IntegraL: Link-based Integration of Library Digital Collections and Resources

NJLA Conference: NJLA CUS/ACRL-NJ Technology Innovation Forum

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Members of the Team …

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IntegraL Project Manager and Co-Principal Investigator

Research interests:

- Text mining
- Dynamic document clustering
- Semantic query expansion
- Bioinformatics
- Information extraction & retrieval

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IntegraL Library Technical Support and System Evaluation

Responsible for:

- Staff, services related to technology including web services, ILS system and digital technology
- Acquisitions of print collections & cataloging
- **Improve quality of services across all library functions**

Members of the Team …

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Michael Bieber
Principal Investigator

Richard Sweeney
NJIT University Librarian

- ☑ **Vahid Hamidullah**, Undergraduate Student
- ☑ **Eric Koppel**, Undergraduate Student
- ☑ **Pawel Bokota**, Undergraduate Student
- ☑ **Said Bleik**, Ph.D. Student
- ☑ **NJIT Librarians**

The Question …

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Why do we need libraries, library resources or librarians when we have Google?

A typical question often asked by inexperienced library users … **not by serious information seekers.**

The Answer …

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Invisible Web aka the "Deep Web"

Robert Lackie spent most of the last decade educating libraries users and librarians about

"**Those Dark Hiding Places: The Invisible Web** …"

http://www.robertlackie.com/

Michael Bergman, a web scientist, first coined the phrase

"**Deep Web**"

http://www.mkbergman.com/

Deep Web refers to web content that are created dynamically as a result of a specific search executed by a searcher

The Deep Web …

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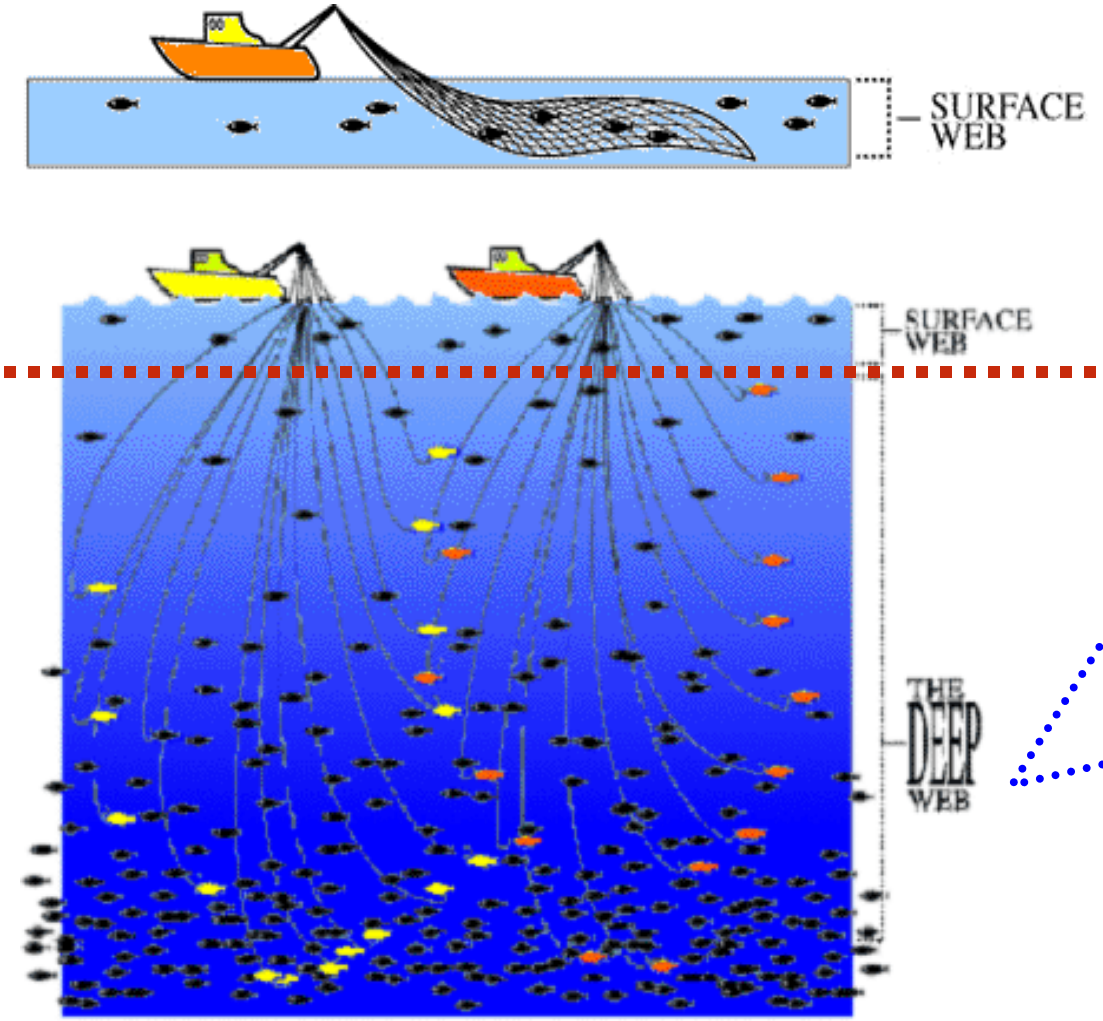

- *"Serious information seekers can [not] avoid the importance or quality of deep Web information."*
- *" Deep Web information is only a component of total information available."*
- *"Searching must evolve to encompass the complete Web."*

The Deep Web …

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Google does not bring relevant resources directly to the users.

The New York Times

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February 23, 2009

Exploring a 'Deep Web' That Google Can't Grasp

By ALEX WRIGHT

One day last summer, Google's search engine trundle
the list of Web pages it knows about. But as impossibl
entire Web.

Beyond those trillion pages lies an even vaster Web o
schedules, medical research and all kinds of other mat
engines.

The challenges that the major search engi
explaining why they still can't provide sati
London next Thursday?" The answers are

Now a new breed of technologies is taking
corners. When that happens, it will do mo
the way many companies do business online.

"…added the one trillionth address to the list of web pages… beyond those trillion pages lies…web of hidden data…all kinds…materials stored in databases that remain…invisible to search engines."

"…deep web technologies hold the promise of achieving [web data integration], by automating the process of analyzing database structures and cross-referencing the results."

The Web + The User…

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- The Web is …
  - incredibly successful at delivering information to users and searchers;
  - not yet a well organized repository of presentable structured HTML pages;
  - a conglomerate of volatile HTML pages.
- The User expects …
  - an urgent need to go beyond browsing;
  - response dynamically to users' queries;
  - wants to get there faster.

Web of Organized Repository of Structured Content

… health site could cross-reference data from pharmaceutical companies with the latest findings from medical researchers, or

… a local news site could extend its coverage by letting users tap into public records stored in government databases.

The Challenge …

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You mean all that relevant information I need is hidden. I'm unable to access it and therefore preventing me from getting an "A" on my research paper? What will I tell my parents?

Challenges for searchers

- need to know what resources to use before they can access them,
- find related information from other resources,
- leave current resource to search related information from other resources.

What is IntegraL ?

