Carl Malamud
Center for American Progress
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Washington, DC 20005
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January 30, 2006

Executive Committee
Radio and Television Correspondents Galleries
Senate Radio-TV Gallery
S-325, U.S. Senate
Washington, D.C. 20510

Attn: Accreditation Committee

Dear Sirs:

Please find enclosed a completed application for Active/Voting Gallery Membership.

I previously held membership in the Gallery from 1994-1996 with the Internet Multicasting Service. As part of our work running the first radio station on the Internet, we sent live streams from the House and Senate floors to the Internet and assisted the Joint Economic Committee in holding the first on-line Internet hearings.

My current position is as Chief Technology Officer and a Senior Fellow at the Center for American Progress, a 501(c)(3) think tank located here in Washington. My work here includes publication of pieces studying the impact of technology on policy formulation and on a variety of technology policy issues. My most recent project has been a documentary on the subject of Internet governance, for which I was granted United Nations credentials to document the recent World Summit on the Information Society.

Much of my work over the last twenty years has combined journalism with a study of the Internet and it's evolution. I'm the author of 8 books and have been a regular columnist for a variety of publications including the Bangkok Post, Communications Week International, and Data Communications Magazine. As part of my work with the Internet Multicasting Service, I was responsible for the regular broadcast/multicast of National Press Club luncheons, was a member of the Public Radio Satellite System, and was responsible for Internet syndication of a large number of programs. In addition, I've created a large number of Internet sites, some of which are listed in the enclosed application.

My purpose in applying for accreditation with the Galleries is to spend greater than half of my time reporting on the activities of the U.S. Congress. Specifically, I hope to accomplish the following activities:

- Providing live high-resolution feeds from the floors of the House and Senate on the Internet using the facilities of the Fiber Optic Project, Verizon's Audio Visual Operations Center (AVOC) and a variety of Internet co-location facilities that allow direct peering of high-volume data with research and operational networks.
- Use of the same facilities to provide a gateway for additional feeds upon request by the original feed providers, such as existing live streams provided by individual committees.
- Live coverage of selected hearings of general interest to the Internet community.

As part of my prior membership request in 1993, the Committee found it useful to have me appear before you to explain in more detail the specific nature of my reporting. Should you have questions about this application, I would be happy to explain this request in more detail.

Sincerely yours,

Carl Malamud
Senior Fellow/Chief Technology Officer
Center for American Progress

enc.

RADIO-TV CORRESPONDENTS' GALLERIES

2005 Membership Application Procedure

Dear Broadcaster:

The attached application is to be used when applying for:

1) **ACTIVE/VOTING GALLERY MEMBERSHIP**—Congressional rules require all Gallery members to be bona fide news gatherers and/or reporters whose chief attention is given to—or more than one-half of their earned income derived from—the gathering or reporting of news. Executive Committee policy limits active membership to Washington-based broadcast news editorial personnel. Active members have building access, vote in elections, and receive an invitation to the annual dinner if their applications are approved before the current year's dinner.

2) **ACTIVE/NON-VOTING GALLERY MEMBERSHIP**—This pass is for broadcast news personnel who are employees of the U.S. Government. These members do not vote in elections but do receive an invitation to the annual dinner.

3) **TECHNICAL/NON-VOTING GALLERY MEMBERSHIP**—This pass is for broadcast news personnel who may not meet all of the criteria for Gallery membership but whose duties require their frequent presence on Capitol Hill. This category also applies to applicants who distribute information electronically, who, although meeting all other criteria for admission to the Radio-TV Galleries, are not directly engaged in "news reporting or gathering" as required for regular Gallery membership. These members do not vote in elections but do receive an invitation to the annual dinner.

4) **TEMPORARY MEMBERSHIP**—This pass provides temporary access to the Galleries and Capitol complex for broadcast news personnel.

Please complete the application and return it to the Senate Radio-TV Gallery, Room S–325, U.S. Capitol, Washington, D.C. 20510. Attn: Accreditation.

INCOMPLETE APPLICATIONS OR PREVIOUS VERSIONS OF THIS APPLICATION WILL NOT BE PROCESSED. THESE APPLICATIONS WILL BE HELD PENDING INQUIRY FROM APPLICANT AND/OR RECEIPT OF ADDITIONAL INFORMATION.

APPLICANTS (EXCEPT THOSE FOR TEMPORARY MEMBERSHIP) MUST ENCLOSE ANNUAL DUES OF $15. MAKE CHECKS PAYABLE TO THE RADIO-TV CORRESPONDENTS' ASSOCIATION OR RTCA. Multiple applications submitted by bureaus must be accompanied by a single corporate check. **CASH WILL NOT BE ACCEPTED.**

RESTRICTION OF USE AND PRIVACY GUARANTEES.

The Executive Committee reserves the right to, and may from time to time, send messages and information to the membership via e-mail based on the information provided.

This electronic mailing list may not be used for any purpose other than issues directly related to Gallery business. This list may not be sold, bartered, or traded to any other entity. This list, in part or whole, may only be shared with individuals or organizations deemed essential to Gallery or Executive Committee business, and then, only given the express consent of the Committee by majority vote.

If you have questions, contact the Senate Gallery at (202) 224–6421.

Sincerely,
The Executive Committee
Radio-TV Correspondents' Galleries

FOR OFFICE USE ONLY

☐ Active/Voting ☐ Active/Non-Voting ☐ Technical Non-Voting ☐ Temporary

☐ APPROVED ☐ REJECTED ☐ HOLD

by: _____

Congress of the United States

Radio and Television Correspondents' Galleries

Name Carl Malamud Date 12/12/20/2005

News Organization Center for American Progress

If you are a freelancer, check here: ☐

Office address 1333 H Street, NW, 10th Floor

Washington, DC Zip 20005 Phone (202) 741-6283 (Newsroom)

Home address 1210 Massachusetts Ave, NW, Apt. 606
(You will be notified of membership approval at your home address)

Washington, DC Zip 20005 Phone (541) 253-7514

E-mail address carl@media.org
(optional—see restrictions of use and privacy guarantees)

1) Congressional rules require Gallery members to be bona fide news gatherers and/or reporters whose chief attention is given to—or more than one-half of their earned income derived from—the gathering or reporting of news. Please check the **ONE** job to which you devote your chief attention. Applications with more than one check-mark will not be processed.

