

Superjanet: library and information services over a gigabit network

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Michael Breaks, "Superjanet: library and information services over a gigabit network ." *Proceedings of the IATUL Conferences*. Paper 12.
<http://docs.lib.purdue.edu/iatul/1993/papers/12>

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SUPERJANET : LIBRARY AND INFORMATION SERVICES OVER A GIGABIT
NETWORK

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I would like to talk about the development of SuperJANET, the new optical fibre network for the UK academic and research community which is currently being installed; to look at some of the pilot applications that are being developed to run over SuperJANET, both library and non-library applications; and to look at the strategic issues that will have to be addressed if SuperJANET is to reach its full potential as an 'Information Highway'.

The Joint Academic Network (JANET) was established in 1983 and all universities and the institutes funded by the Research Councils are connected, as are many other educational and research institutions, such as the British Library. JANET serves a population of over 50,000 terminals and personal computers, and through the world-wide Internet, millions of people are linked together in a vast global electronic village. I will not go into details of how libraries currently use JANET, but refer to the chapter by Peter Stone in Zuck and Flanders (1).

We have moved from the era of kilobit networks to megabit networks and are now approaching the era of Gigabit networks, with SuperJANET in the United Kingdom and the NREN (National Research and Education Network) in the United States. What will the impact be on library and information services of these new Gigabit networks? Networks that will be a 1,000 times faster than JANET and allow the transmission of highly sophisticated image and voice communication. Well the simple answer is that we do not yet know and we can only speculate, but one thing that we can be sure of is that the SuperJANET technology will transform teaching and research and the whole concept of the library will change. If we look at the example of JANET, when this was created less than 10 years ago, it was intended to be primarily a research network to link users with scarce big computers, so that they did not need to travel to the computers with bundles of punch cards to process their research results. The use of JANET as a means of communication or as an information carrier was not high on the agenda of the planners. For example, electronic mail was not identified as one of the uses of the network. Electronic communication between ordinary users is now the major use of the network, as well as its use for information access and delivery.

The SuperJANET network, which is an entirely new network, using the most up-to-date communications technology - synchronous digital hierarchy (SDH) - will not in the short term replace JANET. It has been planned in a number of phases. The first phase was to use the £5m provided by the government in the autumn of 1991, to install a pilot network that would link a few institutions. Further phases will connect more institutions, a further 50 during 1993, so that

eventually all higher education and research institutions will be connected. British Telecom have been selected as the supplier of the network and Edinburgh, Cambridge and Manchester Universities, Imperial College and University College London, and the Rutherford Appleton Laboratory near Oxford, the base of the Joint Network Team, have been selected as the first six sites. They were chosen for their network and computer skills, but also for their geographic spread, to ensure that the first phase of the network covered the country.

The funding for the network is for the wiring and associated equipment and no money has been made available for the development of applications to run over the new network. So it is an expectation of early connection that the initial sites would develop a range of pilot projects that could illustrate the potential of SuperJANET. These were to be in place by the Spring of 1993 to illustrate the potential of the network to the funders and so to guarantee the release of the remaining £15m over the next three years. In addition to supporting the specific applications, the pilot network will also provide a high performance infrastructure for general use by the six sites and it is likely that the staff and students themselves will discover new applications not considered by the planners. A meeting was held in July 1992 for representatives from each of the six initial site to develop SuperJANET applications in partnership with one or other of the sites. These applications include some in the area of library and information services, but before I look at those I would like to look at some applications in other areas, where SuperJANET can assist higher education, both teaching and research.

SUPERCOMPUTING

Supercomputers are capable of generating enormous amounts of data and in many applications the data can only be understood by the user when it is presented as an image, often using colour and animation. A range of projects such as Global Atmospheric Modelling, where a computer model of the earth's atmosphere will be used for climate research, and Oil Reservoir Studies to look at the recovery process that may be applied to North Sea oil.

REMOTE CONSULTATION

In certain areas of medicine it is very expensive to have ready access to a consultant pathologist, and in the most specialised medical fields they are often only found in universities. SuperJANET could therefore be an enabling facility to allow university pathologists to look at high quality microscope images and to provide audio and visual communication between the pathologist and the operating theatre to advise on treatment.

