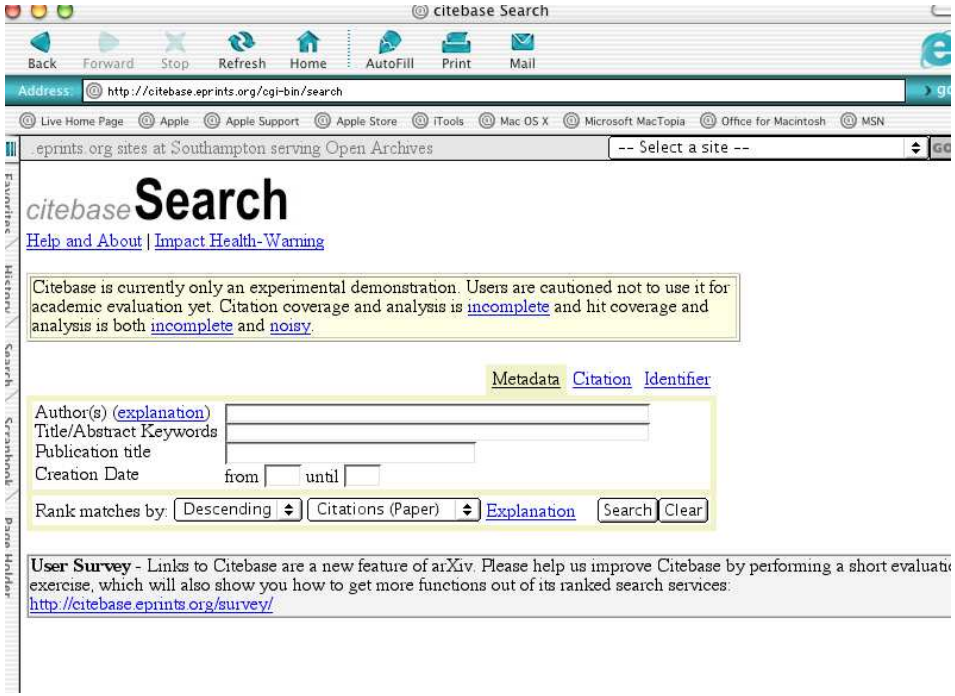
- http://www.myoai.com/
- covers all registered metadata
- features
  - result sets
  - personalization
  - many other advanced features

Cyclades



- http://www.ercim.org/cyclades
- scientific metadata
- features
  - personalization
  - recommendations
  - collaboration
- status?

