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AUTOMATION CONFIGURATION FOR A TYPICAL ACADEMIC LIBRARY SETTING IN NIGERIA

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Abstract

This article examines the adoption and implementation of automation configuration in academic libraries in Nigeria. A discussed concept of Automation, library automation, library automation system, components of a typical academic library automation system, functions automating library, cost implications of library automation, available options to library automation system. Also issues such as addressing bibliographic standard in implementing automation, data conversion and bar-coding, methods of bar-coding the library collections, patron data conversion bar-coding, staff training, library automation system management cycle (LASMC) also explained. A typical library Local Area Network (LAN) Configuration System, library automation system configuration with Internet Access, advantage and limitation of implementing automation, the digital library concepts and also discuss recommendations are therefore proffered that the operations of a library be it academic, public or special; get a quantum jump with the adoption and implementation of automation initiative

Key words:
Library automation and configuration, Academic library, Internet connectivity

Introduction

The primary purpose for which a library (academic, public or special) exists is to provide information bearing resources to its patrons as timely as possible. Information bearing resources, among others, include: books, journals, newspapers, aud bi-visuals, etc. Libraries therefore are not just store house of books and other printed materials but information banks where information knowledge is organised, managed and disseminated to everyone who craves for it (Barclay, 2007).

It is worth noting that the devices for managing information knowledge are dynamic and not static thereby provide flexibility in terms of usage. In order to be able to provide easy interface to the needed information which is the primary responsibility of librarians, there is need for acquisition of adequate skills to keep pace with what the technology is dictating for creating access to the knowledge based of the library. The current trend in the global arena is the use of Information and Communications Technology (ICT) as a platform for

delivering library services. Automation project in academic Libraries has great potential in positively enhancing information delivery performance. These potentials include: increased access to diversity of electronic resources, boosting the image of professional Librarians, increased responsibility in respect of services, creation of more physical space, transforming the library into a more relaxed teaching learning and research (TLR) environment, access to local content made possible through digitization which is aimed at ensuring wider visibility and multiple access, new skills acquisitions, access to library electronic resources in global terms, increased roles and responsibilities for professional Librarian and lots more. Having this as the background, the contribution of automation in achieving the vision and mission of academic libraries in Nigeria cannot be over emphasised.

Concept of automation

According to Schrock (2004) automation can be defined as a system of manufacturing, designed to extend the capacity of machines to perform certain tasks formerly done by humans beings and to control sequences of operations without human intervention. In essence, automation of library functions is geared towards enhancing performance and encouraging an efficient way of handling tasks thereby reducing the possibility of human error. Automation system implementation in an academic library setting, no matter how big or small should be part of its overall long-range plan. It is worth noting that it is a mistake to let the automation project drive the library's priorities and become an end in itself. Automation should always be used as a means to achieve overall better patron service (Ojo, 2003).

Automation, in general term, is carried out in the libraries (academic, public, special, etc) for several reasons: The first reason continues to be to improve efficiency by reducing the cost of carrying out operations. Secondly, to increase management control of the library setup. Thirdly, is to increase library's organizational effectiveness with respect to a robust and efficient information delivery. Automation is a complicated project and at the same time very disruptive if critical attention is not given to its effective implementation, particularly from the outset Tramullas & Garrido (2010). At this point, there is need to do justice to what library automation is all about.

Library Automation

This can be defined as Information and Communications Technology (ICT) based system that enables libraries (academic, public, or special) to improve its services through the implementation of Management Information System (MIS) whereby the data requirements of the critical sections of the library (such as cataloguing, circulation, serials, etc) are captured once Kelsey et al. (1997). The primary goal is to eliminate redundancy or duplicates which is well pronounced under traditional system. The initiative is aimed at achieving a centralised system whereby sections and units of the affected library will depend on the centre for its daily operations Tramullas & Garrido (2010).