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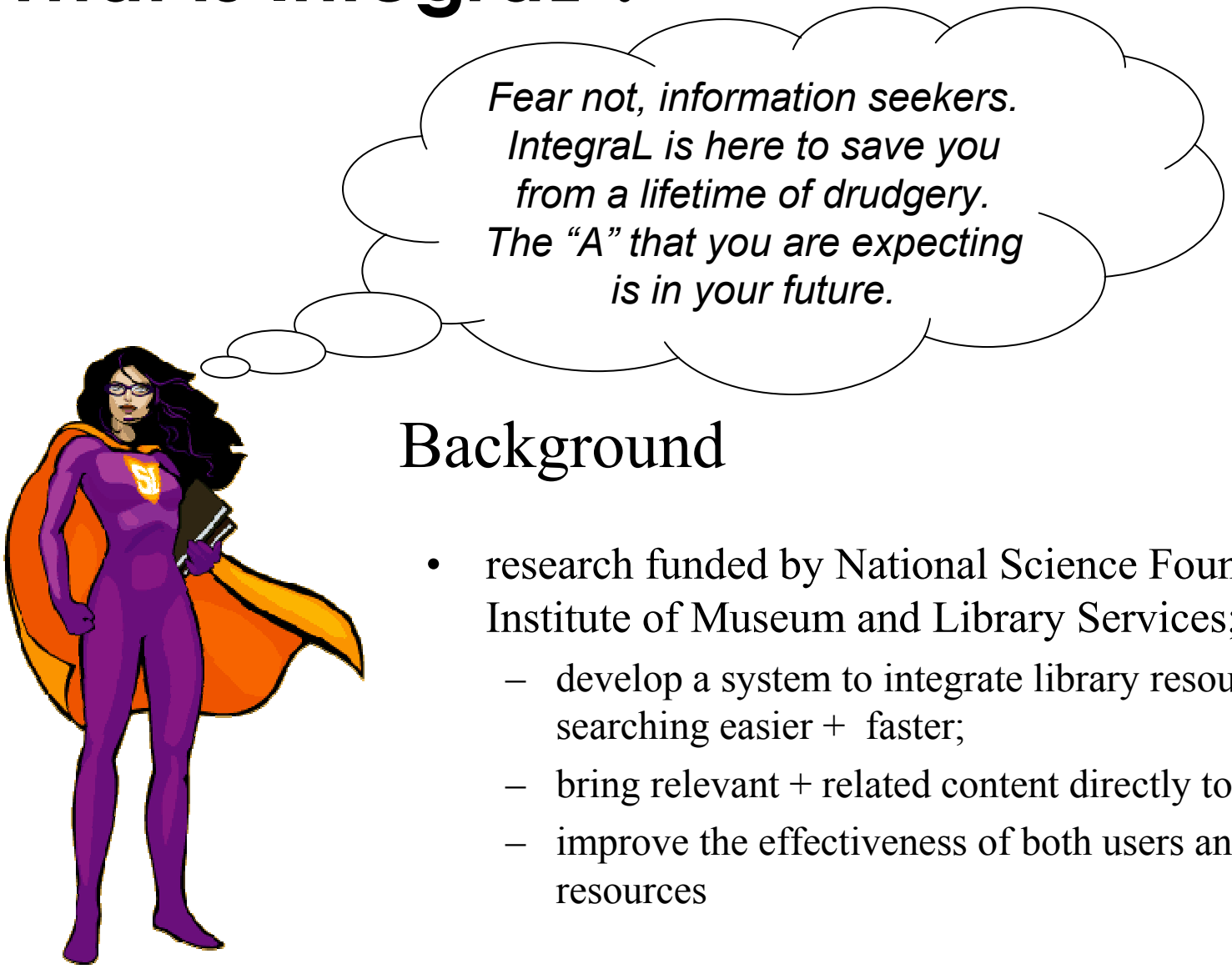

Background

- research funded by National Science Foundation and Institute of Museum and Library Services;
  - develop a system to integrate library resources to make searching easier + faster;
  - bring relevant + related content directly to the users;
  - improve the effectiveness of both users and library resources

What is IntegraL? …

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... is an open source software search engine

... is designed to allow users to efficiently search online resources

- authenticated + non-authenticated

... is browsable across online resources through "linking" of element of interest icons

What is Integral? …

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Element of Interest

- Icons highlight Element of Interest (EOIs)
  - allow ease of integration between various resources
  - supports drill-down for more detailed information on Elements if Interest (EOIs)
  - empowers user's deep search via NER (name entity recognition) plug-ins

1 Semantic deep web: automatic attribute extraction from the deep web data sources

Yoo Jung An, James Geller, Yi-Ta Wu, Soon Ae Chun

March 2007 **SAC '07:** Proceedings of the 2007 ACM symposium on Applied computing

Publisher: ACM Request Permissions

Full text available: Pdf (218.34 KB) Additional Information: full citation, abstract, re

What is IntegraL? …

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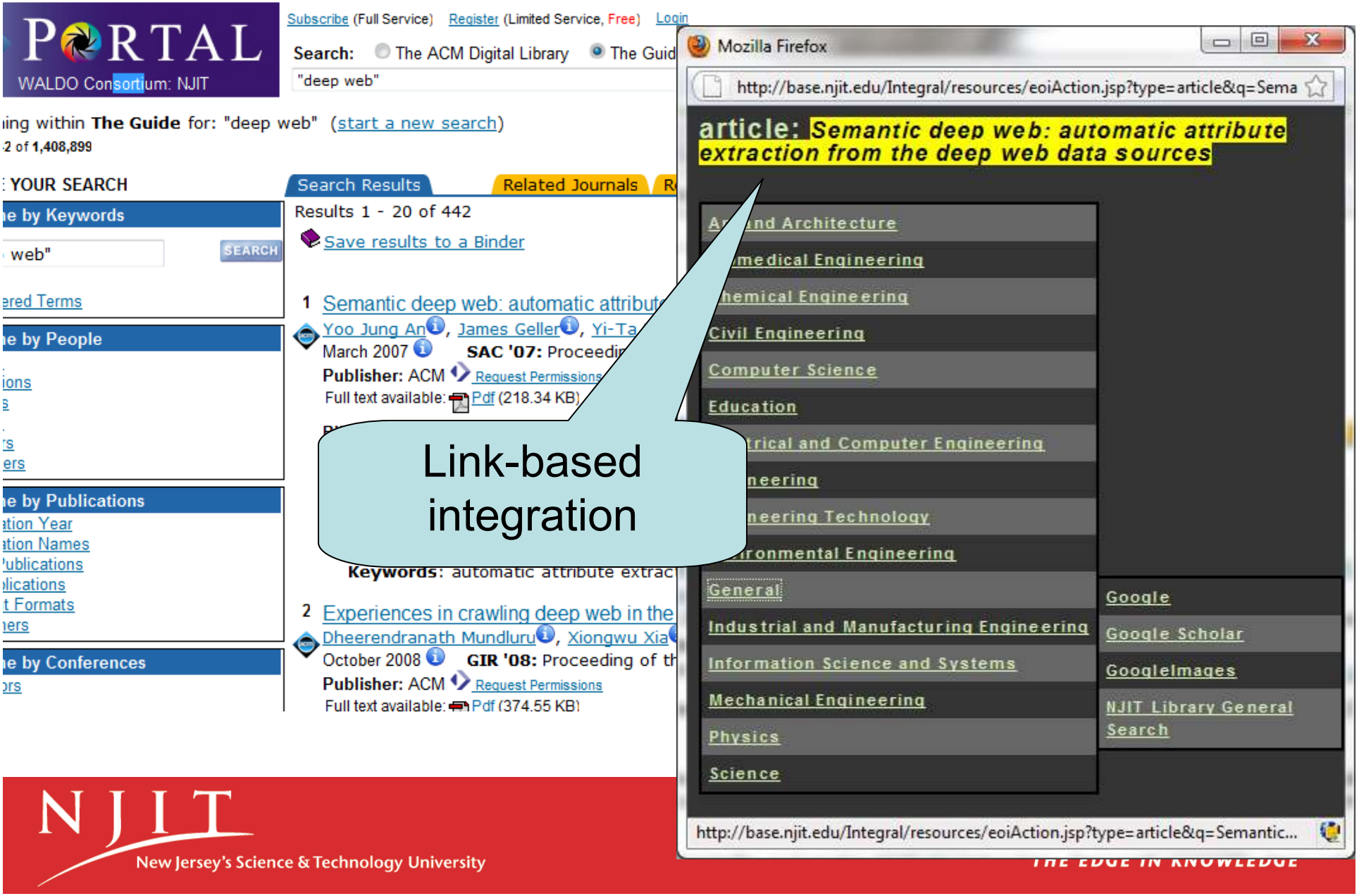

