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## BANGALORE UNIVERSITY ACADEMIC LIBRARY NETWORK (BALNET)

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### Abstract

Bangalore University has three constituent colleges and 440 Affiliated Colleges. The University has a Central Library at a sprawling campus called Jnana Bharati and a Branch library in the heart of the city at the Central College campus. All the 440 affiliated colleges have independent libraries. A number of these libraries have already computerized their housekeeping operations and have created bibliographical databases of their collections. BALNET will develop a resource sharing model by which all participating libraries can avail inter-library loan and document delivery services. In the proposed model the online union catalogue will students and faculty at the BU and any of the colleges to search for required monographs, serials, conference proceedings, articles. The authors has given an overview of proposed network model.

**Keywords :** Library Network/ Academic Library Network/ ICT

### 1. Introduction

Bangalore University is a prestigious university in the capital city of Karnataka, Bangalore, considered to be the Silicon Valley of India. The University has 3 Constituent Colleges and 440 Affiliated Colleges. The University has a Central Library at a sprawling campus called Jnana Bharati and a Branch library in the heart of the city at the Central College campus. All the 440 affiliated colleges have independent libraries. The Central College library as well as the Campus library have a rich collection of documents relating to science and technology, humanities and social sciences Some of the Affiliated College libraries, particularly located in Bangalore City also have good collections. A number of these libraries have already computerized their housekeeping operations and have created bibliographical databases of their collections.

### 2. Need, importance, architecture and objectives of the proposed academic library network and benefits foreseen

Though there is a wealth of resources on a host of subjects (in English, Kannada and other languages) in Bangalore University Library and in the Affiliated College Libraries, the situation today is as follows:

- There has been no means to benefit from the widely held collections for students and faculty in these colleges.
- A sizable user population, particularly in the rural areas served by the University, do not have access to useful resources since their college libraries do not have eclectic connections, many of them having been started only in recent years.
- There is considerable duplication of resources since the BU libraries and the college libraries are not aware of the resources of each other.
- It has not been possible for the libraries to share expensive resources.
- There has been no concerted effort to develop cooperative acquisitions policies especially for costly serials.
- Libraries are increasingly under financial pressure and budgets in real terms are not able to cater to the demands of all categories of users.
- There is a paucity of trained library professionals at the University and college libraries.
- Many of the current library professional staff requires to be retrained in using newer technologies, particularly web technologies and how to utilize resources on the web for the benefit of students and faculty.
- Not enough resources directly useful to the students and faculty are available to students, e.g., Learning Objects, lecture notes, path finders, etc.
- New types of materials that are required by students and faculty are not described sufficiently in the BU and college libraries.
- Libraries both in BU and the colleges require embracing standards and technologies that are relevant to developing digital library paradigms. At present, there is poor understanding and use of contemporary metadata and interoperability standards.
- Libraries have become marginalized due to the easy availability of resources on the web and the trend to use information that is easy to obtain rather than relevant and validated can be counter-productive to the development of a healthy and inquiring body of students and faculty.

