



Building China Academic Digital Library

**An introduction to CADLIS, a national project of CALIS
between 2002-2006**

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Outlines

- Introduction to CALIS
- Introduction to CADLIS
- Subprojects of CADLIS
- Progress of CADLIS



What's CALIS

China Academic Library & Information System

- A nation-wide public service system for academic libraries
 - Funded by the China government
 - Under the leadership of Ministry of Education (MOE)
 - Started in 1997
 - Directed by “Administrative Center for CALIS” which located in Peking University Library
- A nation-wide academic library consortium
 - More than 500 academic libraries as its members by now



Missions of CALIS

- To promote resources creation, preservation and share among academic libraries collaboratively
- To improve capabilities of information services of academic libraries with advanced technologies
- To provide teachers, researchers and students in universities with broaden access to all kinds of resources and library services of academic libraries in china



Phases of CALIS

- **Phase I:**
 - 1997-2001
- **Phase II:**
 - 2002-2006
- **Phase III:**
 - 2006-2010 (under planning)



Phase I of CALIS (1997-2001)

- The amount of fund is 80M RMB
- Major achievements:
 - (1) a nation-wide online cataloging system for academic libraries to catalog and build collaboratively a centralized Union-Catalog Database which is the largest one in china till now
 - (2) an Online Public Access Platform for the Union-Catalog Database, accessible to users and librarians
- CALIS organized and supported its members to build special resources
- As a library consortia, CALIS have been organized its members to evaluate and purchase e-resources jointly in cost-sharing models each year



Organizations of CALIS founded during Phase I

CALIS had the following centers in different levels

- **Administrative Center (AC) — Headquarter of CALIS**
- **CALIS Online Catalog Center (CUCC)**
 - Two of above are located in Peking University Library
 - CUCC is a relatively-independent division of **Administrative Center**
- **4 National Resource Centers**
 - 1.Science,Social Science, 2.Engineering, 3.Medicine, 4.Agriculture
 - Four of them are located in Peking Univ., Tsinghua Univ., Medicine School of Peking Univ., and China Agriculture Univ., respectively
- **7 Regional Centers and 1 National Defence Center**
 - Which are located in other eight first-class universities



Phase II of CALIS (2002-2006)

Started a new project : CADLIS

- To build China Academic Digital Library for high education
- To expand and reinforce organizations of CALIS
- To increase kinds of resources and capabilities of services of CALIS's centers and members in collaboration with each other



What's CADLIS

China Academic Digital Library & Information System

- A national project of CALIS during Phase II (2002-2006)
- Funded by the government (80M RMB too)
- Divided into a group of subprojects

- CADLIS can be viewed as a large-scale federated academic digital library of high-quality academic information resources to provide a seamless federation of collections and associated library services accessible to the broad community of over 1,000 universities in china



Newly-added Organizations of CALIS in Phase II

● CALIS Technical Center

- Founded in 2002
- As a division of “Administrative Center”
- To direct the research and development of standards & specifications, key technologies, architectures and applications of CALIS