__ Bureau Chief
__X__ Correspondent
__ Assignment Editor
__ Director
__ ENG Sound Tech
__ Editor
__ News Director
__ Photographer
__ Producer
__ Reporter
__ Researcher
__ Videographer
__ Booker
__ Courier
__ ENG Deck Operator
__ Lighting Technician
__ Microwave Operations Personnel
__ Radio Engineer
__ Studio Operations Personnel
__ Technical Engineer
__ Unit Manager
__ Other
__ Intern

If your job description is not listed above, please describe your duties and specify your editorial functions, if any.

2) If you are an independent (non-network) broadcaster, list the primary radio or television station which uses your service. The Internet.

3) Please list any Website(s) where your work may be posted Please see attached list.

4) The following lobbying, employment and income restrictions apply to Gallery members:

Applicants must:

—not be engaged in the prosecution of claims or the promotion of legislation pending before Congress, the departments, or the independent agencies

—not be employed in any legislative or executive department or independent agency of the Government, or by any foreign government or representative thereof

—not be engaged in any lobbying activities or paid advertising, publicity, or promotion work for any individual, political party, corporation, organization, or agency of the Federal Government

—not be directly or indirectly furnishing any information to any organization, individual, or group of individuals for the influencing of prices on any commodity or stock exchange

Your chief attention must be given to—or more than one-half of your earned income must be derived from—the gathering or reporting of news for radio stations, television stations, systems, or news-gathering agencies primarily serving radio stations, television stations, or systems. **Full-time students** are not eligible for active membership.

If you are a **freelancer** or work for a production company, this application must be signed by the news director of your chief news client **or** you must submit a letter from a client news organization certifying it is currently using your services.

If you are a **foreign broadcaster**, you **must** submit a letter from your embassy verifying that you represent a broadcast news organization **or** submit other documentation that the Executive Committee shall require.

Approval of applications may be subject to meeting additional criteria established by the Speaker of the House and the Senate Committee on Rules and Administration.

Gallery cards must be returned to the Senate Gallery if you change your affiliation or move from the Washington, DC area. Gallery cards may not be worn while covering Congressional activities for non-news purposes.

Audio and video acquired under auspices of Gallery membership may not be used for political or commercial purposes.

_____
Signature of applicant

5) Certification by Bureau Chief or News Director. (Applicants who are Bureau Chiefs must submit a letter from corporate parent or chief news client.)

Do you understand that all facts stated on this application are true? Yes
(Yes or no)

Signature _____

Name Melody Barnes

Title Executive Vice President for Policy

Phone _____

Return with fee to:
Senate Radio-TV Gallery
S–325, U.S. Senate
Washington, DC 20510

Attn: Accreditation

GPO: 2005 98–826 (mac)

Attachment: List of any Website(s) where my work may be posted.

www.media.org
town.hall.org
bulk.resource.org
trusted.resource.org
public.resource.org
www.betterdogfood.com
www.undesign.org
mappa.mundi.net
www.invisible.net
north.pole.org
www.malamud.com
www.park.org
www.sixes.net

http://scholar.google.com/scholar?q=%22carl+malamud%22
www.rfc-editor.org
www.bangkokpost.com
www.interesting-people.org

A detailed list of URLs is available on request.

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E carl@media.org

February 19, 2006

Mr. Mike Mastrian, Director
Radio-Television Gallery
United States Senate
S-325, U.S. Capitol
Washington, D.C. 20510

Dear Mike,

Thank you for taking the time to meet with me last week regarding my application for membership in the Radio-Television Gallery. Your insights into how the Gallery has changed since I was last a member in 1996 were very useful. As we discussed, my application is somewhat unusual and I hope the Executive Committee will grant me a hearing to discuss the merits of my application.

One of the issues you brought up in our meeting was whether my employer met the qualifications for institutional membership or, as you put it, "whether the Center has a point of view." As we discussed, the Center is a 501(c)(3) non-profit which disseminates a huge amount of information, including extensive publication of original material and employs frequent use of streaming and other broadcast techniques. Some of the material, as you pointed out, has a point of view.

You specifically pointed to a piece by one of our other Fellows discussing the nomination of Justice Alito. While I'd agree the piece you brought up wasn't very supportive of the nomination, I'd point you towards equally strong views by other institutions already represented in the gallery, such as the positions by Bill O'Reilly broadcasting on Fox News.

The second issue you brought up was how much of the Center's activities could be considered news gathering and broadcast journalism. While we are not exclusively focused on news gathering, neither are the traditional media. As the Project for Excellence in Journalism pointed out in their 2005 State of the News Media report, "the most salient trend in network news ownership is that journalism is an increasingly small part of what the corporations that own the networks do." If you look at the many products put out by the Center, I think you'll see a huge amount of original content produced in a very professional manner.

The third issue you brought up was whether I was personally qualified as a broadcast journalism. As the credentials process is focused on the individual and the sponsoring institution does not fill out an application, your point is an important one. My work as a journalist goes back to the mid-80s. Beginning in 1993, my work has focused extensively on what is clearly broadcast journalism. As you can see from some of my on-line archives at town.hall.org/radio, I've produced hundreds of hours of new content for the Internet, ranging from the first Congressional on-line hearings to the first 24-hour streaming media sources on the net (including the floors of the House and Senate) to the works of poets such as T.S. Eliot and Robert Frost reading their own material.

The fourth issue you brought up was, even if I had previously qualified as a broadcast journalist and the Center was not somehow *a priori* disqualified, whether my current activities and the specific proposed coverage as a member of the Gallery meet the purposes and criteria outlined in the Rules and Procedures for Electronic Media Coverage of Congress.

I'm a fairly recent employee of the Center. Beginning in November, I began my current project which is a documentary about Internet Governance. To carry out this project, I attended the United Nations World Summit on the Information Society in Tunisia as a member of the broadcast media. From my broadcast booth, I gathered extensive original material. I then used two High Definition JVC cameras and conducted approximately 30 on-location interviews in Amsterdam, Stockholm, Tokyo, Vancouver, San Francisco, and Washington, D.C. I also covered the December ICANN meeting as a member of the media. All of my raw footage will be released on-line at no charge as will the finished documentary. I am expecting to release this material in summer 2006, but would be happy to show you rough cuts on some of my raw footage.