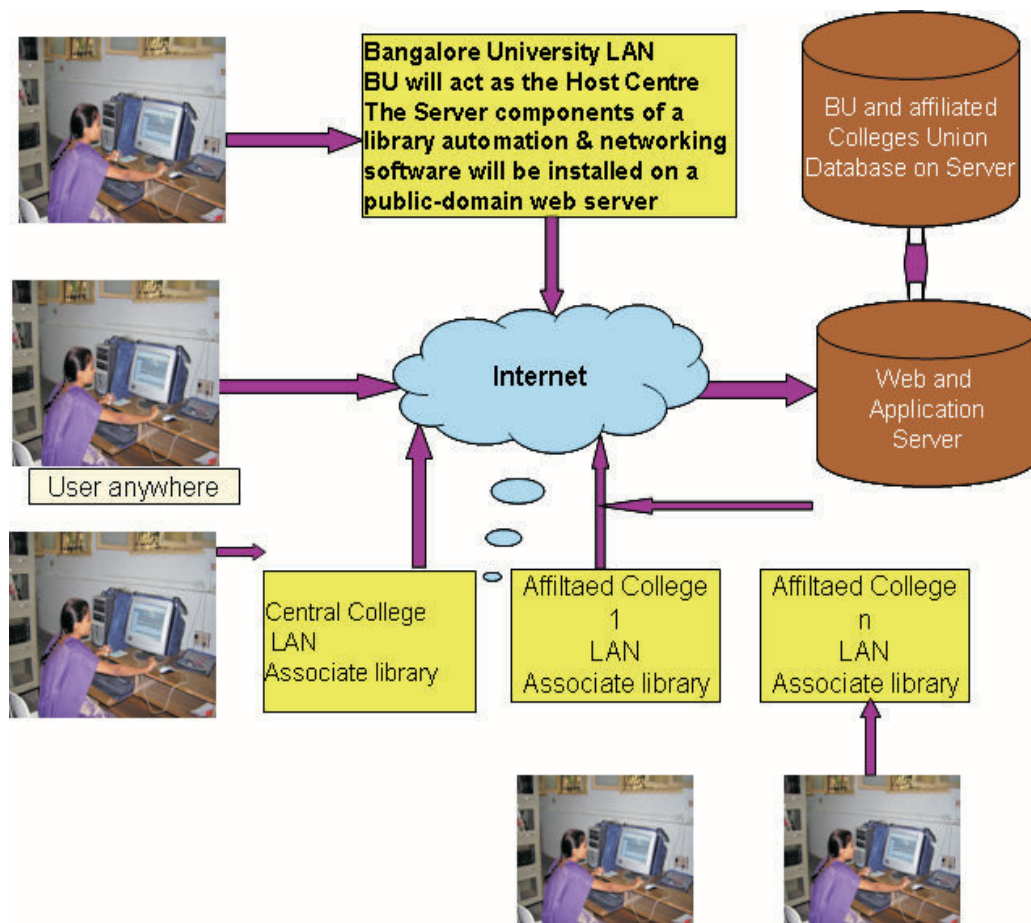
All the above mentioned factors require that systems must be put in place to enable:

- Easy access to information about resources available throughout the libraries in BU and the colleges.
  - Easy access not only to metadata but also to the full text of important materials.
  - Easy access to learning objects both for students and faculty
  - Better sharing of resources and greater exchange of data and information among the different libraries.
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Until the 1990's, it was considered adequate for libraries to automate and make their collections available online. Today, however, libraries must not only automate to enable better efficiencies but also network if resources are to be made accessible equitably and shared efficiently for the benefit of students and faculty across the University. Fortunately, an academic library network is possible to be built cost-effectively using web-based technologies and this project outlines a plan for such a network.

### 3. The Project

The Project to be called “Bangalore University Academic Library Network (BALNET)” with the following architecture.



*BALNET Network Architecture Diagram*

The salient features of the network architecture are as follows:

- Only one high-end Server and Software infrastructure is required. The investment required for such an infrastructure, it is proposed, be borne by the Bangalore University.
- The metadata resources of the BU and all the affiliated colleges will be known to all students and faculty in the entire network via the Union Catalogue database.
- New types of materials including web resources, multimedia, tutorials, learning objects, lecture presentations, full text of reference and costly materials, etc. can be selectively acquired and made accessible to all stakeholders of the network.
- The library network will enhance the value of the different libraries to the academic community as such a network can truly participate in the teaching and research activities of the BU and other colleges more effectively.

However such effort will require a commitment on the part of the management of BU and the management of the affiliated colleges:

- to equip their libraries with suitable computer hardware (where such facilities are not there) and make available reasonably good access to the Internet at the different libraries.
- to equip their libraries with the means to make copies of articles and/or other documents that are required .
- to ensure that their library resources are made available to any other user in the network on demand, subject to well defined rules for the sharing of hard copy as well as photocopy services.

