
Government Information on the Internet

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ABSTRACT

THE U.S. FEDERAL GOVERNMENT HAS BEEN A MAJOR PUBLISHER ON THE INTERNET. Its many agencies have used the Internet, and the Web most recently, to provide access to a great quantity of their information output. Several agencies such as the Library of Congress and the Government Printing Office have taken a leading role in both providing information and offering finding aids, while other endeavors such as FirstGov and subject gateways offer other avenues of access. A brief look back at the history of the government on the Web and the continuing concerns and challenges show how the government is not only a major content provider on the Internet but also a source for the organization of the content.

INTRODUCTION: GOVERNMENT INFORMATION DISSEMINATION AND THE INTERNET

The United States federal government produces a great quantity of information and has been one of the largest publishers in the world. Throughout the twentieth century the amount of information from the federal government has increased enormously. Consider just the number of physical volumes published for each of the decennial censuses and how with each census until the most recent the number of print volumes has grown tremendously. The rest of the government's corpus increased in a similar fashion.

The ideal of the free flow of government information to the people grew into the Federal Depository Library Program (FDLP), with libraries in every state as a means to achieve that ideal. The FDLP certainly provided

unprecedented access to government documents to a significant portion of the country's citizens. In the latter part of twentieth century, the Paperwork Reduction Act and other legislative and regulatory efforts showed a significant concern with the cost to the government of both the printing of all of these documents and the expense of disseminating them to so many libraries.

Meanwhile, another government effort, ARPANET from the Advanced Research Projects Agency (ARPA, later known as the Defense Advanced Research Projects Agency or DARPA), was creating the beginnings of the Internet. Cold War fears led the researchers to look into using packet switching technology for the network to survive nuclear bombing attacks taking out large sections of the network.

As the Internet developed, the information dissemination capabilities of a large network became apparent to those involved in the research. Network developers used it themselves to communicate with each other, and electronic mail became one of the principal means of electronic communications. In addition to brief messages, researchers began sharing documents and then databases. Basically, the Internet became a way to share information.

The federal government certainly has made great use of the Internet for the dissemination and organization of its publications. Since the early days of the Internet, government information resources have grown and expanded in scope. From the Library of Congress to the Government Printing Office and many others, a great quantity of information content has been made available online, and a variety of finding aids and search engines help provide access. While there remain gaps, concerns, and challenges, the government is a major provider of quality, substantial content on the Internet.

LIBRARY OF CONGRESS

The Library of Congress (LC) has been organizing print resources for decades. The Library of Congress Classification System and Subject Headings are staples of library organization. While they have not brought the same level of organization to the Internet, they have certainly contributed some major resources. A look back at the brief history of LC on the Internet provides an example on a large scale of what many other government agencies have done.

Start with the April 30, 1993, announcement from LC. On that date, the Library announced its accessibility on the Internet when it made the Library of Congress Information System (LOCIS) available via telnet connections. LC had joined the hundreds of other libraries who freely offer their catalogs via the Internet.

Library catalogs occupy a unique role in the growth of information resources on the Internet. Internet availability on college campuses and at

government research labs in the 1980s meant that telnet was widely available and that it created new possibilities for information dissemination. And recently automated libraries had freely available online databases that they were happy to share. Lynch and Preston (1990) note that, by 1989, the Colorado Association of Research Libraries (CARL) catalogs and the University of California system catalog (MELVYL) were available on the Internet via the telnet protocol. The number of library catalogs rapidly expanded from there so that, by October 16, 1992, Billy Barron (1992) offered a listing of 482 Internet-accessible library catalogs.

But with the 1993 LC launch, the largest government library provided not only its catalog but a collection of other important federal information. Notess (1993) describes the various databases that LC made available via telnet, including a database of copyright registrations and another with information about federal legislation. This became one of the first free sources for information on federal proposed and passed legislation. The database was not just for current bills. It even covered legislation back to 1973.

The Library of Congress' offering of LOCIS, even back in 1993, demonstrates several trends and approaches to presenting and organizing government information on the Internet. LC data was available online even before LOCIS, but when LC opened up LOCIS to Internet users, it went well beyond descriptive agency information or agency-specific databases.

First of all, consider the LC catalog itself. Much of the data within the LC catalog had long been accessible online. Fee-based bibliographic utilities such as OCLC, RLIN, and WLN offered LC cataloging records to subscribers. And all three utilities were Internet-accessible by 1993.

