

AVANTI: IMPLEMENTING A WEB-BASED "ARTICLES-ON-DEMAND" SERVICE

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ABSTRACT: Avanti is an "articles-on-demand" delivery service that allows patrons to request articles for transmission via the web. Requested articles are scanned into bitmapped PDF files (Adobe Acrobat Portable Document Format) and posted on the web in a passworded account. Users can read articles online, then print or save a copy at their desktop for reference. Since February 2000, Avanti document delivery service has been available at no charge to faculty, staff and graduate students of the Scripps Institution of Oceanography. This paper explains the Avanti document delivery service, discusses management and implementation issues and presents the usage statistics.

KEYWORDS: document delivery, public services, library management, Avanti

As more full-text, full-image electronic journals became available electronically, the Scripps Institution of Oceanography (SIO) Library at University of California San Diego (UCSD) identified a need for electronic access to its sizable print collection that is not available in electronic format. In February 2000, SIO Library implemented Avanti, a free, web-based, "articles-on-demand" service that allows patrons to request articles for transmission via the web. Librarians in UCSD's Science and Engineering (S&E) Library developed Avanti as a web-based alternative to Ariel document delivery using Adobe Acrobat Portable Document Format (PDF). Since we implemented Avanti in the SIO Library, our print collection is delivered electronically to library users at their desktops and labs in convenient, timely manner -- a seamless connection between print and digital content.

From a public services and management perspective, Avanti is an effective document delivery service because:

- Avanti is a production-oriented service utilizing efficient scanning equipment and low-cost student workers. As a "scan-and-post" operation, there is no document cleanup; documents or pages are re-scanned only if a patron asks. Turnaround is within 4-8 hours (maximum 2 business days) from receipt of email request.

- Avanti is platform-independent; it delivers articles through the World Wide Web to the patrons' desktop. The patron can print a few pages or an entire article.
- Avanti provides online access to scanned copies of articles not already published electronically.
- Documents are scanned "on demand" and are deleted automatically after a period of time, usually two weeks; SIO will maintain documents for a longer period at the patron's request.
- Avanti utilizes *ERes* software, a program licensed from Docutek Information Systems that is tailored to the document delivery function. The customized version of ERes software provides a document control interface that is very flexible and easy for staff and students to use.
- Avanti may be easily expanded to include more departments at UCSD.
- Requested articles are scanned into bitmapped PDF files (Adobe Acrobat Portable Document Format) and posted on the web in a passworded account. Users can read articles online, then print or save a copy at their desktop for reference.
- Avanti makes it easy for patrons to get free, web-based, "articles-on-demand" they can view using their Adobe Acrobat Reader because documents are in PDF, the standard document format for most of our electronic journals.
- Because Avanti patrons are registered with their own, unique username and password and may access their list of documents only after agreeing to adhere to copyright provisions for Fair Use, this services allows secure posting of articles in compliance with current copyright fair use provisions.

The web interface [<http://scilib.ucsd.edu/sio/avanti/>] was developed for all Avanti transactions; no print or on-line forms are used. Avanti transactions are conducted primarily through email, which is also used for problem solving and communication about the request, for example: when a complete/correct citation is needed, if an electronic journal is available, when an item is not available in the library (an ILL, interlibrary loan, request is automatically filed for the patron). To register for SIO Avanti service, eligible users (SIO academics, graduate students and staff) send an email message requesting an Avanti account. They include their name, email address, and phone number so library staff can confirm their SIO status; an email is sent back to the patron, with a unique Avanti username and password. Then the patron can order documents via Avanti.

The patron must first check the online Roger Catalog to see if an electronic version is available; articles from electronic journals will not be delivered using Avanti. If it is available electronically, they may use the link on the Roger page to go directly to the journal site. If the article is not available electronically and is in print in the SIO or S&E libraries, the patron can request delivery via Avanti. To submit a request, the patron sends an email to avanti@sio.ucsd.edu directly or through the SIO Avanti web page (their browser must be set up to send and receive e-mail), or they login to their existing Avanti account and click on "Request a document for delivery via Avanti". They must provide their name, email address and complete article citation(s) for the desired documents.

Patrons may request articles, papers, and chapters of 50 pages or less, from journals, proceedings and books found in the SIO or S&E Library print collections. Materials found at other UCSD Libraries are automatically ordered for the patron through SIO's Interlibrary Loan Department. Any item not found in the UCSD Libraries will be passed along and filled through Interlibrary Loan (ILL). If a large number of articles are requested patrons prioritize them according to those they wish to get first. Avanti document delivery service really starts when the user's email request is received. Library staff confirm the patron's Avanti account and the accuracy of the citation(s). Then staff/students search the Roger Catalog to confirm "print only" status and to get the call number of the journal, proceedings, or book. If the article is not available electronically, students pull the requested title from the shelves. Students scan and post the article(s) on a web server in the patron's own, passworded account.