What is IntegraL ? …

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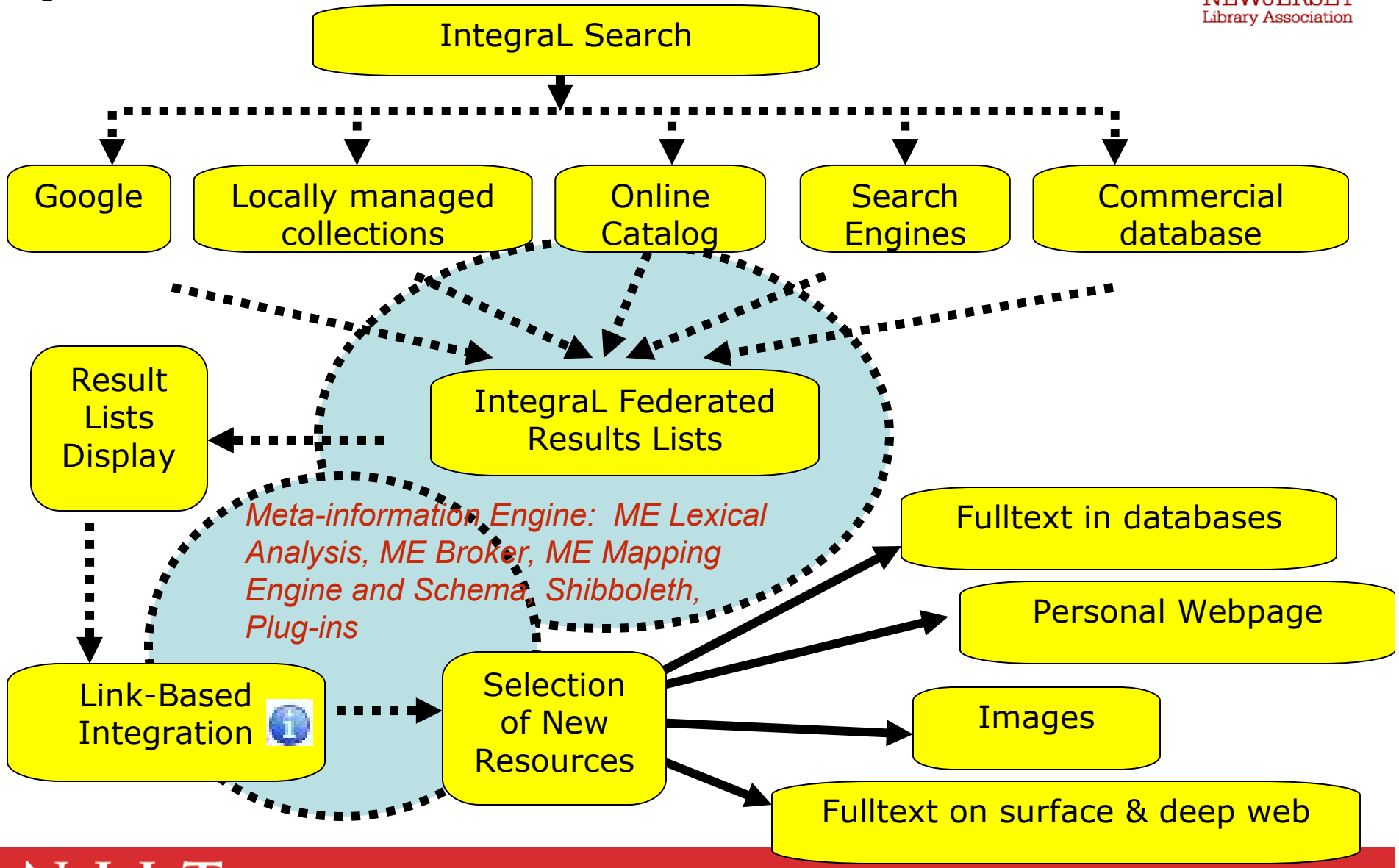
IntegraL = **Integra**ting + **L**ibraries

- IntegraL search engine focuses on:
  - linking online resources selected by librarians
  - providing customized user preferences to the types of linked information.
- IntegraL system architecture:
  - Provide searchers with multiple access points
  - enables searchers to navigate unlinked web content
  - seamlessly links various resources to make browsing across resources easier
  - SSO with Shibboleth
    - your credentials is recognize across various services including email servers, database subscriptions, chat, etc. on your network.

System Architecture



System Architecture …

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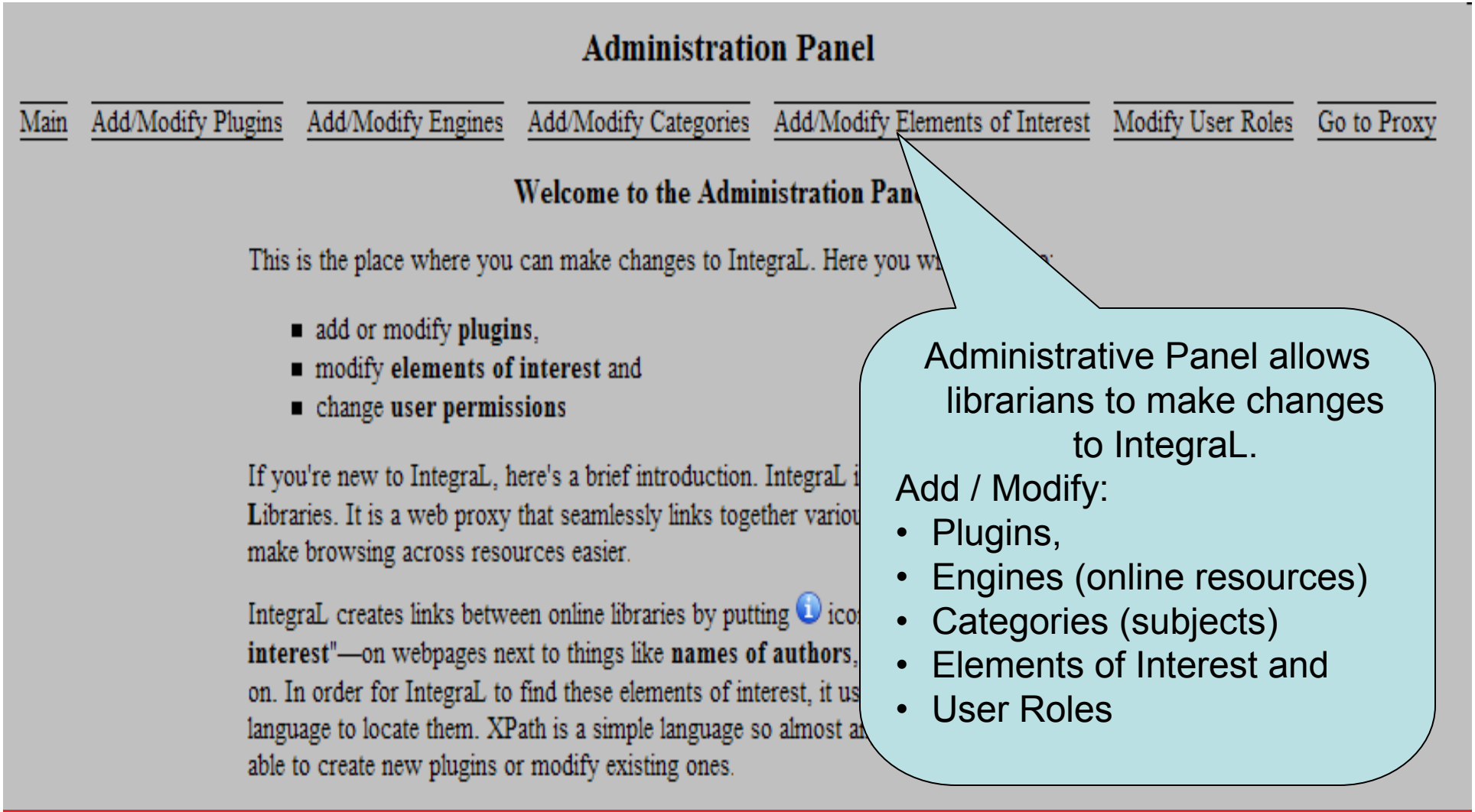

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IntegraL Demo

IntegraL Demo …

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NJIT New Jersey's Science & Technology University