My proposed coverage of the U.S. House and Senate is somewhat unique and is explained in a summary fashion in my original application for credentials. As we discussed, I am most interested in providing greater access to hearings which do not receive adequate distribution on the Internet. In particular, I am attempting to provide a neutral interchange for free access by all educational and research networks, content providers, and ISPs to high-resolution MPEG2 streams of media from the U.S. Congress. To do so, we will connect to the largest Internet Exchange in the Washington Metropolitan Area with an OC192, a specialized high-speed circuit. That in turn will be connected to the Audio Visual Operations Center (AVOC), which provides 280 Mbps video over fiber transmission using the SDI standard documented in SMPTE-259. Finally, we will use existing copper or the Radio-TV Galleries' Fiber Optic Project where available to make the "last mile" connections. As stated above, the materials generated will be available for anybody to use. As a gallery member, my focus would be on dissemination of raw coverage, allowing anybody on the net to provide commentaries on the material.

Again, I would like to thank you for generously sharing your time and discussing my application. I would appreciate your assistance in helping schedule a hearing before the Executive Committee to discuss my proposed coverage.

Sincerely yours,

Carl Malamud
Senior Fellow/Chief Technology Officer
Center for American Progress

Article 31 of 200
A SECTION
SCIENCE: COMPUTERS
Superhighway Routed Through Capitol Hill; Network Plans to Deliver Sound Bites as Bytes
John Schwartz

09/19/1994
The Washington Post
FINAL
Page a03

You read about it, but you missed the broadcast on C-SPAN. You want to hear Sen. Alfonse M. D'Amato (R-N.Y.) singing "E-I-E-I-O" on the Senate floor.

Today, you'll just have to wait for some news program to dredge up the clip for the next D'Amato profile.

But before long, if Carl Malamud has his way, you'll be able to suck that sound bite - or anything that happens on the floor of either chamber - into your computer directly from the Internet, and play it back whenever you like. You'll also be able to grab related materials - from photos to charts to reports - stored elsewhere on the Internet and linked to the segment you requested.

A Cyberspace Station

Malamud is very well connected, though not in the typical Washington sense of the word. He maintains a super-high-speed link to the Internet, the global network of computer networks, and has used those connections to put the first radio station in cyberspace on the air.

For more than a year, Malamud, 35, and a handful of part-time enthusiasts have been broadcasting two to three hours of digital programming daily via his Internet Multicasting Service (IMS). Technofans with sufficiently speedy Internet connections - and the right sound hardware and software - can tap into a weekly live audio feed for news and information about public affairs, science and technology. (Malamud named one of the features, a weekly interview, "Geek of the Week.") Most listeners, with less zippy on-line links, "download" bits of the programming into their computers for later listening.

Gavel-to-Gavel Coverage

Last week, Malamud announced a new venture that plans to take the Internet Radio concept even further: the appearance sometime next year of gavel-to-gavel audio coverage of the workings of the House and Senate via computer.

Why would anyone devote his life to turning the Internet, a key part of the high-tech future, into radio, a symbol of the static-filled past? And why would anyone want to use all of the awesome technology humming around us for a version of C-SPAN - without pictures, yet?

Because it's harder than it sounds. Although electronic text messages blink across the country in mere nano-moments, sound is a data hog. Translating sound into the 1s and 0s that can be interpreted by computers requires 30 megabytes of storage space for every digitally recorded hour - a chunk of the capacity of many home computers. Any semblance of a live broadcast also requires an Internet connection that shuttles data at rates of 64,000 bits per second - several times faster than most mainstream modems for personal computers can handle. Downloading programs at lower speeds for later listening can take hours of precious connect time.

Listening at the Office

Nonetheless, Malamud maintains that his programming reaches more than 100,000 people in 30 countries. Many fans listen in at their offices, because high-speed Internet links and internal computer networks are becoming de rigueur for businesses that send

and receive large amounts of information on-line. "We're not CNN, but we're a lot younger than CNN," Malamud said.

Computer systems of the sort Malamud has in mind promise to bring new capabilities that conventional radio and television can't touch. Today's TV networks give you programs when they choose to broadcast them. But computer communications allow users to grab the broadcast at their convenience, or search and play back a specific portion of a broadcast that interests them.

In the planned project, congressional speeches will take a circuitous path to the Internet. Sounds recorded at the House and Senate galleries will be beamed to IMS's Capitol Hill studio. After turning the sound into a digital data stream, IMS will shoot it over a high-speed line to studios at the National Press Building, where the information will simultaneously be stored on a massive set of hard disk drives and go out live over the Internet feed.

An Archive Service

The Internet Multicasting Service (for general information, send an Internet message to info@radio.com) won't just be broadcasting government proceedings live, though.

With its immense data storage systems - donated, like much of the computer equipment, by workstation mavens Sun Microsystems - the nonprofit IMS plans to archive the year's proceedings for delivery to anyone who has a hankering to listen to, say, what House Minority Whip Newt Gingrich (R-Ga.) talked about last Tuesday on the floor.

`Speaker Recognition'

One of the hottest aspects of the "Congressional Memory Project," however, is the software Malamud is planning to use to search the vast data archive. Most users will simply order up sound bytes by time and date. IMS plans to create a rough index of proceedings based on the Congressional Record, which is also available on-line.

Going a step further, Malamud hopes to implement still-experimental "speaker recognition" software that detects and stores the idiosyncratic patterns of sound in people's voices. Once those telltale characteristics are determined, a large audio database can be searched for matching patterns. Thus users of the archive could simply request any member's speeches on a certain date.

Because such software isn't a proven commodity yet, "we're not depending on speaker recognition as a magic bullet," Malamud said.

Here's how the Congressional Memory Project is expected to work in practice: You're sitting at your computer (or, at least, the next computer on your wish list) and navigate your way to IMS using graphical "browsing" software such as Mosaic. Your screen fills with a page of information that contains text describing the service and several on-screen icons. To hear House proceedings live, click one icon. To hear the Senate, click another. Another icon will lead to the archive. Some of the text will be highlighted: Clicking on it will activate links to other material, which might include text of bills under debate, government reports and other documents, as well as pictures and illustrations stored on computers around the globe.

Plans for Expansion

Along with the new channels of government coverage, Malamud has plans to expand his existing Internet Radio programming, having signed agreements with Monitor Radio, Radio France International and other providers. Malamud is also working with the Kennedy Center to broadcast the center's educational programs, lectures and performances for youth.