TEACHING

There are a number of subjects that have a high visual content and SuperJANET would allow the transmission of video information between centres. The application that has been chosen is the teaching of surgery by interactive video techniques. This will be surgical operations direct from

the operating theatre, clinical presentations of patients with surgical conditions from the ward or lecture theatre, and there could be discussions between surgical specialists on topics of wide interest. The teaching of surgery is heavily dependent on the transfer of visual images, which can be both still and moving and often have to be in close-up. The pool of patients is necessarily limited and the changing patterns of treatment are reducing the length of time patients stay in hospital and are therefore available for teaching. Such teaching is best done in an interactive way and it is necessary for students to experience the immediacy of an operation.

GROUP COMMUNICATION

The ability of SuperJANET to transmit sound and moving pictures to and from workstations on the desk, means that groups of researchers could work together in real time, sharing white boards on which they could write and interact as if they were all in one room. The development of sophisticated workstations, which can support multimedia communication, means that video conferencing and distance learning can take place over the network directly from the desk, rather than from specially equipped studios.

LIBRARY AND INFORMATION SERVICES

This area is of most interest to us and I would like to spend some time looking at some of the SuperJANET library and information applications. As you can see from some of the previous applications, which in many cases deal with information, though not the traditional bibliographic information that libraries have dealt with, the boundaries between what has been generally accepted as services that come from the library will change, and the nature of the library will change. The SuperJANET Project Team considered that libraries would have a central role in providing services over the network and they commissioned a research project to look at the strategic issues that would need to be addressed, as well as encouraging the development of potential pilot projects. This project, which I have been directing, gave itself the name of SPIRS - SuperJANET Project in Information Resources and Services - and I would like to outline some of our findings, by firstly looking at some of the potential applications.

(i) One of the immediate applications is in the area of document delivery, particularly for journal articles. The cost of journal subscriptions is increasing and so is the number of titles, yet libraries are having to cut back on subscriptions, as their budgets fail to rise in line with the rise in the cost of subscriptions. There is also the very high cost of storing the material in libraries on a long term basis, when it is generally acknowledged that less than half of the journal literature is consulted or cited. So resource sharing between institutions is seen as one possible long term solution, as long as inter-library loan arrangements can be improved and researchers can be provided with almost instant access to the articles they need.

The SuperJANET network will allow the transmission of the full text of articles, with graphics

and colour pictures, as published in the original text. The transmission could be via the library or direct to the workstation of the researcher, bypassing the library. The document could come from another library, from the BLDSC, from another broker or perhaps direct from the publisher and payment could be made directly by the researcher. There are a number of experiments underway at the moment to use the network to deliver scanned pages of journal articles. There is a project based at University College London using the RLG Ariel software over the first phase of SuperJANET and the BLDSC are about to deliver scanned images of journal articles over the current 2 Mbit/s network to Nottingham University Library.

(ii) SuperJANET will allow access to archives, illustrated manuscripts and rare books, which could be consulted by groups of researchers, located in different institutions, but working in real time. SuperJANET will provide for the transmission of high quality images, so rare material could be scanned to create an image that is as good as the original. No longer will researchers have to travel to examine rare material, no longer will rare material have to be handled and possibly damaged. It will be possible to compare and manipulate the documents on screen, as if one was handling the originals. One of the SuperJANET projects in this area is to provide access to the Genizah fragments and some illustrated Persian manuscripts at the University of Manchester Library.

(iii) It will be possible to create real electronic journals with SuperJANET. The electronic journal or newsletter has been in existence for quite a long time as a plain text file, but it has not been seen as a substitute for the printed version by researchers. One of the reasons for this is that it is inferior to the printed version. It is just text on the screen, without the different typefaces and packaging that make text readable. If electronic journals were superior to the printed versions, if they could provide colour pictures, chemical structures and mathematical formulae, sound and moving pictures, and you could turn over the pages and browse through the articles, then we would look at them afresh. SuperJANET could change the whole concept of the journal. As a result of the SPIRS project, group of publishers, including learned societies, university publishers and commercial publishers are currently creating an experimental electronic journal testbed on SuperJANET, by each contributing a body of current journal material in a subject specialism which takes advantage of the facilities that SuperJANET provides.