IntegraL Demo

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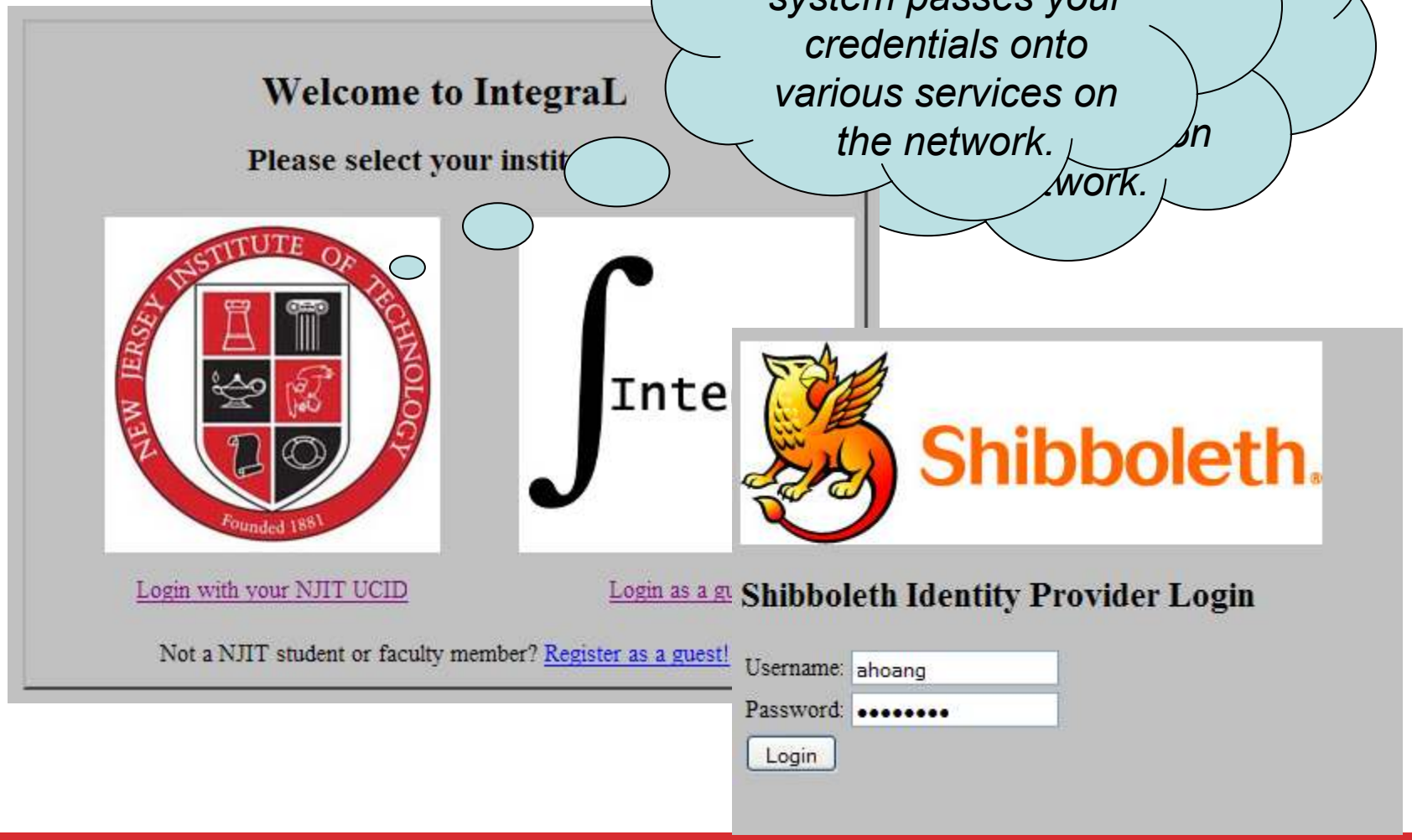
You only have to login once. Your system passes your credentials onto various services on the network.



IntegraL Demo

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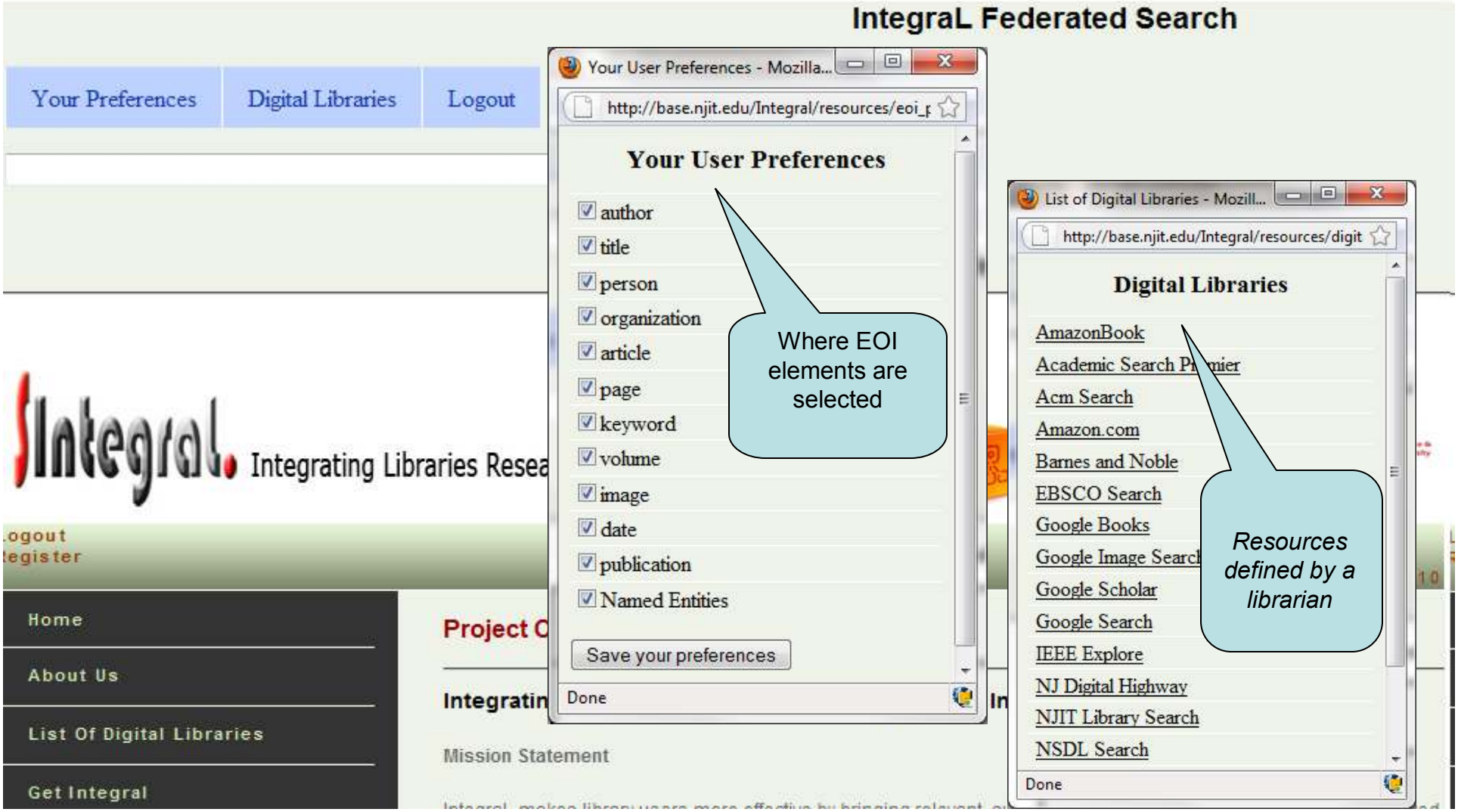
NJIT New Jersey's Science & Technology University