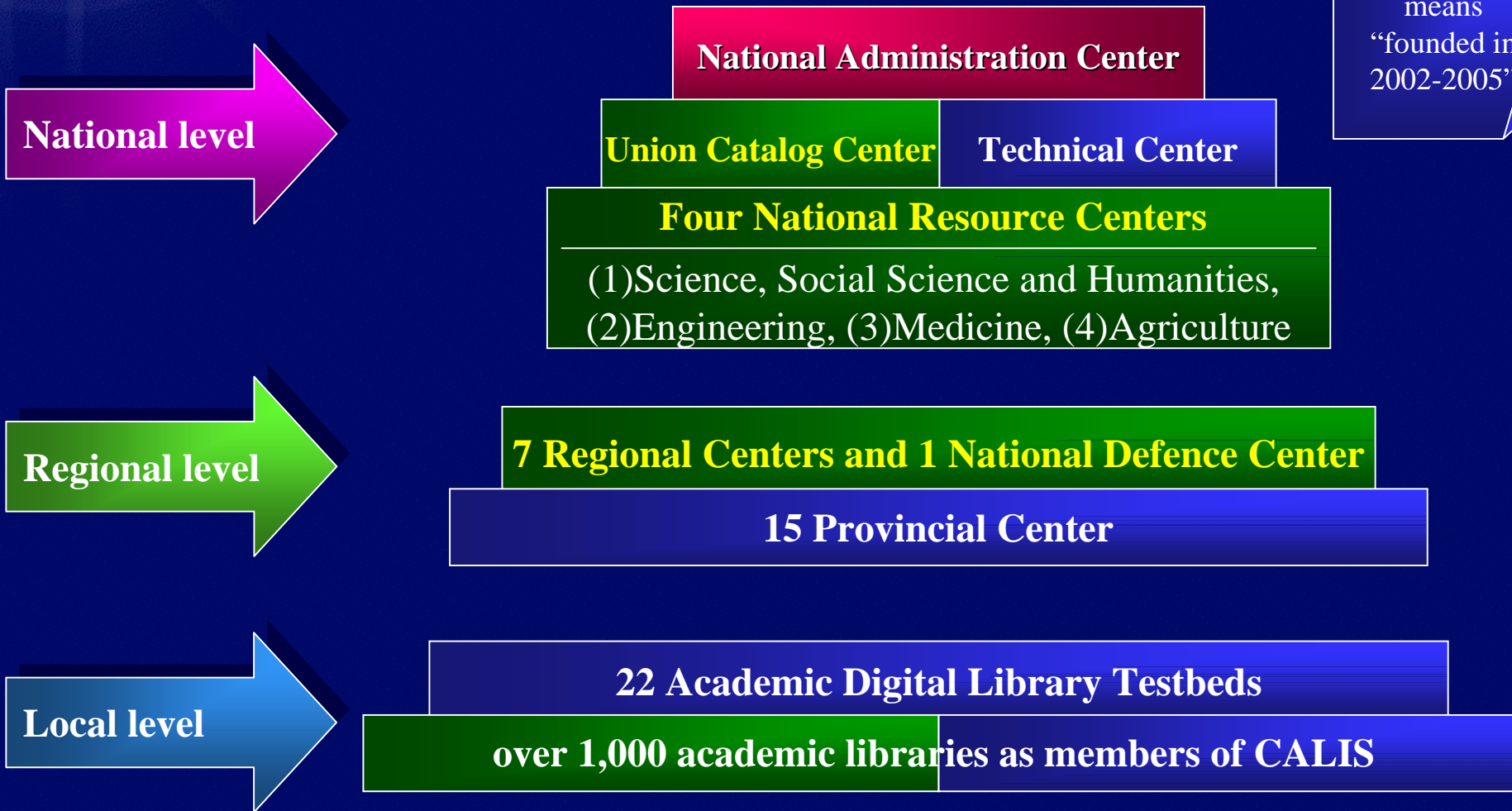
● 15 Provincial Centers of CALIS

- Formed between 2004-2005 successively
- Each of them is located in a first-class university in its province
- Funded by CALIS as well as the provincial government
- to enhance capabilities of services of CALIS and to serve more local academic libraries.



Organizational Structure of CALIS (3 levels)

❖ Blue Color means “founded in 2002-2005”





Goals of CADLIS

- 1) To make the standards and specifications of CADLIS and promote their adoption in academic libraries broadly
- 2) To design and develop an open architecture and infrastructure of China Academic Digital Library
- 3) To develop key applications and total technical solutions which are used to build digital libraries for the centers of CALIS and local academic libraries, and to support collections digitizing, creation, preservation and sharing, library service integration, communication and collaboration among over 100 academic libraries (These are viewed as core members of CALIS)
- 4) To support core members of CALIS to build digital collections collaboratively, which will be shared among all members
- 5) The newly-built local academic digital libraries can be connected to centers of CALIS and to each other



Resources in CADLIS (1/2)

- **CCC** (CALIS Current Contents) – a central database
 - 20 millions abstracts from 24,000 western journals
 - holdings covering 75% of academic libraries, public libraries and institutional libraries in china
- **Union Catalog database:**
 - 3 millions bibliographic records
 - 6 millions Holdings records from senior members of CALIS
- **China Thesis & Dissertation Database**
 - Central database : 100,000 abstracts and related full-text (16 pages only) from 100 universities



Resources in CADLIS (2/2)

● Teaching Reference Database

- Central database: 40,000 records coming from over 50 universities
- E-book database: 30,000 e-books related to teaching reference records

● Special Resources:

- 70+ special collections built by 70 academic libraries

● Other Resources:

- NetLibrary of OCLC
- etc.



Subprojects of CADLIS

1. Standards and Specifications of CADLIS
2. Digital Library Integrated Platform (**DLIP**)
3. Collaboratively Online Union-Cataloging System (**COUCS**)
4. Collaboratively Virtual Reference System (**CVRS**)
5. Networked System of Special e-Collections (**NS-SEC**)
6. Networked System of electronic Thesis & Dissertation (**NS-ETD**)
7. Networked System of Teaching Reference Information (**NS-TRI**)
8. Subject Gateway of websites for Key Disciplines of High Education (**SG-Web**)
9. Portals of CADLIS
10. Networks of Unified Services of CADLIS
11. Evaluation on Resources and Services of Academic Digital Libraries
12. Other subprojects (omitted here)



Subproject 1: Standards and Specifications of CADLIS

- It is led directly by Administrative Center
- Broad participations :
 - senior technologists and librarians come from Peking Univ., Tsinghua Univ., Wuhan Univ., Shanghai JiaoTong Univ., Xi'an JiaoTong Univ., Fudan Univ. and Xiamen Univ.
- Based upon
 - the national project “Research of standards of China Digital Libraries” (funded by Ministry of Science & Technology).
 - CALIS attends this project and undertakes one of its subproject.
 - International standards



Subproject 1: Achievement

● Its achievement:

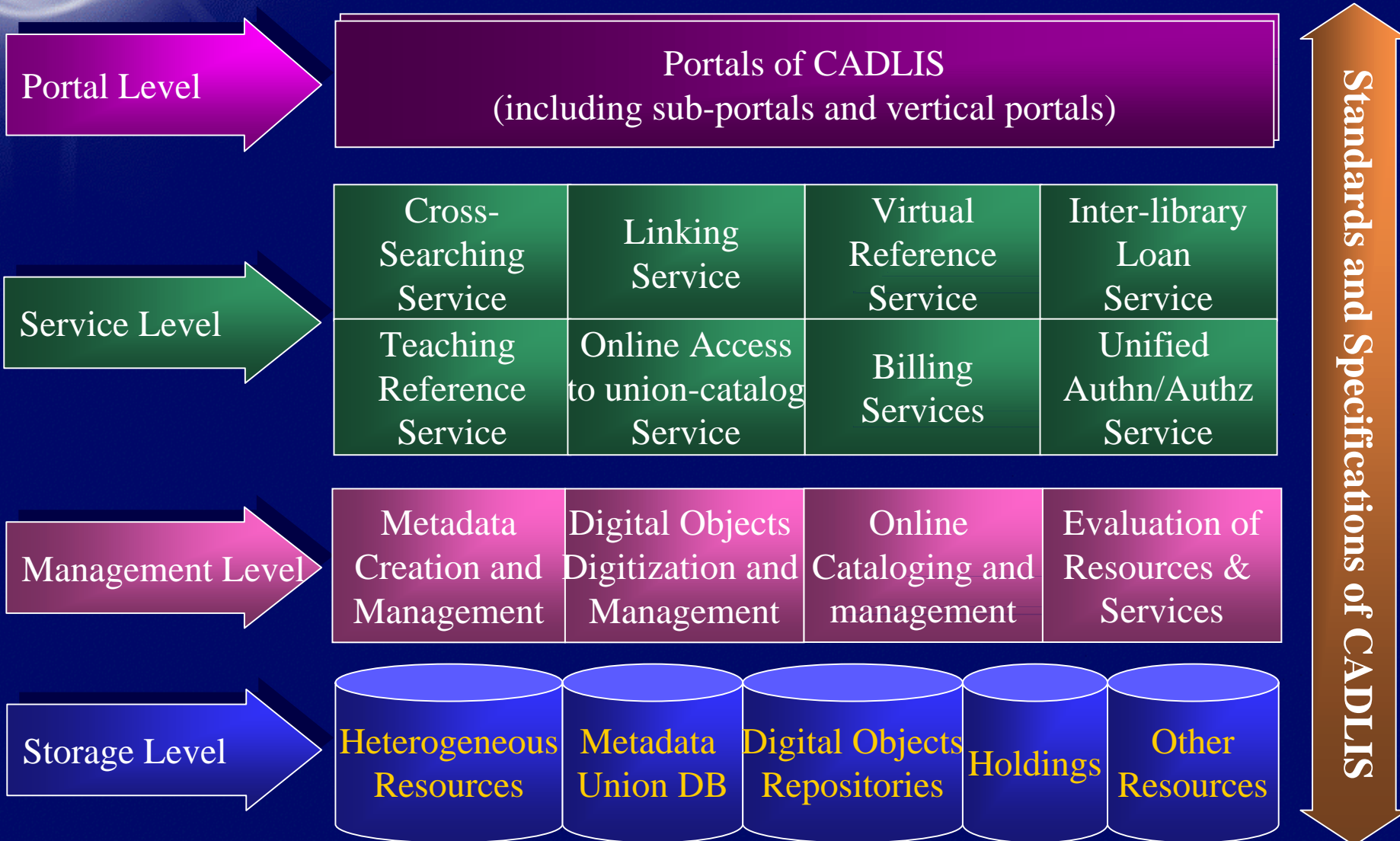
- the book named as “Technical Standards and Specifications of China Academic Digital Library & Information System”
- First drafted in Feb., 2004, published in Nov., 2004, revised in May, 2005
- Its next edition will be published in the first half of the year 2006

● The book covers:

- Architecture of CADLIS and its interoperability (includes interface protocols and their behaviors)
- Construction of Portals of CADLIS
- Metadata and digital objects
 - e-book, e-journal , thesis & dissertation, rubbings, rare books, atlas, genealogy, audio, and so on
- Digitization , creation, archiving, dissemination and harvest of resources
- Quality control criteria on resources
- Operation specifications, such as retrieval and access, virtual reference, collection management, cataloging, inter-library loan, and so on.