citebase

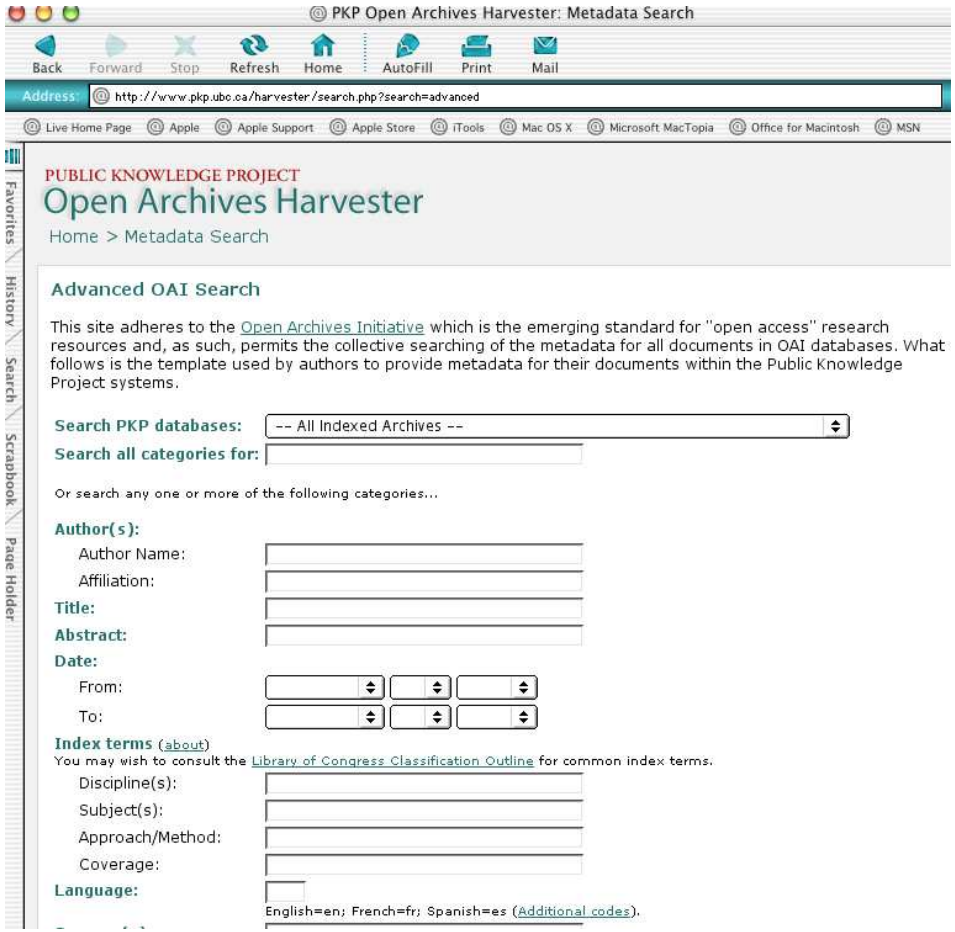


- http://citebase.eprints.org/
- arXiv metadata
- citation based indexing, reporting

OAIster

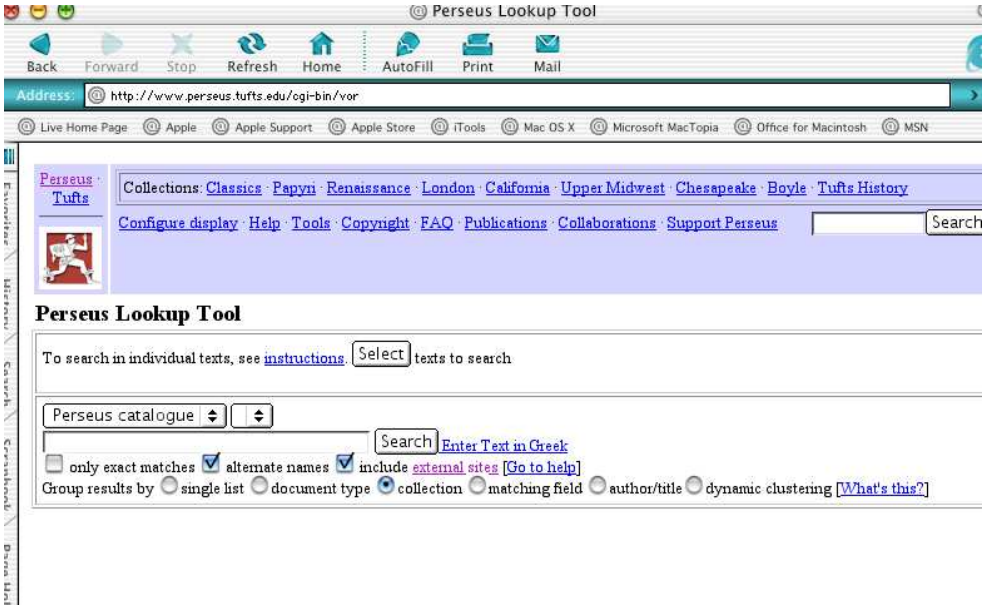
- http://oaister.umdl.umich.edu/
- harvests all known archives

Public Knowledge Project



- http://www.pkp.ubc.ca/harvester/
- domain-specific filtering of harvested metadata (?)

Perseus



- http://www.perseus.tufts.edu/
- they claim to harvest all DPs, but only humanities related DPs appear in the pull down menu

Service Providers

- It is clear that SPs are proliferating, despite (because of?) the inherent bias toward DPs in the protocol
  - easy to be a DP -> many DPs -> SPs eventually emerge
  - hard to be a DP -> SPs starve
  - currently 5x DPs more than SPs
- SPs are beginning to offer increasingly sophisticated services
  - competitive market originally envisioned for SPs is emerging

Why The OAI-PMH is NOT Important

- Users don't care
- OAI-PMH is middleware
  - if done right, the uninterested user should never have to know

- Using the OAI-PMH does not insure a good SP
- OAI-PMH is *(or is becoming)* HTTP for DLs
  - few people get excited about http now
    - http & OAI-PMH are core technologies whose presence is now assumed

Other Uses For the OAI-PMH

- Assumptions:
  - Traditional DLs / SPs will continue on their present path of increasing sophistication
    - citation indexing, search results viz, personalization, recommendations, subject-based filtering, etc.
  - growth rates remain the same (5x DPs as SPs)
- Premise: *OAI-PMH is applicable to any scenario that needs to update / synchronize distributed state*
  - Future opportunities are possible by creatively interpreting the OAI-PMH data model