THE EDGE IN KNOWLEDGE

IntegraL Demo …



Integral Demo …

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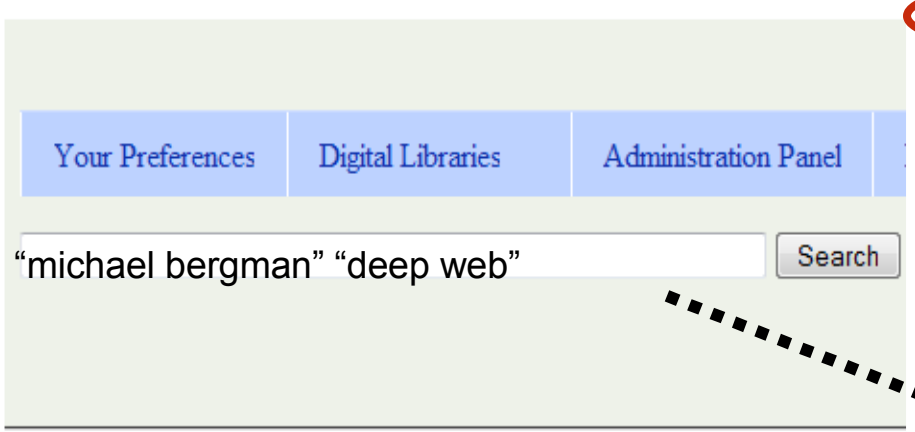

Federated Search Results

Google	4200 results
Ask Search	132 results
NJIT Library Author Search	0 results
NSDL Search	0 results
ACM Search	0 results
Google Book Search	0 results
GoogleImages	93 results
Scopus Affiliation Search	0 results
Google Scholar	40 results
IEEE Book Search	0 results
ScienceDirect	1 results

IntegraL Demo …

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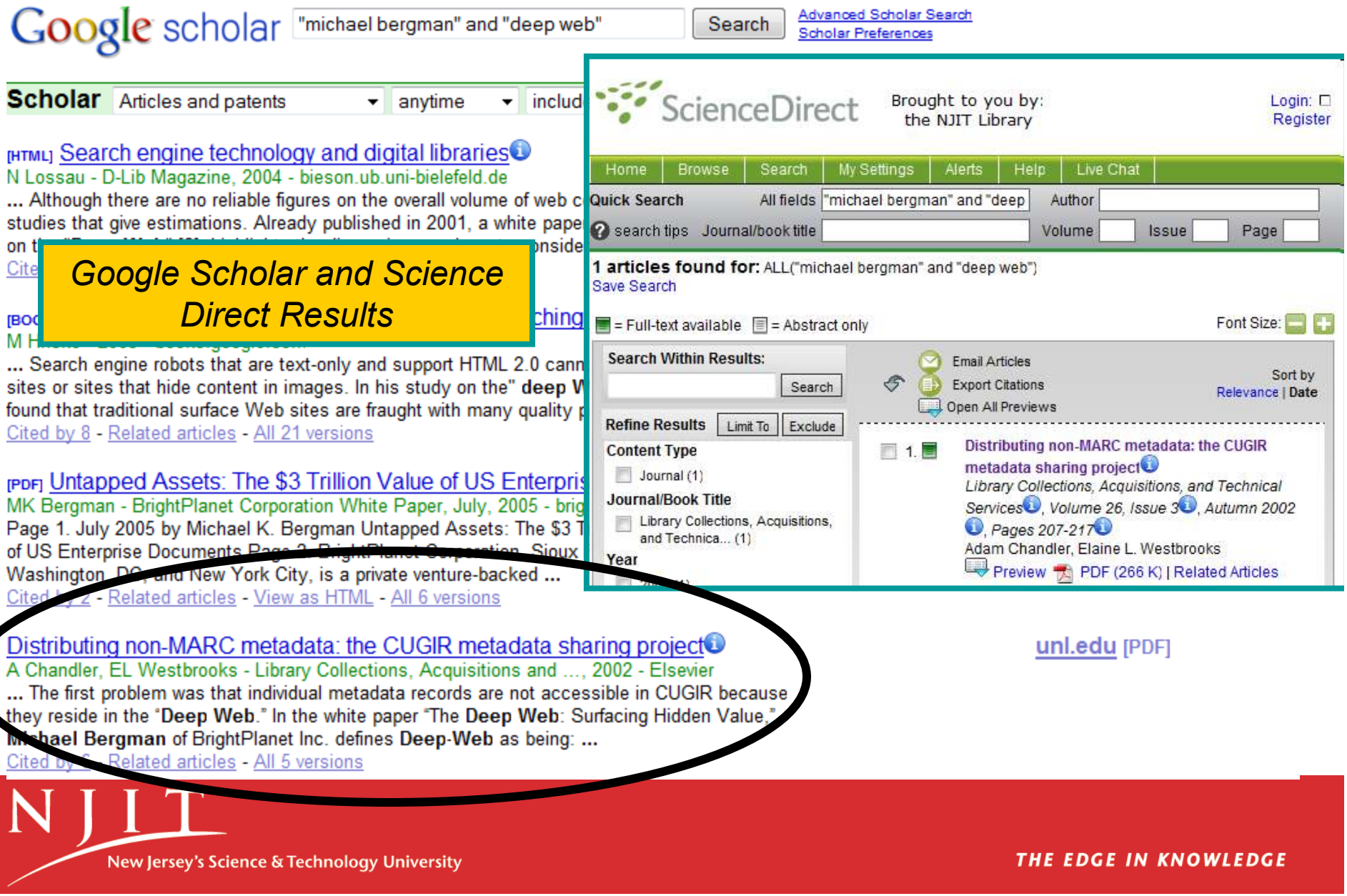

IntegraL Demo …

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ScienceDirect

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Home | Browse | Search | My Settings | Alerts | Help | Live Chat

Quick Search | All fields: "michael bergman" and "deep | Author | search tips | Journal/book title | Volume

Library Collections, Acquisitions, and Technical Services
Volume 26, Issue 3, Autumn 2002, Pages 207-217

Article | Figures/Tables | References | PDF (266 K)

doi:10.1016/S1464-9055(02)00247-6
Cite or Link Using DOI

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Special section on metadata

Distributing non-MARC metadata: the CUGIR metada

Adam Chandler[a], and Elaine L. Westbrooks[b]

[a] Cornell University, Central Technical Services, 110c Olin Library, Ithaca, NY 1485

[b] Cornell University, Albert R. Mann Library, Technical Services, Ithaca, NY 14853-5

Available online 1 October 2002.

address two access-related problems. The first problem was that individual metadata records are not accessible in CUGIR because they reside in the "Deep Web." In the white paper "The Deep Web: Surfacing Hidden Value," Michael Bergman of BrightPlanet Inc. defines Deep-Web as being:

> … content that resides in searchable databases, the results from which can only be discovered by a direct query. Without the directed query, the database does not publish the result. When queried, deep Web sites post their results as dynamic Web pages in real-time. Though these dynamic pages have a unique URL address that allows them to be retrieved again later, they are not persistent [27].

Integral Demo

Google and Google Images Results

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Google "michael bergman" and "deep web"

Web Show options... Results 1 - 10 of about 4,200 fo

AI3:::Adaptive Information » Mike Bergman on the semantic Web and ...
... Bioinformatics · Blogs and Blogging · Book Reviews · Brown Bag Lunch · **Deep Web** · Description Logics · Document Assets · Information Automation · irON ...
www.mkbergman.com/ - Cached - Similar

About Mike » AI3:::Adaptive Information
Nov 24, 2008 ... He was the author of BrightPlanet's award-winning Internet search tutorial and **deep Web** and document assets white papers. ...
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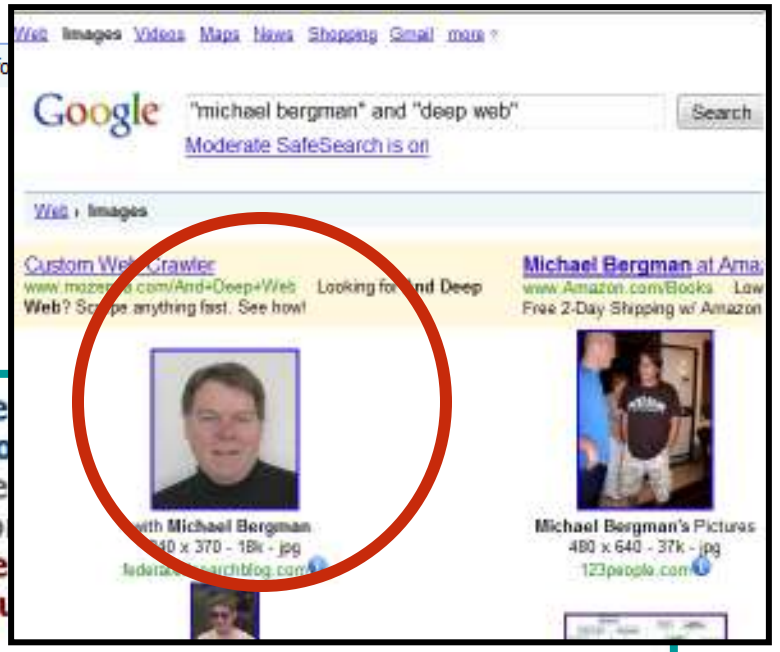