It is a system based on Information and Communications Technology (ICTs) that enables library services with respect to improving the quality of services being provided on daily basis and at the same time enables electronic access to and sharing of library resources such as information that appears only in electronic format (e.g both Local Area Network based i.e LAN-Based and Internet-Based e-Resources). In the case of Kenneth Dike Library,

University of Ibadan, LAN-Based e-resources include: Egranary (i.e Collections of IOWA State University library, packaged in hard drive for university libraries in Africa with poor internet connectivity), TEEAL (The Essential Electronic Agricultural Library), to mention just a few. The Internet-Based e-resources include: HINARI (Health Information Network Access to Research Initiatives) for medicine and medicine related disciplines, AGORA (Access to Global Online Research in Agriculture), OARE (Online Access to Research in Environment), just to mention a few. At this point, there is need to look at the critical components of a typical academic library automation system.

Global trends in library automation

Major development in libraries, particularly academics, in respect of automation started in 1960s in the western world (Groenewegen, 2010) . According to Groenewegen, the period between 1960 and 1965 was noted for creating the necessary awareness about library automation as a result of the western world initiatives which was well pronounced in the United States of America (USA). This was so because majority of academic libraries in the USA took the initiatives of commencing automation through prototyping with punched cards (Line, 2006). According to Line, an early library automation initiative in the United Kingdom (UK) was witnessed at the University of Southampton. Further, the implementation of automated acquisition system in 1966 started in UK which was acclaimed to be the first of its kind. According to Line (2006), in respect of library automation, the United States of America acted as the vanguard for the entire western world. The first systems Librarian was appointed by the University of Sydney in Australia in 1968 (Groenewegen, 2010).

Horsfall (1992) submitted that well pronounced library automation activities in the early days of computing were characterized with the following: Installation of Online Public Access Catalogues (OPACs) which acted as a browsing window to library's holdings. On-line Interactive Processing Systems (OIPS) which provided flexibility in respect of delivering information effectively. Production of the keyword in context (KWIC) indexes for articles appearing in Chemical Abstracts; and the positioning of the library within its parent organisation, particularly in the academic environment as a major user of IT infrastructure.

In the later part of 1960s and the 1970s, libraries joined cooperative ventures to overcome the costly nature of computer systems and also started to adopt international standards for data sharing and exchange. Such cooperatives included Birmingham Libraries Cooperative Mechanisation Project (BLCMP) in the UK and the Ohio Colleges Library Centre (OCLC) in the USA. The library cooperatives in addition to allowing access to cooperative shared data, also supplied automation systems such BLS and OLIB from BLCMP and OCLC respectively. This was also the time when libraries worked with IT units in their organisations to develop library-based applications. Throughout the world, university libraries were at the centre of this IT revolution. Hopkinson (2009) reports that in 1983, the Joint Academic Network (JANET) in the UK began to connect universities in the country to facilitate sharing of catalogue information online using dial-up connectivity to access remote databases such as Medline, British Library's BLAISE database and DIALOG. The 1980s was also a period of gradual transition from in-house built systems to integrated library management systems

created by third party vendors. This period experienced growth of desk top computers making it possible and less costly for library automation projects to be implemented. Horsfall (1992) admits that, the subsequent availability of more flexible and easier to use software during the mid 1980s made it possible for library systems to become available at a reasonable cost even for smaller libraries. This period also witnessed advances and growth in data storage and retrieval technologies. This development culminated in the transition from systems delivering surrogates of print materials to systems delivering full text content.

The 1990s saw the growth of the internet and the evolution of digital libraries (Nelson, 2001). This was also the period of rapid transition from mediated to un-mediated access by users to library resources. Also witnessed during this period was the emergence of commercially integrated library systems such as: VTLS, TINLIB and more. The 1990s was also a period that saw catalogues being accessed on the Internet and subsequently evolving into web-based environments that leverage the power of hypertext technology. From the onset of the twenty first century content providers started publishing on their own domains and enabling access to their remotely stored databases. Tramullas and Garrido (2010) in a call for papers posted on the Web admit that library automation has in the last decade experienced a reversal with research efforts focussing on digital libraries, Web 2.0 and social networks.