### **Benefits to target audiences**

The benefits that are foreseen to the different target audiences from the proposed network are as follows :

#### **Students**

- Students across the university and affiliated colleges will have wider access to resources.
- Learning materials (created by faculty of BU or other colleges or downloaded proactively by library staff from the Web) can be put on the network and will become accessible to all students.
- Resources outside of the libraries (e.g., free full text reference books) could be made accessible.

#### **Faculty benefits**

- They will also have access to resources across the network and beyond.
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- They can make their teaching materials (lecture notes, presentations, tutorials, specially created resources of the Distance Education department) available to other teachers and students in the network and also benefit from that of others who contribute their teaching resources.

### **Bangalore University**

- Will provide the leadership in introducing automation and web technologies to big and small colleges.
- Will enable more predictable sharing of costly resources between the network libraries.
- Metadata exchange and sharing becomes possible since all libraries in the network will be using the same standards.
- New types of materials, e.g., multimedia content may be prepared at the University level and made easily accessible across the network.
- Cost of server hardware and sophisticated software can be shared by the University and colleges.

### **Affiliated colleges**

- The introduction of new technologies in libraries will open the doors to wider sources of information.
- The colleges and university can begin to participate in cooperative arrangements to access electronic serials and costly reference materials in full text form for the benefit of students and faculty.
- Learning objects developed within the network and those downloaded and described in the Union database will become available.

### **Libraries in BU and colleges**

- Better efficiencies because of automation.
  - Possibility for new services (hitherto not possible).
  - The Union database that will be developed in the network will have better quality metadata such data can be downloaded from free sources on the Web.
  - Libraries can simply share metadata instead of duplicating their work.
  - Costly resources are better possible to be shared.
  - Training provided to library staff at BU and colleges will update skills to enable library staff to handle newer web-based technologies and resources for the benefit of the academic community.
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**Other beneficiaries**

- Entrepreneurs, Businessmen and other Professionals in Bangalore City may be allowed to access BU and college resources for a fee.
- The general public (who are indirectly stakeholders by virtue of the taxes that they pay) may also be allowed access to the resources on payment of nominal fees.

**4. Project milestones**

In order to achieve the goals and objectives of the Project, the following milestones have been identified.

- Identification of a suitable library automation and networking solution that will allow cost-effective networking via the Internet as described in the architecture presented in this report.
  - Designating a public domain server by BU on which the server side software can be installed and ensuring that such a server is made available as per the requirements of the chosen library automation and networking solution.
  - Identify the infrastructure (hardware, networking, connectivity required, etc.) at BU as well as the affiliated colleges to enable the network whose architecture has been described in this report.
  - Establish the needed items of infrastructure not only at BU but also at the affiliated college libraries who will participate in the network.
  - Develop local area networks (LAN) in the BU and in the affiliated college libraries and ensure that library LANs are bridged to the BU campus LAN/Intranet and also at the colleges.
  - Installation of the Server and client side software at BU library and the various college libraries.
  - Conversion of data already available in machine-readable form at BU library and that of the affiliated college libraries into an international metadata format such as MARC-21. This will enable BU and the affiliated colleges to download authoritative metadata from MARC-21 data sources such as the Library of Congress, National Agricultural Library, National Library of Medicine and others who offer such data free of charge.
  - To design a BALNET website. This website would be a single-window entry point to the library network and will also contain information from BU and all the affiliated college libraries, their resources, rules, policies, etc. It will also point to links for the online public access catalogue (OPAC) of the network and will also allow end-users to connect to e-serials and other resources.
  - Development of the online union catalogue of resources of member libraries. This will be accessible via a link on the BALNET website.
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- Organization of training programmes on the use of the chosen software for librarians and system administrators at BU and the affiliated colleges. There may be need for at least two training programmes over a 4 month period to ensure that library staff at BU and affiliated colleges are comfortable in using the software.
  - Organizing orientation programmes for students and faculty at BU and the affiliated colleges. This aims at sensitizing the students and faculty to the resources, facilities and strengths of the network and how they might benefit from these. Such programmes are needed both as formal ones as well as one-on-one sessions.
  - To develop subject portals of information resources available on the web and to link them to the BALNET website.
  - To establish an online reference facility at university to provide an information service to all BALNET participating libraries also facilitate as referral resource centre.
  - The online reference centre will enable students and faculty and others anywhere in the network to email their information requests. The service will be manned by senior library staff of BU. They will be using one or more databases accessible to BU to respond to expressed information needs in some cases, the reference staff may need to fall back on subject specialists at BU to answer various needs. It is envisaged that the facility will enable students and staff valuable assistance in teaching, assignments and in research work.
  - Development of a formal mechanism for oversight of the network and for addressing problems that might affect its smooth functioning. The mechanism will also ensure that there is efficient document delivery and inter-library lending amongst libraries. The mechanism proposed will be a committee comprising the Vice Chancellor of BU as chairperson, three principals of colleges and three librarians as members and the librarian, BU as member-secretary. The committee will appoint a courier service to be associated with the inter-lending envisaged. All members of the network, it is proposed, will be charged a small annual fee of Rs. 5000 - 7500 to cover the cost of the service.
  - Co-ordinate with other regional, national and International Library networks for exchange of information and resources.

