OASIS for Online Distribution of Academic Information in the Japanese Medical Community

Takahiro Kiuchi

UMIN Center, University of Tokyo Hospital, Tokyo, Japan

Abstract

OASIS is a member-only homepage hosting service with a member list retrieval system, member mailing list service, and several application software services developed for academic societies, etc. by UMIN (University hospital Medical Information Network), Japan. In order to use OASIS, more than thirty Japanese academic societies have registered all their members to UMIN, which is the primary reason for the large number of medical professionals registered to UMIN. Using OASIS, academic societies can offer Internet-based, member-only information services to its members at low cost. As for the merit for each individual researcher, only one UMIN ID is required, which enables access to all the member-only homepages of academic societies of which the researcher is a member. I believe that OASIS has contributed greatly to promoting online distribution of academic information in the Japanese medical community.

Keywords:

Internet; academic information

Introduction

OASIS is a member-only homepage hosting service with a member list retrieval system, member mailing list service, and several application software services, initiated in 1998 by UMIN (University hospital Medical Information Network), a public medical network organization in Japan [1-4]. In order to use this service, many academic societies, etc. in Japan have registered all their members to UMIN, which is the primary reason for the large number of medical professionals registered to UMIN. As the registered user accounts can be used for many purposes, such as online data entry for clinical trials and epidemiological research, etc., OASIS is considered the most basic and important service among all the UMIN information services [5-7].

In this paper, I present an overview of OASIS and discuss its significance and role for promoting online distribution of academic information in the Japanese medical community. Technical characteristics of OASIS information system are also discussed.

Background

UMIN from its establishment to the mid-1990s

UMIN was established in 1989 as a common network computer center for national university hospitals in Japan, funded by the Ministry of Education, Science, Culture, and Sports (currently renamed to the Ministry of Education, Culture, Sports, Science, and Technology.) [8]. At the time of its establishment, UMIN provided its information services only to national university hospitals, using its own closed private network. The initial UMIN system did not become popular because of its unfriendly character-based interface, limited number of available terminals, absence of attractive digital content and application services, etc.

In 1995, UMIN initiated its Internet-based information services and thus was made available to all the medical professionals in Japan. Thanks to the initiation of the Internet-based service, the number of users rapidly increased. However, the purpose of most new users was only to use an Internet electronic mail service of UMIN. At that time, there were many institutions that had not started their own electronic mail services yet. Other UMIN services were not very popular because there was no attractive killer digital content or application software. Before long, each institution would come to set up its own electronic mail service. Then, UMIN electronic mail users would gradually switch to the services of their own institutions.

In the mid-1990s, many people in the world believed that distribution systems of goods and information would be dramatically changed with the popularization of the Internet and that existing traditional businesses would be mostly replaced by new network-based ones. As for the medical field, many net ventures were established around the world aiming at information services for medical professionals. The usual business strategy of these ventures then was to solicit as many users as possible, using much attractive digital content, and to obtain an overwhelming share of the market in the early stage [9]. They believed that higher market share meant less cost per user, and tried to increase their market share even further. Thus the net ventures spent huge money to achieve initial domination. UMIN did not have enough budget to purchase expensive digital content, and could not sell such content online without legal revision because UMIN was a government-funded organization.

Japanese academic societies in the mid-1990s

In Japan in the mid-1990s, although a considerable number of academic societies had open homepages of their own,

+

there were only a few that had member-only homepages for their members, and all of them were still experimental. All information services of academic societies such as journals, newsletters, member lists, etc. were delivered to their members, using paper-based materials via ordinary mail. However, it was anticipated that all information services of academic societies would eventually be distributed online to their members via the Internet in the future. Some academic societies began to examine how to provide member-only information services to their members via the Internet. However, the additional cost necessary to initiate Internet-based information services was a serious problem for them. Until the termination of paper-based information services, both online and paper-based services would have to be carried out simultaneously. While the cost for printing did not change significantly even if the number of printed materials decreased, considerable expenditure was necessary to initiate an online information service, including hardware, software development, system and user management, etc.

Basic idea for developing OASIS

If UMIN had not been used gainfully by many medical professionals, then there would have been no significance in its existence. As UMIN did not have sufficient funds to purchase or develop digital content, the remaining measure left for its survival was to develop a scheme whereby third parties put their digital content on the UMIN web servers and offered it to their service targets. In other words, UMIN had to be a vehicle to mediate digital content from its suppliers to medical professionals. In medicine, much useful digital content has been developed by academic societies. Especially in Japan, medical academic journals have usually been published by academic societies, and not by commercial publishing companies. I thought that UMIN and academic societies could take up each other's slack. UMIN could offer server hardware, application software, and system management service to academic societies, and academic societies could put their digital content on the UMIN web servers for their members. The OASIS information service was originated from this idea.