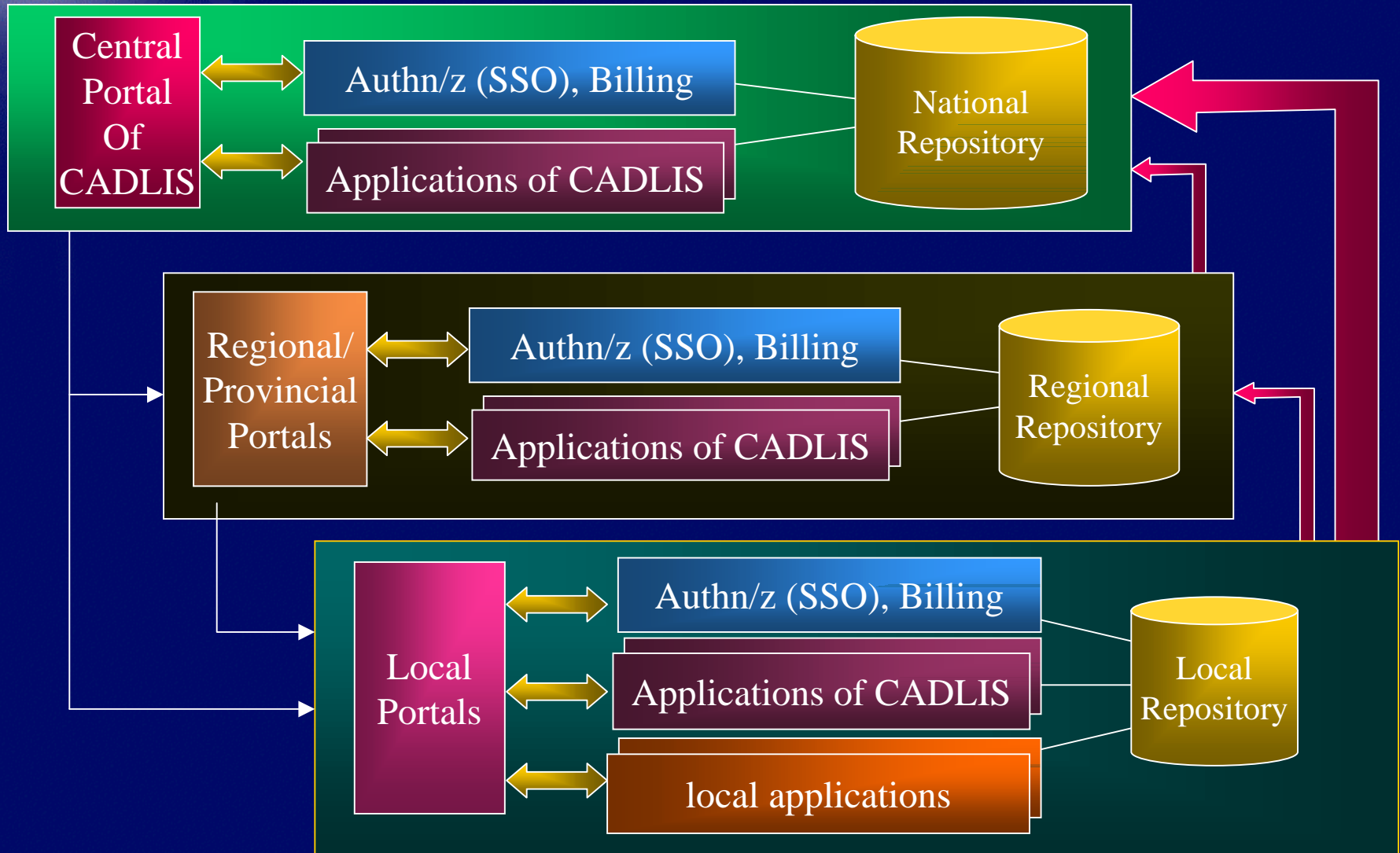


Architecture of CADLIS





3-level Deployment of CADLIS





Subproject 2: Digital Library Integrated Platform (DLIP)

- It is designed and developed by **CALIS Technical Center**
- It consists of a group of key applications which can integrate other applications and resources and allow librarians to build academic digital libraries easily.
- Some applications of DLIP are used to build Networks of Unified Services of CADLIS



Subproject 2: Key Applications of DLIP

	Applications	Description	Std. & Spec.
1	Portal Servers	Used to build portals of academic digital libraries, and can be able to integrate other applications and resources through portlets	JSR 168
2	Unified Identity Server (UIS)	Provide single-point services of authentication and authorization, as well as federated authentication between two libraries.	OASIS SAML 1.1
3	Unified Search System	To provide cross-searching service among multiple heterogeneous resources	ANSI/NISO Z39.50, Zing, RSS, ODL
4	Linking Server	an OpenURL resolver between different resources in context of users	ANSI/NISO Z39.88 (OpenURL)
5	Inter-library Loan System	Used to provide Inter-library Loan services and document delivery services between two of libraries	ISO10160/10161
6	Billing System	Used to charge fee of paper-per-view services for commercial resources	Simplified ebXML



Subproject 3: Collaboratively Online Union-Cataloging System (COUCS)

