Architecture and Development of CAS IR GRID

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Outline

- Background and Some Considerations
- System Architecture of CAS IR Grid
- Two-phased Pushing-up strategies
- Lessons and Experiences from Implementation
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1. Background and Some Considerations

- **Scientists of CAS** *(Chinese Academy of Sciences)*
  - Play a very important role in Chinese science research
  - Publish many high standard papers abroad
    - But they could not always be disclosed and accessed by Chinese scientists
- **How to make full use of these high standard academic resources is a big problem for scientists, policy makers and librarians in CAS.**
1. Background and Some Considerations

- In 2007, the CAS Institutional Repository Grid was brought forth
  - Each institute establishes its own local repositories as a node of the Grid
  - NSL constructs a centralized metadata repository, which could harvest the metadata of academic resources stored in many distributed institutional repositories
  - NSL also keeps an integrated search interface for the resources and provides other enriched services
Future Institutional Repository Landscape CAS

- 12 branches
- 97 institutes
- 9 supporting institutions
- 1 Grad Schol & 1 University

Graduate School of Chinese Academy of Sciences

Institutes in Beijing area

Shenyang Branch

Changchun Branch

Shanghai Branch

Hangzhou Branch

Xian Branch

Lanzhou Branch

Kunming Branch

Chengdu Branch

Guangzhou Branch

University of Science and Technology of China
1. Background and Some Considerations cont.

- CAS IR Grid, which targets at
  - providing the organizational and technological framework for a CAS-wide IR infrastructure for research
  - helping every institutes set up their own IRs to increase the visibility of, and preserve their research outputs
  - implementing a harvester-based cross-repository search and browse service to enhance exposure of the CAS’s research output as a whole
  - making the GRID ready for becoming building blocks for national or international wide repository infrastructure
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2. System Architecture of CAS IR Grid

Federated Institutional repository (Core)

IR for Inst. Of Chem.
IR for Inst. Of ....
IR for Inst. Of ....
IR for Inst. Of ....
IR for Inst. Of ....

eJournals
eBooks
OAI Repos.

"Hub and Spoke " Model
2. System Architecture of CAS IR Grid

User Service
[Knowledge browsing /Search/analyzing
[Communities | Inst. Profiling...]

Open API
[RSS/OAI/SRU...]

OAI Harvester

Metadata Repository

OAI DP
IR

Illustrated Functional Structure
2. System Architecture of CAS IR Grid

- In institute level, we focus functionalities of
  - depositing and publishing all sorts of knowledge outputs (Journal and conference papers, ETDs, documentary materials, research data, and etc.)
  - knowledge organization and sharing
  - long term preservation
  - knowledge asset auditing
  - knowledge relationship analysis and etc.
2. System Architecture of CAS IR Grid

- Whilst in the Academy level, we concern
  - knowledge discovery and scheduling
  - organization of Communities
  - cross-disciplinary or cross boundary content integration
  - institutional profiling
  - knowledge capacity analysis and etc.
2. **System Architecture of CAS IR Grid**

- Also, Federated Institutional Repository should be embedded into the services of Library, and be a component of research infrastructure of CAS

- We have two steps to go to build our IR Grid
  - **Step One:** Building Institutional Repositories in Institutes
  - **Step Two:** Building the Federated Repository for the whole Academy
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3. Phase I: Building Institutional Repositories in Institutes

- **Four tasks we have done**
  - Select the institute and set up examples for other institutes to follow
  - Develop IR based on DSpace
  - Integrate with the existing system (such as ARP)
  - Help the institute plan and implement IR
### 3.1 Select the institute and set up examples for other institutes to follow

- Best practice is very important for implementation of IR in institutes
- We are very careful in choosing the institute for setup a example
3.1 Select the institute and set up examples for other institutes to follow

- We laid out the principles for choosing institutes for set up examples
  - Urgent needs of IR from institute
  - Support from the head of institute
  - Clear understanding of IR from the library of the institute
  - Necessary input to the IR implementation
  - Experienced in implementation of information systems
3.1 Select the institute and set up examples for other institutes to follow