Not all of Malamud's ventures are multimedia. The EDGAR text database of filings to the Securities and Exchange Commission by thousands of companies is available free via the Internet thanks to the Internet Multicasting Service , the New York University Stern School of Business and grants from the National Science Foundation. Malamud has also put patent materials on-line.

By working out the kinks of sending and receiving multimedia programming, Malamud believes he is showing the way for future information superhighway services such as interactive television. "The cable companies and telcos {telephone companies} think 500 channels means home shopping and video on demand. I think we're what the face of those 500 channels will look like," Malamud said.

SPEAKER IDENTIFICATION BASED TEXT TO AUDIO ALIGNMENT FOR AN AUDIO RETRIEVAL SYSTEM

Deb Roy[1] *Carl Malamud*[1,2]

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[2]Internet Multicasting Service, 31 Madison Street, Cambridge, MA 02138 USA
dkroy@media.mit.edu, carl@media.org

ABSTRACT

We report on an audio retrieval system which lets Internet users efficiently access a large audio database containing recordings of the proceedings of the United States House of Representatives. The audio has been temporally aligned to text transcripts of the proceedings (which are manually generated by the U.S. Government) using a novel method based on speaker identification. Speaker sequence and approximate timing information is extracted from the text transcript and used to constrain a Viterbi alignment of speaker models to the observed audio. Speakers are modeled by computing Gaussian statistics of cepstral coefficients extracted from samples of each person's speech. The speaker identification is used to locate speaker transition points in the audio which are then linked to corresponding speaker transitions in the text transcript. The alignment system has been successfully integrated into a World Wide Web based search and browse system as an experimental service on the Internet.

1. INTRODUCTION

In the United States, the text of proceedings of the two houses of the Congress has long been published in the Congressional Record. No systematic effort has been made, however, to record audio from the floor of the House and Senate. In 1995, the non-profit Internet Multicasting Service (IMS) began sending out live streaming audio to the Internet and making complete digital audio recordings of the proceedings on computer disks. The challenge was to make this massive amount of recorded audio information, literally hundreds of hours, available to Internet users in a meaningful way. After investigating a variety of options, it was decided to couple the Congressional Record (the text database) to the audio database that we accumulated. The resulting system allows users to efficiently search, browse, and retrieve audio over the Internet.

Recently there have been several efforts to build audio retrieval and indexing systems. The most popular approach has been to index audio based on content words using either large vocabulary speech recognition or keyword spotting [1, 2, 3, 4, 5, 6]. Other cues including pitch contour, pause locations and speaker changes have also been used [7, 8, 9]. In one system the closed caption text of television news broadcasts was aligned to the audio track based on pause locations enabling users to perform searches on text and then access corresponding audio [10].

Audio retrieval systems will continue to grow in importance as digital archives become more common.[1] Since the majority of such archives will consist of speech, this is a natural application domain for speech processing. By extracting some structure from audio, an archive which is inaccessible due to it's size and the difficulties of searching unstructured audio can become searchable by content. Applications include multimedia content re-use, audio note taking, and content-searchable multimedia archives.

In this paper we describe a novel method based on speaker identification which was used to align the text and audio recordings of the proceedings of the Congress. The resulting system enables Internet users to quickly locate original congressional proceedings which were previously unavailable in audio form.

2. THE CONGRESSIONAL DATABASES

The Congressional Record includes edited transcripts of the proceedings, manually generated time stamps, results of any votes, and scheduling information about upcoming sessions. The transcripts are originally created live during the proceedings by a human transcriber. Among other things, two types of information recorded by the transcriber are of particular interest for the automatic text to audio alignment task: each speaker transition is recorded, and time stamps spaced every 10 to 45 minutes are entered during long pauses in the proceedings. One of the significant challenges is that the Congressional Record is not a verbatim record of the proceedings. Members have the opportunity to add new material, abridge their remarks, and otherwise edit the transcripts.

The audio database used for the experiments described in this paper contains 132 hours of proceedings of the House of Representatives recorded from January 20 through February 22, 1995. We also collected the corresponding text transcripts in electronic form. The audio was sampled at 16 kHz with a 16 bit digitizer. The recordings consist mostly of speech from the 435 male and female members of the House of Representatives. The recordings also contain occasional background speech, applause, laughter, and other noise.

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[1]For example most large radio broadcasters in the U.S. are switching to digital and will begin to accumulate massive digital audio archives.

3. THE CONGRESSIONAL DATABASE RETRIEVAL SYSTEM

Figure 1 shows the main components of the audio retrieval system. The text and audio databases described in Section 2 are shown at the top of the figure. The World Wide Web (WWW) interface enables users to constrain searches using a variety of parameters (see Section 5 for more details). The search parameters are used to locate selections of text from the text database. The text search engine includes a parser which extracts information about the date, time, and speaker identity from the text databases and uses this information to enforce some of the user specified search constraints. The search engine returns pointers to speaker transition points within the text which indicate search matches. The text- to audio alignment system then provides pointers into the audio database which correspond to the selected text. The WWW interface also provides both audio playback and a text display so users can interactively skim both the text and the audio in real time over the Internet (real time audio play back is supported over the Internet multicasting backbone using several popular audio transfer protocols including VAT, Real Audio and Xing).

4. TEXT TO AUDIO ALIGNMENT

A key component of the audio retrieval system is the text to audio alignment system which performs an automatic time alignment of the audio and text databases. One method of performing the alignment might be to run a large vocabulary speech recognizer on the audio and align the text output of the recognizer to the text transcript. This approach is difficult because the transcriptions often stray significantly from the verbatim words of the audio. Additionally, the original audio recordings have variable signal to noise ratios[2] which makes speech recognition difficult.

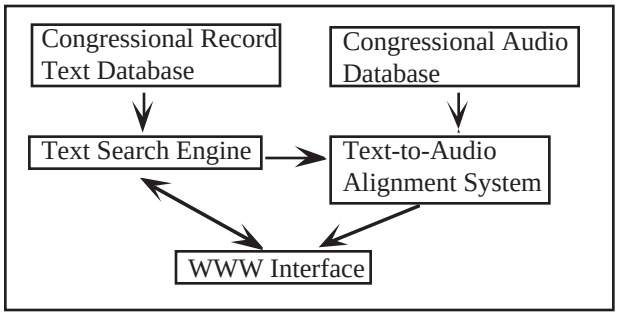

Figure 1: The Congressional Audio Retrieval System

Rather than attempt to align text and audio using speech recognition, our approach is to use speaker identification. We extract the sequence of speakers from the text transcript. We then use acoustic models of the speakers (described below) to locate points in audio where speaker transitions occur. We can then find correspondences between the text and audio at these points of speaker change. In addition to the speaker sequence, we also use the time stamps to further constrain the speaker identification process as described later in this paper.

