

The digital archives and digital libraries in Taiwan

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Abstract

From the points of information technology and society changes, we explain why and how we initiated National Digital Archives Program (NDAP) and digital public library projects. NDAP aims to archive national cultural heritages in digital media and to make them accessible by the public. Our digital public library projects aim to assure information access rights of public and reduce the digital divide of urban and rural.

1. Background: IT is now transforming our Society

Nowadays, no one can deny that information technology (*IT*) is now transforming or changing our society. It is transforming the ways we communicate, the way we deal with people and the way we learn. Besides those ways, *IT* also transforming the nature of all kind of works we are facing everyday, including doing commerce, doing health care, conducting research, dealing with environment, building and designing things, and many more. Each level of governments and even the practice of politics, such as democratic, are subjected to change, too. It is difficult to find a single thing that is not subjected to change at all. And, all the changes happened are so unexpected fast that everyone can feel the tight pressure come from those changes.¹

Under this ever-changing situation, we think we have to concern and ask: *How does information technology interact with our culture and society? What are the cultural and social impacts and the ways of impact of Information Technology? How long will these transforming last?* Specifically to our people, we might worry: *Can our culture survive the information age? Or, will our traditions become endangered while Internet becomes more popular? And, if so, what shall we do?*

In order to address the above questions/problems, some preliminary studies on the nature of *IT* as well as the possible social and cultural impacts of *IT* have been conducted since 1996. The subjects studied include the following major topics: the properties of digital media, the rules of media on communication and knowledge processing, the nature of information, a definition of information that serves our purposes, characteristics of *IT*, the rules of *IT* on academic research, education and learning, etc.

(1) The Origin of Change: Digital Media

Digital media is quite different from any kind of traditional media. Any traditional media can be classified as “material media”. This means we have to select a kind of materials as media to mark on it whatever we like to express traditionally. Therefore, any communication activity that must use a kind of media is subjected to the media material properties, or obstacles. So, before digital media has been invented and used, communication is costly and subjected to those characteristics of the economical systems developed by in those days.

Unlike traditional media, digital media can be classified as “energy media”. It usually utilizes stable energy states within material to mark what we like to express. Therefore, it does not destroy the material while using it. So, digital media usually can be used over and over almost without limit. It is almost free from any material obstacles, and free from any temporal and spatial constraints that materials used to subject. As a consequence, while digital media is being used, the characteristics of communication drastically changed, and certainly do not follow the characteristics of our traditional economical systems. We have to regulate them by laws, such as by intellectual property rights or privacy laws.

(2) Digital Media, Communication and Social Change

As digital media is applied, the ideas, methods, tools, audience, range, situation, and effectiveness of communication have all been changed. The change of communication behavior leads to the change of fundamental value systems of our daily life. In other

words, communication change leads to social and cultural change.

Besides, from documented progresses of human civilization development, media's influence on the representation and dissemination of knowledge has proven to be very great. Handling knowledge in general can be considered as a kind as communication also. Whenever a new form of media was introduced, it invariably led to changes in the dissemination of information knowledge, modified human relations and society, initiated organizational and social change, and developed new forms of civilization. The same multi-facet changes also happened in the field of knowledge processing.

(3) Social Functions of Information Technology

IT can be viewed as the technology dealing with digital media. So, as social functions are concerned, *IT* is not only communication technology, but also knowledge processing technology as well. Since communication and knowledge processing are two indispensable driving sources of civilization, naturally, *IT* becomes the major driving force of new civilization.

People may argue that there are other forces that cause social change too, such as invention of new materials, new mechanical tools, new sensors, the advances of microelectronics, bio-informatics and even the influence of the thought of post-modernism. It is true that *IT* is not the only driving force of change. But, while we take a closer look of all those forces, we can easily found that it is *IT* that makes all those achievements possible; at least, *IT* greatly speeds up their developments.

For example, consider the role of *IT* in supporting various academic disciplines. *IT* should not confined merely as a very powerful tool, in fact, *IT* provides new ways of looking at problems, offers new ways of interpreting problems, offers new methods of solving problems, and even provides new models and new theories to understanding problems in every discipline without an exception. May be these phenomena can explain why we have so many computational sciences and informatics of various kinds in the past two decades. It is obvious that academic achievements will certainly lead to social and cultural change. And these changes must owing to *IT*.

(4) A Definition of Information

In order to build up consensus among our colleagues, we adopted a definition of information developed by Professor Ching-Chun Hsieh years ago. It says: **Information is defined as the form of what we know expressed on media.** By this definition, the properties of information can be derived from four aspects, namely the characteristics of what we know, the media used, the tools and associated skills applied, and the expression system applied. And, every one of these four aspects will provide us a checklist to study and understand the social and cultural impacts of *IT*. Some of our major findings have already shown in the above paragraphs.

Our studies made us believe that mankind is now facing a fatal cultural and social change, from material media to energy media, from paper to digital multi-media. Considering the situation while writing system had just been invented, people will write down every thing they know in words in order to maintain their tradition and the ways of living. So is the situation today. We have to digitize all our cultural treasures in order they can be understood and utilized in digital era. Otherwise, they might be gradually faded away.

(5) Digital divide and class society

Information technology has brought digital media and new method to access information. They possess the following characteristics:

- a. More information to use than before;
- b. More information from distant places
- c. More information exchanges among individuals;

We can say more information obtained means more control gained. Due to digital divide, a new class society is forming. How to eliminate digital divide is an important issue we have to deal with.

NDAP aims to archive national cultural heritages in digital media. Our digital public library projects aim to assure information access rights of public and reduce the digital divide of urban and rural.

2. An Introduction to *NDAP*

NDAP is a National Project authorized by the NSC and conducted by Academia Sinica. It is the fifth National Project of ROC, Taiwan. The project office is located in the Institute of Information Science, Academia Sinica. The Director of NDAP is Professor Kou-Shu Yang, Member of Academia Sinica.

The goals of **NDAP** are manifold. They are listed as follows.