## **5. Project implementation**

In what follows, an implementation plan is presented taking into account facilities already available.

### **Establishment of the network hub at BU**

A Central Network facility with a high end server (as required by the chosen software) will need to be established in the University Library at Jnana Bharati. This will be connected to the Branch Library at Central College Campus and all Constituent College

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Libraries through intranet and to all Affiliated College Libraries through internet as per the architecture given above. .

### **Creation of Online Union Catalogue**

The union catalogue of Bangalore University, its Branch Library at City College Campus already exists and is available in a networked environment. The creation of metadata databases at other colleges conforming to the same international standards as that of BU will need to be done. Wherever some machine-readable data exists in college libraries, these will need to be converted to the standards in use at BU. All such data from the colleges will need to be uploaded to the existing union catalogue of the University Library.

### **Developing a reference and information service model:**

The Bangalore University Library will identify and provide access to important reference sources, databases and online resources in the University library as well as the libraries of constituent and affiliated colleges. A link to these sources will be provided on the BANLENT website. A protocol of reference sources available through internet will also be developed to provide Central Online Reference Service facility and also to enable participating libraries to extend reference service systematically to their user community.

### **Developing a resource sharing model**

BALNET will develop a resource sharing model by which all participating libraries can avail inter-library loan and document delivery services. In the proposed model, the online union catalogue will facilitate the students and faculty at the BU and the colleges to search for required monographs, serials, conference proceedings, articles, etc. Once these are located, the user can place an inter-library loan or document delivery request that will automatically be routed to the Librarian and the network administrator. The Networked Administrator in turn sends the details of the request to the library for possessing the item. The library concerned is expected to honour the request and provide either the item itself or a copy through e-mail/courier services. The service will be free of charge to the user as well as the requesting library. Such service costs, it is proposed, will be met from an annual fee that each of the participating libraries will pay annually. The user is expected to return the physical item borrowed within the prescribed period with intimation to the Network Administrator and the libraries of his/her institute. Similarly, the model enables the individual users of any participating library to obtain copies of serial or conference papers. A private courier service is proposed to be appointed to take care of collection and delivery of materials. The model also proposes the use of electronic document delivery for serial articles.

### **Development of Subject Portals**

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BALNET will develop subject portals wherein librarians will monitor the web to identify resources that are useful to the academic community, describe such resources and post them on the union catalogue database as well as to one or other subject portal. Users of BALNET will have access to the portals in the subjects of their interests. This will not only save the search time of the users.

### **Peer-to-Peer networked services**

It is an architecture in which all participating library and its parent institutions will have a peer site. To create the peer site, web space is proposed to be provided by BALNET. BALNET staff will provide web design services to colleges where needed. Each site will have the ability:

- a. To provide advertisements/notifications describing the services of the college and library.
- b. To be able to search the network for service(s) advertised/notified by other peer sites.
- c. BALNET will host all notifications/communications of the University to enable constituent/affiliated colleges to access the same speedily and promptly.