Integral Demo …

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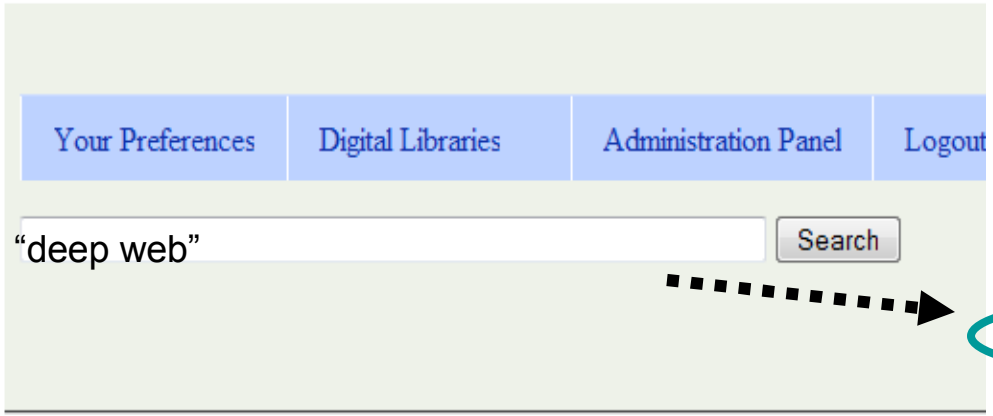

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NJIT Library Author Search	5599 results
NSDL Search	7 results
ACM Search	442 results
Google Book Search	0 results
GoogleImages	15100 results
Scopus Affiliation Search	0 results
Google Scholar	4280 results
IEEE Book Search	0 results
ScienceDirect	163 results

Integral Demo ...

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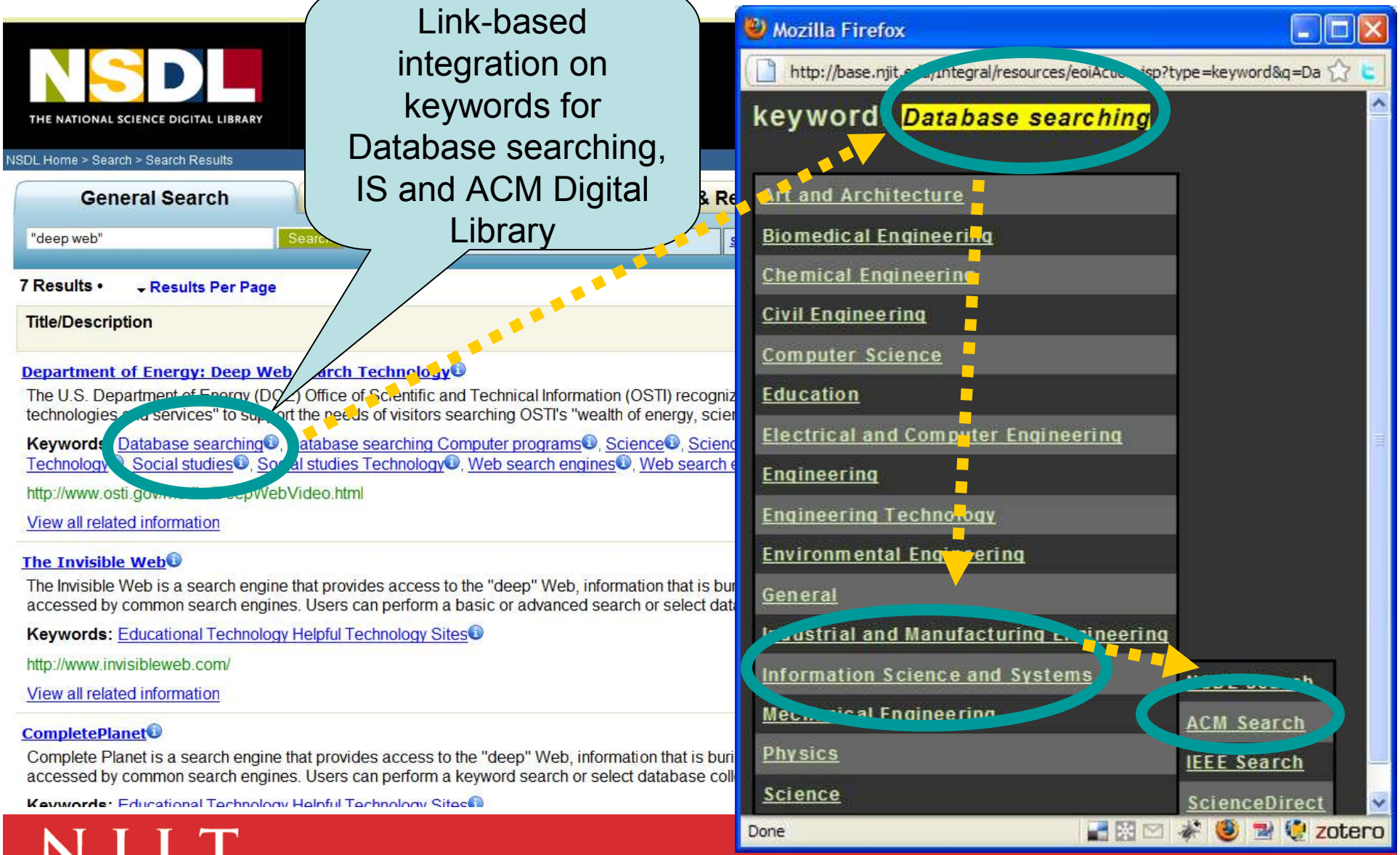
Link-based integration on keywords for Database searching, IS and ACM Digital Library