E-mail is sent when the article has been posted to the patron's Avanti account, usually within 4-8 hours. The patron uses a web browser to access the Avanti account; when a username and password are entered and the copyright acceptance button is clicked, the list of requested articles appears. The patron clicks on a hypertext link to open a document with the Adobe Acrobat Reader. Documents can be read online or printed or saved as a file on the computer's hard disk for subsequent use.

Avanti articles are scanned in black & white; the files are saved and posted as PDF. On a limited basis the library will provide a color image file that is sent to the patron as an email attachment, if the SIO patrons asks for specific page(s) scanned in color. The patron notifies us if the quality of an Avanti document is not good, and the document or selected pages are re-scanned and posted to the patron's Avanti account. Avanti articles are available for 2 weeks, after which they are automatically deleted. Patrons must ask for their articles to be available for longer than 2 weeks.

Usage data (Fig. 1) indicates Avanti document delivery service was instantly popular. In the period February 14 through 29, 100 SIO patrons registered for Avanti service; there are an average of 15 new registrations per month. The number of new registrations increase after email announcements and when new SIO Grad student orientations in the Fall. A steady number of articles are requested throughout the year, including intersessions and during the summer. This steady-stream of work helps us maintain regular student staffing levels in the library.

February 2000 - September 2001	
383	Total Number Registered Users
3,602	Total number articles scanned from SIO collection

Figure 1: Usage data

Implementation of Avanti service required planning and coordination within the SIO Library and among other UCSD Library departments as well as obtaining funds from the SIO Director to support staffing a new service. The Head of Public Services was assigned responsibility for managing implementation, including: staffing, budget, equipment (hardware and software), staff/student scheduling, outreach/PR, rollout and troubleshooting.

Before asking the SIO Director for funds we analyzed the cost and usage data from the S&E Avanti pilot project, including the average amount of student time needed to do the scanning and processing for each document (estimated by S&E to be a total of 10 minutes per document), estimated per document cost (\$1.25-\$1.50) and volume of work (10-20 articles per day).

Existing staffing resources for Avanti at the SIO Library include one ILL Manager (0.5 FTE) who runs Avanti service at SIO along with Ariel and other ILL operations and one Library Assistant III (5 hours per week) directing the work of students who do the Avanti tasks, along with ILL lending and borrowing support duties. Additional student assistant hours enable Avanti service at SIO. Student assistants (2.6 FTE) process Avanti requests, scan and post Avanti articles; these are the students who normally assist with other ILL tasks (pulling materials, photocopy, processing ILL materials for mailing, etc.) Students in the Circulation Unit do shelving; shelving is not part of the Avanti-funded workload.

Students can do most of the Avanti operation, which costs less than using career staff. Students open email, search the Roger Catalog to get call numbers and confirm "print only" status, pull the volumes from the stacks, scan the articles using the Minolta scanner and convert them to PDF. Students have a fairly high level of access on the Eres part of the Avanti system. Using Eres, students can add documents to the Avanti server and link the articles to patron accounts. To complete the transaction, students use an email template to compose and send an email to the patron when the article is available.

Career staff are responsible for the higher-level tasks of the Avanti operation. The ILL/Avanti manager and Library Assistant III have Manager level of ERes access. Staff responsibilities include: handling all new accounts, receiving the email & managing the Avanti email box, looking up call numbers on Roger, verifying incorrect/incomplete citations on an appropriate database and providing email reference service by informing users when the article is available electronically, being forwarded to S&E's reciprocal Avanti service, or requested from another UCSD Library or Interlibrary Loan. The ILL Manager handles the difficult ILLs generated from Avanti requests. SIO's Head of Public Services oversees the Avanti budget, statistics and spreadsheets with assistance from the ILL Manager and Library Assistant III and notifies the Department Head when Avanti funding runs low.

The Director of SIO funded startup in the amount of \$5,575 to support scanning staff (students). SIO's initial funding request was based on S&E's estimate of per document scanning time (equates with student staffing resources and per document cost) combined

with anticipated use of this new service by SIO patrons. In advance (annually, or when money runs low), the Scripps Library Director solicits funds from the SIO Director to continue the service. At this time, Avanti service is fully funded at approximately \$4800 per year (\$400 per month). Hereafter is the method used to calculate the amount needed to continue the service.

In May 2001 (when \$1200 of the initial funds remained), data from 18 months of Avanti service at SIO were used to calculate continuing cost of SIO's Avanti service. Nailing down exact costs in a project like this is not easy; despite the fact that students and staff keep a log of the amount of time actually spent scanning each Avanti article, the log does not reflect pre- and post-processing time. Because we needed more precise data, one student worked exclusively on Avanti for two months. Based on the Avanti log this student processed 201 Avanti scans in 17.2 hours (average scan time per document = 5.2 minutes); he recorded 46.75 hours on his time sheet. The difference between the time sheet and the Avanti log is the processing time, or 29.55 hours = 1773 minutes. Then divide 1773 minutes by 201 documents scanned; the result is 9 minutes, which is the processing time per document (see Fig. 2). The combined scanning and processing time averages a total of 15.3 minutes per document. Based on the student salary rate, \$7.14 per hour, the cost is approximately \$1.80 per document.