Overview of OASIS

Hardware

The OASIS information system is made up of four servers, namely a WWW server (Dell PowerEdge 6450 with 4 CPUs, 2 GB memory, and 100GB storage), database server (SUN Fire 280R with 2CPUs, 2GB memory, and 100GB storage), upload server (Dell PowerEdge 2550 with 2CPUSs, 1GB memory, and 100GB storage), and mailing list server (Dell PowerEdge 6450 with 4CPUs, 4GB memory, and 100GB storage). Until December 2001, HP-UX-based servers with less performance had been used. As OASIS software modules and its related software run under any UNIX or UNIX-like operating systems with minimal porting effort, there are many options for hardware platforms.

Software

OASIS software modules, other related software modules, and their relationships are presented in Fig. 1 [2-4, 7]. Software modules developed by UMIN are written mostly in PERL 5 and partially in C language. Other software modules are freeware in PERL 5 and C language, except the database management software, namely Oracle 8.1.7. Some academic societies install their own software modules to OASIS WWW servers and use them in addition to the application software provided by UMIN.

All operations of academic society secretariats and individual members are carried out using web-based interfaces, except the HTML uploading operation for a member-only homepage. Secretariats of an academic society can add new members, delete existing members, and update information of existing members, using the OASIS member list management system. If they alter their member list, then the member lists for the member list retrieval system, homepage access list management system, and mailing list management system are also altered accordingly (Fig.2). Note that the homepage access list management system and mailing list management system can be also used independently of OASIS.

Members of academic societies in medicine and its related fields are qualified for UMIN registration, and thus OASIS user academic societies are authorized to issue UMIN IDs by themselves. When a new member is admitted to each user academic society, a society secretariat issues a new UMIN ID (unless the member already has one) to the member and adds its membership authority to the new or previously existing ID. Using the member list retrieval system, each society member can search other members by keywords concerning their name and affiliation. Retrievable member information includes name, affiliation, email address, telephone and fax number, etc. UMIN mail addresses of members are used in a society member mailing list. Thus email messages from an academic society are sent primarily to the members' UMIN email addresses. Each member can use the UMIN email server directly, or specify other servers for email forwarding, using a Web-based interface. Even if they lose the received messages, they can read them because the messages are usually archived in the member-only homepage provided by OASIS.

For a security reason, homepage maintainers cannot upload HTML files, etc. directly to the OASIS web server. They upload them first to the upload server. Then, the uploaded files are automatically copied to the OASIS web server every hour.

Usage statistics

The number of registered UMIN users is currently more than 158,000. Now the majority of Japanese medical doctors have UMIN accounts. The stepwise shape of the bar graph shows intermittent batch registrations of members of large academic societies (Fig. 3).
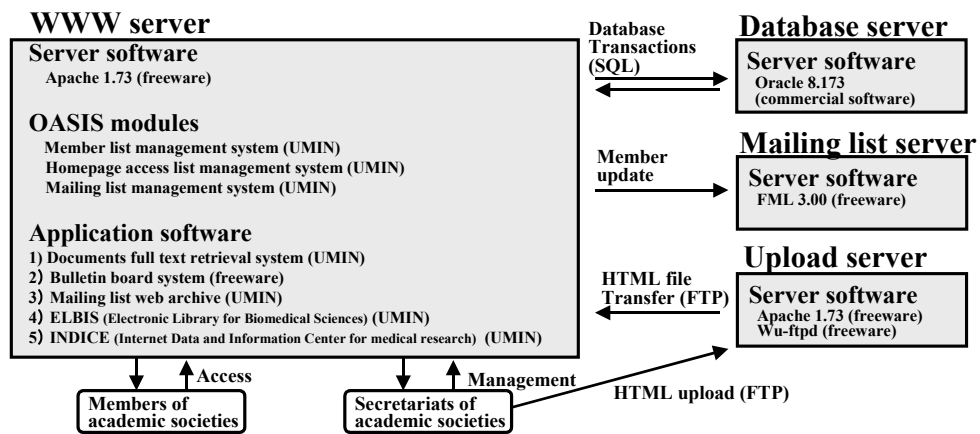
+

WWW server

Server software
Apache 1.73 (freeware)

OASIS modules
Member list management system (UMIN)
Homepage access list management system (UMIN)
Mailing list management system (UMIN)

Application software
1) Documents full text retrieval system (UMIN)
2) Bulletin board system (freeware)
3) Mailing list web archive (UMIN)
4) ELBIS (Electronic Library for Biomedical Sciences) (UMIN)
5) INDICE (Internet Data and Information Center for medical research) (UMIN)

Database Transactions (SQL)

Database server
Server software
Oracle 8.173
(commercial software)

Member update

Mailing list server
Server software
FML 3.00 (freeware)

HTML file Transfer (FTP)