Globally, libraries, particularly academic, are increasingly transforming their print collections into electronic formats through digitization (scanning of analogue sources into the computer) or subscription to e-journals with or without print alternatives as a strategy to make them more accessible and to enhance resource sharing (Youngman, 2007). Scholars and publishers are now required to make their publications available through open access so that they can be easily and widely accessed (Association of Research Libraries, 2006). Besides, there is a growing move towards the use of open source software. Some libraries are increasingly migrating from commercial software to open source while others are planning their automation from scratch based on open source software Hopkinson (2009). For example, open source software such as Evergreen supplied by Equinox is increasingly being adopted in North America, Europe and some parts of the developing world such as Asia and Africa. Breeding (2011) admits that, there is movement towards open source with libraries from North America (the USA and Canada), Europe (Britain, France, Armenia and Georgia) and Asia (India and Nepal) selecting Koha and Evergreen. In Africa, EIFL (2004) is promoting open source in Zimbabwe, Malawi and Mali. The trend is also towards Cloud Computing as an alternative model of outsourcing library automation services from external agencies. In Cloud Computing model, computer hardware, software, content and other resources located in virtual space can be leveraged by libraries. The OCLC WorldCat is a good case in point of Cloud Computing service provided to libraries around the world.

Components of a Typical Academic Library Automation System

Library Automation System, particularly for academic libraries in Nigeria should have the following as its critical components:

i.   Library's Functions Automation. This comprises automation of critical functions such as cataloguing, circulation, serials control, Online Public Access Catalog (OPAC), acquisition and so on.

ii. Use of Local Area Network-Based Electronic Resources (LANBER) within the library (e.g in Kenneth Dike Library, University of Ibadan, Ibadan LanTEEAL, eGranary Digital Library (as mentioned earlier, this is packaged in hard drive and made available to academic libraries in Africa with poor Internet connectivity by IOWA state University, USA,), etc.

iii. Accessing and use of Internet-Based Electronic Resources remotely (e.g. AGORA (Access to Global Online Resources in Agriculture), HINARI (Health Information Network Access to Research Initiative), EBSCOHOST, OARE (Online Access to Research in Environment), DOAB (Direct Open Access eBook), etc).

iv. Office automation (e.g. word-processing, spreadsheets, databases, etc.)

v.   Patron services (e.g. computer laboratory, Electronic Classroom, Digitization Chamber, etc). Presented next are various functions of the library that need to be automated. These functions, as listed, include: Online Public Access Catalogue (OPAC), Circulation, Cataloguing, Acquisition, Serials Control and Reporting. The bibliographic and patron databases are also highlighted.

Functions of Automating Library

The following are the critical elements in automating a typical academic library
OPAC, Circulation, Cataloguing, Serials Control, Acquisition, Bibliographic Database
At this juncture, the cost implications of library automation will be exhaustively discussed.

Cost Implications of Library Automation

Implementing Library Automation in a typical academic library setting in Nigeria is capital intensive. The size of collections will automatically determine how much is to be invested. The brief summary of the overall expectations is as follows: Planning and consulting costs, purchase of the computers and its accessories, purchase of Local Area Network (LAN) accessories, and cabling costs of bringing internet link into the library with sufficient and sustainable bandwidth, putting records held in printed format into electronic format, providing access as well as payment of associated subscriptions when the need arises. Planning for sustainability costs in the event that library depends on a funding organisation e.g. MacArthur Foundation, costs of Maintenance which can either be preventive or breakdown, whichever is appropriate can be adopted.

The various options that are available in the choice of library automation system are: Acquiring robust software which is Local Area Network based (LAN-BASED) with window interface, adopt in-house software development, prototype with a freely available Database Management System Software (DBMS) on your computer to get template for entering your bibliographic records e.g Microsoft Access. acquiring a web-based Library Management Information System for a consortium of libraries e.g Virtua (an integrated web-based software being adopted by six (6) universities in Nigeria: namely: University of Ibadan, University of Jos, University of Portharcourt, Bayero University Kano, Obafemi Awolowo University, Ile-Ife and Amadu Bello University, Zaria).

Data Conversion and Bar-coding

Bar coding is the process by which a barcode label is attached to an item in the library's collection. Barcodes serve as a computerised accession number - a unique identifier that links a specific book, journal issue, compact disc, etc., to the item record that describes it.

Methods of Bar-coding the Library Collection

Smart barcodes - Barcode number is pre-assigned to a particular item record. The library software prints this barcode together with call number and/title of the item. Library staff find that specific item on shelf and put the barcode label on it.

Dump barcodes - Barcode number on the barcode label is not related to any item until that number is manually entered into the item record by the library staff. This is usually done by scanning in the number using a barcode reader.

