VTLS IN POLISH ACADEMIC AND RESEACH LIBRARIES

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Abstract: A short review of history and outline of main and optional components and services of Virginia Tech Library System, VTLS, is given. A new product of the company, VIRTUA, is briefly presented. A comprehensive information on the system implementation in Polish academic and research libraries is provided with special attention to computer and networking technology.

1. VTLS in Brief

VTLS [1] originated from a local project launched in 1974 at Virginia Polytechnic Institute and State University, USA [2]. The first, simple, system called CFS (Circulation and Finding System) was developed during a few next years supporting more and more standards. In early 90s the system was available for two Hewlett-Packard platforms (MPE and Unix OSs), two IBM platforms (370 Series and ES/9000), SUN, DEC and Novell for PC (small libraries). Currently, the company seems to support UNIX systems rather than proprietary ones (like MPEor VM). The same concerns Data Base Management Systems supported (migration from TurboImage and DB2 environment to Oracle). System access technology has changed from asynchronous dumb terminals to ATM workstations. All these general changes of the company's strategy were, obviously, system safety and performance oriented rather than the market's technological fashion. Actually, the system is installed in 429 libraries in 33 countries and is accepted by 12 national libraries.

2. The Basic VTLS System

The basic VTLS system consists of ten subsystems:

1. Online Public Access Catalog
2. Keyword and Boolean Searching
3. Circulation
4. Reserve Room Control

5. Cataloging (includes interfaces that allow direct import of records from OCLC, RLIN and similar data bases)
6. Authority Control
7. Serials Control (supports USMARC Format for Holdings and Locations)
8. Status Monitoring
9. Reporting and Collection Management
10. Parameters and Library Profiling

3. Optional Packages

1. Document Delivery
2. Journal Indexing
3. Acquisition and Fund Accounting
4. Z39. 50 Server
5. PC Client Packages

    a) VTLS ADA Workstation (for visually impaired patrons)
    b) VTLS InfoStation (graphical user interface with digital sound, full motion video…)
    c) VTLS Z39.50 Client
    d) VTLS EasyPAC (Windows-based general-purpose workstation)
    e) VTLS EasyCAT (Windows-based workstation for catalogers)
    f) VTLS Voice Activated Library Services
    g) Special networking features (resource sharing among libraries):

        — searching and copy cataloging
        — union catalog maintenance
        — materials and data distributions
        — interlibrary loans

4. VTLS Services

1. Consulting
2. Custom programming
3. Customer support
4. Documentation
5. Installation
6. Locally Mounted Databases
7. Migration Services
8. Partnership and Special Projects
9. Record Conversion and Processing
10. Record Loading and Indexing
11. Training

5. VTLS New Era

VTLS' break-century system is called VIRTUA. All components of the new system are connected to the network, thus the system can be easily re-designed. It implements the concept of data warehouses which means that the data and the server software can reside on separate servers and even separate platforms. In such a manner VIRTUA realizes true distributed computing. VTLS developed its new system using object-oriented design. VIRTUA supports full UNICODE standard allowing catalog, search and display bibliographic data and documents in most languages of the world. Library staff can query databeses using standard SQL command set or to hook-up their own application to the system using build-in Application Programming Interface, API. Generally speaking the new system gives more flexibility both for staff and patrons but can be bandwidth- and performance-consuming for demanding user.

6. VTLS in Poland

This overview comes six years after first three Polish academic libraries: the Warsaw University Library, the Jagiellonian Library from Cracow and the University of Gdansk Central Library have chosen VTLS: US-developed computer application designed to control all processes any contemporary automated library must deal with. A wise, far-seeing policy of Andrew W. Mellon Foundation (USA) investing in modernization of Polish education system infrastructure has caused a sort of an avalanche effect. The subsidized libraries rapidly changed their policy from local to national level, forming a sort of consortium and involving additional funds to support and better develop their projects. Lack of experience in organizing interuniversity consortiums forced project teams to devote a full year to train both technical and library staff, form task groups for legal affairs, networking and for library formats and standards. Trainings were available also for those libraries from Poland who haven't received foreign grants, but were willing to join the consortium as soon as the financial situation made it possible. Formal agreement between the universities was signed by their Rectors two months after the universities signed their license agreements with VTLS Inc. It is interesting, that the agreement was signed also by yet another university (University of Mining and Metallurgy) which decided to finance its software license from their own University Investment Fund. This exceptional behaviour indicated that despite Poland's poor pre-transition period, Polish educational and research system still could act as a valuable co-investment partner. In the following three years the newly born consortium was joined by twenty three new members from four cities: Wroclaw (1), Lublin (4), Cracow (12) and Gdansk (7). In the next two years three institutions cancelled their membership, but two new libraries joined the consortium. There are some signs that a few new libraries may receive their VTLS license this year.

Among the VTLS consortium libraries we have a number of sigificant libraries, namely: the oldest in the country, 600-year old Jagiellonian Library, 400-year old Gdansk Polish Academy of Science Library, Warsaw University Library (the largest academic library in Poland) or Wroclaw University Library with its largest stock of special col-

lections. Undoubtedly, the consortium posseses the higher collective cataloging power in the country. But in the first half of 90s the libraries were unable to consume their cataloging potential because of serious infrastructure deficiences.