OAI-PMH Data Model

set-membership is item-level property

resource

item = identifier

all available metadata about *David*

item

Dublin Core metadata

MARC metadata

SPECTRUM metadata

records

record = identifier + metadata format + datestamp

Typical Values

- repository
  - collection of publications
- resource
  - scholarly publication
- item
  - all metadata (DC + MARC)
- record
  - a single metadata format
- datestamp
  - last update / addition of a record
- metadata format
  - bibliographic metadata format
- set
  - originating institution or subject categories

Repositories…

- Stretching the idea of a repository a bit:
  - contextually sensitive repositories
    - "personalization for harvesters"
    - communication between strangers, or communication between friends?
  - OAI-PMH for individual complex objects?
    - OAI-PMH without MySQL?!
      - Fedora, Multi-valent documents, buckets
      - tar, jar, zip, etc. files

Resource

- What if resource were:
  - computer system status
    - uptime, who, w, df, ps, etc.
  - or generalized "system" status
    - e.g., sports league standings
  - people
    - personnel databases
    - authority files for authors

Item

- What if item were:
  - software
    - union of versions + formats
  - all forms of metadata
    - administrative + structural
    - citations, annotations, reviews, etc.
  - data
    - e.g., newsfeeds and other XML expressible content
      - metadataPrefixes or sets could be defined to be different versions

Record

- What if record were:
  - specific software instantiations / updates
  - access / retrieval logs for DLs (or computer systems)
  - push / pull model inversion
    - put a harvester on the client behind a firewall, the client contacts a DP and receives "instructions" on how to submit the desired document (e.g., send email to a specified address)

Datestamp

- semantics of datestamp are strongly influenced by the choice of resource / item / record / metadataPrefix, but it could be used to:
  - signify change of set membership (e.g., workflow: item moves from "submitted" to "approved")
  - change datestamp to reflect access to the DP
    - e.g., in conjunction with metadataPrefixes of "accessed" or "mirrored"

metadataPrefix

- what if metadataPrefix were:
  - instructions for extracting / archiving / scraping the resource
    - verb=ListRecords&metadataPrefix=extract_TIFFs
  - code fragments to run locally
    - (harvested from a trusted source!)
  - XSLT for other metadataPrefixes
    - branding container is at the repository-level, this could be record- or item-level