Patron Data Conversion Bar-coding

Converting student data from the University Administration's Management Information System

Deciding the barcode numbering system

Bar-coding students' ID cards

Staff Training

Involve staff members at all levels in planning activities.

Make effective use of vendor-provided training and make sure you receive enough of it to meet your needs.

Identify any separate training programmes, who will be trained, and individuals who will be responsible for any ongoing training in the area.

Use training tips to make in-house training effective. Develop a plan for training users.

Figure 1: Library Automation System Management Cycle (LASMC)
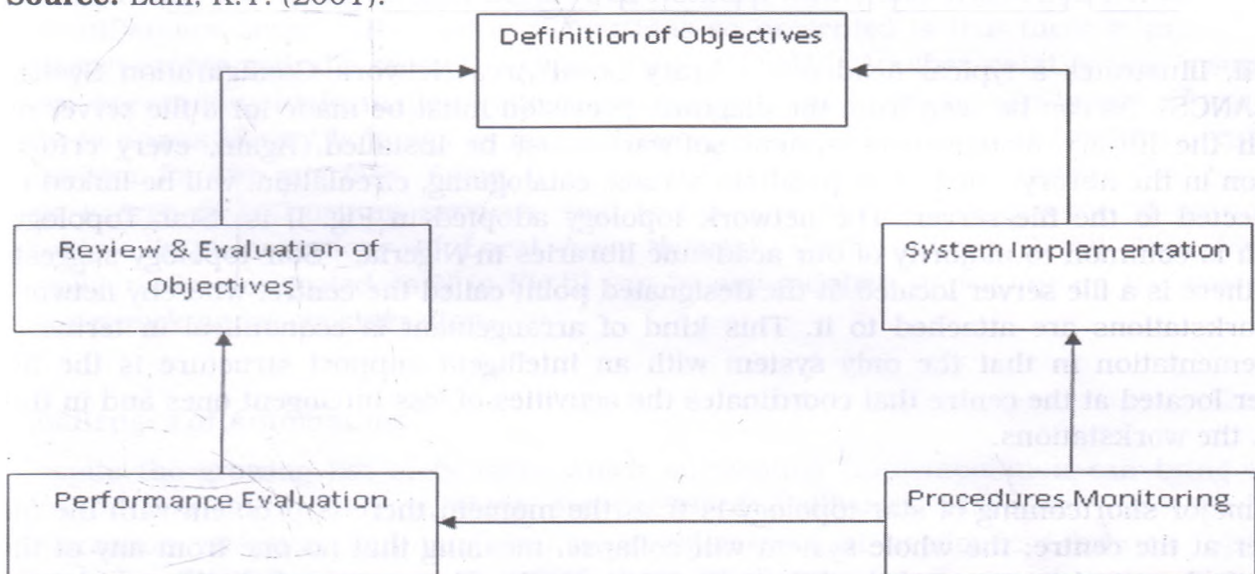**Source:** Lam, K.T. (2001):

Fig. I presents Library Automation System Management Cycle. The components of the cycle are hereby explained.

Definition of Automation Objectives: The objectives of Library automation system must be stated in a clear term, possibly, both broad and specific objectives. The broad objectives may focus on the entire vision of the library while specific objectives may focus on meeting the needs of the users.

Implementing the system: Proper implementation of the automated system must be based on the stated objectives in order that the vision of the library management may be realised

Monitoring the Procedures: The procedures for proper implementation of an automated system must be monitored in order to guide against error in implementation, outcome of which can be a disaster.

Evaluating Performance: At this point, the performance of the automated system must be evaluated for feedback, to know whether the requirements are met or not.

Reviewing Objectives: The initially stated objectives must be reviewed to ensure that these are met.