More significant for the general Internet user was the Digital Research Associates' (DRA) service, which was often referred to as the "LC catalog." DRA was a library automation vendor, and before the Library of Congress itself opened up LOCIS via the Internet, DRA provided telnet access (originally at dra.com and still available at lcmarc.dra.com/lcmarc) to the LC-MARC bibliographic file and authority file (Rogers, 1992).

Before 1993 was over, LC moved on from the telnet-based LOCIS to using the newer menu-driven gopher technology and introduced LC MARVEL (Library of Congress Machine-Assisted Realization of the Virtual Electronic Library). MARVEL prefigured much of the kind of information content that most government agencies put online even today. It included sections for information about LC and MARVEL, links to LOCIS, press releases, library hours, information on how to obtain an ISBN or ISSN, and congressional information ("Library of Congress Goes Online," 1993).

The next year, LC announced plans to digitize some of its collections, such as photographs, maps, pamphlets, and speeches. It then planned to

make them accessible on the Internet and in particular wanted to promote education by making the collections accessible at schools and local libraries (DeLoughry, 1994). The great success of the American Memory Project (<http://memory.loc.gov>) grew out of this laudable goal.

By the beginning of 1995, LC had also announced the launch of its new Congressional Web site, THOMAS, at thomas.loc.gov/ (Library of Congress, 1995). THOMAS brought the full text of legislation, the House calendar, summaries of floor proceedings, and additional resources to the growing Web-using public. This move from telnet to gopher to the Web was mirrored by many other government agencies.

LC has come a long way since 1995, and its Web site is a gateway to THOMAS, American Memory, the LC Catalog, and much more. Yet this brief overview of its early history on the Internet highlights several trends seen elsewhere in online government resources including: that information is first put online by a nongovernment agency, the use of new technologies to disseminate information, and the digitization of documents.

PUSH FROM THE OUTSIDE

Some of the other major government information resources were likewise first made available through the efforts and servers of nongovernmental entities before the government itself made the move.

The Internet Town Hall, a nongovernmental Internet site, was an active proponent of making the Security and Exchange Commission's (SEC) Electronic Data Gathering, Analysis, and Retrieval (EDGAR) filings available for free to the public. And while the SEC was busy pushing companies to file via EDGAR, thus ensuring that the SEC would have the information in electronic format, the Internet Town Hall influenced the SEC to then make the filings available to the public (Notess, 1994). Eventually, the SEC developed its own system and process, so that it now makes all the EDGAR filings available on its Web site.

Full-text U.S. patents are another well-known example. Several other nongovernmental companies also offered free access to full-text patents and related patent information (Santo, 1995). Two private organizations, MicroPatent and Source Translation and Optimization, offered some very useful free search services with access to patent abstracts and even some full-text patents. The Internet Town Hall also offered an experimental Internet publication of patent information in 1994. It provided free access to the full-text of recent patents. Shortly before their experiment ended officially, the Patent and Trademark Office (PTO) finally announced (September 26, 1995) that they would provide patent information on their Web site and that it would be available for free to the public. Yet Kaiser (1998) reports that the PTO was just announcing that the data would not be available until late in 1998 and early in 1999.

GOVERNMENT PRINTING OFFICE

As the LC example showed, government agencies have continued to use new technologies to disseminate, organize, and present their information. The Government Printing Office (GPO) went through a similar transformation. But it had another factor affecting its changes.

The rise of the Internet and its incredible transformation in the 1990s from a technology experiment of limited interest to becoming one of the primary means of disseminating information occurred at the same time as a growing concern over government expenditures. The timing of the Internet's growth coincided with efforts to reduce the expense for the government of printing and disseminating publications and the expense of producing them. So the GPO and the Superintendent of Documents had great incentive to explore various options for transforming government publications into electronically disseminated documents.

Indeed, GPO has been in the forefront of government agencies in effectively using the Internet as a dissemination medium and has made significantly more efforts at providing bibliographic control of its output than many other government agencies. The recently relaunched GPO Access (now at <http://www.gpoaccess.gov>) has been one of the major sources of government information on the Internet for a decade. It also provides several important tools for the organization of online government information from other agencies.

GPO first began electronic dissemination by sending floppy disks and CD-ROMs to depository libraries in the 1980s. However, disks still share the same production and expense problems that print sources face. Multiple copies of each disk are produced and then sent to the depository libraries. Another approach from the 1980s was using an electronic bulletin board (BBS) for dissemination. Data could be produced just once, placed online at the BBS, and then users would dial into the BBS via modem (and perhaps long-distance charges) to retrieve the data. Yet most BBS interfaces were not easy to use and retrieving specific data could get quite complex. The long-distance phone charge also discouraged most general interest use.