- a. Preserving national cultural collections.
- b. Popularizing fine cultural holdings.
- c. Strengthening cultural heritage as well as guiding cultural development.
- d. Popularizing knowledge and Improving Information sharing.
- e. Enhancing education and learning.
- f. Bootstrapping cultural and value-added industries.
- g. Improving literacy, creativity and quality of life.
- h. Promoting International Cooperation and resource sharing

Technically speaking, there are two major goals of the digitization. First one is to apply increasing computational capacity and network bandwidth to manage and bring accessibility and usability to huge volume of distributed complex data and transforms it into information and knowledge. The second one is to create new capability to serve existing and new user communities, especially for all levels of education. In a nutshell, a content-oriented and network-based scalable multimedia information management infrastructure will be built.

The organization of **NDAP** is shown in **Figure-1**. The operation of **NDAP** is shown in **Figure-2**. In Figure-2, it is easily seen that there are 3 classes of projects in **NDAP**, we call them organization project, open project, and core project, respectively.

Organization projects are those carrying on by major content holders. So far, we have 9 major content holders participated in. They are: the National Palace Museum, the National Library, the Historica Sinica, the Office of Taiwan Provincial Archives, the National History Museum, the Council of Cultural Affairs, the National Museum of Natural Sciences, the National Taiwan University and the Academia Sinica.

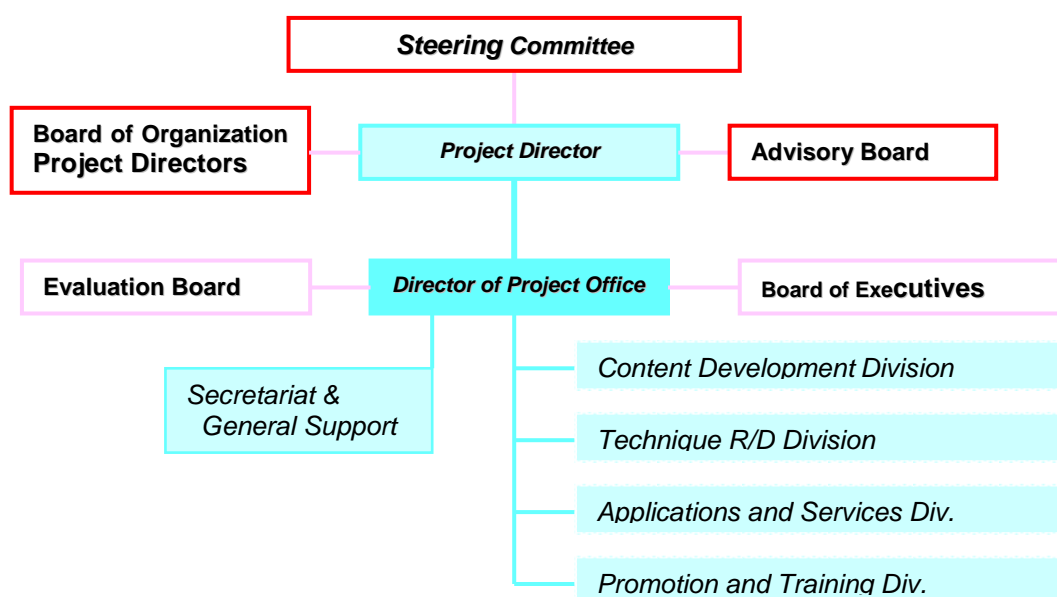


Figure-1 NDAP organization chart

Open projects are those selected from a set of proposals according to open RFP announcement. In 2002, we have 7 open projects for digital content creation, 5 for technical development, and 16 for various applications of digital archives. Core projects are those that will support to or build infrastructures for those organizational and open projects. For instance, there are 11 thematic groups for various content developments and these supports are come from one of our core projects. The 11 thematic groups include: Zoology, Botany, Geology, Humanities, Archiving, Calligraphy and Painting, Goods, Maps, Stone and Bronze Rubbings, Rare Books, and Archeology. These thematic groups provide a mechanism to solve problems raised in digitizing collections in their areas, respectively.

The output of **NDAP** has a centralized database called “the Taiwan Digital Archives (**TDA**)”. The ancestors of **NDAP** had already contributed some digitized archives into the **TDA**. To name a few, such as: language corpus for various times and places in history, historical maps of China and Taiwan, collections of indigenous cultures in Taiwan, some contemporary historical archives of China and Taiwan (1860-1970), some nature resources of Taiwan (including all species of fishes, shell fishes and plants, partial species of insects, butterflies and birds, and some minerals), some archaeological collections and fossil collections, some collections of bronze and stone rubbings, museum collections of jade, porcelain, bronze, ancient calligraphy and painting, images of rare books, selected gazetteer documents, and some early periodic and newspapers published in Taiwan.

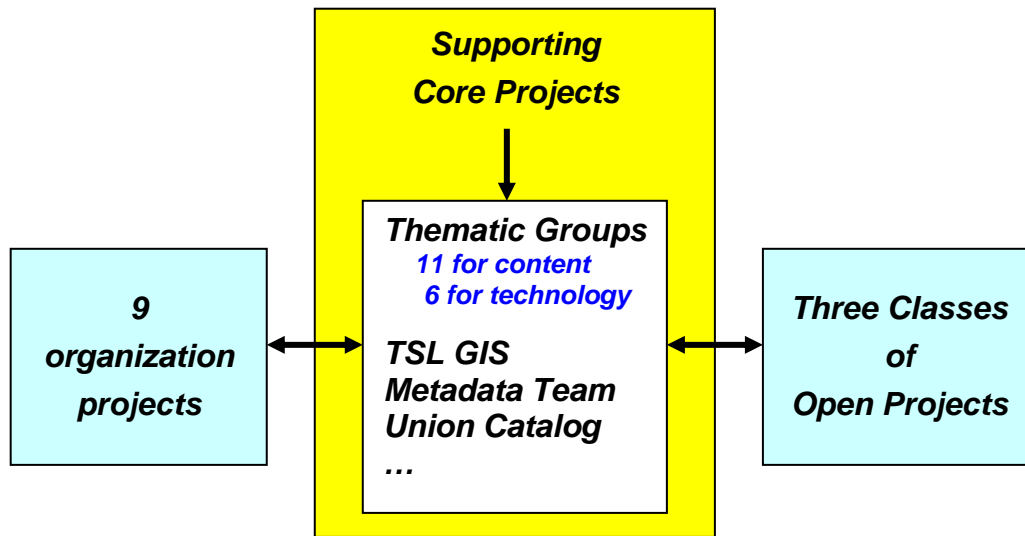


Figure-2 Projects and their Operational Relations in NDAP

(1). Some Technical Considerations

- **TSL-GIS**

The core technology is another essential point in this project. To cope with the content space, besides adopting and developing various information technologies, geographical information system (**GIS**) is utilized as a common framework for spatial data processing. And, a dedicated and global support in linguistic and scriptural issues for all contents is established. The digital information life cycle is enforced to establish solid procedures from creation, accessibility, management, storage and presentation of digital information. The design and implementation for providing intellectual access to stored information, from users, content providers, and system builder's aspects, are discussed. On the other hand, collaboration and outreach are also crucial points in the development of **TDA**.