- After evaluation, Institute of Mechanics, CAS become our choice
- In addition to the evaluation criteria we laid out, the institute have some other features we prefer:
  - The head of library also is one of the head of institute
  - The library of the institute is one of the most active libraries in CAS
3.2 Develop IR based on DSpace

- To reduce the complexity and TOC of the system, we choose to use DSpace as fundamental institutional repository system.
- To make DSpace adapt to the Chinese information environment, we have localized the DSpace and built a Chinese institutional repository system based on it.
3.2 Develop IR based on DSpace

- What we have done to localize the DSpace
  - Make DSpace support Chinese
  - Extend the metadata schema of DSpace
  - Improve the workflow and interface of DSpace
  - Enhance the import/export functions of DSpace
  - Enhance access control of DSpace
  - Optimized OAI-PMH data provider, especially for exposing customized Metadata record
  - Support research statistics
  - Provide open interface for DSpace, for example SRU (Search and Retrieval from URL)
3.3 Integrated with the existing system

- An important problem is how to integrate the existing system.

- For example, since the institutes of CAS have implemented ARP (Academic Resources Plan) system which stored metadata of research outputs of the institutes. It is quite important for the institutes to use those existing metadata in the ARP systems to avoid duplicate input work.
3.3 Integrated with the existing system

- In fact, lots of existing systems to be integrated
3.3 Integrated with the existing system

- What we have done
  - Standard metadata and data package Format (for import and export in bulk)
  - Open search interface via SRU
  - Try to make good use of OpenURL functions provided by DSpace
3.4 Help the institute plan and implement IR

- In order to make Institute of Mechanics, CAS set up the IR and make IR function normally, we try to
  - Help the institute lay out a strategies
  - Help the institute organize the deployment team
  - Provide Training program for
    - the staff of library
    - the researchers of the institute
    - the students of the institute
3.4 Help the institute plan and implement IR

- We have also provided reference materials on implementation of IR:
  - Guidelines of planning and implementation of IR in CAS
  - The manual of IR in CAS
  - The system management guide of IR in CAS
  - Best practices of implementation of IR in CAS
  - .......

3.4 Help the institute plan and implement IR

- IR sited in institutes of Mechanics, CAS
3.4 Help the institute plan and implement IR

- Two test IR sites for NSL and OPT institute

- Other 4~6 institutes are queued to be launched their IR program this year
4. Phase II: Building the Federated Repository for the whole Academy

- **Three tasks need to be done**
  - Deploy the IRs and Spread the IRs to institutes across the country
  - Develop OAI metadata harvester system to harvest metadata from IRs in institutes to NSL center repository
  - Develop value-added and augmented services
4.1 Deploy IRs and Spread the IRs to institutes across the country

- Provide training program for
  - Librarian of the institutes
  - Management officer of the institutes

- Provide detailed materials for implementing IR
  - Manual, guide, best practices

- Provide strong technologies support for installation and deployment of IR
  - Install on spot
  - Remote install
  - Remote help system
4.2 Develop OAI metadata harvester system

- Now we consider the FIR are to be based on DSpace as well
- OCLC open source software OAI Harvester 2.0 are selected to be extended and integrated into DSpace via a way of plugin
- DRIVER’s open-sourced D-Net toolset are also considered whether it will be a better option for us, though
4.3 Develop augmented & value-added service

- Extend browsing and search system to provide content in a variety of logically organized dimensions
- Develop knowledge capacity and capability analysis functionalities
- Support OAI and SRW/U interface that it can be easily integrated with other systems
- ......
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5 Lessons and Experiences from Implementation

- The requirement of institutes is a factor more important than technologies
- Integrated with the existing system and other libraries services is very important
- Planning ahead will lead to successful deployment
- IR must be an open system provide necessary access interfaces
Thanks!

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