With the rise in access to the Internet by the public and libraries, GPO then moved on to the Internet. Originating from the GPO Access Act, or more officially, the Government Printing Office Electronic Information Access Enhancement Act of 1993 (Public Law 103-40, 107 Stat. 112, June 8, 1993), GPO created publicly accessible and searchable access to major government publications like the *Congressional Record* and the *Federal Register*. As Minahan (1994) notes, GPO had the documents up on the Internet by the following year. Searchable access relied on Wide Area Information Service (WAIS), a sophisticated and free full-text search system with relevancy ranking developed by Brewster Kahle (1992) at Thinking Machines Corporation.

Although the law allowed a charge for access (except at depository libraries), the GPO Access databases soon became freely available to all through GPO Access Gateway sites set up by depository libraries ("GPO Access," 1995), and then by December 1995 GPO decided to waive the fees for GPO Access (Gordon-Murnane, 1999).

As of April 2003, GPO Access lists over ninety distinct databases, all accessible via the GPO Access site. Of those databases, several are particularly important in providing some level of bibliographic control over electronically published documents. The Catalog of U.S. Government Publications (<http://www.gpoaccess.gov/cgp>), the online successor to the venerable print *Monthly Catalog of U.S. Government Publications*, is a bibliographic catalog of print and electronic publications created by federal agencies from 1994 through the present.

The records for online documents include links to the online full-text publications when possible, but the GPO also provides another database, New Electronic Titles (http://www.access.gpo.gov/su_docs/locators/net), that focuses exclusively on Web-accessible federal government publications. Organized by month, New Electronic Titles actually does a specialized search in the Catalog of U.S. Government Publications for online documents.

The continued cataloging by the GPO of online documents, especially those that no longer have a print version, means that there is better descriptive and subject information about the documents than there is for most Web pages. GPO also decided to use Permanent Uniform Resource Locators (PURLs) rather than the more standard URLs.

The idea of PURLs is certainly worthy. URLs can and do change frequently. A document that used to be at <http://agency.gov/latestreport.html> may soon be moved to <http://agency.gov/archive/crypticstringt.html>. A GPO PURL will look more like purl.access.gpo.gov/GPO/LPS25. The PURL is then redirected to the appropriate URL. The permanence is achieved by having a PURL resolver that always has the updated URL. For libraries, this greatly eases record maintenance work. Only the PURL resolver needs to be updated, not every single library that has the record in their catalog.

On the negative side, PURLs do not provide the same level of information that a URL can. For example, the PURL for *Prague, NATO, and European Security* is <http://purl.access.gpo.gov/GPO/LPS12869>, which redirects to the URL of <http://www.carlisle.army.mil/ssi/pubs/1996/prague/prague.pdf>. A close look at the URL shows that this is a 1996 publication, from an army site, and it is in PDF format, none of which is obvious from the PURL. In addition, even the PURLs sometimes fail to have a functioning URL in the resolver database. At least the full record in the Catalog of U.S. Government Publications usually includes the URL as well as the PURL.

GOVERNMENTAL SITE ORGANIZATION

Many agencies went from BBS to gopher to the Web but, once they arrived on the Web there was still plenty of development and a concern with how best to present and organize the information on their site or sites. The U.S. federal government had been closely involved with the creation of the Internet, so it was natural that the government would also want to be a savvy user of the network. As government agencies began to make systems available via telnet, FTP, gopher, and eventually and most successfully on the Web, there was an obvious organizational structure already in place: the structure of the government

Thus, the typical first move online for a government agency has been to set up an agency Web page arranged hierarchically just like the agency. In the mid-1990s government departments set up Web pages that were often organized to mirror their internal structure. It certainly made sense to those within the agency, who knew the structure, but Web designers soon realized that it confused most other users.

Several alternative approaches have developed and, even though some Web sites are still primarily organized around the hierarchy of the agency, the government now has a wide diversity in the types of Web sites available.

One of the first approaches was to build a site organized by groups of users. The Library of Congress site (<http://www.loc.gov>) even has a section like this now, with separate entry points for Researchers, Law Researchers, Librarians & Archivists, Teachers, Kids & Families, Publishers, Persons with Disabilities, Blind Persons, and Newcomers. NASA's site (<http://www.nasa.gov>) highlights four target audience groups: Kids, Students, Educators, and Media and Press.