Temporal, Spatial and Lingual (**TSL**) three mutually orthogonal axes construct the content space. We called them "**TSL** coordinates", as shown in Figure-3. The integration of **TSL** coordinates onto the **GIS** is called the **TSL-GIS** in our system. At present, although we already have a complete set of digitized China and Taiwan historical **GIS**, but the **TSL-GIS** is now in developing stage. Not only because of the intrinsic property of **TSL-GIS** will provides general references for timing and addressing, but also the scalability and localization concerns in scope for a robust **TDA** data architecture. These **TSL** coordinates and relevant technical conventions, standards and specifications are the most important factors that make unite various digital products into **TDA** possible. From the content point of view, a research database will be the solid foundation of the whole **TDA**. Based on that, a learning database could be built for different educational purposes. Furthermore, it could be extended and compiled to be a popular and easy-to-understand database for all walks of life.

- **Linguistic Support for Processing Chinese Language**

Besides providing various corpuses and technical services to help projects to solve common linguistic problems, the language coordinate includes linguistic ontology, markups (phonetic, syntactic and semantic) and multi-lingual mapping facilities. The

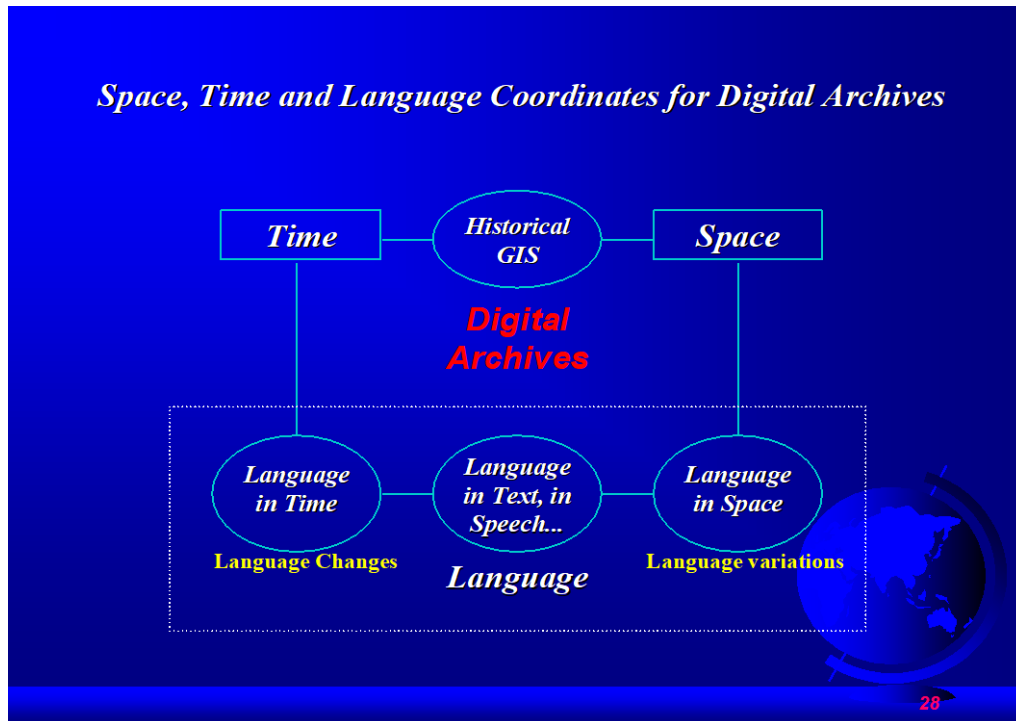


Figure-3 Digital Archives and TSL coordinates

common linguistic problems include solving the “missing character problem” which is caused by the inadequacy of the present-day Interchange Codes of Chinese characters, authority control of variants of Chinese characters, auto-segmentation of words from text, parsing of Chinese sentence, and many more.

- **Metadata Sets**

The metadata team (Metadata Architecture and Application Team, **MAAT**) will provide standards and services to all content building projects when help is needed for creating metadata set of digitized collections. Metadata sets will be created in multi-lingual form. Table-1 shows the metadata sets developed last year during the preparation stage of **NDAP**. A website has been constructed as a communication gateway between supported projects and the **MAAT** for sharing experience, research results, and collect resources of metadata standards, etc. The **MAAT** website, <http://www.sinica.edu.tw/~metadata>.

Table 1 Metadata Sets developed by NDAP in 2001

Projects	Metadata Set Name	Referenced Standard
拓片與古文書數位典藏計畫	The Digital Archives of Rubbings and Archives	CDWA
史語所藏內閣大庫檔案數位典藏計畫	Digital Archives for the Grand Secretariat Archives	EAD

