

Future professional services in Scientific Information by joint R+D of Universities, Libraries and Industrial Providers

**with report on the German Government Digital Library programme
Global-Info.**

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Abstract

Development of aimed for future professional services in a new technological field, here the scientific information, calls for a special kind of approach:

Joint experimenting and evaluation by a coherent action of future users (readers, authors), developers and commercial providers willing to offer these eventual future services.

In the 6 year - 60 Mill. DM programme of the German Government, Global-Info, consortia of 13 commercial providers and R+D groups at 13 Universities are formed. Complemented by an initiative, IuK, for Information and Communication of The Learned Societies in Germany, (about 15 societies with some 100.000 members), all three types of partners are set up to tackle coherently the formidable task of a future professional digital library.

The organization schemes, the main concepts and the present status as well as some examples of early prototypes are presented.

The embedding into the international development is aimed at by including the large international publishers as partners right from the beginning, and by working on setting up a close contact to other large industrial nations' government programs such as the Australian Digital Library project and to their learned societies.

A personal view to where the market might go is added: from separate production and offline publishing to an 'online' information service in the production process of science, -with offline archiving.

1 Introduction

You may wonder that a Theoretical Physicist is worthwhile for you to listen to. I will argue here that in the early stage of an industrial transition (revolution) period the exchange of ideas and views between different fields, backgrounds, and profession is what may lead to explore early the new terrain and thus may gain more time for adjusting and developments of new and lasting and professional and thus profiting services. I will be here for two weeks to learn, - and to consult if asked for.

¹further, detailed and updated - information will be found in the online version of this paper, to be released after the conference, in July 1998 at <http://www.physik.uni-oldenburg.de/hilf/vortraege/EDM-Hilf.html>

All services mentioned here may be reached by starting from <http://www.physik.uni-oldenburg.de/services.html> .

In the second part of the talk I will give a tour on how in Europe and especially, as best known to me, in Germany the learned societies in Natural Sciences try to cope with this. Two major steps of action are undertaken in Germany:

An *Initiative of all Learned Societies for Information and Communication* in Sciences has been launched. As its present chairman I see it very active.

The Government has started a Funding programme *Global-Info* which allows to apply for about 60 Mill. DM in 6 years by consortia. Each consortium is formed by University research groups of different learned fields and of different places, and by industrial providers, e.g. publishers, data base hosts, etc. The project is explicitly open to all relevant and interested international providers, such as the internationally operating publishing houses, but also to providers abroad willing to join the design and development of new prototypes of services. As a member of the steering committee of the *Global-Info* Programme I would enjoy your interest.

Both activities aim to cope with the rapidly changing scene and to end up with detailed and technologically founded requirements, prototypes, and recommendations for new professional services in the field of scientific information and communication.

2 Mechanism of Industrial Development

A personal view of the mechanism of industrial developments may serve as a warm up:

Scientists, to take here this small group of about about hundred million worldwide distributed professional customers, need information and create information. To work efficiently they need professional, efficient, easy to use services for creating, posting, transfer, upload, distribution, archiving, search and retrieve, reading, refereeing of the worldwide distributed scientific information.

In the last hundred years a culture for these services was established which culminated in the present worldwide and for all learned fields accepted publication scheme: scientists as authors create documents, send them to a publisher, who screens it, let it be refereed, works on the layout and prints it as part of the next volume of one of the 10.000 scientific journals, distributes it by mail to the some 10.000 scientific libraries where the reader can go to and read or copy the article. A multi-billion Dollar Print-and-distribute Industry has served us with a perfect system for that industrial stage.

With the upcoming new age of electronic data communication, just think of email and the World Wide Web, being started and used for long by the physicists, most urgently in need for immediate worldwide information, we are in the industrial phase transition and have all to work on the new professional culture of serving the same

intellectual needs but with the new technological possibilities to be exploited to make scientific work much more effective and ease creative work.

The challenge is that we do know the technological means and we do know the requirements of the scientists but we have yet to explore the scope and definition of the new services apt to serve.

Such situations have occurred earlier in history as well: from the stage of mail transportation by horses to cars, from cars to air-planes or trains, from large computers to PC and workstations,.. And in personal life we know that long periods of steady work are apparently suddenly interrupted by drastic changes. It is difficult to accept that long periods of profitable life are apt to be an extra burden for a successful enterprise after the next industrial phase transition. ²

Seldom have the giant companies as leaders in the past technology made it to lead in the new field. A reason may be that smaller companies and enterprises have less burden of large routine services and thus may easier take the risk to listen and discuss with the future customers for what the requirements are and take the time to develop contacts with research groups at e. g. Universities.

Thus we think that the way to a successful future professional (and thus profitable) services lies in a unconditioned open and pre-competitive close cooperation and collaboration between research groups, say at Universities, which are active in this field and providers in industry. It is this concept which is followed in Europe in the Science Information Scene to find out about the future yet unknown services, - and at the same time gain acceptance by its future customers. In the time of an industrial phase transition the open exchange of ideas and the discussion across the learned fields and the industrial sector border lines is essential.

3 The IuK Initiative

In Germany, after realizing in 1993 that a phase transition in scientific information services is inevitably to come due to the new technology of electronic computing, an *Initiative for Information and Communication IuK of the Learned Societies* was founded. By now almost 20 societies representing more than 100.000 members have joined, from the natural sciences (mathematics, physics, chemistry, biology) education, computer, sociology, psychology, technology etc.