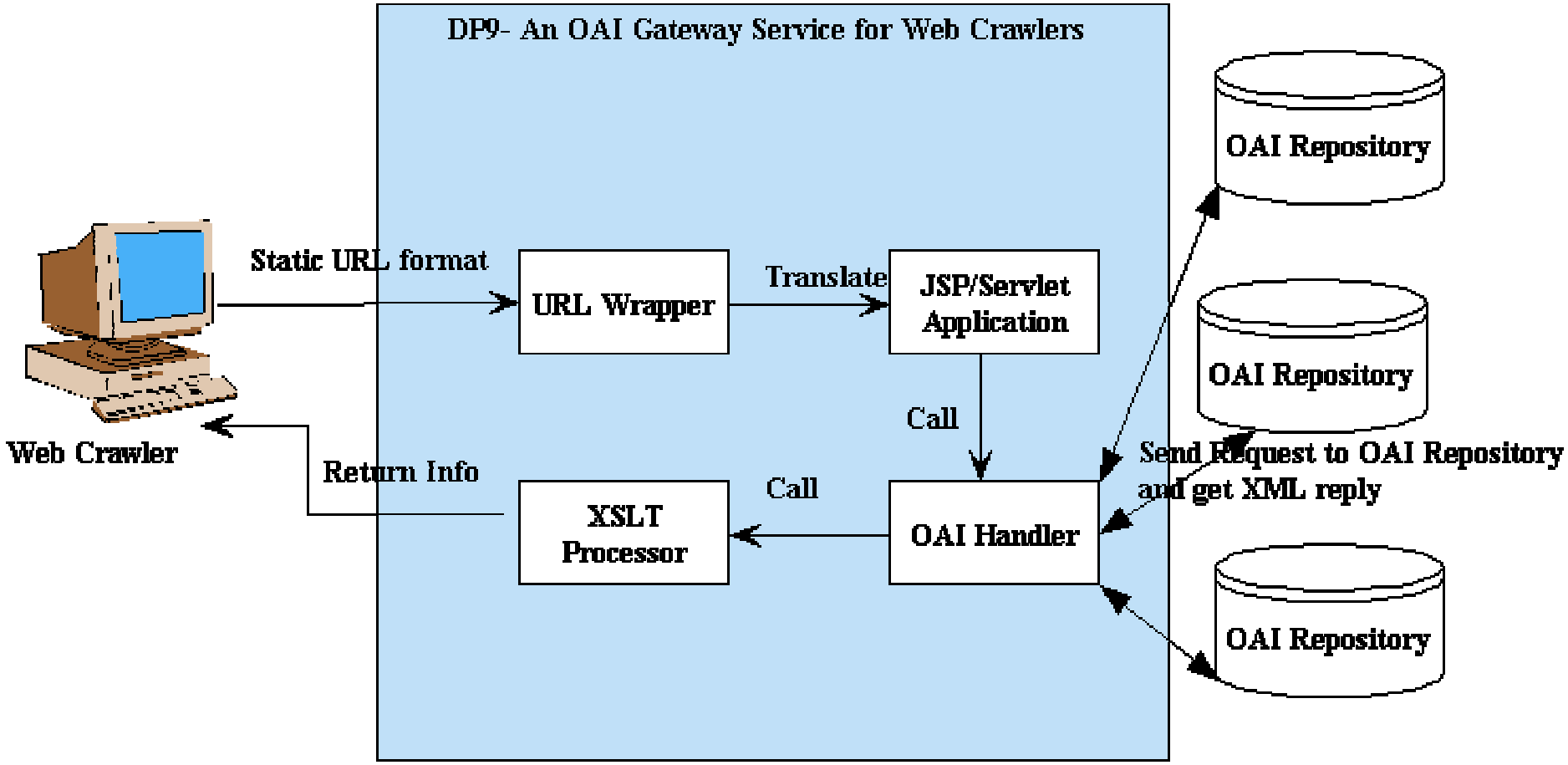
Set

- sets are already used for tunneling OAI-PMH extensions (see Suleman & Fox, D-Lib 7(12))
- other uses:
  - in aggregators, automatically create 1 set per baseURL
  - have "hidden" sets (or metadataPrefix) that have administrative or community-specific values (or triggers)
    - set=accessed>1000&from=2001-01-01
    - set=harvestMeWithTheseARGS&until=2002-05-05&metadataPrefix=oai_marc

Interesting Services

- DP9
  - gateway to expose repository contents in HTML suitable for web crawlers
- Celestial
  - OAI "cache", also 1.1 -> 2.0 converter
- Static (mini-) repositories
  - XML files, based on OLAC work
- OpenURL metadata format registries
  - record = metadata format

DP9 Architecture



see Liu et al., JCDL 2002; http://dlib.cs.odu.edu/dp9

Slide from Liu

DP9 Formatting

- Format of URLs
  - http://arc.cs.odu.edu:8080/dp9/getrecord.jsp?identifier=oai:NACA:1917:naca-report-10 &prefix=oai_dc
  - http://arc.cs.odu.edu:8080/dp9/getrecord/oai_dc/oai:NACA:1917:naca-report-10
- HTML Meta tags
  - Some crawlers (such as Inktomi) use the HTML meta tags to index a Web pages; DP9 also maps Dublin Core metadata to corresponding HTML meta tags.
  - For pages that are designed exclusively for robots navigation, a noindex robots meta tag is used
  - X-FORWARDED-FOR header to distinguish between different users coming in via a proxy

Slide from Liu

Celestial

- Developed by Brody @ Southampton
  - http://celestial.eprints.org/
  - designed to complement DP9
  - see Liu, Brody, et al., D-Lib Magazine 8(11)
- Where DP9 is a non-caching proxy, Celestial caches the metadata records
  - can off-load work from individual archives, higher availability
  - can harvest 1.1, 2.0; exports in 2.0

"Static" Repositories

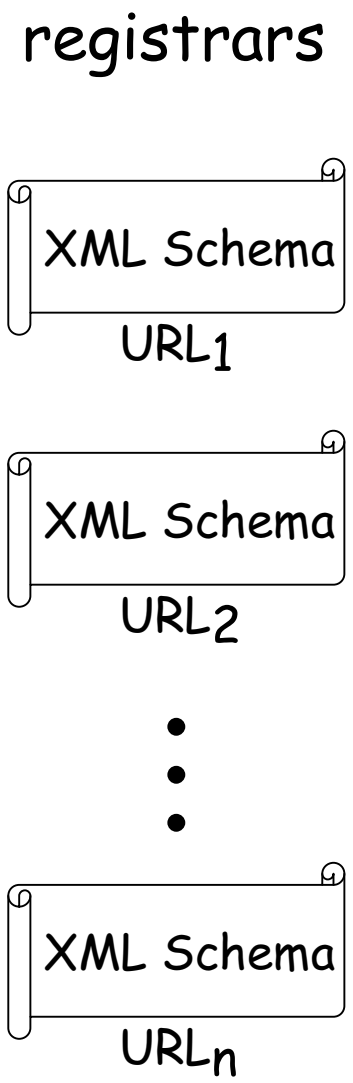
- Premise: a repository does not wish to have an executing program on its site, so it has a "static" XML file with some of the OAI-PMH responses in place
  - Design still being discussed
    - accessed through a proxy
    - could be a low functionality node, or the XML file could be produced by a process and moved outside a firewall
- Based on OLAC work by Bird & Simons
  - http://www.language-archives.org/