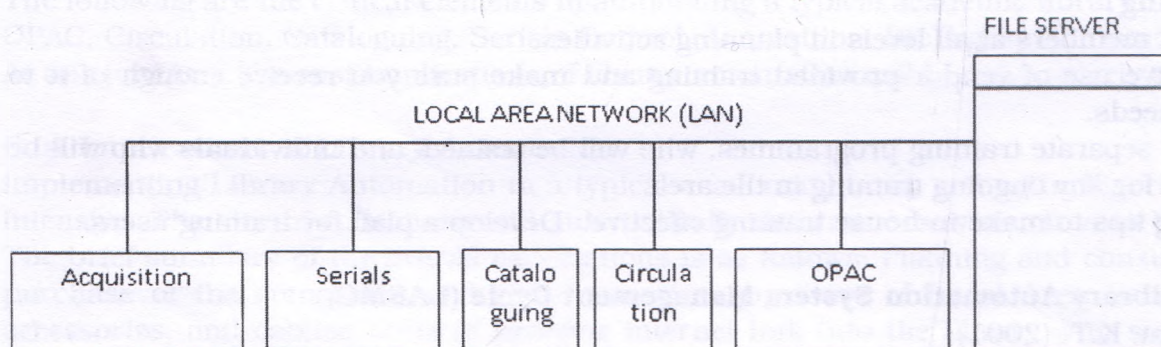**Figure II: A Typical Library Local Area Network (LAN) Configuration System**

Fig. II, Illustrates a typical Academic Library Local Area Network Configuration System (ALLANCS). As can be seen from the diagram, provision must be made for a file server on which the library management system software must be installed. Again, every critical section in the library, such as acquisition, serials, cataloguing, circulation, will be linked or connected to the file server. The network topology adopted in Fig. II is "Star Topology" which is common to majority of our academic libraries in Nigeria. Star topology suggests that there is a file server located at the designated point called the centre, whereby network of workstations are attached to it. This kind of arrangement is economical in terms of implementation in that the only system with an intelligent support structure is the file server located at the centre that coordinates the activities of less intelligent ones and in this case, the workstations.

The major shortcoming of star topology is that, the moment there is problem with the file server at the centre; the whole system will collapse, meaning that no one from any of the identified critical sections of the Library can access the file server unless the problem is resolved and the file server becomes operational again.

It is worth noting here that star topology is limited or restricted to Local Area Network (LAN) in that web interface may not be provided. The implication(s) of this is that one can only access the file server by registering his/her physical presence in the library where it is located. This now leads us to Library Automation System Configuration with Internet access.

Figure III: Library Automation System Configuration with Internet Access
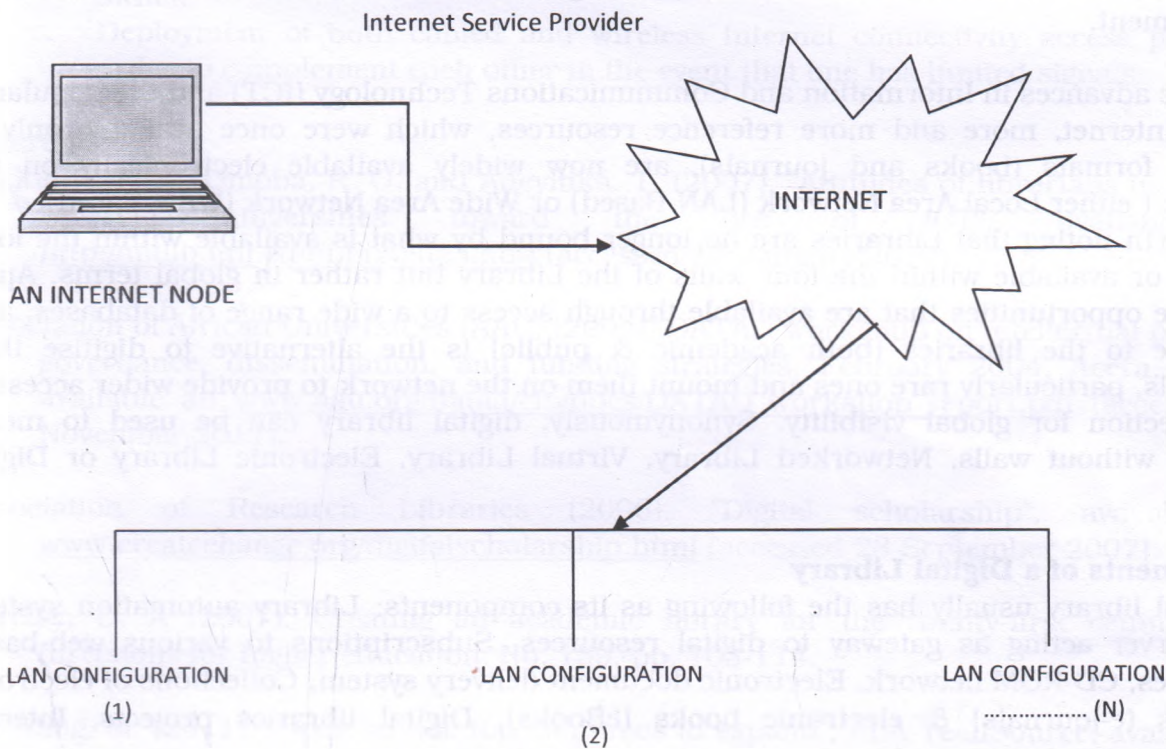