考古發掘標本、照片、記錄與檔案數位典藏計畫	Digital Archives of Chinese Archaeological Data	CDWA, MIDAS
史語所傅斯年圖書館藏善本圖籍數位典藏	Digital Archives for Rare Books of Fu Ssu-Nien Library (傅斯年圖書館)	TEI
史語所民族學調查標本、照片與檔案數位典藏	Digital Archives for Ethnological Specimen, Photo and Archives	CDWA
近史所檔案館外交經濟重要檔案數位典藏計畫	Digital Archives Project for Official Economic Archives and Diplomatic Archives	EAD
臺灣動物相典藏之研究：魚類與貝類	Zoological Research of Taiwan: Fish and Mollusks	SPECIES 2000 Standard Data
臺灣的本土植物數位典藏計畫	Digital Archives Project of Indigenous Plants of Taiwan	HISPID
語言座標及典藏	Linguistics Anchoring and Language Archive of Digital Archives	OLAC
近代中國歷史地圖與航空照片資訊典藏計畫	GIS Archive for Modern Chinese Historic Atlas and Aerial Photos	FGDC
臺灣原住民－平埔族計畫	Taiwan Aborigine	The International Core Data Standards for Ethnology / Ethnography
地震數位知識庫	Knowledge base of Taiwan's Earthquake	DC
國史館典藏國家檔案與總統文物數位化中程計畫	National Digital Archives Program (2002-2006): Academia Historica (Taiwan, ROC)	EAD
省文獻會：臺灣總督府專賣局檔案數位化子計畫，與行政長官公署檔案數位化子計畫	Digital Archives Project of the Office of Governor-General in Taiwan	EAD
故宮器物數位典藏子計畫	Digital Archives Project of Chinese Antiquities at the National Palace Museum	CDWA
故宮書畫數位典藏子計畫	Digital Archives Project of Chinese Painting and Calligraphy at the National Palace Museum	CDWA
國立歷史博物館數位典藏計畫	Digital Archives Project of National Museum of History	CDWA
台灣社會人文電子影音數位博物館	Digital Video Library Project	ECHO Metadata Model
台灣老照片數位博物館	Taiwan Memory: Digital Photo Museum	VRA 3.0

(2) Some Projects Web Sites

Some websites now are available. Many of these websites are still under construction. But, they will provide a general picture of the **TDA**. For illustration, some of these websites are described as follows.

● The fish database in Taiwan

The total number of fishes in Taiwan has accumulated to 263 families and 2,675 species. This number does not include some unidentified species, especially deep-sea fishes. The curatorial and distributional data of these Taiwanese fish have been integrated into a single database that can be accessed interactively on the Internet at <http://fishdb.sinica.edu.tw>. This database includes the following contents:

- Basic information and a specimen photo of each species - One can make inquiries by fish name, body contours, or fish pictures, etc. A list of newly added species and the reasons for changing scientific names are also provided.
- Distributional database - Though the **GIS**, user can check the actual distribution area

of each species on the map (in a grid system, 10' each) or obtain a list of species for each grid.

- c. Bibliographic database – at present, 274 taxonomic, ecological, or distributional articles on fish in Taiwan have been collected since 1990 including local Chinese articles.
- d. Curatorial database - One can inquire about the approximately 5,000 lots and 2,000 species of fish specimens deposited at the Institute of Zoology, Academia Sinica and 1,000 of species deposited at the National Museum of Natural Science and Technology.
- e. Chinese fish names of the world fishes – The Chinese names of 26,600 valid species in Wu et al. (1990) are provided for promoting the unification of Chinese fish names.
- f. Miscellaneous – New version of errata of “Fish of Taiwan” (Shen et al. 1993), Chinese character fonts and pronunciations of characters with “fish” radical are furnished.

The above regional database of Taiwanese fishes can link and access fish data for each species in the global fish database, **FishBase** of ICLARM at <http://www.fishbase.org>. Though the collaboration with **FishBase**, the users of **Species 2000** can also get the most up to dated data on Taiwanese fishes via **FishBase** (<http://www.sp2000.org>). It is believed that the establishment of a global biodiversity information exchange system, like “**GBIF**” (Global Biodiversities Information Facilities) or “**BioNet–International**” (the global network for taxonomy) all will need local database workers to provide regional database with content so that the goal of information sharing throughout the world can be reached.

- **The National Palace Museum**

(**Website:** <http://www.npm.gov.tw/dl/index.htm>)

This project includes establishing a set of digital standard, selecting works for photography, setting image specifications, analyzing and editing information, arranging for the scanning of images, image color management, image copyright protection, information storage and management, and developing a digital value-added application systems. This procedure is shown in Figure 4. **NPM** has developed cooperative arrangements with related institutions and has invited Academia Sinica to participate and cooperate in developing image file transfer, metadata, image copyright protection, and geographic information systems.



Figure 4: Developing the National Palace Museum Digital Archive

Each year, approximately 2,000 works from the Antiquities and Painting & Calligraphy departments are chosen for a total of 10,000 over five years. Each year,

approximately 40,000 works from the Books and Documents Department are chosen for a total of 200,000 over five years. For protect copyright, digital watermark has been included in each image files.

As the quality of is concerned, digital images are divided into five classes based on their fidelity level: reproduction image file (surrogate image), publication catalogue image file (archive image), medium image file (medium image), screen display image file (reference image), and screen preview image file (preview image). For example, the specifications of reproduction image files are:

- a. . Image format: CMYK (32 bits/pixel)
- b. . File type: TIFF
- c. . Resolution: greater than 600 dpi
- d. . Image file picture dimensions: approx. 872 x 621 square centimeters
- e. . File size: greater than 600 MB
- f. . Color management employs International Color Consortium Profile in all the equipment to achieve uniform color output. As part of the entire quality control process, there are three main parts: high-level screen sample coloring, professional **RIP** sampling, and international **IT8.7/3** proofing.

The National Palace Museum website also won a bronze medal for web art at the Barcelona AVICOM (International Council of Museums for Audiovisual and New Technologies) Conference in July 2001. It was also the winner of an award for aesthetics and web art at the Festival Audiovisuel International Musees & Patrimoine in November 2000 and a MUSE Award at the St. Louis AAM (American Association of Museums) Conference in the educational/interpretative category in May 2001.

● **A System of Chinese Civilization in Time and Space (CCTS,**

<http://gis.ascc.net/ccts/>)

This is a part of the works conducted by the Institute of History and Phonology in cooperates with the Computing Center of Academia Sinica. The project directors are Dr. I-Chun Fan and Mr. Eric Yen.

Based on the requirements of multi-disciplinary research applications, the goal of this system is constructing an integrated GIS-based application infrastructure on the spatial extent of China, in the timeframe of Chinese history, and with the contents of Chinese civilization. Although target users of this system are primarily set to be scholars, academic experts, and schoolteachers, most general spatial-and temporal-based applications are also provided. A feedback mechanism was established for collecting research and application results continuously to fertilize contents and elaborate the value of information integration for our users.