<i>Average length of a scanned article</i>	15 pages
<i>Average time to scan an article</i>	6.3 minutes
<i>Average time to process email, verify citation and page the volume from the shelves</i>	9.0 minutes
<i>Average combined scanning and processing time</i>	15.3 minutes
<i>Average number of documents posted per day (includes weekends)</i>	6.2 per day
<i>Average PDF document size</i>	~1.9MB
<i>Average no. of Avanti hours per week (students)</i>	13 hours
<i>Student salary rate</i>	\$7.14 per hour
<i>Average cost</i>	\$1.80 per document
<i>Continuing cost per month (student staffing)</i>	~\$400 per month

Figure 2: Avanti data

Other start-up costs were covered by UCSD Library-wide Document Delivery/Interlibrary Loan funds, including:

- Scanning workstation computer (~\$1,500)
- Minolta PS3000 face-up scanner bundled with cable, ISIS drive, EPIC Software (~\$14,000)
- Microcomputer ~ \$1,500
- Largest size monitor afforded at the time
- Laser printer: minimum 8MB
- Adobe Acrobat Exchange (~\$200)
- Samba software (~\$200) to eliminate the ftp step
- Table and high chair (~\$1000); a hip-high table/surface works best, so the operator can stand or sit on a high chair
- Network connection (undetermined Library Systems' cost)
- Server space for PDF documents (undetermined; Avanti files are stored on an existing server. The library may have to buy more hard disk space or migrate to Electronic Reserves server, later.)
- ERes software version 4 with Document Delivery module (~\$2500)

Avanti's limitations such as black and white scans and a 50-page limit on the size of a requested document were trivial. Obtaining and setting up the requisite popmail account was frustrating and held up implementation for months. The most egregious problems we experienced were related to the quality of the delivered product (the PDF files) and the inability to get a timely and satisfactory explanation from Minolta as to the cause. A patron noticed that Avanti PDF documents were "grainy" as compared to a photocopy. Upon further investigation, we discovered that Avanti scans were 5.2% smaller than the original or a photocopy! There was also no discernable difference between 300 dpi and 600 dpi nor does Minolta's proprietary *Epicwin* software allow one to scan at a higher percentage (increase or decrease the size). The Minolta service representative could not explain this "shrinkage", nor confirm or deny that this was the best their scanning equipment and software could produce. After months of persistent phone calls, Minolta finally sent two engineers to look at the equipment and our documentation of the problem. They concluded 1) the shrinkage was "standard" because of the camera position on the PS3000 scanner, 2) *Epicwin* software does not allow for correction (re-sizing), and 3) newer models such as the PS7000 use Adobe software, which is more flexible. Therefore, the shrinkage problem may be ameliorated when we migrate to the newer Minolta face-up scanner.

When Avanti was put into service, outreach/PR to the SIO research community included articles in the weekly electronic newsletter (*SIO Log*), email to the SIO distribution list (all-at-sio) and signs in the elevators and near public photocopiers and microcomputer workstations. Library instruction/orientations and a quarterly email promote the service and bring in more new registrations. Avanti is prominently located on the SIO Library homepage and was showcased at a development event. These outreach/PR efforts will continue because new and continuing students, staff and academics at SIO must be informed about Avanti service. Avanti is the highest priority of SIO Library's document delivery services followed by ILL borrowing for SIO patrons, then (in priority order): S&E Avanti and other UCSD requests via Ariel/Fax/Photocopy, other University of

California (UC) requests and non-UC (including IAMS LIC). Avanti is one-stop shopping for SIO with reciprocal service from Science & Engineering Library. If an ILL is needed, the requested information is transferred into an OCLC request.

Plans are underway to implement Avanti in other UCSD Library Departments. The Medical Center and Biomedical Libraries are implementing Avanti service (funding from School of Medicine) in 2001/2002 FY. There are a few projects similar to Avanti. The California Digital Library (CDL) is looking at ILL delivery of PDF articles to end-users or ILL units, possibly with Northern and Southern University of California (UC) servers. The Southern Regional Library Facility (SRLF) is experimenting with PDF scanning and delivery. Virginia Tech offers ILLiad, [<http://www.ill.vt.edu/>] electronic delivery of articles via their proprietary software. For more information, see the Atlas Systems website [<http://www.atlas-sys.com/>]. Ohio State offers Prospero [<http://bones.med.ohio-state.edu/prosporo/>], a Web-based document delivery system that was designed as a complement to the Ariel software system. Ariel [<http://www.rlg.org/ariel/>] is a product of the Research Libraries Group (RLG), which allows libraries to use the Internet to exchange documents through interlibrary loan.

Because of Avanti, SIO Library staff has gained experience in implementing and using scanning technology for high-production document delivery. As new programs evolve we will be ready to step up, scan and deliver the service to our patrons.