We have implemented the alignment system shown in Figure 2. The text parser extracts the sequence of speakers and time stamps. Although the Congressional Record was not designed to be machine readable, it uses fairly standard formats for indicating speaker changes. There were errors in parsing this information since the format is not always followed in the transcript; this is discussed in Section 5. The time stamps are also well marked and can be extracted from the text but were found to be accurate only within a range of about two minutes.

We used methods similar to [11] to build acoustic models for each of the 435 members of the House of Representatives. First we manually located two 30 second segments of speech from each person spoken on two different days. For each 60 second sample of audio, we then computed 12^{th} order cepstral coefficients using a 32 ms Hamming window with 16 ms overlap, and then computed the mean vector and covariance matrix, μ and Σ, of these cepstral vectors.

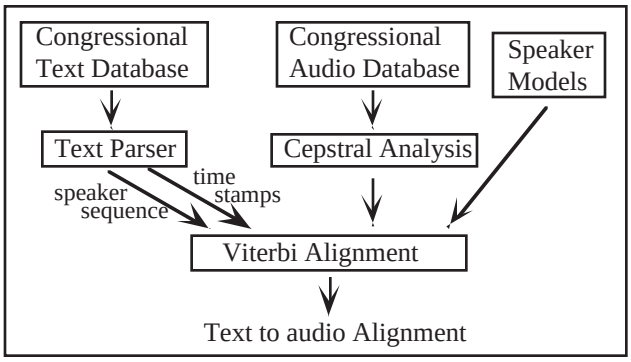

Figure 2: Estimating temporal alignment of text and audio

For a cepstral vector x and Gaussian model with mean μ and covariance Σ the likelihood that the vector was produced by the model is given by (1):

$$L(x;\mu,\Sigma) = \frac{1}{(2\pi)^{n/2}|\Sigma|^{1/2}} \exp\left\{-\frac{1}{2}(x-\mu)'\Sigma^{-1}(x-\mu)\right\} \quad (1)$$

(The vertical bars denote taking the determinant of the enclosed matrix).

Given the audio recording and text record of a day, we obtain three types of information: (i) a matrix of values indicating the likelihood of each frame of audio in the day was generated by each speaker model (by applying Equation (1) to each observed cepstral frame using each speaker model), (ii) the sequence of speakers who spoke in the day (from the text), and (iii) approximate time stamps recorded every 10 to 45 minutes throughout the day (also from the text).

[2]Speakers talk into an open microphone mounted on a floor stand; the microphone occasionally picks up considerable background noise from other people present in the chamber.

By constraining the sequence of models which are considered using the speaker sequence extracted from the text, we can solve the alignment problem using the Viterbi algorithm [12]. Specifically, we wish to recover the best speaker sequence $Q=(q_1, q_2,...q_t)$ given the observed sequence of cepstral vectors $X=(x_1, x_2,...x_t)$. The likelihood for a given speaker sequence is:

$$\delta = \prod_{i=1}^{t} L(x_i; \mu_i \Sigma_i) \quad (2)$$

Where μ_i and Σ_i are the mean and covariance computed from the 60 second sample of speaker q_i.

We used the Viterbi algorithm to find the speaker sequence which maximizes δ in Equation (2). We further constrained the Viterbi algorithm with the time stamps from the transcripts which usually occur during long pauses in the audio recordings (this is when the transcriber has time to check the clock and type in the time). To use this information we located pauses in the audio recording by thresholding the short-time energy of the audio using a fixed threshold. We then located the pause in the audio closest to each time stamp and segmented the audio recording into segments of lengths between 10 and 45 minutes. We processed each audio segment separately using the corresponding segment of the speaker sequence list to constrain the Viterbi alignment. This time stamp based segmentation insures a limit on the drift in alignment error since the time stamps act as anchor points; a speaker sequence alignment is forced locally within each segment and the error from one segment cannot effect the error in the next.

We note that since the original time stamps are only accurate to within approximately 2 minutes there is occasionally an error in the assumed speaker sequence at either end of the segments which leads to some alignment errors.

5. RESULTS

In this section we first describe the types of errors we encountered in the system and then present some preliminary speaker alignment accuracy results on a small subset of the corpus.

We have found several causes for errors in the speaker identification process:

- undocumented speaker turns in the text transcripts (for example there are several cases in which the transcript indicates a single speaker transition but in the corresponding audio two speakers argue for control of the floor generating as many as 15 (often overlapping) speaker transitions!)
- non-standard documentation of speaker turns in the transcripts which were not detected by our text parser
- short speaker turns which are overlapped completely by another speaker in the audio recordings
- undocumented speakers for whom we have no voice models (usually clerks who announce administrative details of the proceedings)

Each of these errors may cause the Viterbi alignment to fail. Fortunately the time stamps provide alignment anchors which prevent errors from propagating beyond a single audio segment. In our initial analysis we have found that close to half of the audio segment alignments have errors due to one of these sources. Some directions for future work to alleviate these problems are described at the end of this section.

For this initial analysis, we randomly selected five one-hour audio segments recorded on three different days. Of these segments we found that two of the segments contained one of more of the errors listed above and were not analyzed further. We note that the average error in alignment for all speaker transition points in these two segments was greater than one minute. The three remaining segments of audio contained a total of 49 speaker transitions. Figure 3 summarizes the speaker alignment performance on this set of audio. Any point along the curve indicates the percentage of speaker transitions (vertical axis) which are located with an error less than or equal to a specific alignment error (horizontal axis). For example 57% of the transitions are located by the system with an alignment error of 3 seconds or less; 70% of the transitions are found when a 15 second error is acceptable. We note that for the task at hand (i.e. retrieving specific audio segments from several hundred hours of archives) alignment errors in the tens of seconds still provides a very useful service.