This system consists of basic geospatial materials, WebGIS integrated application environment, and thematic information. The fundamental base maps come from Dr. Tan's "The Historical Atlas of China", which is composed of 8 volumes with 21 map groups that holds 307 maps, and covers 2000-year long Chinese historical features from the ancient time to Qing dynasty. All the maps were georeferenced with accuracy in 2 mm. Administrative boundaries and inhabited localities had been vectorized, other major themes are partially digitized based on research requirements. Furthermore, the distribution of cultural areas in pre-historical stage was incorporated and extends the temporal coverage to 7,000 BC. Millions of historical atlas and remote sensing imagery

are persistently geo-referenced and overlaid into the system to broaden the spatial and temporal scope and for various applications. This system has the following features:

- a. A WebGIS-based distributed application infrastructure is constructed to provide both content navigation and Web mapping.
- b. Lower the cost for doing things in GIS way, and with shorter learning curve.
- c. Capable of integrating any geospatial and attribute information in the Internet.
- d. Users could upload their results and contribute to the system, or just save to their local clients alternatively
- e. Having scalability, integration and access control consideration into the design.

As an application example of this system, the systems of Scripta Sinica (漢籍電子文獻系統, It is a huge collection of digitized ancient Chinese books, over 400M Chinese characters at present.) and some catalogs of local gazetteers in Ming and Qing Dynasties has been integrated into CCTS. A diagram shows the system architecture of CCTS is shown in Figure 5. And, the information contents of CCTS are in Figure 6.

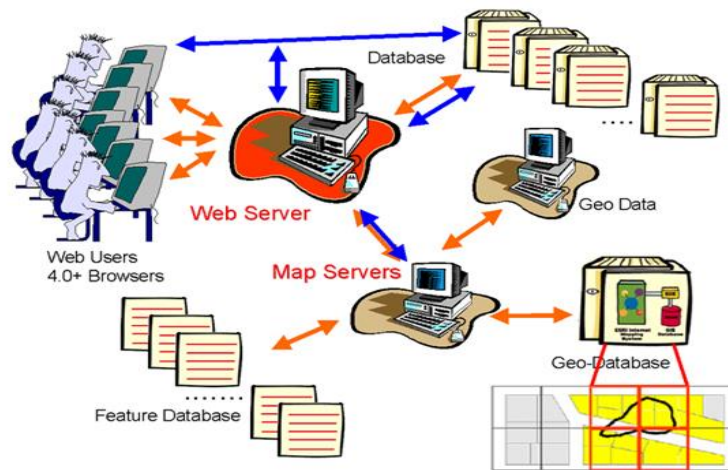


Figure 5: System Architecture of CCTS

Information Contents in CCTS

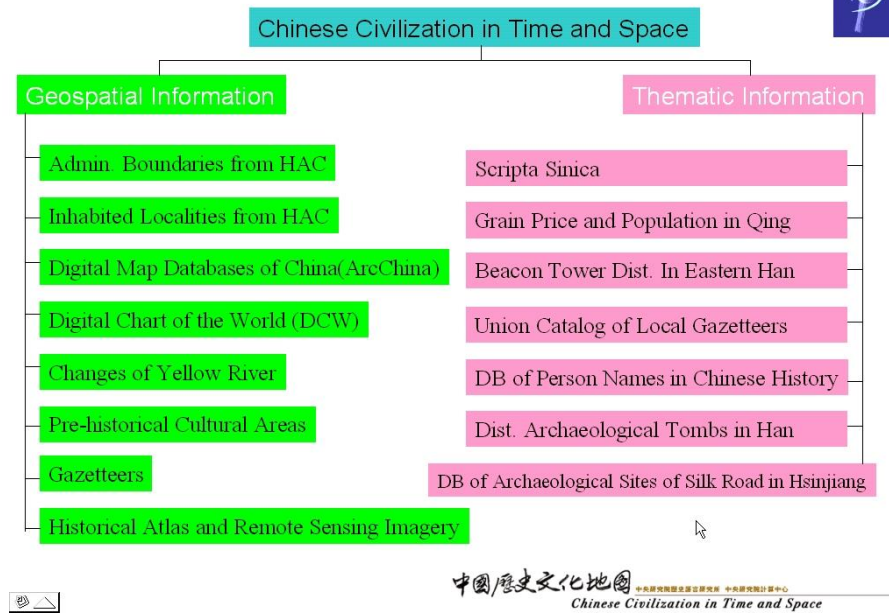


Figure 6: Information Contents in CCTS

For illustration, while selecting any area from the WebGIS GUI, users would have a window listing all the place names within that area and each name could further link to the Scripta Sinica, Local Gazetteer Systems, Union Catalogs of University Libraries, and Database of Historical Notability. In Figure 7, that is an example of choosing the Kiangnan area and pop out 16 prefecture names, based on the map of Grain Price and population in 1820. Once the link of Suzhou to Scripta Sinica is clicked, and then users could define the query scope by marking the catalog of ancient books in the Scripta Sinica webpage. The lower two windows show the query results in book list and in context of some book.