These type of applications will move us closer to the reality of the 'virtual library', where the user no longer needs to come to the library, because the user's workstation has become the library, providing them with instant access to the information that they want. Libraries have always, of course, been 'virtual' in the sense that they could not hold everything, but were access points to information stored elsewhere, but access to remote material was generally through the Library. Networks now allow access to and delivery of remote material from the desktop.

STRATEGIC ISSUES

The library applications that I have outlined are all pilot and experimental projects and if they were to turn into real services, then a number of significant issues will have to be addressed. I would like to briefly outline some of these issues, which are not the technical ones, but the economic, social, cultural, legal and some would say, ethical ones.

(i) The first major issue is copyright, the same rules apply to electronic copyright as applies to printed material and users and publishers are going to have to address this issue, if SuperJANET is to become an Information Highway. The publishers make their living by producing books and journals and they add value to the information that academics produce. Academics themselves have a clear need to see the results of their work published in prestigious academic journals. The whole reward system for both individual academics and for individual universities depends on the current scholarly publication system. It will not easily be changed and in the end can only be changed by cooperation between the publishers and the academic community. In essence, it is an economic problem and different pricing and charging models need to be established for the dissemination of scholarly information.

(ii) There are a whole range of issues based around standards. The effective use of network information resources will depend on a combination of factors: the ability to identify resources of interest; the ability to interact with, and consolidate results from, diverse resources; the ability to request and pay for services; the ability to share data between applications. This can only be achieved if the library and information community promotes initiatives which clarify standard and application issues. For example, standards like MARC become even more important if we are to develop protocols which will enable the user to search a range of remote catalogues using their 'home' search language.

(iii) We will need tools that provide users with the ability to discover what is available on the network, to obtain it and to effectively use it by integrating it into other applications. There is a lot of work going on in the area of Network Resource Guides to allow us to discover what is available on the network and there are already a number of such tools available like, WAIS and Gopher, which enable us to access the information, but there is still a long way to go before the average user can find the information that they want.

(iv) Users will need to be aware of the new ways in which networks can deliver information to them and they will need training in the use of the technology and of the network. Together with training, we will need to address the wider cultural issues and how to change the user's perceptions of obtaining information. Most researchers have developed tried and tested methods of obtaining the information that they need and they will need both persuasion and help, to change these methods.

(v) Librarians will also need training. They will need to update their skills if they, rather than other groups, are to lead the development of the virtual library. If librarians do not involve themselves with the issues of network information services, then others will do so and we will be left behind. We have the necessary skills that will enable us to understand what our users need and to deliver the services that meet these needs. Librarians will need to take on new roles as information navigators, acting as informers, trainers and educators. The amount of information already available on the Internet is vast and it is uncontrolled. Librarians will need to develop new skills to control this information, by describing and cataloguing electronic information resources, and we will see a reestablishment of the unique skills of the cataloguer. Librarians will become the guides through Cyberspace, the 'infonauts' of the network.

(vi) Institutions will need to be prepared to make full use of SuperJANET. They will need to have the technical skills to connect to the network; to have the high performance local area network to distribute services over the campus; to ensure adequate workstations to enable both staff and students access to the new services; and put in place an appropriate organisational structure, so that they can provide users with a 'one-stop-shop' service.

SuperJANET provides the technology to change the very nature of the library and the very nature of information. Libraries will become access points, not only for bibliographic information, but for integrated sound, images and video. The 'virtual library' will happen with or without librarians and users will access and obtain information direct from their workstations. However, I believe that they will do it more efficiently and effectively with our involvement. We must not denigrate the skill of the librarian in organising information and managing access to it, whether it is in printed or electronic form. The 'virtual library' will not be delivered by technology alone and I have outlined some of the issues that will have to be addressed alongside the technological ones. Librarians have an obligation to be involved in solving these issues.

REFERENCES

- (1) STONE, Peter. JANET : the educational and research network of the United Kingdom.in Zuck, Gregory and Flanders, Bruce, eds. *Wide-area network applications in libraries*. Meckler, 1992. pp. 45 - 87.