7. Technological Infrastructure Bottleneck

The consortium libraries' projects required rapid implementation of modern technology, both in multitasking and multiuser computer systems and networking. Project teams in all libraries started with less than little experience in the above areas and rather theoretical knowledge. It is important to know that these days, in absence of different consulting services, Polish academic staff represented the most educated part of the society. It means, that in case of any problems, project teams were forced to look for correct solution on their own. This concerned mainly problem of selecting computer hardware and networking technology. The teams were fully aware of the potential costs of hardware incompatibility. Prior to any purchase, a very detailed analysis of each case was carried out, but lack of standards descriptions and protocol specifications slowed the purchase procedures very much.

The early design of the future academic library system coincided with worldwide International Standards Organization/Advanced Research Project Agency (ISO/ARPA) standards battle and immense invasion of outdated technology on Central Europe: IBM's mainframes with SNA protocols and DECNET. Library automation teams quickly rejected mainframes and most proprietary protocols, but ISO/ARPA confrontation was a serious problem. In fact the choice had a political flavour: ISO standards were EC backed and somewhat younger while ARPA specifications were supported by the United States and looked a bit outdated with its Internet adress space visibly exhausting. At first look it was very hard to guess which philosophy will prevail in the near future in the area of networking protocols: IP or X.25. Hewlett-Packard – a computer systems vendor recomended by VTLS Inc., was offering both technologies combined in a very tricky way. Their PA RISC-based HP 3000/9xx servers with MPE/XL operating system were sold as a 'critical mission' alternative to the family of HP 9000/8xx UNIX servers. Both families had the same hardware and the vendor offered two-way migration option in case of customer dissatisfaction or application platform change. In MPE/XL OS standard LAN segment was shared by TCP/IP, Novell's IPX and proprietary HP's Avista Flow Control Protocol (AFCP) non-routable protocol with a small snag: HP's server LAN adapter accepted only IEEE 803.2 frames and neither Ethernet I nor Ethernet II frames. This caused a number of complications concerning interoperability with third-party hardware that were considered as key components of future system. The complications to set up correct LAN/WAN architecture were coming not only from HP side. Cisco Systems, the most advanced router vendor, mentoned in its AGS+ router documentation that the system converts standard Ethernet's 48-bit address to 9-bit address. It was unclear if this would be correctly handled by other vendors LAN equipment.

An even greater problem concerned WAN connectivity. In order to allow system-

to-system communication Hewlett-Packard offered the following models:

a) Server-to-server connectivity over X.25 Public or Private Packet Switching Network, PSN, (X.25 adapters located on the server's I/O bus)

b) Data Terminal Controller, DTC, equipped with X.25 card direct connecivity to server X.25 adapter or to another DTC with X.25 port via PSN

c) Connectivity over asynchronous lines between two LANs via local Telnet Express network adapters (TCP/IP)

Thanks to extensive networking seminars organized for Central Europe specialists in Vienna and Trieste our experts were able sew all heterogenic system seamlessly, finally choosing the winning IP strategy. The final model was based on a modified variant c. with additional Cisco routers to provide WAN access over synchronous lines. Hewlett-Packard routers were rejected since they had no compatibility certificate with Cisco routers over synchronous lines (currenltly HP routers are marked as 'Cisco compatible').

The intellectual part of the system design was relatively easy to carry out with comparision to the physical inter-city systems connectivity. Of four library servers in 1993 only half of them (in Cracow and Gdansk) had Cisco routers with direct connectivity to Metropolitan Area Networks, MANs, while the servers in Warsaw and Wroclaw had not. These days Polish VTLS library network subsystems were connected over the lines leased from local PTTs and had three problems ahead:

— how to get good trasmission service across MAN
— how to get good transmission inter-city service
— how to be recognized as an importent partner at the early developmnet of academic and resaearch MANs

From among mentioned four libraries only the University of Gdansk Central Library was designed from the very beginning as a node of MAN. This allowed later to lower significantly the appropriate costs and speed up the time of broadband connectivity of the local library server to MAN node (University of Gdansk Central Library server in 1996 was connected to MAN over FDDI as a first library server in Poland). If, on the other hand, the Local Area Network, LAN, development is concerned, only Jagiellonian Library in Cracow had moderately developed LAN, while each of the remaining libraries had only a short LAN segment limited to the closest neighbourhood of a server. To solve all the above the libraries needed significant funds, again found abroad ($164,950 granted by Open Society Institute, OSI, a subsidiary of G. Soros Foundation)[3]. After the project was completed, all four library LANs were connected over fiber optic cables to corresponding academic MANs, though the quality of the service not necessarily corresponded to declared FDDI standard, e. g. in Warsaw 'political reasons' caused cramming campus 100 Mbps FDDI traffic through 10 Mbps Ethernet and then — even much more dramatically — through serial 64 Kbps synchronous port (Warsaw Academic MAN operator demanded all participating insti-

tutions to connect over the standard allowing these days billing the network traffic).