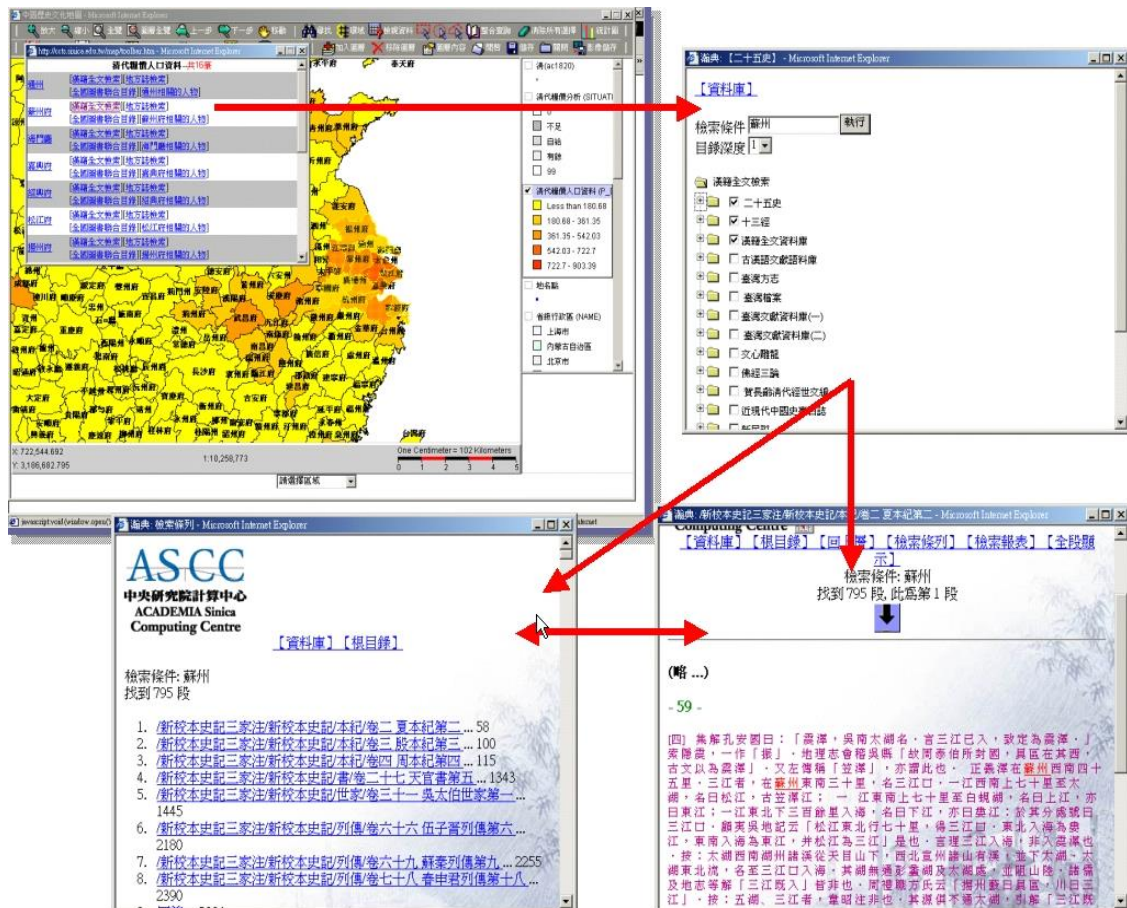


Figure 7: An illustration of integration of Text, Local Gazetteers and GIS

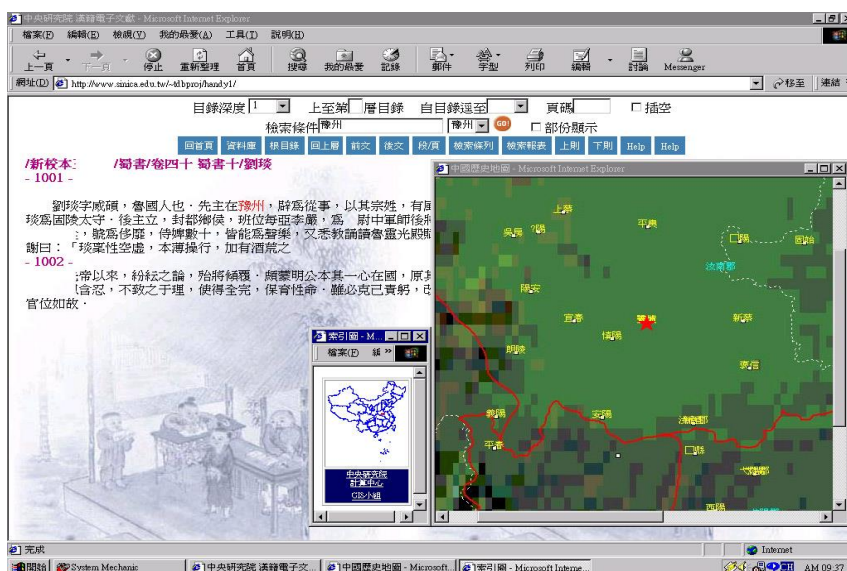
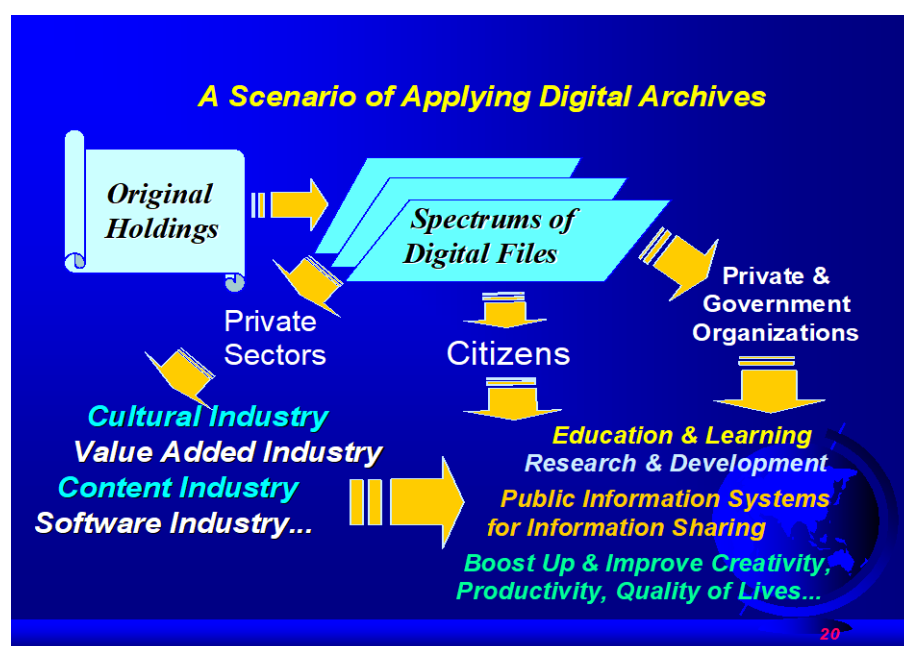


Figure 8: Integration of Scripta Sinica in CCTS, Checking Maps in CCTS from Scripta Sinica

On the other hand, once the user of Scripta Sinica is checking context of some book, and like to know the footprint of some place name. Currently, there is a prototype providing a link button for user to get the map from CCTS, just like figure 8 the example showing 豫州 in 三國. A more intelligent mechanism, which directly parses the context sentences to identify the terms of place name, is under construction.