Another approach that started around 1998 was the construction of cross-agency, subject-specific sites. These subject-oriented gateways also had keyword-derived domain names rather than agency-related domains. For example, Healthfinder at <http://www.healthfinder.gov> was designed to assist consumers in finding government health information on the Internet. Recreation.gov offers information from all of the federal land management agencies that have recreational use on their lands. The U.S. Business Advisor (<http://www.business.gov>) aims to give businesses a central access point to government services, transactions, regulations, and opportunities.

The FEDSTAT site (<http://www.fedstats.gov>) follows this approach. It tries to provide quick and easy access to the broad range of statistics offered by more than one hundred federal agencies. With topic links, statistics by geography, and a multi-Web site search function, it offers several access points to the statistics. Yet, with the huge number of statistical reports covered, it can still be difficult to identify exactly the most pertinent report without having some knowledge of the whole universe of government-produced statistics.

FINDING GOVERNMENT INTERNET SOURCES

The problem with the voluminous publications from the government and the corresponding voluminous number of Web sites is that, with so much information available, it can be quite difficult to know where to find an answer to a specific question. Fortunately, there are a number of finding aids and search tools that can make the task at least somewhat easier.

Many search and retrieval systems focused on U.S. government information resources have come and gone. In the early era of the Web, directories of government Web sites and gopher servers were the best entryways into the online government resources because they provided some kind of hierarchical agency access.

The government section of the well-known Yahoo! directory was updated relatively frequently in the early years and was fairly comprehensive. It also included sections at the federal, state, local, and international government levels. While useful for finding agencies, it did not work very well at finding government information by subject.

By 1997, the Federal Web Locator from the Villanova Center for Information Law and Policy was one of the most frequently used general directories of U.S. federal government agency Web sites. It was arranged by agency hierarchies that roughly mirrored the arrangement of the *U.S. Government Manual*. Although it did have a basic keyword search ability, it was still primarily a directory by agency rather than by subject. It has moved around between various URLs but can now be found at <http://www.infoctr.edu/fwl>.

Many other specialized directories have been created to help people find government Web sites. Almost all of them relied heavily on hierarchical agency access. At the same time, developments in search engines that would index all the words on Web pages and make them searchable were being developed and getting increasingly popular. On the government side of things, there were a few specialized search engines just for U.S. federal government sites.

GovBot, from the Center for Intelligent Information Retrieval (CIIR) at the University of Massachusetts, was one early example. GovBot used the Inquiry software developed at the CIIR to search Web pages in the .gov and .mil domains. However, for some searches, general Web search engines such as HotBot or AltaVista using a .gov or .mil domain limit could be more effective. GovBot lasted for several years but was eventually retired.

Another interesting search engine solution was launched by Northern Light in the spring of 1999. USGOVSEARCH was the result of a partnership between the Web search engine Northern Light and the Commerce Department's National Technical Information Service (NTIS).

As Hane (1999) reports, USGOVSEARCH included over 20,000 U.S. government agency and military Web sites with almost 4 million pages,

along with the 2 million abstracts from NTIS. Because the initial May 1999 announcement included access pricing details, the search engine met with several protests about the pricing structure.

Yet, USGOVSEARCH offered some real advantages and features that differentiated it from other government-oriented search engines. It included the full NTIS abstracts database, which was available nowhere else on the Web for free. The advanced search included the subject limits derived from a Northern Light-created, government-oriented taxonomy. While it only listed the more general upper-level hierarchical terms, the more specific subject terms would be found in the folders within search results (Notess, 2000).

Unfortunately, the deal with NTIS eventually ended. The NTIS database was removed. And eventually, as Northern Light itself was bought out and then abandoned by Divine, Inc., USGOVSEARCH went the way of GovBot.

Within the government itself, several initiatives were underway to create a central, government-specific portal or search engine. GPO Access was one approach, but other agencies also tried developing their own. NTIS's FedWorld crossed agency boundaries. LC had its own directory. And then there was the WebGov initiative. Announced in September 1998, WebGov was supposed to be a central government-wide portal and was going to be up and running in thirty days. Due in part to fighting between agencies and in part to lack of funding, it never got off the ground (Brown, 2000).

It was not until two years later, in September 2000, that FirstGov rose out of the ashes of WebGov as a live, viable site. As O'Leary (2001) describes it in an early review, the initial version did have its problems and inaccuracies but, for the first time, the government had its own portal and search engine. Certainly, one major reason for this was that Eric Brewer of Inktomi had donated some of the technology.

FirstGov has become the most prominent government-sponsored, central access point for government information. And many other government sites link back to FirstGov. For a more detailed view of FirstGov, see Patricia Diamond Fletcher's article "Creating the Front Door to Government" in this issue of *Library Trends*.