OpenURL Metadata Registry

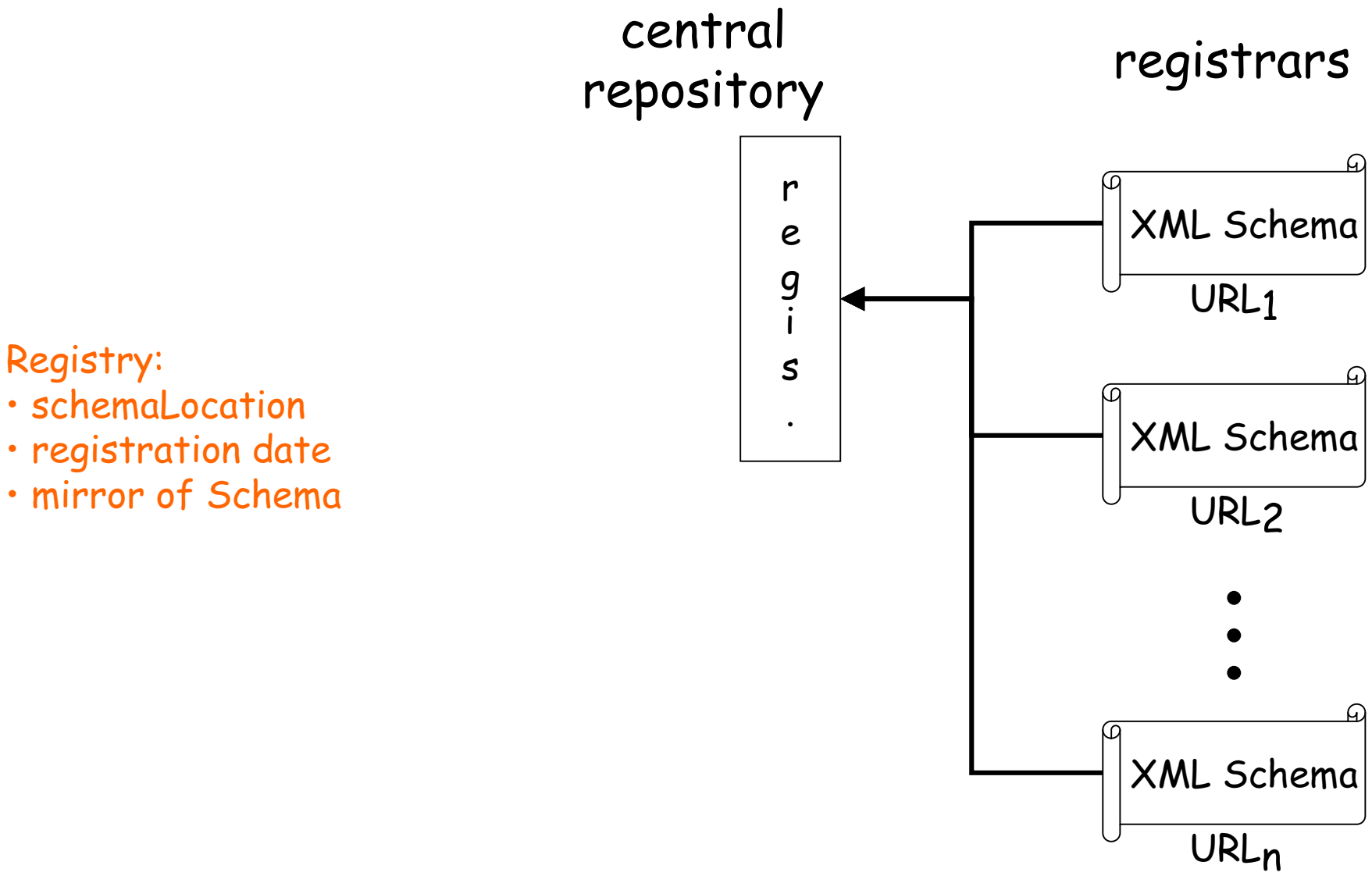
- Registry of metadata formats for OpenURL
  - http://www.sfxit.com/openurl/
  - http://lib-www.lanl.gov/~herbertv/papers/icpp02-draft.pdf