In the second half of 90s VTLS libraries are in the full production period and demand more quality of service. This comes across the contemporary trends to support Asynchronous Transfer Mode, ATM. Libraries must look again for new sponsors to allow further system development. Additonaly, two Polish academic network operators supporting different WAN philosophies (FR and ATM) should converge to one fast and reliable solution: ATM.

8. Development of National Fund Policy

Immediately after completnig its first, four-server system, the Interuniversity Coordinating Committee for Implementation of VTLS submitted to the State Committee for Scientific Research Consortium's first proposal to support common retroconversion project and received a grant. This policy was continued year-by-year resulting in a quick development of the system.

It is impressive to look at the charts displaying the development of Polish domestic contributions for VTLS the Academic Consortium. The figures reflect only a fraction of overall governmental subsidies directed to support the library programs. The pictures were derived only from the data available from retroconversion and license projects. We did not analyse here the spectacular budget and grant input which allowed total modernization of academic and research infrastructure either. This is definitely out of the scope of the present paper. And last, but not least, it is important to remember that the VTLS Consortium was probably the most dynamic structure able to consume large amounts of money in a very well organized manner, but for sure it was not the only library project in Poland.
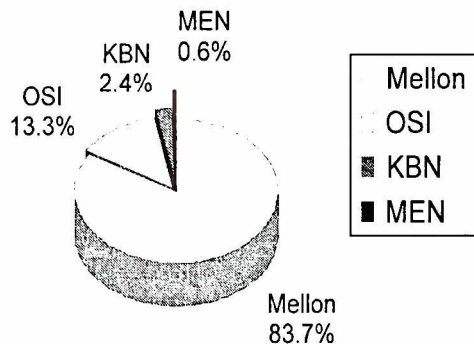
Legend:

Mellon: *Andrew W. Mellon Foundation, USA*
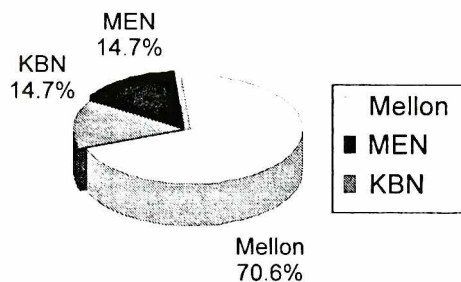OSI: *Open Society Institute, USA*
KBN: *The State Committee for Scientific Research, Poland*
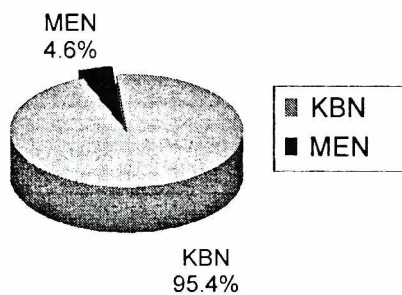MEN: *The Ministry of National Education, Poland*
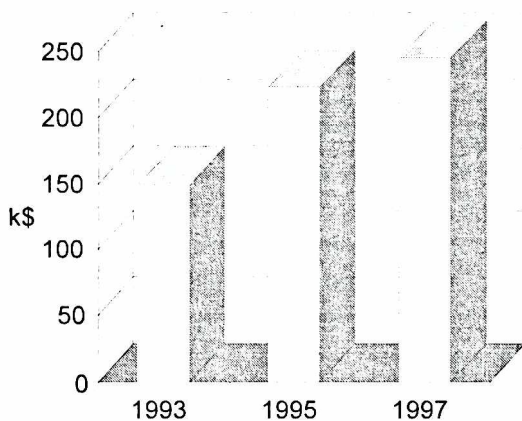
1993 VTLS Consortium Sponsors

MEN
0.6%
KBN
2.4%
OSI
13.3%

Mellon
OSI
KBN
MEN

Mellon
83.7%

1995 VTLS Consortium Sponsors

MEN
14.7%

KBN
14.7%

Mellon
MEN
KBN

Mellon
70.6%

1997 VTLS Consortium Sponsors

MEN
4.6%

KBN
MEN

KBN
95.4%

Polish contributions in absolute figures

k$

250
200
150
100
50
0

1993   1995   1997

We can conclude from the above data, that the Polish VTLS Academic Consortium has reached, probably, the highest available level of the domestic subsidies. The last picture demonstrates a saturation effect, and it is unlikely that governmental contributions to the project may be significantly increased. Since all domestic grants were received to cover the costs of retroconversion and licenses, it is still possible to receive additional funds through the other finance channels.

References:

[1] *http://vtls.com*

[2] Chachra V., Gulbenkian G., V*TLS Inc.: The Company, the Products, the Services, the Vision*, Library HI TECH **11**, (2) 7 (1993)

[3] Czerminski J. B., *Library Systems Intercommunication*, in: *Computers in Libraries – – Poland '94*, Proc. of the Polish Librs Assoc. Natl Conf., Chorzow 1994