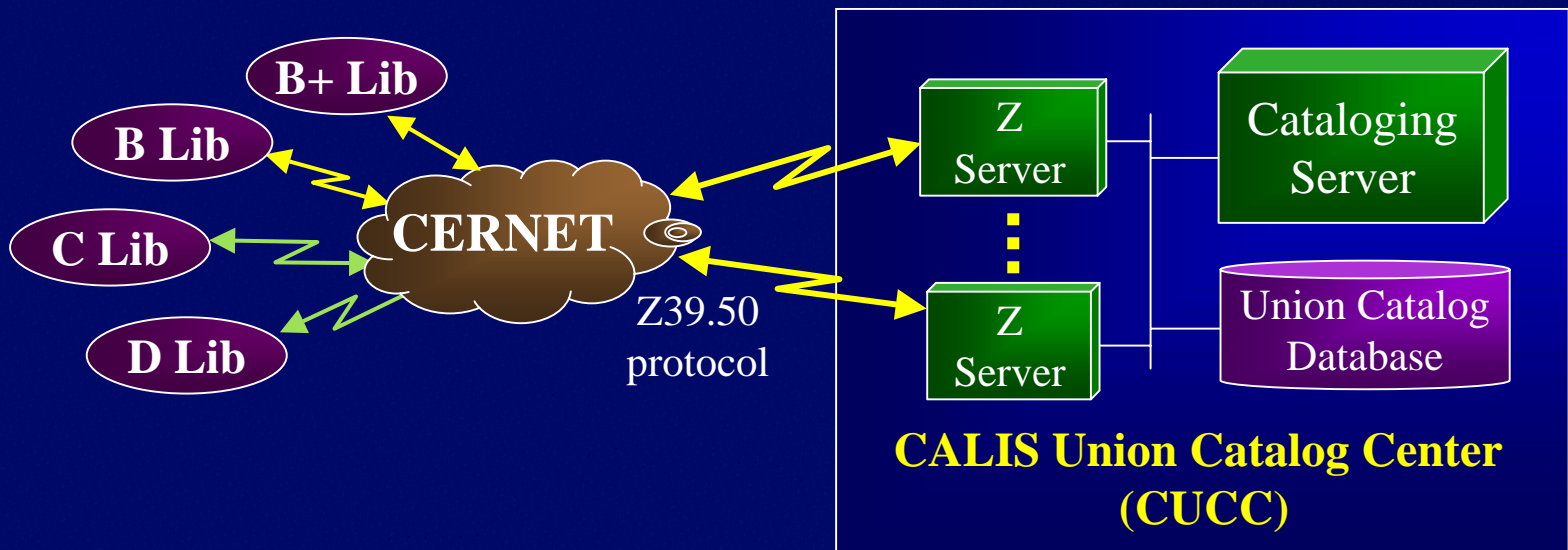
- It is led by CALIS Online Catalog Center (CUCC)
- The system is designed and developed by CALIS Technical Center
- The system is the largest online cataloging system in China,
 - which has a central union catalog database including millions of bibliographic records and holdings
- **Features of the system:**
 - Support metadata standards such as CNMARC、USMARC、JPMARC, etc.
 - Support cataloging in six languages
 - Chinese, Japanese, English, French, German, Russian
 - Using ANSI/NISO Z39.50 protocol to exchange metadata between the local clients and central system



Subproject 3: Users of COUCS

- Over 500 libraries are members of the User Committee of CUCC
- Type of members:

Capability \ Type	Class B+, B	Class C	Class D
Cataloging directly in the central database	Y	N	N
upload holdings	Y	Y	N
download records	Y	Y	Y





Subproject 4: Collaborative Virtual Reference System (CVRS)

- It is led by Shanghai Jiaotong University Library
- Its core members are 12 academic libraries
- More academic libraries can join the network of CVRS
- Collaboration in CVRS
 - Members can create, edit and share knowledge resulted in virtual reference collaboratively
 - Members can collaborate seamless to provide a combined virtual reference service to a single user in real-time or asynchronously.



Subproject 4: Components of CVRS

- CVRS consists of two applications:
 - Central Reference System (CRS)
 - It has a centralized knowledge database which can harvest knowledge from local reference systems
 - Local Reference System (LRS)
 - It has a local knowledge database which can disseminate its knowledge to Central Reference System.
 - Local system can connect to each other and to the Central system
- Interoperability between the two systems
 - When a user ask a **LRS** one question and the **LRS** can not answer it, then the **LRS** can redirect the question to another **LRS** or **CRS** in real-time or asynchronously.



Subproject 5: Networked System of Special e-Collections (NS-SEC)

- It is led by Wuhan University Library
- Its core members are over 70 academic libraries
- It will build
 - 70 kinds of special collections developed by core members
 - a central special union-collections deployed in and maintained by Wuhan University Library.