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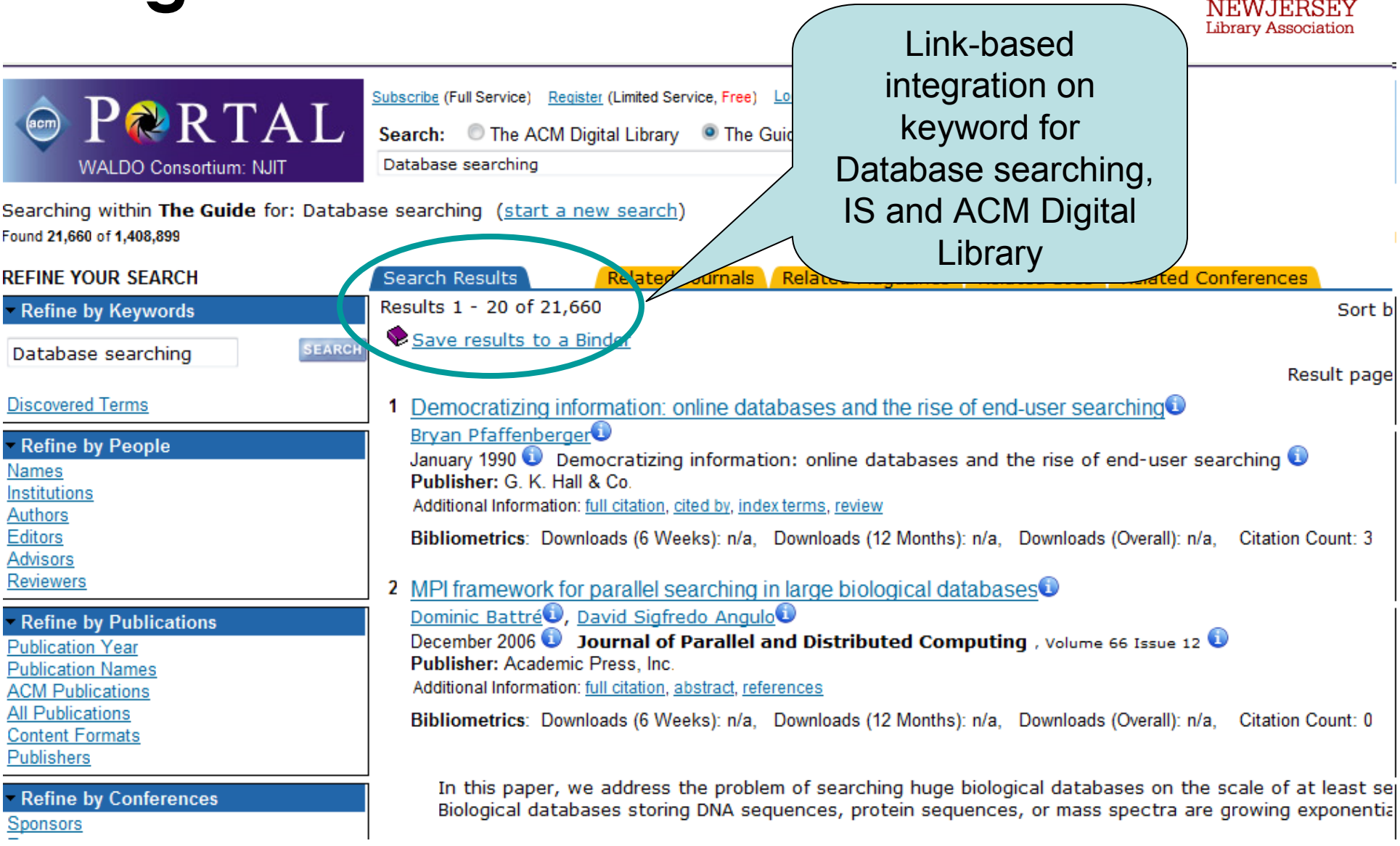

Link-based integration on keyword for Database searching, IS and ACM Digital Library

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Integral Demo …

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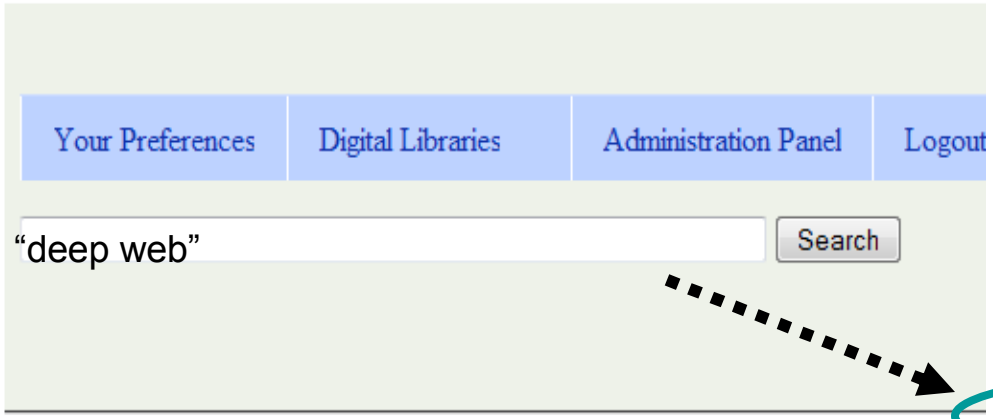

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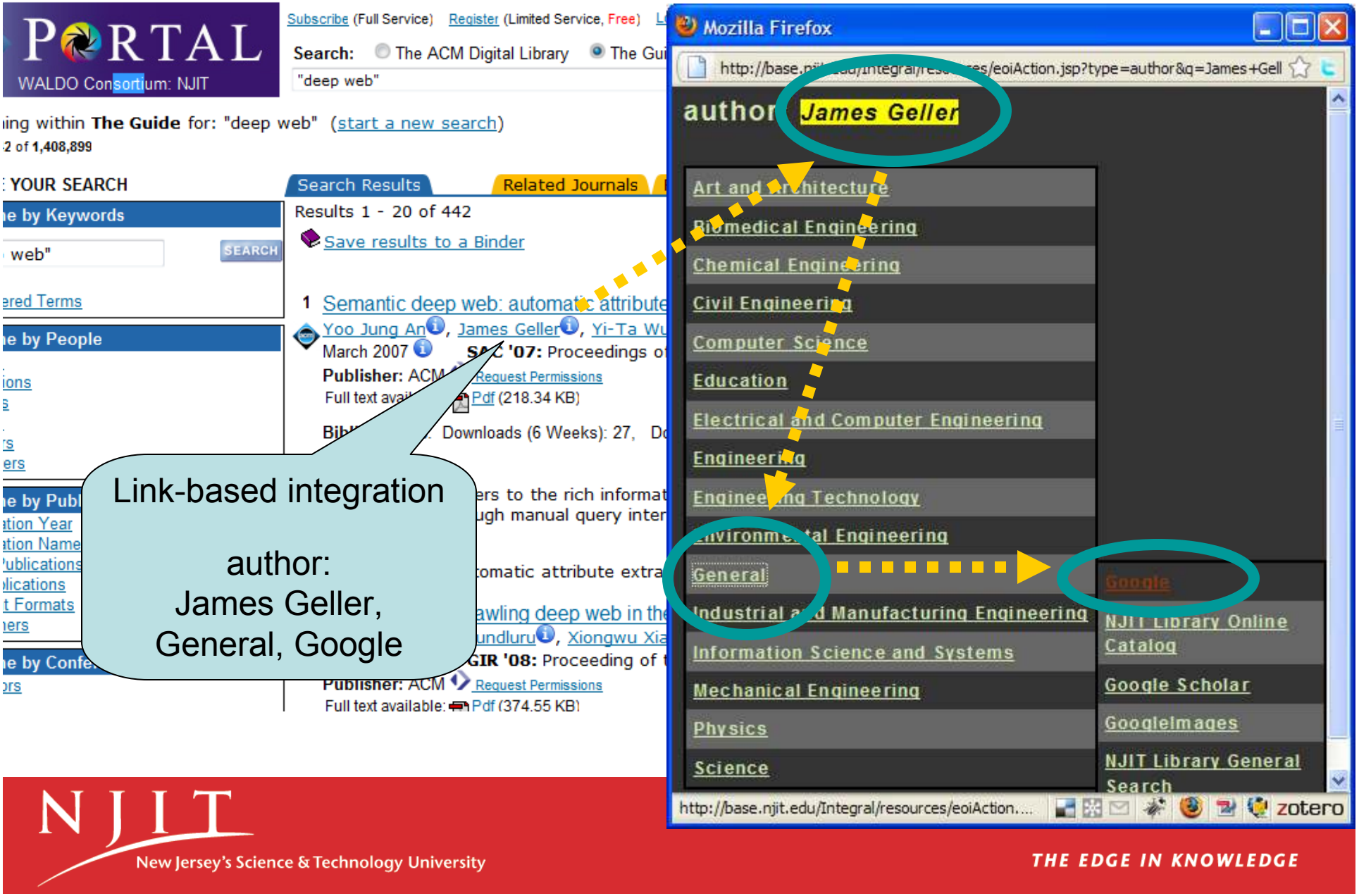

Integral Demo ...