Fig. III shows Library Automation System Configuration with Internet Access. This configuration incorporates both Local Area Network (LAN) and Wide Area Network (WAN). The difference between the two configurations so presented is that there is provision for Internet access with the second configuration (i.e Fig.III). Another point is that it supports inter operability of information system, meaning that the location is no longer a barrier for one to access library holdings as long as one is connected to Internet facilities because of provision for web interface. Again, from Fig. III, several Local Area Network Configurations can engage in consortium services, that is resource sharing. In essence, it encourages multiple implementations of Local Area Network Configurations. Local Area Network Configuration designated as N in Fig.III can be any number, depending on the capacity of the network under consideration.

Challenges of Automation

Despite the growing list of benefits which automation implementation can bring to the affected academic Libraries, there are perceived challenges which are associated with automation adoption and implementation in respect of academic Libraries. Speaking generally, the following are some of these challenges: staff apprehension about the possibility of losing jobs, learning of new skills, added responsibilities for Librarians, raised

expectations of users, high costs of subscription to full text journals, and bandwidth bottlenecks among others.

The Digital Library Concepts

A library is considered as a digital library if it provides access to digital information by using a variety of networks, including the Internet. Further, it must provide services in an automated environment, i.e the services of a digital library are provided in an automated environment.

With the advances in Information and Communications Technology (ICT) and the popularity of the Internet, more and more reference resources, which were once available only in printed formats (books and journals), are now widely available electronically on the network (either Local Area Network (LAN-Based) or Wide Area Network (WAN-Based).

It is worth noting that Libraries are no longer bound by what is available within the local context or available within the four walls of the Library but rather in global terms. Apart from the opportunities that are available through access to a wide range of databases, also available to the libraries (both academic & public) is the alternative to digitise their materials, particularly rare ones and mount them on the network to provide wider access of its collection for global visibility. Synonymously, digital library can be used to mean: Library without walls, Networked Library, Virtual Library, Electronic Library or Digital Library.

Components of a Digital Library

A digital library usually has the following as its components: Library automation system, Web server acting as gateway to digital resources, Subscriptions to various web-based resources, CD-ROM network, Electronic document delivery system, Collections of electronic journals (e-journals) & electronic books (eBooks), Digital libraries projects, Internet resources, etc.

Conclusion

It can be concluded that the operations of a library (be it academic, public or special) get a quantum jump with the adoption of automation initiative. Automation helps in providing fast and reliable access to the resources available in the library as well as those available outside the four walls of the library; that is in global terms. Careful implementation of automation project, particularly in an academic library setting will enhance the academic library's ability to meet its service mission and at the same time assure its sustainability, thereby enhancing Teaching, Learning and Research (TLR) initiative of the affected institution.

Recommendations

The following recommendations are hereby proffered.

i. A good Local Area Network (LAN) is needed for effectively implementing Automation Configuration, particularly in our academic libraries in Nigeria.

ii. For setting up of a sustainable platform for implementing automation, there is need for cordial relationship between the ICT unit of the university and the systems unit staff of the library in terms of dropping and distributing signals to the entire library system of the university.

iii. Local Area Network Configuration of the library must be done in conjunction with the ICT Unit of the university because of the colour code issues with respect to crimping of cables in order to have a healthy and sustainable network in place.

iv. For effective management of the network, in the case of a big library with different sections and units like Kenneth Dike Library, University of Ibadan, Ibadan, network segmentation is strongly recommended, using CAT6 cable as backbones linking critical sections/Units to the automation unit of the library with dedicated switch.

v. Deployment of both cabled and wireless Internet connectivity access points in order to complement each other in the event that one has limited signals.

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