Subproject 5: Components of NS-SEC

The system consists of two applications:

(1) Central Union-Collection System

- It can harvest data from local collection systems and store them in central union-collections.
- It allows users online to access to the central database

(2) Local Collection System

- It allows members to digitize and create metadata and digital objects, and to store and manage them in their local collections.
- It uses **OAI-PMH protocol** to disseminate local metadata to the Central system.
- It uses **METS standards** to encode its local digital objects and disseminate them to the Central system through **Message Queue** (OpenJMS or MSMQ)



Subproject 6: Networked System of electronic Thesis & Dissertation (NS-ETD)

- It is led by Tsinghua University Library
- Its core members are nearly 100 academic libraries
- It will build a central ETD union-database deployed in Tsinghua Univ. Library.
- It supports core members to build the local ETD systems (including ETD full-text databases)



Subproject 6: Components of NS-ETD

The system consists of two applications:

(1) Central ETD System

- It can harvest ETD data from local ETD databases and store them in the central union-database.
- It allows users online to access to the central database

(2) Local ETD System

- It allows students to submit their electronic papers into the local ETD database, allows librarians to online catalog metadata of these papers, and allows local users online to access these metadata and full-texts.
- It uses **OAI-PMH protocol** to disseminate local ETD metadata.
- It uses **METS standards** to encode its full-texts of ETD and disseminate them to the Central system through **Message Queue** (OpenJMS or MSMQ)



Subproject 7: Networked System of Teaching Reference Information (NS-TRI)

- It is led by Fudan University Library
- Its core members are nearly 50 academic libraries
- The system consists of two applications:
 - (1) Central TRI System
 - The Central TRI System can be integrated the e-Book Database
 - The Central TRI System harvest metadata from the local system through **OAI-PMH protocol**
 - (2) local TRI System
 - The local TRI system allows librarians to collect, edit, store and manage TRI records.
- These TRI records include information such as:
 - school, department, discipline, specialty, course, major, elective, teachers, reference books, e-book links, and so on.



Subproject 8: Subject Gateway of websites for Key Disciplines of High Education (SG-Web)

- It is led by Xi'an Jiaotong University Library
- Its core members are 70 academic libraries
- It aims to provide organised access to the Internet resources which are selected and cataloged by librarians collaboratively according to the key disciplines of high education
- Two applications: Central SG System and local SG System
 - Local SG system can crawl websites, categorize them semi- or fully automatically, and allows librarians to catalog them.
 - Central DG system has a centralized metadata database and provide nation-wide Subject Gateway services to users
 - They disseminate or harvest metadata through **OAI-PMH protocol**



Subproject 9: Portals of CADLIS

CADLIS has a lot of portals listed in the following:

- The Central Portal of CADLIS
 - located and maintained in Administrative Center

- 4 National Sub-Portal of CALIS
 - located in 4 National Resource Centers

- 7 Regional Portals + 1 National Defence Portal of CALIS
 - located in Regional Centers and National Defence Center

- 15 Provincial Portals
 - located in 15 Provincial Centers

- 5 Vertical Portals
 - Located in the centers of 5 specific subprojects



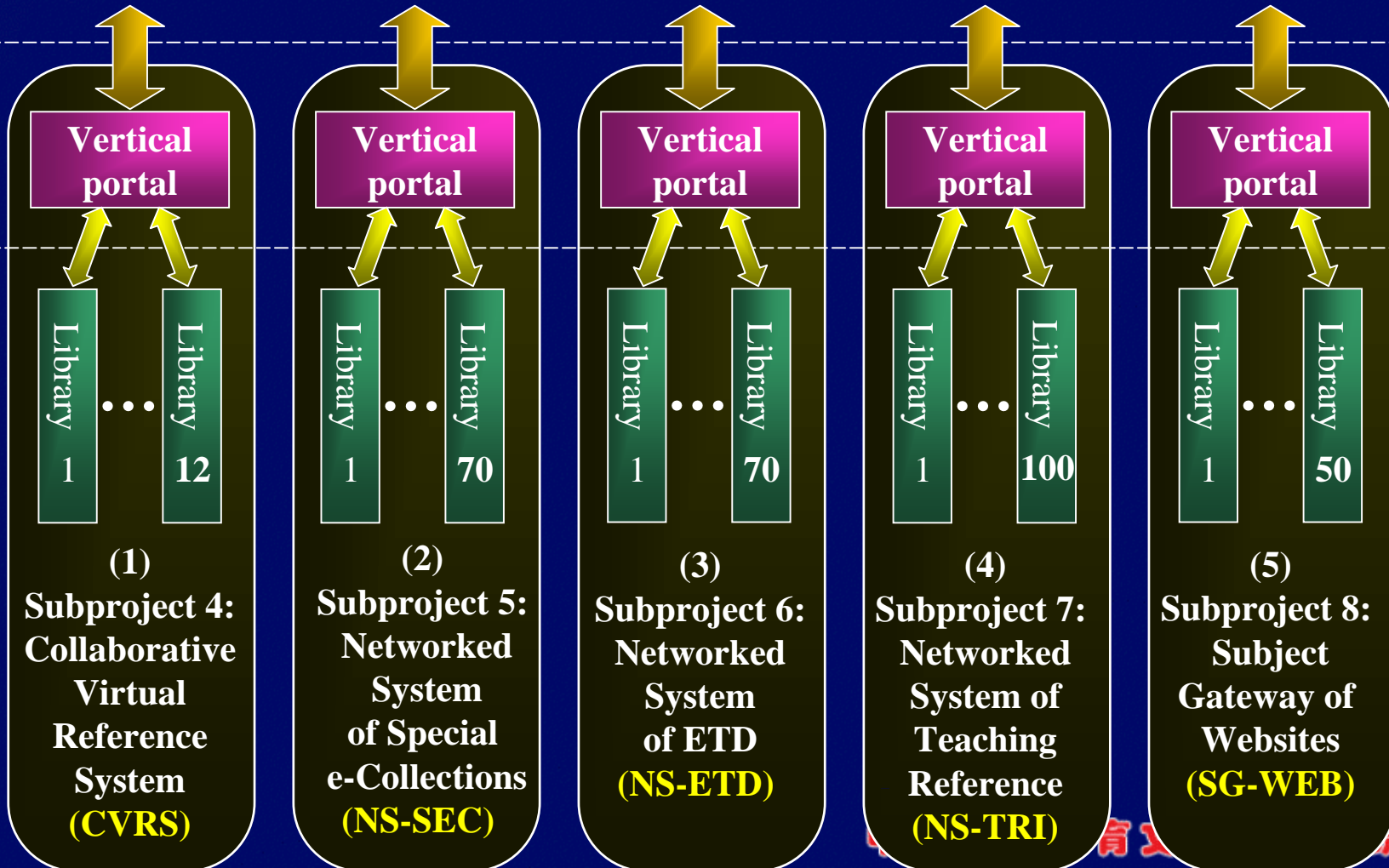
Five Vertical Portals located in the Centers of Five specific sub-projects