The IuK is organizing an international conference (next is *IuK 99: Dynamic Documents; 22.-24.3.1999 at Jena*) and national workshops. It has several working groups on topics such as *Metadata, Dissertations Online (Ph.-D. theses), electronic jour-*

²Germany subsidises coal mine workers to continue their job instead of buying cheaper Australian coal with more money than needed to create the respective number of new workplaces..

nals, copy right and legal topics.

This year it released a first recommendation on using throughout the international Dublin Core set for defining Metadata of documents. Also, the deans of Physics and Mathematics of the German Universities agreed on a common set of regulations how to treat legally electronic dissertations with a joint agreed on set of Metadata. This leaves free the actual layout of the web-pages while keeping the professional correct retrieval of data.

The IuK is entering international bodies and just joins the W3C consortium which internationally coordinates the technical development of the internet. The IuK is looking for contact to other countries or continents learned society activities.

4 The Global-Info Programme of the German Science Ministry

The federal ministry project in Germany, *Global-Info* aims at a coherent initial funding of projects on all facettes in Scientific Information. Its server, <http://www.global-info.org/>, shows five subdivisions with the topics *developing of prototypes, learning and teaching schemes, Metadata and quality, usage of content, business models*. It is expected that in July 1998 the first set of applications of consortia will be handed in, to be refereed by international experts. Each project within this framework of 60 Mill. DM is a joint enterprise of industry, publishers and University research groups. By this visionary but high risk projects can be outsourced from commercial partners to University groups. In addition, the direct contact to the scientists instantaneously in different field departments at different places is to be realized by test-bed like experiment of serving prototypes of future services, train the users and evaluate their reaction before and after training.

At present the contact and integration of the international publishers and of providers abroad is looked for.

5 Projects of the international Physics Community

In Physics the *European Physical Society EPS* has installed a new *act on committee on Publication and Scientific Communication* which is working on recommendations with regard to a recognition scheme for journals, and stimulates new services esteemed useful for its members and divisions.

In Europe three major new journals have been launched: *European Physics Journal* a merger of a major French and a major German journal, and *NIP, New Journal*

of *Physics* which is purely electronic, free to read and download to anyone, but authors (or more sense-fully their institutions) have to pay about 500 US \$ per article before the critical refereeing is started. *JHEP, Journal for High Energy Physics* is electronic, refereed, free of charge to read, but post-publication printouts are costly.

Last fall representatives of the 94 known national physics societies in the world met for the first time to discuss also information management matters.

The electronic Physics Preprint Server, xxx.lanl.gov, started 1991 by Paul Ginsparg at Los Alamos, has developed into a worldwide net of active or passive mirrors. They server for safer archiving because of the many copies, more query-enter ports. In some fields of physics and mathematics virtually all scientific documents are handed in electronically in full text (about 100.000).

The EPS is operating an additional service, *EurophysNet*, which searches across the Web-Sites of the Physics Departments, and thus acts as a large distributed database of documents owned and maintained by the authors on *their* servers.

Recently both systems are being combined by a DFN *Deutsches Forschungsnetz* funded project of four Universities in Germany under the leadership of M. Bischoff.

Extensive work is done to implement throughout the use of Metadata to ensure that search engines understand what is searched for and find it.

The rather successful service TIPTOP, an automatic upload server for physics, where anyone can upload physics information for online distribution, let it be conference or job announcements, review texts, experimental data, etc., is being sold to IoPP, a commercial publisher owned by the IoP, the Institute of Physics, the Physics Society of UK. It remains to be seen how the integration of this up to now free open service into a commercial surrounding will boost the usage.

6 Call for work sharing between science and industry

To handle the transition of the past culture of management of scientific information into a new technological age system with yet unknown new and superior services for an effective scientific working is a gigantic task. In a short time we have to organize research, definition of requirements, development of prototypes, worldwide installations, training of all the distributed authors and readers for all fields of science to ensure the necessary coherence of publication/information scheme. The work sharing between science as customers, researchers, and creators of documents

and industry as needed for yet unknown future effective professional services on a worldwide scale with this huge heterogenous set of unorganized players worldwide distributed is unprecedented. That both the University groups and the providers do not have a tradition to work sharing in this field, does not make the task easier. In a time of steady evolution it was not necessary, but in the present time of rapid revolution it is mandatory.

7 The future of scientific information and communication management

The future of scientific information and communication even assuming the present technologies to be used is yet unknown, but slowly emerges. The separation and separated services for the different functions is one line: refereeing groups independent of a specific journal, distributor services or archiving houses with no publishing house, search services, etc. offer new perspectives and chances for even small companies to serve specific needs.

For a specific piece of information itself it seems useful also to split the different aims: documents start to be not only interactive (user can put in his own parameters and run the programme of the author himself), and dynamic (document is updated by the author), but may split into different parts for different readers and tasks, introductory material, data, experimental setup description, results, etc.

Most important for industry is the beginning separation of the active exchange of scientific information between researchers and the offline archiving happening independent and later on and may be in quite different ways.

The disadvantages of the past publication emerges in as much as we explore the new possibilities. The possible advantages of the new system are yet to be explored and wait for your active work internationally embedded.

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