### **Test bed and other services**

Analytic work to date by the BALNET initiative on needed functionality for libraries seeking network membership lead us to propose the creation of a set of initial test bed services during this project, which are summarized as follows:

**i) Interoperation Service:** This is the primary service for discovering and coordinating access to all other services made available on the BALNET network. Users will be able to locally register their available services for advertisement on the P2P network. Additionally, users will discover the breadth of available services, and obtain the necessary information to interoperate with those services. Initially, we will develop an application that can be easily downloaded and deployed so that users can easily manage their service advertisements, as well as search and discover other existing services. This application will utilize a standard metadata schema for service advertisements.

**ii) Federated searching service :** This service will provide the capability to search multiple distributed databases using either the Z39.50 or the SRU/W protocols. The Yaz toolkit (<http://www.indexdata.dk/yaz/>), an open source toolkit available for creating Z39.50 clients and servers will be experimented with. BALNET will make use of Zebra, an open source structured text indexing and retrieval engine (<http://www.indexdata.dk/zebra/>) that will enable us to take the harvested metadata from a repository, index that metadata for searching purposes, and then connect to Yaz for Z39.50 access.

**iii) Alerting Service:** This test bed service will proactively alert learners, scholars, and educators of the existence of new materials in the network. The alerting service will work by first gathering information about an individual's learning and/or research

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needs and interests, saved as one (or more) user profiles. On a regular basis, these profiles will be applied (searched) against sets of newly available content metadata exposed either through the BALNET Union Catalogue database or other sources including other library catalogues. The results of these searches will be provided to end-users via a specified portal. A lightweight protocol for this service will be experimented with to provide the alerts to be transmitted to a user's portal account or optionally sent to the individual via email. This service will proactively alert learners, scholars, and educators of the existence of new materials and make the process of finding and getting information from digital libraries easier and more transparent.

**iv) Institutional repository services :** The recent web services protocol, OAI-PMH (Open Access Protocol for Metadata Harvesting) has now been widely employed by universities, research organizations, and even corporate houses to build institutional open access repositories which can be harvested by others using OAI-PMH harvesters. The software that will be chosen should have compliance with OAI-PMH so that BU and college libraries can create digital repositories of their own scholarly contributions. Such contributions are then easily accessible via simple http protocols to other libraries and information centres that may use a OAI-PMH harvester to connect to and download data from the repositories and then provide needed information services to their users. Similarly, the BU and college libraries can harvest metadata and link to several specialized repositories world wide for the benefit of their users.

- **Conversion services :** This test bed service would function solely to convert data in different formats used by the P2P network. The service would have an associated protocol simply specifying a particular conversion among those registered on the server. Such adhoc conversion scripts would specify unambiguously an incoming format stream and a desired response stream, much as an XSLT process for XML, but additionally operating on MARC transport format records. This would provide extensible functionality for converting between existing and adhoc data formats utilized by the network during the project.

**v) Path finding service :** This test bed service would provide a means of generating, transmitting, and editing standardized "pathfinders" for BALNET resources. Pathfinders are library guides created by subject experts for learners who are seeking to use library resources for specialized topic of research. Pathfinders produced by subject experts knowledgeable about highly technical scientific topics are relatively rare and labor-intensive to produce, and are therefore a highly desirable commodity worth sharing among libraries for the benefit of their learning communities. This test bed service would have an associated lightweight protocol providing a means of rapidly distributing and discovering such specialized guides between libraries in the P2P network. The service would specify a variety of interchangeable encoding formats for pathfinders, and enable the automated conversion from one format to another via the conversion test bed service. This will enable libraries to collaboratively share pathfinders interchangeably, without imposing a unified format for all pathfinders on all participating institutions. The path finding service will be important for building up a body of reference and training materials for library users seeking to use network resources.