(3) A scenario of Applying *TDA*

The applications of *TDA* are up to our imagination. A scenario of possible applications of *TDA* is shown in Figure-9. In 2002, we will focus the application of *TDA* into two major domains, education and industries. *NDAP* will cooperate and/or collaborate with Ministry of Education and Ministry of Economics to promote the utilization of *TDA* in various levels of education and to stimulate cultural, value-added and information-related industries, respectively. We think, digital archives themselves will be a new form of material and the content of digital archives will be serving as a new kind of “energy” to bootstrap both education and industries. Also, we hope we can provide a free public cultural information system to our citizens by the end of 2002.



2. The development of digital libraries in Taiwan

Libraries form one part of the infrastructure of the information society. Libraries with rich and accessible collection help people innovate and give the society the competing ability. Especially, Free information supplied by public libraries helps reduce the information lag of public. There are two important issues for public libraries: The first is how to make information accessible via Internet. The second is: what digital information can be accessed.

(1) Web-base automation systems of public libraries

Automation of public libraries in Taiwan was initialized in 1980. In that time, automation systems were stand-alone or local network systems. In the Internet era, public libraries must face some new challenges into consideration: for example, how to enable users to access catalogues and library services via Internet, how to integrate information resources within the same county/city and village/town to better serve readers. It is necessary to renovate automation system with current development of technology. In order to link up public library services by Internet, the Cultural Affairs Department of Taiwan Provincial Government formed the Consulting Committee of the Taiwan Province Public Library Automation and Network System in 1996. One of the missions of the committee was to help public libraries upgrade their systems from Novell to TCP/IP architecture. This aim has now been achieved with the generous support of our government. Our collection of public libraries in Taiwan can be accessed from all over the world via Internet. We illustrate our system architecture of public libraries as follows

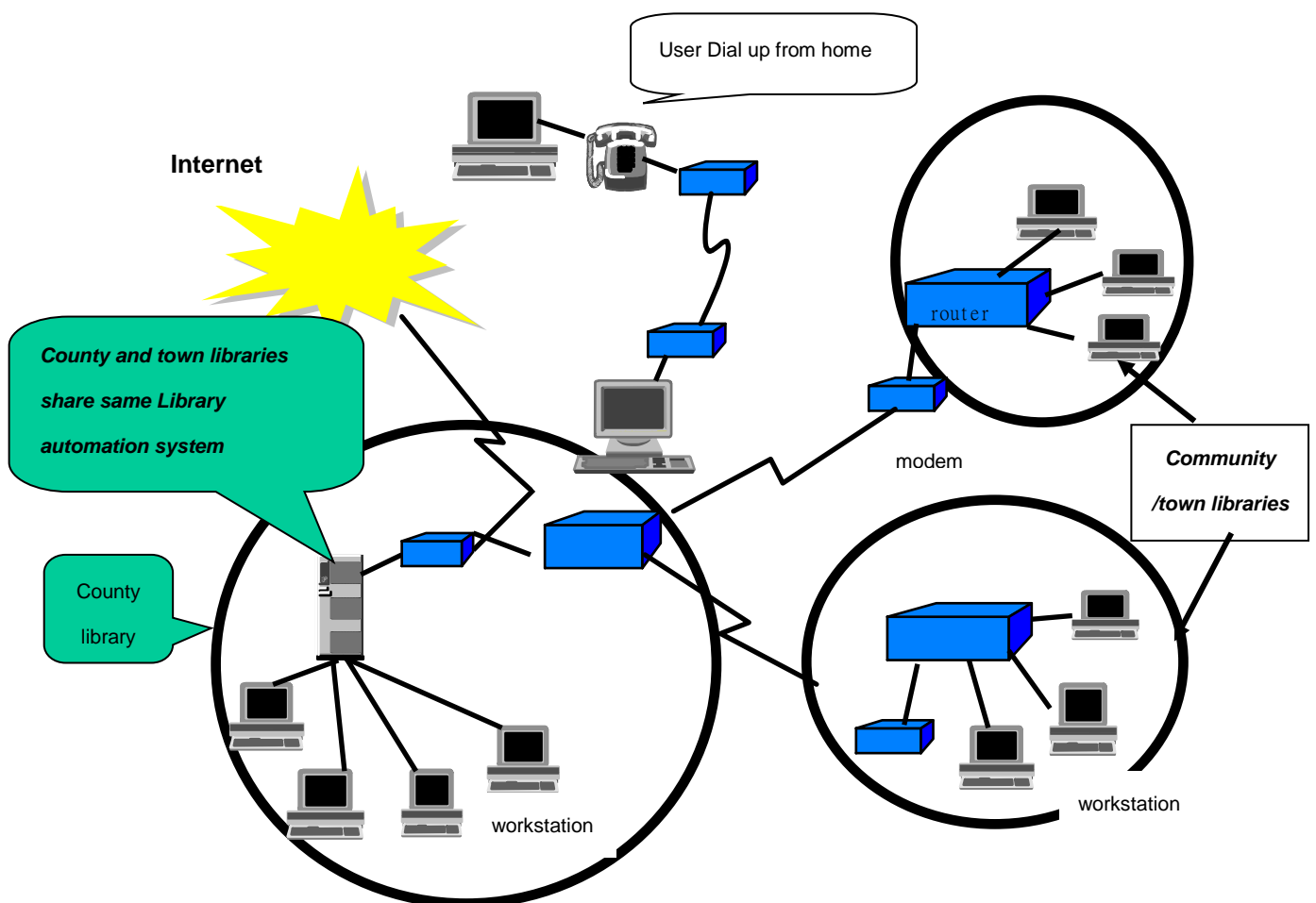


Figure 10 Structure of Library Automation of Public Libraries in

(2) Electronic resources for public libraries

Due to the advances of digitization, more and more digital content and commercial databases are produced, which make libraries more efficient to provide electronic resources and to share databases.