Upload server
Server software
Apache 1.73 (freeware)
Wu-ftpd (freeware)

Access

Management

HTML upload (FTP)

Members of academic societies

Secretariats of academic societies

Fig. 1. OASIS software modules, other related software modules, and their relationships

Member list retrieval service

OASIS member list online retrieval system

Member update

Member update

Administrators of OASIS

OASIS member list management system

Member-only homepage service

Homepage access list management system

Administrators of member-only homepages independent of OASIS

Member mailing list service

Mailing list management system

Administrators of mailing lists independent of OASIS

Fig.2. Automated member update procedures

Japanese Society of Pathology (4,272 members)

Japanese Urological Association (7,300 members)
Japanese Society for Cardiovascular Surgery (3,580 members)
Japanese Society of Nephrology (7,600 members)

Japanese Association for Thoracic Surgery (9,113 members)

Japanese Society of Gastroenterology (27,000 members)

Japanese Circulation Society (20,270 members)

Japanese Neurosurgical Society (7,515 members)
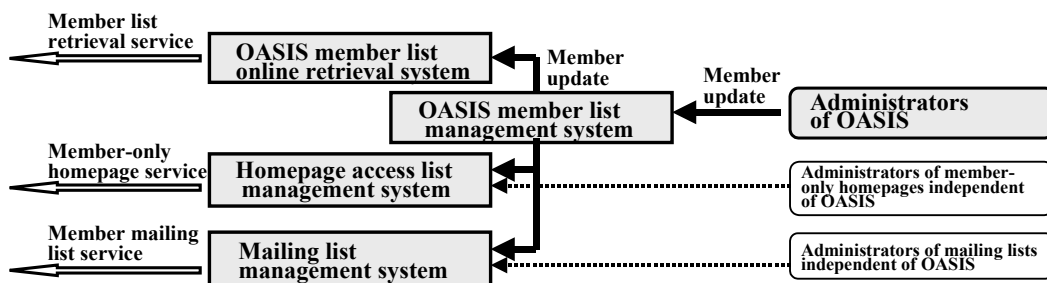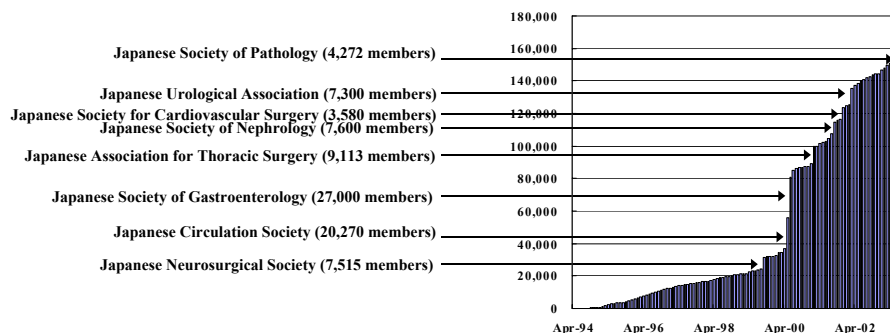
Fig.3. The number of medical professionals registered to UMIN

The batch registrations account for more than sixty percent of UMIN registered users. More than thirty academic societies use OASIS for providing their member-only information services for their members. Only a few academic societies do not use OASIS, and issue their own IDs and passwords to all or part of their members for their own member-only information services. In the past, at least two academic societies gave up issuing their own IDs and decided to use OASIS.

Discussion

Significance and roles

It would be inefficient for each academic society to have its own hardware, to develop its own software, and to manage its information system and user accounts solely by itself in order to initiate its member-only Internet-based information service for its members. The application software necessary for each academic society does not vary very much, and thus it can be shared among many academic societies. Using OASIS, each academic society does not have to spend its budget on server hardware, application software, and system and user management. So each society can use more of its budget for preparing digital content for its members. In

particular, the benefit to a smaller academic society is even greater.

It should be noted that the information system resources have not been the only things that UMIN has provided to academic societies. The UMIN staff has been afforded opportunities to meet secretariats of many academic societies, and is familiar with the actual performance and problems of their information services. Thus UMIN staff has usually played a role as a consultant for the digitalization of member services of academic societies, and I believe that its advice has been useful to each society.

As for the merit for each individual researcher, only one UMIN ID is required, which enables access to all the member-only homepages of academic societies of which the researcher is a member. In Japan, there are many academic societies, and an average Japanese faculty medical researcher is usually a member of several of them [10]. Thus one common ID for every academic society would be very convenient for each researcher.

OASIS has contributed greatly to online distribution of academic information in the Japanese medical community. I believe that a similar information system would be beneficial to other countries. However, it would be difficult to promote a similar project in countries where most major academic societies have already initiated their own member-only information services. The software specification and operational procedures would be different among academic societies, and it would be very difficult to coordinate common software specification and operational procedures. One of the most important reasons for the success of OASIS is that it was initiated when most major academic societies in Japan had not launched their own member-only information services.