Goal:

- inform linking servers re Schema
- ease of admin for all parties involved
- limit human overhead



Slide from Van de Sompel

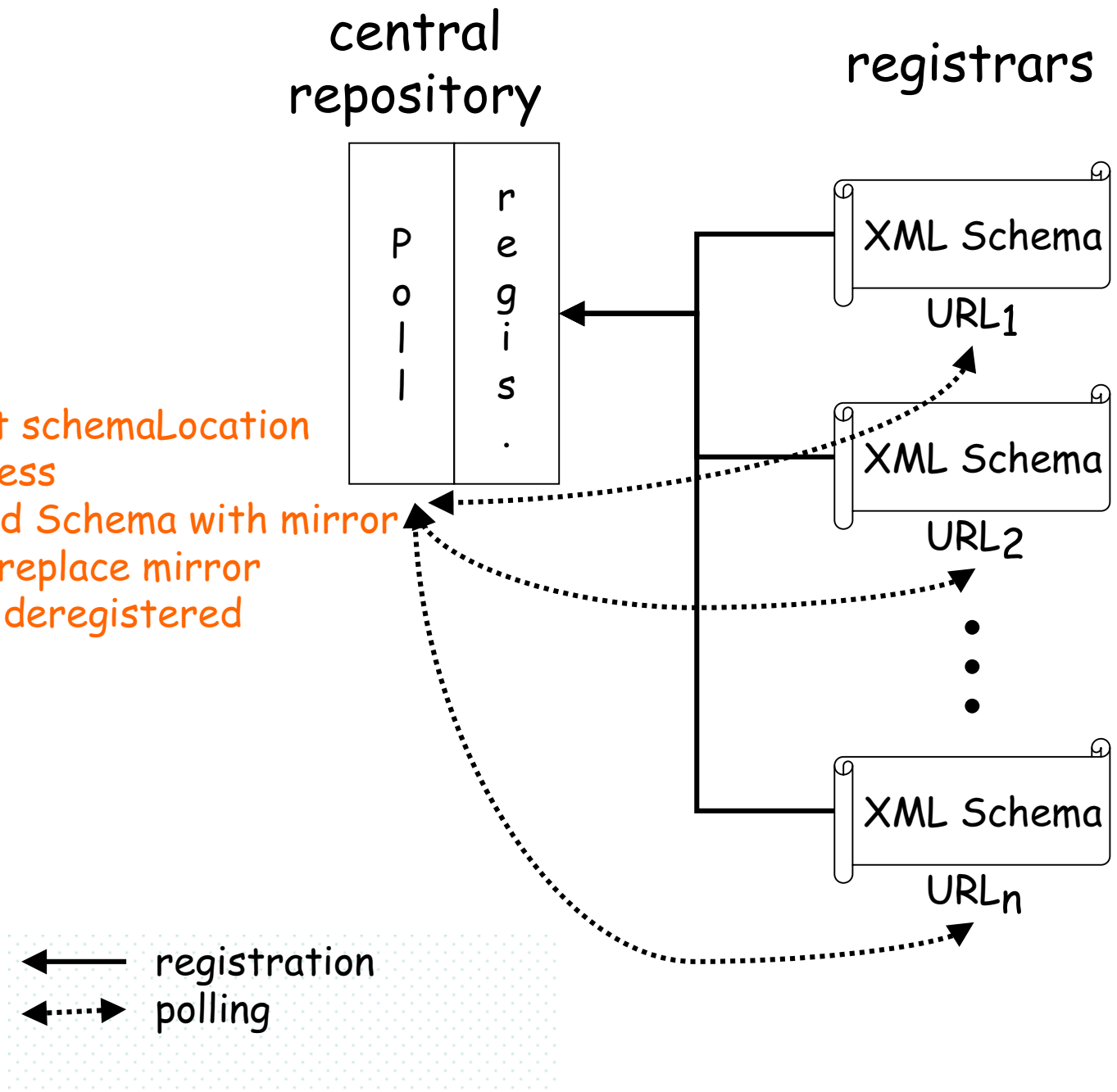


Registry:
- schemaLocation
- registration date
- mirror of Schema

Slide from Van de Sompel

Poll:

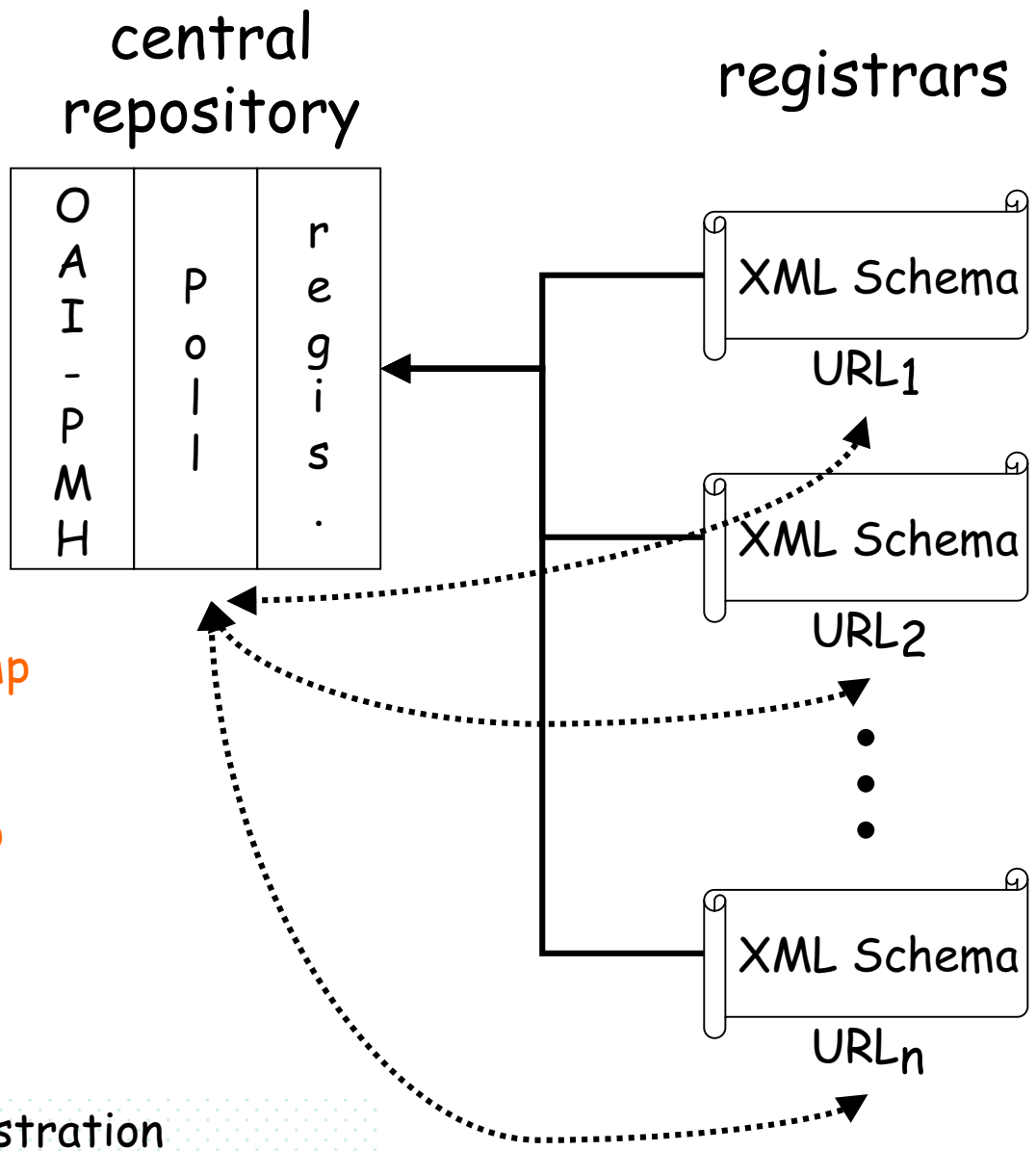
- fetch schema at schemaLocation
- log failure/success
- compare fetched Schema with mirror
  - changed => replace mirror
  - removed => deregistered



Slide from Van de Sompel

OAI repo:

- record-ids = schemaLocation
- oai_dc record :
  - registration info
  - (de)registration datestamp
- xsi record :
  - mirror schema
  - schema update datestamp
- poll record :
  - process info
  - recent poll datestamp