Taichung Municipal Library and National Central Library have acquired many nationally licensed databases for public libraries, such as electronic newspaper, electronic periodicals, electronic books and so on. These databases expand collections of public libraries and, via network, are accessible by everyone in Taiwan. This helps to shorten the information lag between urban and rural areas. Here is a list of our current databases of public libraries:

Table 2 : Databases for public libraries in Taiwan

1	七大報即時報紙標題索引
2	聯合報全文影像
3	中國時報全文報紙影像
4	經濟日報全文影像
5	中央日報全文影像
6	中文新聞全文檢索系統中華日報
7	聯合知識庫
8	聯合報(地方版)
9	民生報
10	時報知識贏家
11	臺灣經濟新報
12	期刊論文索引光碟使用
13	中文圖書資訊學文獻摘要資料庫(CLISA)
14	臺灣生態筆記資料庫
15	科白尼 21 科普知識庫
16	科學月刊
17	昆蟲圖鑑百科
18	科學人雜誌
19	尖端科技資料庫
20	世界美術資料庫
21	故宮圖文資料庫 93-95
22	歷史照片 資料庫
23	蔡志忠漫畫
24	光華雜誌 upgrade
25	中國大百科 upgrade
26	Grolier Online(大美及新知識百科)
27	中文版大英百科全書(全文版)
28	中文版大英百科全書(簡明版)
29	2003-2005 世界年鑑
30	文訊雜誌資料庫
31	詩心瀚選(100,000 首)
32	臺灣人物誌 upgrade 全國版(第二集)
33	臺灣人物誌全國版(第三集)
34	臺灣文獻叢刊
35	期刊論文索引光碟使用
36	中文圖書資訊學文獻摘要資料庫(CLISA)
37	國語週刊知識庫
38	商品行情資料庫

We also plan to integrate those heterogeneous commercial and public databases by Z39.50, OAI and OpenURL. The architecture of our integrated searching service is as follow:

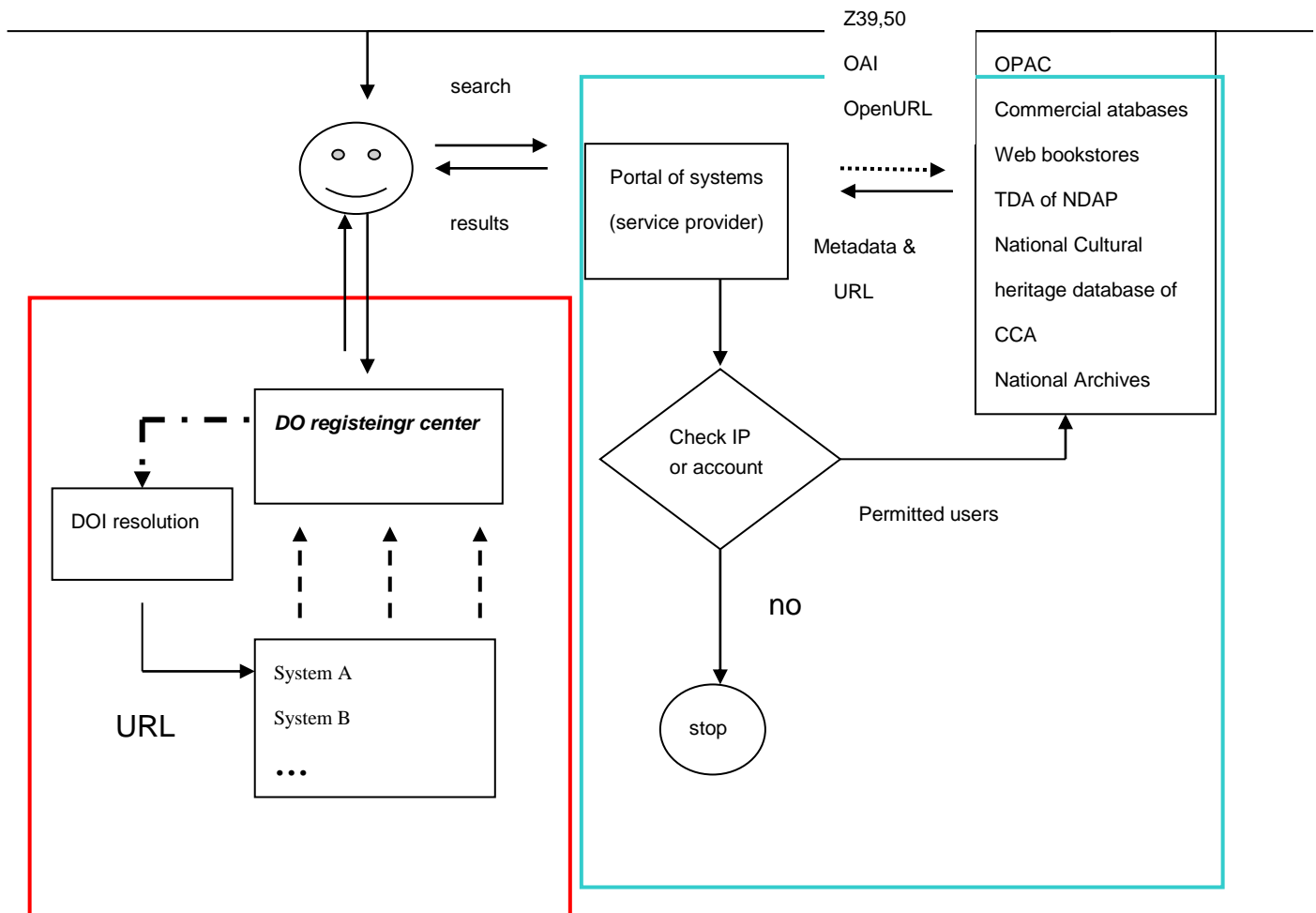


Figure 11 : architecture of integrated searching service

7. Conclusion

As Internet speeds up the coming of a new civilization, the trend of shifting major media from paper to digital is unavoidable. Cultural issues are thus the utmost priority that we must face and solve with collective wisdom. **NDAP** provides a good start to address cultural issues in this fast and ever-changing world.

In this network era, knowledge economy is oncoming and life-long learning is inevitable. Public libraries in Taiwan are expected to form a local information centers. We hope our public libraries will provide all kind of information to anyone anywhere and anytime. What we have done is just a beginning.

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¹ The original message of this paragraph is come from an report of National coordination Office for Computing, Information, and Communications, USA, August 1998