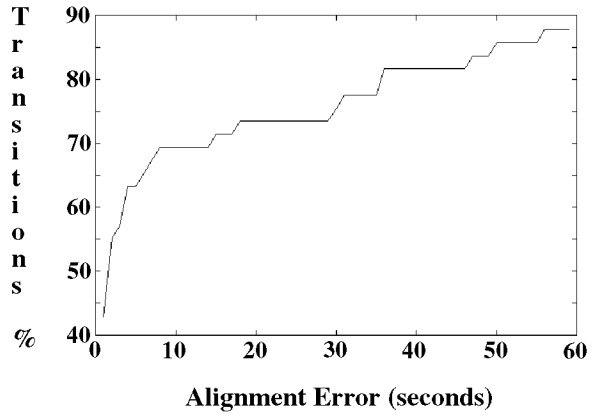

Figure 3: Preliminary results of the speaker alignment system (results shown only for the segments which did not contain errors of the type listed in the text)

This preliminary analysis suggests that we need to soften the constraints derived from the text transcripts so that the speaker sequence produced by the Viterbi alignment does not have to match the text sequence precisely. We also note that the length of text associated with each speaker turn in the transcript can be used as a predictor of the duration of the corresponding audio segment. In future work we plan to derive duration predictions from the text and use them as a further constraint on the alignment procedure.

6. THE SEARCH AND BROWSE INTERFACE

We have build two WWW interfaces for accessing the audio database over the Internet. The primary interface is a search form with which the user can search for audio segments constrained by several criteria including keywords, name of speaker, political party of speaker, speaker's home state, date range, time range (specify range of times within a day).

A full text search is performed on the text database and a list of candidate hits are listed on a web page. The user can click on an entry from the list to go to a display page which has a scrollable window to view the text, and an audio playback interface to listen to the corresponding audio over the network. All audio alignment is precomputed by the text to audio alignment system off-line so the system response time is quick.

In cases there the audio alignment has failed, a secondary browse interface can be brought up by the user which displays a list of temporally close segments before and after the initially selected audio segment. Since errors in the alignment are typically within a few minutes of the actual location[3], the user can use the browser to quickly locate the information of interest.

7. CONCLUSIONS

We have presented a system for aligning the audio and text of the proceedings of the U.S. House of Representatives. The alignment effectively couples the text and audio databases in a manner which enables efficient search and browsing of hundreds of hours of audio. The resulting audio retrieval system has been deployed experimentally on the Internet since October, 1995 at the WWW site http://town.hall.org.

8. ACKNOWLEDGMENT

The authors would like to thank Herb Gish for many useful discussions.

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[3] The worst case error is limited to the time stamp interval for that section of the Congressional Record.

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CYBERSTATION GOES ON THE AIR IN SHOW-BIZ FASHION

DAVID BANK, Mercury News Staff Writer

The audio feeds are coming in from as far away as Australia and from as close as the rock band jamming in the ballroom of the Hilton Hotel. And they are all going out as bits of data over the global Internet computer network in the first show-biz spectacular for a new broadcast medium.

The four-day radio show that began Tuesday featured a live rock 'n' roll performance, a spinning Internet slot machine, a computer-controlled toaster and interviews with celebrities of the digital world, along with a running commentary by John Gage, Sun Microsystems Inc.'s chief scientist.
"It's broadcast in the broadest sense," Gage said, standing between two prefabricated octagonal pods that housed the bank of computers that make up the production studio. "We're sending worldwide through pathways that none of us know."

The experiment, which can reach millions worldwide, is neither radio nor television, but an attempt to use the power of computer networks to provide a new type of live interactive programming. For now, it's accessible only to those with high-speed data connections and powerful workstation computers.

The broadcasting station, dubbed a "cyberstation," was commissioned to kick off the huge Networld+Interop convention of computer network professionals that begins today.

But the creator of the cyberstation, veteran Internet innovator Carl Malamud, points out that television programming, too, originally was available only to a select few. But there would have been no incentive to buy television sets unless there was programming to receive. Those who became successful programmers, he said, were the visionaries who saw the potential of the new medium.

Cable companies, telephone companies and modem manufacturers are all rushing to provide high-speed connections to home computer users, and the speed of microprocessors is multiplying while prices fall.

"A year from now, when this becomes available to consumers, someone has to know how to be a cyberstation," Malamud said.

Malamud's not-for-profit Internet Multicasting Service in Washington has been broadcasting two channels of Internet radio for about a year, transmitting live speeches from the National Press Club and producing Geek of the Week interviews with industry figures.

Last year, the organization launched an alternative telephone company that uses the Internet to send faxes around the world, virtually free. The messages are sent as electronic mail, which incur no long-distance charges, until they reach a relay computer near their destination. That computer then sends the message to the receiving fax machine.

All of the efforts are intended to demonstrate the value of a general purpose information infrastructure, such as the Internet, Malamud said. In contrast, a cable television system is used almost exclusively to carry television programming.

Malamud said it is crucial that government policy-makers and corporate leaders heed the lessons of the Internet, which can be made to do whatever innovative hackers can make it do because there are a set of agreed-upon protocols.

"People can do things we never thought of before," he said. "That's crucial. We've got to have that."

Malamud is trying to squeeze as many new novelties as he can in the four days the cyberstation will operate. There will be a live broadcast by Secretary of Commerce Ron Brown and an interview with Ralph Nader. National Public Radio will broadcast its "TechNation" show from the studio. Malamud received permission from music publishers to broadcast music from compact discs over the 'net.

Computer users with access to Mosaic, the software for browsing the Internet's World Wide Web, will be able to click the lever on the Internet Slot Machine. The prize for getting three red icons together: a $1,000 Internet tutorial.

"Our goal is to see how much data we can put on the 'net at once," Malamud said. "The answer is: a lot."
IF YOU'RE INTERESTED

The cyberstation will broadcast from Networld+Interop from 7 a.m. to 6:30 p.m. today and Thursday and from 7 a.m. to 4 p.m. Friday. For information, send e- mail to hype-requestmedia.org . On the World Wide Web, type http:// www.media.org . The anonymous ftp address is ftp.media.org (use your user name as the password).

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Memo: Additional information end of article

AGENT CHANGE CARL MALAMUD HAS MADE THE NONPROFIT INTERNET MULTICASTING SERVICE THE FIRST ROUND-THE-CLOCK 'CYBERSTATION' ON THE INTERNET

DAVID BANK, Mercury News Staff Writer

WHEN Rep. Newt Gingrich took over as Speaker of the House on Wednesday, Carl Malamud helped carry Gingrich's message to the people.

