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Developing a Virtual Library for an Overseas Campus

Judith M. Nixon

Abstract:

This article describes the development of a 'virtual library' for all off campus users. One of the major imputes for the virutal library was so we could delivery our electronic resources to our new overseas campus. Three major goals were accomplished by the day the overseas campus opened. Many of our electronic resources were moved to WEB-based delivery, a proxy server was set up to authenticate off-campus users and allow use of the WEB delivered databases, and a Windows Terminal Server was set up to deliver CD-ROM based databases.

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Developing a Virtual Library for an Overseas Campus

Mission impossible?

In September 1998 I was asked to plan a library for our new Master's in Management Science Program in Hannover, Germany . This was an exciting challenge as the directive was to do this from the States without any extra staff either in the states or in Germany. A virtual library was the best solution.

Background:

In 1998 the Krannert Graduate School of Management began planning for an overseas campus to open in September of 1999 as the German International School of Management Administration (GISMA.) The plan was to deliver Purdue's curriculum and courses, taught by Purdue faculty, to a pilot Master's program in Hannover, Germany. Students in the program were to be registered as Purdue students and receive a Purdue degree. In addition, students were to have all the rights and privileges of our other students -- including access library services.

The task before the Krannert School and the library in 1998 was to plan and deliver the program in one year. This was an exciting time; students were recruited, a location for the school was found, and West Lafayette faculty were selected to go to German to teach. From the initial planning stages the library was involved, and I was asked to serve as the

library consultant. With such a short window of time, and no on-site librarian or library staff, I decided to concentrate on developing a “virtual library” by delivering our electronic business databases to the GISMA students’ desktops. Development of a “real” library of books and journals was delayed until we had an on site librarian.

This article describes the development of the “virtual library,” and how we delivered most of our business databases to the German campus. The creation of the “virtual” library had three major components.:

- move as many electronic databases as possible, as quickly as possible to WEB-based delivery;
- set up a proxy server; to authenticate off-campus users;
- put the CD-ROM’s that we could not convert to WEB access on a Windows Terminal Server.

Move To Web-Based Delivery:

Our first step was to move as many of our databases from CD-ROM format (and Internet access using proprietary software, such as *Dow Jones*) to WEB delivery. This goal was part of our electronic access development on campus anyway. We were moving as fast as we could in this direction as part of our basic library strategic plan to put data on the desktop of all our

users, regardless of where the user is located. The German campus only added another reason to convert to WEB delivery.

Business databases that we converted were *Dow Jones Interactive*, *Lexis/Nexis* (to *Lexis/Nexis Academic Universe*), *CCH Tax Service*, *Gale Group databases*, *Disclosure*, and *FIS*. Some of these conversions were relatively inexpensive, only costing a bit more than the CD-ROM or Internet access. Others, such as *Disclosure*, were very expensive, but were converted as part of the library-wide initiative. *ABI/Inform Global* was a major exception. The Library system was not ready to pay the price difference, which was more than twice the price of the CD-ROM. Eventually we ordered the WEB version through funds allocated for the development of the German campus. The rationale for using GISMA funding was that the full text WEB database provided a retrospective collection of full text journal articles instantly, without the need to select, order, and process a retrospective printed journal collection.

Set Up A Proxy Server:

The primary filter for access to WEB based databases on the West Lafayette campus is by IP filtering. We negotiate access to WEB based subscriptions for our students and staff based on IP address rather than by

password control, because it is much easier to administer. In other words we control who can use the database by controlling the IP addresses of the computers that can access the database. Database vendors are given our IP address range, and they limit access to these. This works well for anyone entering the databases from an on campus computer, but *does not work* for off campus users, such as student who live in apartments and distance education students. Of course, our German students and staff fall into the category of users that are denied access because their IP addresses are not accepted by the computer hosting the database. This was not a new problem or a problem unique to the German extension of the Krannert School of Management.

To solve this problem we set up a proxy server which authenticates off campus users. It runs on a regular PC (Intel machine) and uses Apache software.(1) We chose Apache because it was free and had good documentation. Users must configure their browser (*Netscape* or *Internet Explorer*) to point to our proxy.pac file. On our web page we have screen by screen directions on how to do this.(2)

Windows Terminal Server (WTS):

However, not all databases could be converted to WEB products. Some were not available on the WEB, and some were too expensive. For the databases that we opted to keep in CD-ROM format, we set up a Windows Terminal Server. (Originally this was the NT Server 4.0, Terminal Server Edition.) The Windows Terminal Server provides access to Windows applications from non-windows platforms -- e.g. Macintosh and UNIX.

It “serves up” windows software to another computer, and allows a user to access a software package that is located on someone else’s machine. From the users point of view, it looks like the program is running on their computer over the network, while, in fact, their computer has become a dumb terminal in the process. The server displays the output of the program to a window on the user’s screen and accepts input from the user’s keyboard and mouse.