CONCERNS AND CHALLENGES

One significant concern with the move away from multiple copies of print documents at many libraries to one electronic copy on an agency's Web site is that the loss of redundancy can easily lead to the permanent loss of the information content. If that one copy is removed, lost in a computer crash, or forgotten in a site upgrade, there is an increased potential that all future users will permanently lose access to it.

In the same vein, if an online copy is changed, due to necessary corrections or to political leadership changes, there may not be an archived

record of the original Web page. Without that, future historians, journalists, and others may not be able to identify what changes have been made and when they were made. Will a new administration in Washington try to purge Web pages from a previous administration? So far in the Internet age, we have only had the change from the Clinton administration to the Bush administration. And already there have been several efforts to remove older material.

Davis (2002) reports on an internal memo in the Department of Education that called not only for the department to remove outdated pages but also to remove items that might not reflect the current administration's political philosophy. While that process is still ongoing and the eventual fate of all the old pages is yet to be determined, this is exactly the kind of situation that is likely to become more frequent as the Web ages and as administrations change.

On another front, the Office of Management and Budget (OMB) proposed major changes to the requirement for government agencies to use GPO for printing publications (Procurement of Printing, 2002). Although the requirement to send publications to the Depository Library Program remains, great concerns have been raised about potential loss of many documents. Helfer (2003) argues that the fugitive documents problem will be made worse by this weakening of the Federal Depository Library Program and GPO. And the requirements in the OMB proposal that the Superintendent of Documents would bear the costs that have been legislatively mandated to be borne by the agencies themselves certainly could exacerbate the problem of fugitive and lost documents.

The nature of the Web makes it difficult for the government to keep many secrets because public information can be posted by almost anyone with a Web site. But if the information is never published or posted, that risk is averted. And even though most government agencies have moved toward putting many of the publications online, there are still other areas in which the government is reticent to publish certain documents or has actively removed them.

With the greater concern about terrorism since the September 11, 2001, attack on the World Trade Center, many government sites have actually removed information that was formerly available on the Internet. OMB Watch, another nongovernmental organization, has documented many such incidents on its Access to Government Information Post September 11th pages at <http://www.ombwatch.org/article/archive/104/>.

Yet even before September 11th, the military had expressed concern. The Deputy Secretary of Defense (1998) issued a memorandum calling for a department-wide review of information vulnerability on the Web. "All DoD components that establish publicly accessible Web sites are responsible for ensuring that the information published on those sites does not compromise national security or place DoD personnel at risk" (p. 1).

In another unusual situation completely separate from the Defense Department, the Department of the Interior was ordered to disconnect its systems from the Internet by a federal judge on December 5, 1999, due to vulnerabilities in Indian trust-fund databases. This meant that many sites such as the National Park Service, the Land Management and Reclamation Bureau, the Fish and Wildlife Service, the Minerals Management Service, and the Surface Mining Office all suddenly had no information or only very abbreviated information on their sites (Dizzard, 2002). The various agencies slowly were able to get approval from the court to bring their sites back up but, as Lisagor (2002) notes, 6 percent of the department's systems were still disconnected as of November 2002.

Unfortunately, no private organizations have mirrors of all the information that was on the vanished sites. Any information that was only accessible via an interactive database search is gone. But some of the more static pages have been available from services like the Internet Archive's Way-back Machine (<http://www.archive.org>) as long as a user knew the appropriate URL.

CONCLUSION

There is no doubt that the quantity and quality of government information on the Internet is a substantial resource for many kinds of users, from everyday U.S. citizens to advanced researchers of social trends. Government sites provide detailed data sets, satellite imagery, weather records and trends, tax forms, contractor opportunities, hazardous waste disposal pamphlets, elementary history lesson plans, consumer guides, proposed regulations, laws, court cases, speeches, testimonies, and so much more.

Compared to so much else on the Web that is of widely varying quality and often more concerned with selling something than providing accurate content, government sites offer a great wealth of information. Despite some of the concerns and challenges with documents not being published or even removed, there is still a vast quantity of government information freely available on the Web that is of great importance for scholars and researchers.

The desktop availability of the data in a wide variety of formats and from many different agencies is a boon for researchers who want access to data at their time of need rather than waiting for delivery of documents many days later. Finding the appropriate material can still be difficult, but search engines like FirstGov and directories and subject-oriented gateways are a great help.

Through the efforts of government agencies like the Library of Congress, the Government Printing Office, and many others, the Internet public is fortunate to have a substantial body of valuable information content available at the desktop for free, and at any time of the day from all over the world.

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