Center of CALIS



Centers of sub-projects

Local Academic Libraries (as members of sub-Projects)





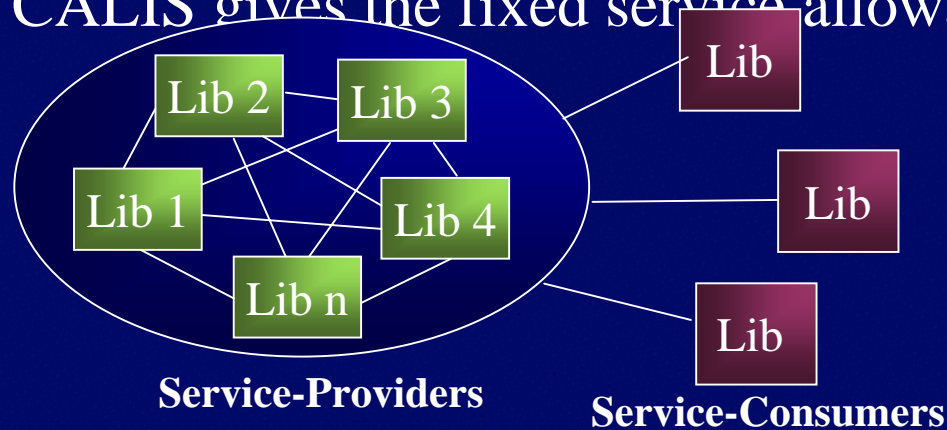
Subproject 10: Networks of Unified Service of CADLIS

- (1) CALIS Document Delivery Network
- (2) CALIS Centralized Authentication Services
- (3) CALIS Virtual Reference Service (CVRS)
Collaborative Network
- (4) CALIS Centralized Linking Services
(omitted)



(1) CALIS Document Delivery Network

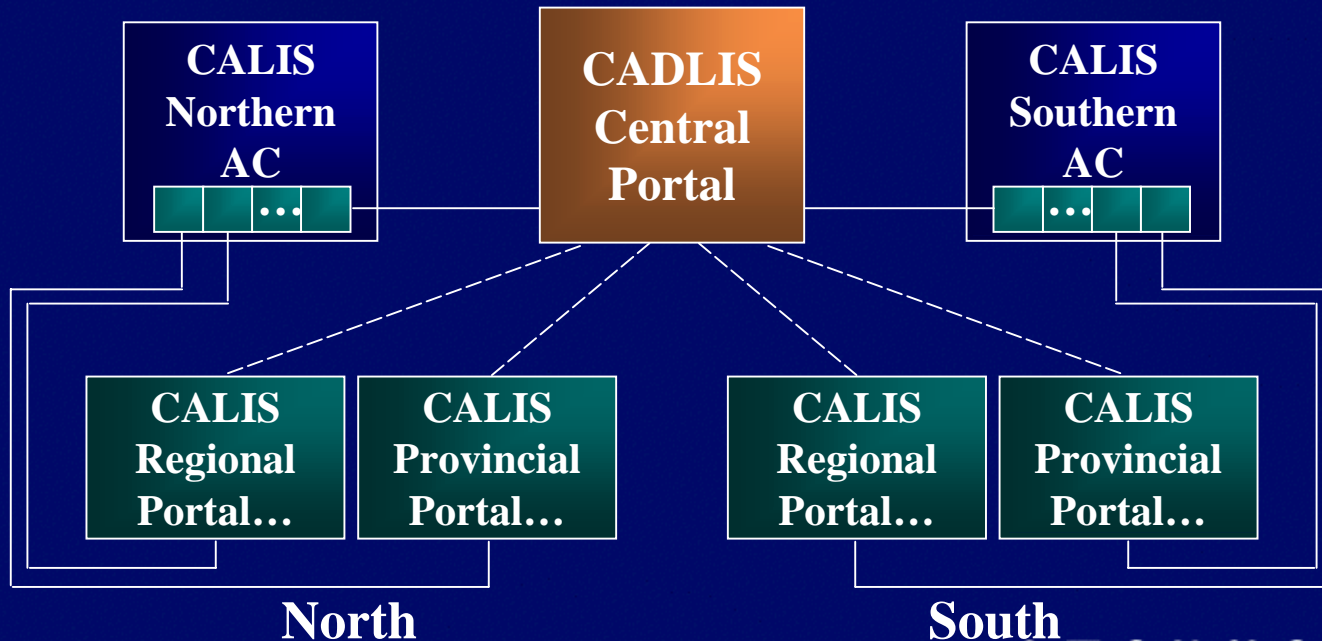
- Type of services in the Network:
 - Inter-Library Loan(ILL), Document Delivery (DD), other services
- Two types of academic libraries in the Network :
 - Service-Provider(SP), Service-Consumer(SC)
 - SP needs to deploy CALIS's inter-library loan (ILL) system in their libiraried
 - SC may or may not need to deploy ILL system
- Nearly **40** core academic libraries are SPs of CALIS
- CALIS gives the fixed service allowance to each SPs