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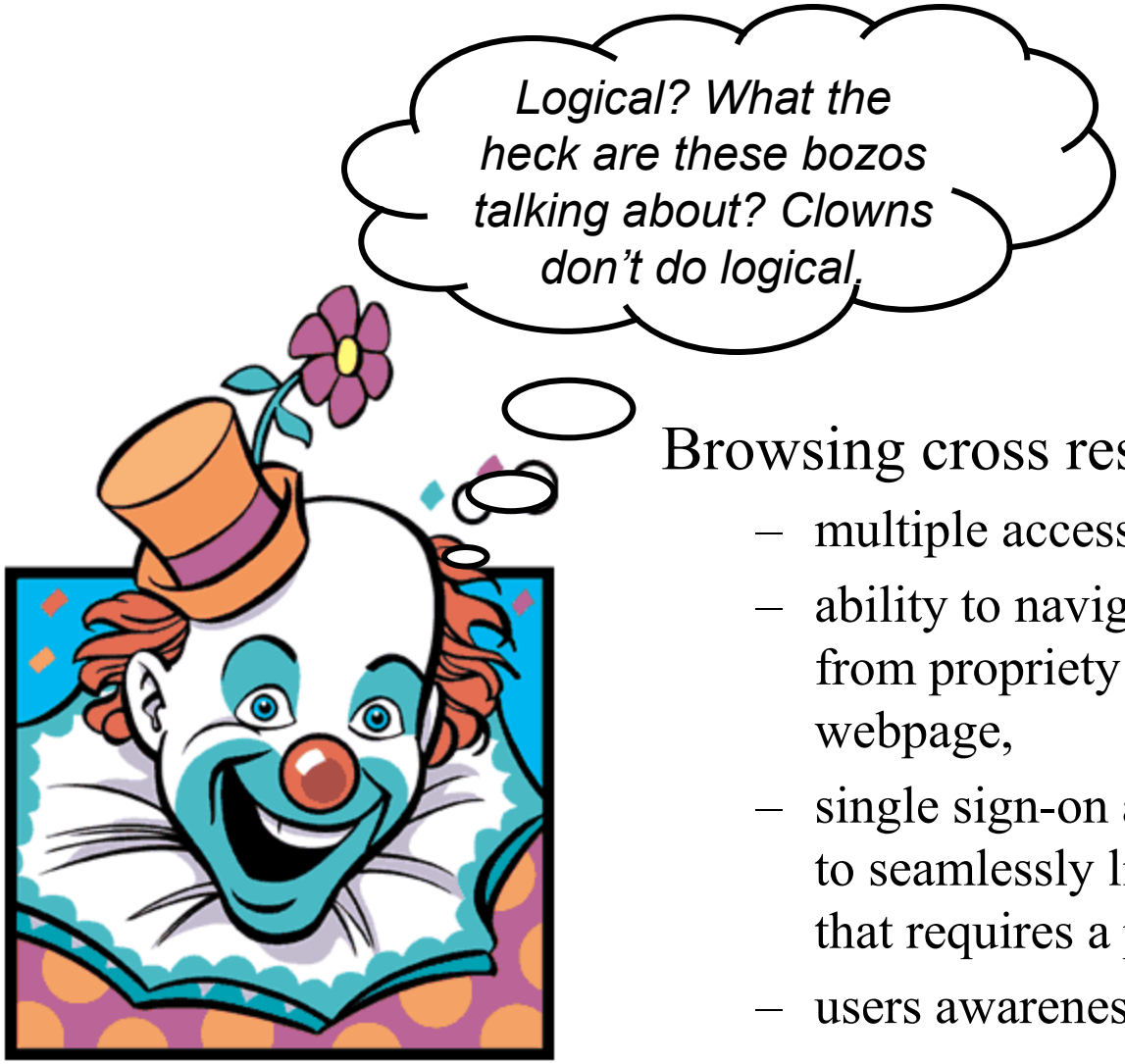
Benefits of Using IntegraL



Browsing cross resources

- multiple access points through linking of EOIs,
- ability to navigate unlinked web content e.g. from propriety databases to author's personal webpage,
- single sign-on authentication using Shibboleth, to seamlessly links to databases an resources that requires a password login.
- users awareness of additional resources

Benefits of Using IntegraL …

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- Direct access to system's features
  - access to admin panel via the web
  - Ability add/modify/delete resources with minimal technical expertise.
- Information Literacy
  - IntegraL automates a search strategy that experienced searchers might go through by manually and inexperienced searchers might not even be aware how to do.
- Bridging silos between surface web and deep web
  - This bridges the gap between the silos of the structured web and the deep web
  - IntegraL leverages metadata and structure from one silo into the another to create a better search toward getting better results

Links & Further Reading

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- Wikipedia Definition of "Deep Web" http://en.wikipedia.org/wiki/Deep_web
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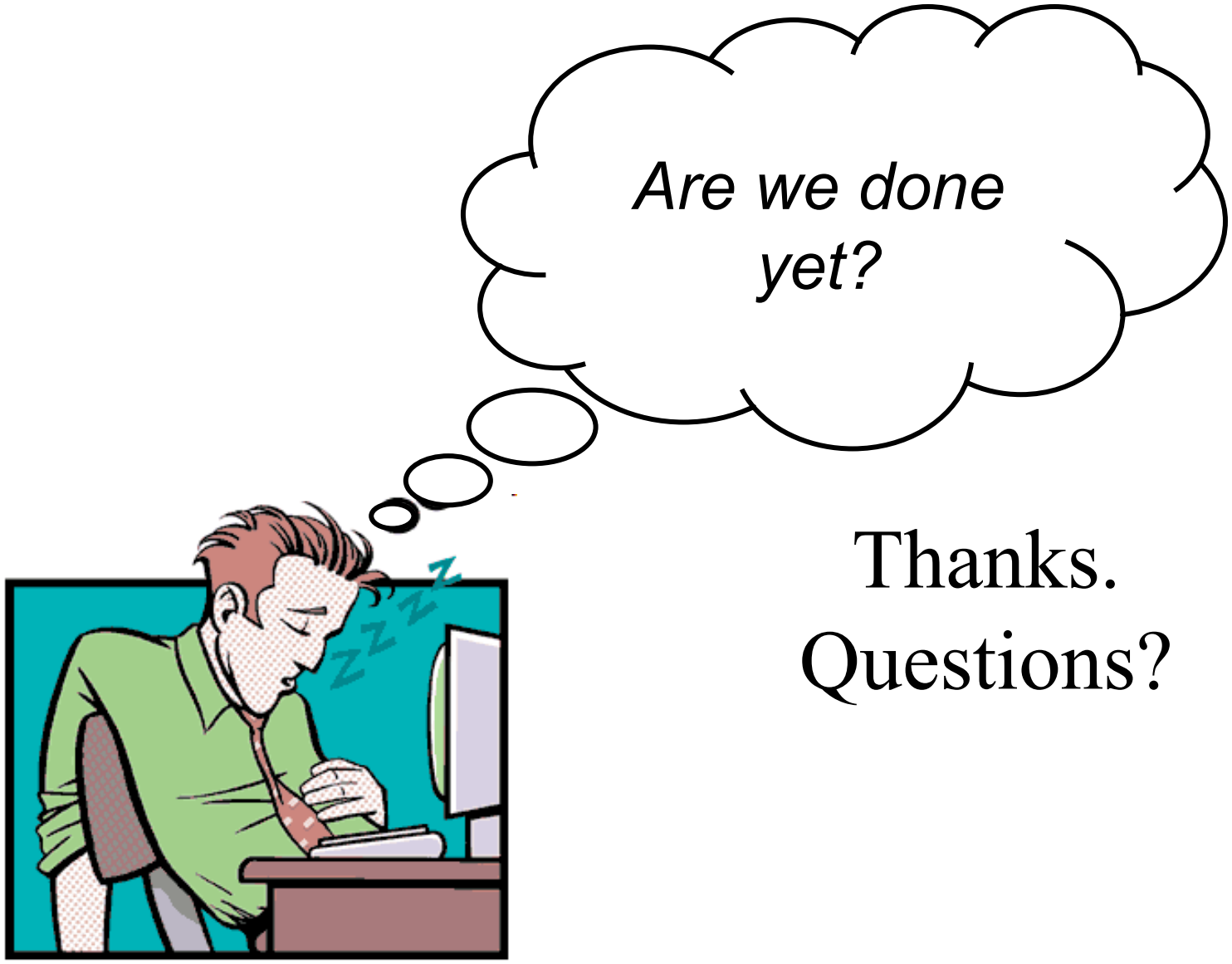

Thanks.

Questions?