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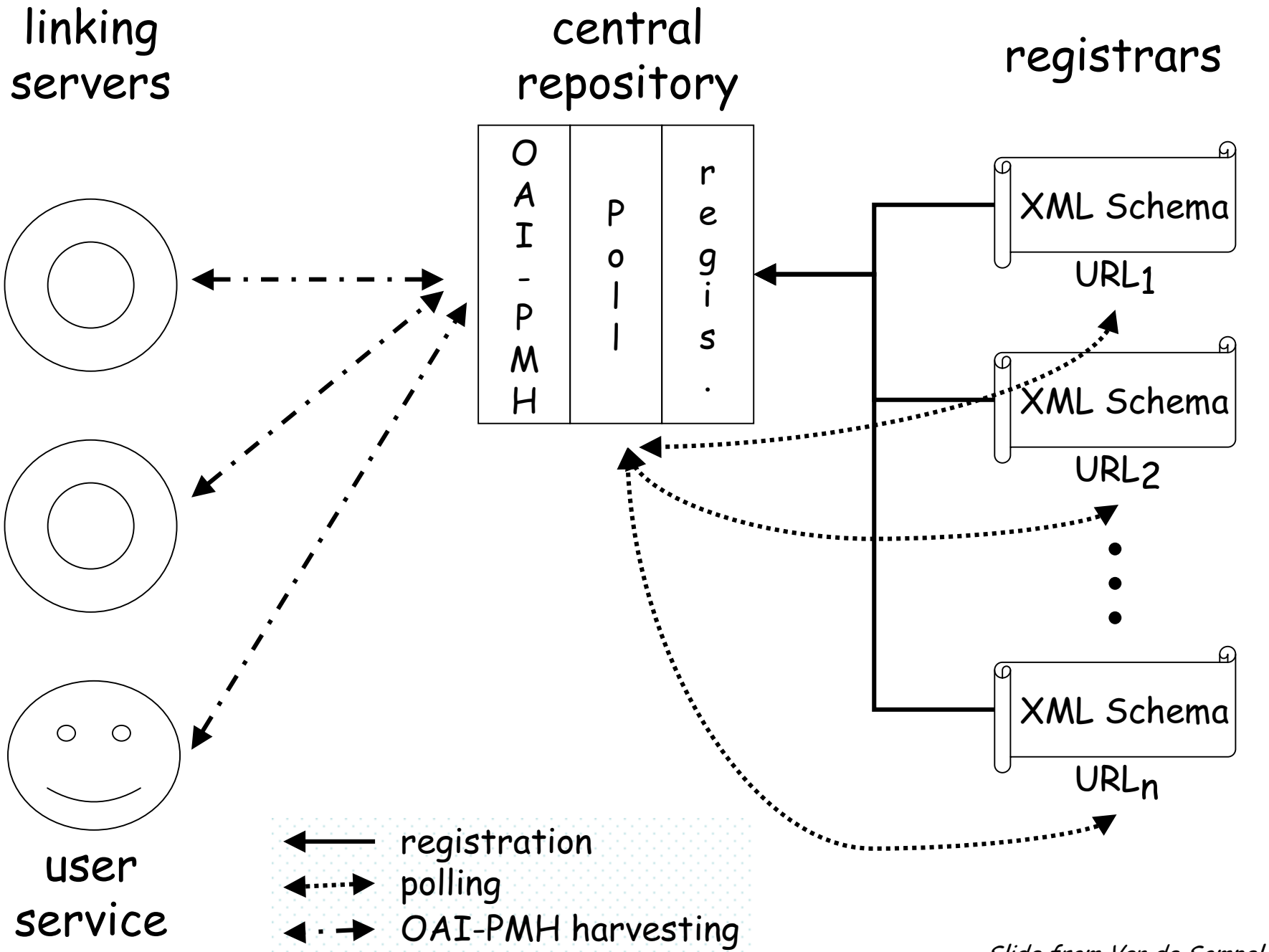

Slide from Van de Sompel

Conclusions

- DPs continue to proliferate
  - and spawn SPs!
- SPs are / are becoming a competitive market
  - e.g., at least 10 different interfaces to arXiv metadata
  - growing sophistication of services
  - differentiation of SPs will be on features that have little to nothing to do with OAI-PMH

Conclusions

- Protocol / transport gateways
  - Dienst <-> OAI
    - DOG, http://www.cs.odu.edu/~tharriso/DOG/
  - Z39.50
    - ZMARCO (UIUC)
  - SOAP
    - prototypes @ VT (Suleman) & ODU (Zubair)
  - WebDAV/DASL
    - resurrect DASL?

OAI-PMH Will Have Arrived When:

- general web robots issue OAI-PMH verbs
  - …DP9 will no longer be needed
  - requires shift in "control": harvester or repository?
- mod_oai is developed and is included in the default Apache configuration
- OAI-PMH fades into the background
  - similar to TCP/IP, http, XML, etc.
  - next year's workshop is on OpenURL