More precisely, to 12 people.

That was the size of the audience when Malamud's Internet Multicasting Service launched gavel-to-gavel coverage of floor debate in the House of Representatives and the Senate over the worldwide Internet computer network.

Malamud's audience was limited because the live audio transmission requires high-capacity communication lines that are not yet available to most home computer users.

But like all of Malamud's efforts, the Congressional Memory Project is a pilot for something bigger, much bigger.

Congress itself is making texts of bills and speeches available through Thomas, its new site on the Internet. Malamud is going a step further, serving up live and pre-recorded audio files.

The Internet Multicasting Service has become the first round-the-clock "cyberstation" on the Internet, with channels for music, international programming and public affairs in addition to the proceedings of the House and Senate.

Malamud is taking technologies developed in research labs and putting them to popular use to show the Internet's potential once homes are equipped with affordable, high-speed lines.

To awaken people to the changes he sees ahead, Malamud sometimes inserts short audio clips into on-line sessions with his favorite slogan: "Adapt or die!"

"He is no different from (CBS founder) Bill Paley or Edward R. Murrow in creating the new cyberspace model," said Eric Schmidt, chief technology officer at Sun Microsystems Inc., which has supported many of Malamud's projects. "He sees himself as an information entrepreneur and a change agent."

Unlike other entrepreneurs, however, Malamud, 35, is not looking to cash in on the Internet's explosive growth. He ran up more than $40,000 in credit card debt to establish the Internet Multicasting Service as a non-profit corporation in 1993 and says he has turned away offers of millions of dollars from venture capital investors. He pays himself $6,000 per month.

Non-profit status, he said, lets him move quickly on projects, cut deals with both government agencies and private corporations, and, most importantly, pursue his interests without worrying about turning a profit.

"The fun work is before there's money in it, because it's never been done," he said. "If I wanted to make money, I'd go work for a computer company. I felt I had a vision of what the system ought to look like that I felt others didn't share."

Malamud's vision is of an electronic community -- cyberspace -- that includes more than shopping malls and movies-on-demand and virtual rooms for idle gossip. The Internet Multicasting Service is trying to construct public spaces in the electronic world -- free concerts, public libraries, open government.

Malamud constructs those sites from his cramped offices in the National Press Club building in Washington D.C., which is jammed with Sun workstations, routers from Cisco Systems Inc., audio sound boards and huge computer servers that store billions of bits of data. He's well-wired, with a high-speed T-1 line directly to the Internet. Networking wizards from around the world drop by to help; Malamud has commitments for the coming year of three days of volunteer time from a dozen top-flight researchers.

"Carl has spent two or three years doing something that nobody else has been crazy enough to do and that is to cajole lots of equipment and money out of these corporations," said Simon Hackett, who spends two-thirds of his time running his networking company in Adelaide, Australia, and the rest roving the world having fun, particularly with Malamud.

Equipment donated

Companies like Sun, MCI, O'Reilly & Associates and the publishing giant R.R. Donnelley & Sons Co., have each put up at least $100,000 in cash and even more in donated equipment and services. Last year, Malamud raised about $650,000. This year, he figures he'll collect more than $900,000.

The companies hand over the money in return for access to his ideas, his research findings and a piece of the publicity he generates with "cheap stunts" that demonstrate the Internet's versatility.

"He thinks in such weird terms," said Lance Boxer, vice president for data services for MCI, which is making a major push into the Internet market. "It's the kind of out-of-the-box thinking MCI needs right now.

"He's got ideas about how to take this thing called Internet, which was not a profitable business, and make it into something we could sell."

Resources helpful

The resources allow Malamud to quickly put many of his endless supply of ideas into practice. For him, engineering glitches and bureaucratic obstacles are simply different forms of problems to be solved.

When he found out that the Securities and Exchange Commission was paying a private information company to maintain its electronic data base and then paying again to use the data base, he offered to solve the problem for a fraction of the cost. That led to a two-year experimental project, funded by the National Science Foundation to make the Edgar data base available over the Internet.

That put him in competition with private information providers like Mead Data Central, which holds the government contract for the information.

"On Edgar, it's unlikely it would have happened without him," said Jamie Love, director of the Taxpayer Assets Project, a Ralph Nader spin-off focused on securing public access to government information sources. "He's done more than anybody in the executive branch to prove the value of government information." The next project of Malamud's "Information Highway Beautification Fund" was to be the huge data base from the U.S. Patent and Trademark Office. But the effort recently ran into resistance from patent commissioners who again fear free distribution will undercut those companies who sell the information for a fee. That attitude brings only a sneer from Malamud.

"They are more worried about their sweetheart relationships with government contractors than they are with their public duty," he said. "They feel our activities threaten their friends. I call that improper, at best."

Launches alternative

He launched an alternative "telephone company" that uses the Internet to send faxes around the world, virtually for free. The idea came to him when he realized a telephone number could be expressed as an e-mail address. That makes it possible to send fax messages as electronic mail, which incur no long-distance charges. When the message reaches a computer near its destination, the computer makes a local call to the receiving fax machine.

At Christmas, Malamud produced the first live karaoke performance of Handel's "Messiah," sending the annual Kennedy Center performance over the Internet with sing-along lyrics highlighted in red.

"He's making the technology do things we never expected," said Steve Deering, the researcher at Xerox's Palo Alto Research Center who developed the protocols for multicasting -- a way to send audio and video over the Internet -- as a tool for researchers.

"We don't have the imagination to go make these things happen, or the drive," Deering said. "He does. He doesn't consider anything to be too much of a hassle."

Bred to solve problems

Malamud was bred to solve science problems. His father was a founding scientist at Fermi Lab, the advanced particle physics laboratory at the University of Chicago, and his mother holds a doctorate in invertebrate physiology.

But he hasn't been able to shake his lifelong obsession with public policy. At 17, he managed a losing campaign for a Democratic state senate candidate in a Republican stronghold in a nearby Illinois suburb.

His computer knowledge is self-taught. As a Ph.D. candidate at Indiana University, he was supposed to be teaching undergraduate economics. But he complained so much about the campus computer center that a system operator told him to put up or shut up.