(2) CALIS Centralized Authentication Services

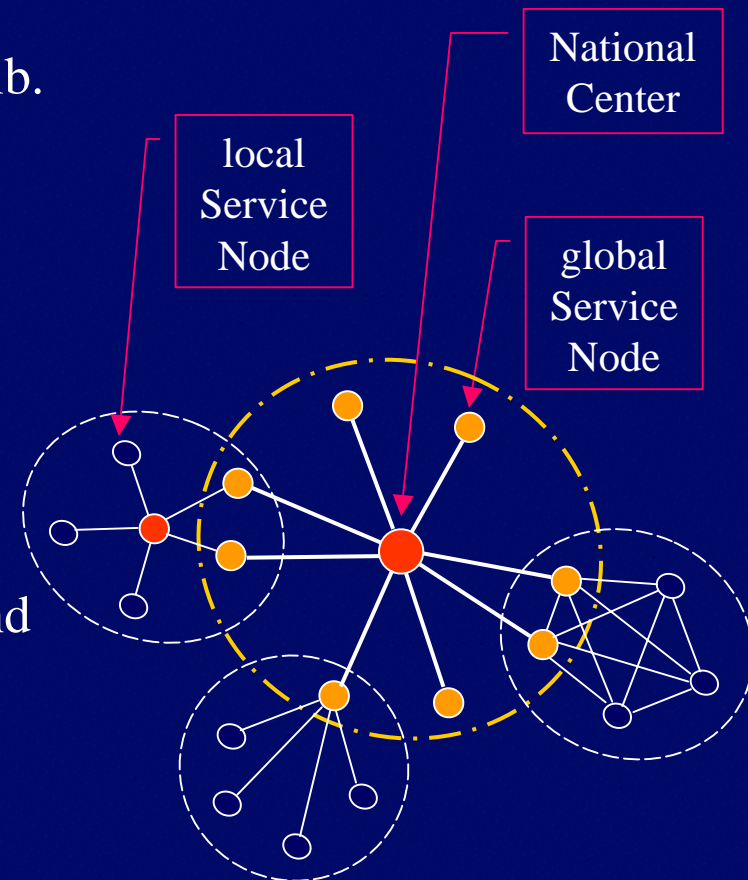
- Two Authentication Centers (AC):
 - The Northern Center and Southern Center, located in Peking University Library and Nanjing University Library, respectively.
 - Support automatic mirror, end-to-end failover and fast fault recovery
- They provide a single point of authentication service to regional and provincial portals of CALIS, to achieve SSO





(3) CALIS Network of CVRS

- It is a nation-wide collaborative network of virtual reference service provided by academic libraries
- The National Center of CVRS
 - It is located in Shanghai Jiaotong Univ. Lib.
 - It has a centralized Knowledge database which harvest knowledge from local reference systems
- Service nodes of CVRS
 - Located in academic libraries
 - They provide virtual reference services to their own universities
 - They can communicate with each other and with the Center of CVRS in real-time or asynchronously
 - Global service nodes will disseminate knowledge data to the Center of CVRS





Other subprojects

- Omitted here



Progress of CADLIS

- Major applications of CADLIS have been deployed in all centers of CALIS and some local academic libraries
- Portals are being built for centers of CADLIS/CALIS, and will be finished in the end of this year
- Special collections, ETD union database and other resources are now being built by members of CALIS collaboratively
- The whole project of CADLIS will be completed and closed in the first half of the year of 2006. But the services of CADLIS will be sustained persistently



Next Step

- Some of key applications will be upgraded to accommodate the new editions of standards
- Planning the Phase III (2006-2010) of CALIS
 - Capabilities and performance of CADLIS need to be improve further
 - New technology (such as Grid, semantic web, etc.) will be used in DLs
 - New Services will be provided
 - Wide bandwidth of network are appreciated in Digital libraries



Thanks !

www.calis.edu.cn