The Windows Terminal Server provides the technological solution for delivery of windows-based CD-ROM databases. Since the CD-ROM databases installed on the Windows Terminal Server are on a network, they must be licensed to be networked. We renegotiated our licensing agreements for any databases that were single-user-stations to networked versions. This, of course, included some price increases. When using

databases on a network, vendors require that the University limit access to students and faculty. All our users are authenticated through a custom written program that checks the user's name and University Identification number against a database of users drawn from our circulation files.

- **Further Details On The Windows Terminal Server:**

The Windows Terminal Server runs on a Pentium 800 machine with 2-4 processors, and a gig of memory. It is based on NT 3.51. It was developed by Citrix and licensed to Microsoft in 1997 for NT 4.0 Server, calling the modified NT the Terminal Server Edition. Now it is included with Windows 2000. It allows seventy concurrent connections to the Windows Terminal Server at the same time. Each user's session is maintained completely independent of others. The Windows Terminal Server, not the user's computers (or client), talks directly to the remote server at the vendor's site that has the electronic database, so the remote server sees only the address of the Windows Terminal Server. The Windows Terminal Server handles the processing for all Windows applications on the Windows Terminal Server. Only screen updates, keyboard and mouse movements, are sent over the network.

While the applications for this technology are exciting and almost endless, the ramifications for distance education are profound.(3) Off-

campus student can access specialized software packages located on on-campus computers. For the Library, this provides a way to deliver database that could not otherwise be placed on a student's personal computer due to cost of the program for individual computers or licensing issues of the database, machine requirements (on Macintosh, UNIX or PC machines with hardware restrictions), or sheer administrative work that technicians would have installing software on everyone's computer. The Libraries id a leader at Purdue in the use of the Windows Terminal Server on campus.

- **Installing The ICA Client:**

To gain access to the Windows Terminal Server, users must install a Citrix Client on their personal computers. They have two choices: ICA Java Client or Primary (native) ICA Client. (ICA stands for Independent Computing Architecture.) These ICA Clients are the desktop component of the two part system utilizing a Citrix server application for deployment. We recommend the Primary ICA Client over the ICA Java Client as it allows printing and downloading, but make both available.

The ICA Java Client is made available because it is easier to set up. It is written in Java and runs within the users Jave-enabled browser. It requires that the user have a Web browser that is Java Development Kit

(JDK) 1.1 compliant. Netscape 4.6 or Internet Explorer 4.0 (or greater) are acceptable browsers. The ICA Java Client does not allow printing or saving of files. In addition, MacIntosh computers do not support the ICA Java Client, so MacIntosh users need to load MacInstosh IAC. Because of these limitations of the ICA Java Client, we recommend the Primary ICA Client. It is available free for downloading from the Citrix home page(4) and can be used on any computer on the network that has a graphical user interface. Once installed it on the hard drive it works with the user's browser, like a "plug-in." It only needs to be installed once; after that user can use any database on the Windows Terminal Server. From the user's point of view, a few minutes spent installing the Citrix Primary Client leads to full access of all databases on the Terminal Server.

In our setting users access the Windows Terminal Server using their Web browser to connect. There are multiple other ways that users can access the Windows Terminal Server from remote locations. We have choose to have users access via their web browsers. Other options are :

- With the Microsoft Terminal Server client on Windows for Workgroups 3.11, Windows 9x, and Windows NT systems; the Microsoft client uses the Microsoft Remote Display Protocol over the TCP/IP.

- With the Citrix Program Neighborhood on Windows, Macintosh and UNIX system.; the Citrix client uses the ICA protocol over NetBEUI, IPX/SPX, and TCP/IP; Citrix ICA requires a Windows Terminal Server add-on Called MetFrame; ICA is well suited for low bandwidth connections.
- With an X windows System server; a Windows Terminal Server add on called WinCenter, developed by Citrix and distributed by NCD, is required.

Conclusion:

Through technology we were able to deliver a 'virtual' library to our German campus on the day school opened. Students were shown how to set up their laptop computers to point to our proxy server and how download the Citrix ICA Primary client. They were off and running, doing research for their classes before one book or journal was on the library shelves. Through the use of web-based subscriptions and the Windows Terminal Server, an electronic business library is on the desktop of all students regardless of where in the world they are located.

1. See <http://www.apache.org> for more information on this software.
2. See <http://www.lib.purdue.edu/proxy>
3. Purdue began using Windows Terminal Server in 1998. In addition to the Libraries use of Windows Terminal Server to delivery CD-ROM based databases, Purdue's Schools of Engineering, Science, and Pharmacy are using Windows Terminal Server for AutoCAD 2000, MatLab 5.3, Microsoft Office 2000 Professional, Microsoft Visual Studio 5.0, SAS 6.12 / 8, and SPSS 9.0.
4. See <http://www.citrix.com/download/>