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## 6. Project Requiements and Estimated Expendituer

### Central Facility

#### Non-recurring expenditure

Equipments Description	No. of units required	Approximate Costs (in Rs.)
<b>Hardware</b>		
1. High end Server	1	8,00,000
2. Computer Terminals (For office function)	6	2,00,000
3. Computer Terminals for users	10	3,00,000
<b>Software</b>		
1. Integrated Library Networking Software		5,00,000
2. Other Software including Antivirus s/w		2,00,000
3. Accessories Printers, UPS, Fax, Telephone Xerox etc.		20,00,000
<b>Total of 'A'</b>		<b>40,00,000</b>
<b>B. Furniture</b>		
7. Computer table, chairs, UPS racks cupboards, meeting table and chairs, staff tables and chairs		10,00,000
<b>Cumulative of A &amp; B</b>		<b>50,00,000</b>
<b>Recurring Costs</b>		
1. Manpower		
■ Network Administrator 1x Rs 20,000 x 12 months		2,40,000
■ Network Assistants 2x Rs10,000x 12 months		2,40,000
■ Office Accountant 1x Rs 8000x 12 months		1,00,000
■ Office Assistant 1x Rs 5000x 12 months		60,000
2. Printing and Stationary, ILL &		2,10,000
3. Documentary delivery services		
■ Travel and meetings		1,00,000
■ Training and Orientation: Staff and Users		2,00,000
■ Miscellaneous		50,000
		<b>12,00,000</b>

## 7. Funding

The initial cost for capital investment for installing the servers and other nodes and accessories will be provided by the Bangalore University. To meet the recurring expenditure and to sustain the project for extending better services to the user community, it is proposed to charge the annual fees as under:

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■ Under graduate colleges	5,000
■ Colleges with UG & PG Courses	7,500
■ Corporate libraries	10,000

However, this fee structure could be revised from time to time by the Executive Council of the BALNET as and when required.

## 8. Administrative Mechanism

The responsibility of execution and maintenance of the proposed BALNET project rests with the university librarian, Bangalore University. To oversee the functioning of the BALNET and to act as Advisory Body, there should be an Executive Council consisting of the following :

### Chairman

Vice-Chancellor, Bangalore University

### Members

- a) Five chair persons of the departments From Bangalore University nominated by the Vice-Chancellor by rotation on seniority basis.
- b) Ten principals of the colleges of whom one shall be from the constituent college of the BU nominated by the Vice-Chancellor by rotation on seniority basis.
- c) Ten librarians of colleges of which one shall be from the constituent college of the BU nominated by the Vice-Chancellor by rotation on seniority basis.
- d) Registrar, Finance Officer, Director College Development Council.
- e) Director of Collegiate Education, Government of Karnataka.

### Members Secretary

University Librarian, Bangalore University.

The Executive Council will meet once in a quarter year to discuss matters relating to the functioning of the BALNET and oversee its affairs.

## 9. Conclusion

This model can be applied to any University by changing according to the local situations. The main aim of UGC and INFLIBNET to reach to remotely located colleges will be fulfilled with this plan. However, we can also include giving the access to e-journals through the Universities IP based gateways.

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**BIOGRAPHY OF AUTHORS**



**Dr.P.V.Konnur** presently working as University Librarian, Bangalore University, Bangalore since 2005. Earlier to this assignment he served as University Librarian at Goa University Goa, for seven years and as Reader and Lecturer in Department of Library and Information Science, Karnatak University, Dharwad. He is a Fulbright scholar 2002-03 and recipient of SALIS Dr.Harish Chandra Best Librarian Award for the year 2006. He is responsible for establishment of Goa Academic Library Network at Goa University and he has proposed a similar network for Bangalore University also.

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**Dr. S Srinivasa Ragavan** possessing MA, MLIS, PhD. Having 16 years of professional experience. Served as Head of the Library in Engineering Medical and National Institutes of importance. Presently heading the LIS of NAAC, established the library and information center. Organized 5 national level workshops and seminars sponsored by NAAC, ISTE, SRELS. Awarded and executed a project under MHRD MODROB Scheme. Published and presented 15 papers in books, journals and national conferences. Guided 30 M.Phil students of DDE of Alagappa, Annamamali and Madurai Universities and guiding 6 Ph.D students.

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