As far as I know, there are no other information services for medicine in the world comparable in service scale and functions to OASIS. There is a similar, but different, network information service called CTS Net, which is a non-profit organization sponsored and owned by The Society of Thoracic Surgeons, The American Association for Thoracic Surgery, and The European Association for Cardio-Thoracic Surgery [11]. It has called for the participation of other societies for cardiovascular and thoracic surgery in the world, and now has about 18,000 registered users. CTS Net is an international network based on the one specialty in medicine, while UMIN is a domestic network for all medical specialties. The merit of CTS Net is international communication and information, while that of UMIN is the coverage of interdisciplinary domestic academic societies and user support based on the native Japanese language. Both have their merits, and the Japanese Association for Thoracic Surgery registers its members to both sites.

Most net venture businesses for medical information services established in the mid 1990s have failed, and those which have survived are small in size and not very profitable. I suspect that the OASIS project has succeeded because it is a non-profit business managed by a publicly authorized organization. It would be difficult for a private company to carry out a similar project because of the difficulty in gaining the participation and cooperation of many academic societies.

Technical characteristics

In a web-based service, each user has to actively open a URL or follow a given link in order to access information, while in a mailing list, each user receives information via email in a passive manner. The former and latter types of information services are usually called "pull-type" and "push-type," respectively. The characteristics of OASIS are the combination and coordination of the two types of information services. Both web-based and mailing list services mutually cover the weaknesses of the other. For example, in a web-based service, users may miss information updates if they do not access the web site frequently. Using a mailing list service simultaneously for notification of the information update, such misses will be dramatically reduced. In a mailing list service, there is strict limitation in file size for transferred information, while in a web-based service, there are no such limitation. In addition, a user may lose provided information because of a local hard disk crash or erroneous operation, while in a web-based service, information will not be lost unless the web administrator deletes it. If mailing list archives are provided in a website, such loss of information can be avoided.

In OASIS, UMIN email addresses are used for an all-member mailing list for an academic society. As a considerable proportion of regular email addresses of society members change every year, this method is reasonable. A secretariat of an academic society does not have to maintain regular email addresses of its members. Each society is responsible only to deliver its messages to the UMIN mail addresses of its members, who can then access the UMIN mail server directly to read the messages, or can forward them to the mail servers that they usually use.

Acknowledgement

References

[1] Kiuchi T, Ohe K, Ohashi Y, Sakurai T,Kaihara S. University Medical Information Network - Past, Present, and Future. MEDINFO 98. IOS press 420-24, 1998

[2] Kiuchi T, Ohe K, Sakurai T. UMIN - Key Information Infrastructure for the Japanese Medical Community. MEDINFO 2001. IOS press 1359-63, 2001

[3] Kiuchi T. UMIN - National Information Infrastructure for Biomedical Sciences (keynote). Proceedings of KOSMI

2003 Spring Congress. The Korean Association of Medical Informatics (KOSMI). 3-7, 2003

[4] Kiuchi T. UMIN - Concept, History, and Current Status. Proceedings of the VIP Scientific Forum of the International IPSI Conference 2003 (in press)

[5] Kiuchi T, Ohe K, Kaihara S. Using a WWW-based Mail User Agent for Secure Electronic Mail Service for Medical Users. Methods of Information in Medicine, 37:247-53, 1998

[6] Yamakami H, Kiuchi T, Nagase T, Ohe K, Kaihara S, Sakurai T. Development and Trial Operation of a World Wide Web-based Data Entry System for the Collection of Statistical Data on the Management of the National University Hospitals in Japan. Medical Informatics, 23:19-29, 1998

[7] Kiuchi T. UMIN INDICE and Virtual Coordinating Center for Clinical Research. International Conference on Advances in Infrastructure for Electronic Business, Science, Education, Medicine, and Mobile Technologies on the Internet 2003 Summer, 2003

[8] Ministry of Education, Culture, Sports, Science, and Technology (MEXT). URL: http://www.mext.go.jp/english/. Downloaded on July 21, 2003

[9] Spector R. Amazon.com: Get Big Fast. Random House Business Books, 2001

[10] UMIN Academic Society Database. URL: http://gakkai.umin.ac.jp/gakkai/e_index.htm. Downloaded on July 21, 2003

[11] CTS Net. URL: http://www.ctsnet.org/. Downloaded on July 21, 2003

Address for correspondence

Takahiro Kiuchi, M.D., Ph.D.

UMIN Center, the University of Tokyo Hospital
7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8655, Japan
Tel. +81-3-5800-6549, Fax +81-3-5689-0726
Email kiuchi@umin.ac.jp

+