Consulting background

A decade of consulting for large computer companies and government agencies such as the Federal Reserve and the Pentagon taught him that simple access to information can change the course of technological development. The success of the Internet, he discovered, could be traced to something as simple as free on-line access to the technical standards for the protocols. Rival standards withered because college students in computer labs could not get at the tightly held and expensive documentation.

That led to his other efforts to free other caches of government information and make them available through commonly used Internet features such as e-mail, file transfer protocols (FTP) -- which allows users to get files, such as shareware from remote locations -- and the World Wide Web.

But mostly he tries to have fun (his definition: an all-night effort to wire up a network for a trade show demonstration, for example) and stir up trouble. He once persuaded a publisher to give him $45,000 to go around the world three times in six months exploring the still-nascent Internet.

Indeed, his current multicasting efforts grew out of his desire to start a magazine to tweak the sensibilities of the computer industry and tout the potential of the Internet. But he found it would cost millions of dollars to publish and he feared being beholden to advertisers.

"Then the idea came. Let's use the Net," he said.

That led to "Geek of the Week," a weekly half-hour interview that computer users were able to download and play back on their own machines. The point was partly to distribute the information and partly to understand the new distribution technology itself.

Radio show on Internet

The reaction at the time was, "What, a radio show on the Internet?" Two years later, the show has become a station that carries weekly luncheons from the National Press Club, programming from National Public Radio, a 24-hour music channel and now, the House and the Senate.

It's still a work in progress. For example, users will be able to recall snippets of legislative action by electronically searching the text of the Congressional Record for the desired subject and then ordering the audio files of the proceedings -- a kind of Congress-on-demand that C-SPAN is not able to offer.

"This method of communicating with people is going to be major media," Malamud said. "Eventually, we're going to have audiences of millions of people. This will be an important part of people's lives."

IF YOU'RE INTERESTED

To reach the Internet Multicasting Service, point your World Wide Web browser to http://town.hall.org. For information about the Congressional Memory Project, use http://town.hall.org/radio/. If you don't have access to the Web, send e-mail to inforadio.com, which will generate an automatic response to frequently asked questions. Thomas, the new congressional information service on the Internet, can be reached at http://thomas.loc.gov.

MULTICASTING BECOMES A HIT BY DISTRIBUTING ROLLING STONES CONCERT

DAVID BANK, Mercury News Staff Writer

FIRST came e-mail, then the World Wide Web.

Next up is multicasting, which really will make the Net rock and roll.

It was the 20-minute Rolling Stones concert over the Internet's multicast backbone, or Mbone, that brought widespread attention to it last November.

"Now a lot of people are trying to figure out how to get their hands on it and turn it commercial," said Stephan Fitch, president of Thinking Pictures, the New Jersey company that produced the Stones event.

Multicasting is a method for distributing live programming over the Internet. The programming can take many forms: video, audio, text or "whiteboards" -- in essence electronic chalkboards that any number of users at different sites can scribble to simultaneously. Unlike traditional television or telephone service, multicasting connects groups with groups. Every viewer also can be a transmitter.

Multicasting generally requires high-capacity network connections that are still mostly found only in corporate or university settings. But the increasing home use of integrated services digital network, or ISDN, lines and the prospect of on-line access via cable means that multicasting may soon become a popular medium.

Because digital video and audio data consists of millions of bits of information per second, the developers of multicasting have established a reservation system for events -- such as the Stones concert -- to avoid overloading the Mbone. The growth in the number of smaller networks connected to the Mbone is doubling every seven months, a faster growth rate than the Internet itself.

"It's still an experimental service," said Steve Deering, the researcher at Xerox's Palo Alto Research Center who developed the original Mbone protocols. "We're explicitly preventing its growth. If we stopped jumping on it, it would take off."

NEWSMAKER PROFILE

CARL MALAMUD

(box) Age: 35

(box) Education: Masters of Business Administration, Indiana University

(box) Founder: Internet Multicasting Service, Washington, D.D.

(box) Past Experience: Computer consultant for government agencies,

including the Federal Reserve and the Pentagon

(box) Other: author of five books

Illustration: Photo

PHOTO: KAREN T. BORCHERS -- MERCURY NEWS

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The Man With Ideas

Internet: The Robert Moses of cyberspace plans a 1996 world's fair

By KATIE HAFNER

THREE YEARS AGO, CARL MALAMUD, an economist, writer and computer consultant, traveled around the world three times. In six months, he went to 56 cities and visited resident techies in each. Malamud saw that pieces of Marshall McLuhan's vision of a global village were actually falling into place. When he returned, he resolved to help make the circle complete. A conspicuous, unstoppable force in the Internet community, Malamud is organizing perhaps the most ambitious undertaking on the Internet to date: a 1996 world exposition modeled on world's fairs of the past, with 100 participating countries. Funded by corporate sponsors and expected to cost about $10 million to set up, with another $10 million in donations of equipment, the fair will blend the physical and virtual worlds. The main entrance to the fair will be called Central Park-a huge World Wide Web site residing on eight computers spread around the world. The Central Park computers will be linked by a global, ultra-high-speed electronic railroad. In addition, each participating country will have its own electronic theme pavilion. Throughout the year actual events, such as Peter Gabriel's World of Music, Arts and Dance concert tour next summer, will be broadcast over the Internet as part of the fair.

If anyone can pall this off, it's Malamud. At 36, he is the idea man of cyberspace. Malamud is perhaps best known among Internet coguoscenti for popularizing audio on the Net. In 1993 he ran up $40,000 in debt on his credit cards to buy sound equipment and began producing weekly interviews with computer experts. He called the program "Geek of the Week." People could download interviews from the Internet, store them on their computers and listen to them later.

Malamud's broadcasts were a hit, with more than 100,000 listeners the first year. But they were data-intensive, which made them easily accessible only to people with very high-speed connections to the Net. Even using a relatively fast modem, it could take two hours to download a half-hour interview. Now, with applications such as RealAudio, a new audio format that makes listening to audio on the Internet nearly instantaneous, audio on the Net is finally reaching the masses.

"Geek of the Week" grew into Internet Multicasting Service, a not-for-profit "cyberstation." Malamud oversees a staff of six from an office above a Chinese restaurant on Capitol Hill in Washington, D.C. He gets his funding and donations of equipment from corporations such as Sun MCI Communications and disc manufacturer Quantum Corp. His annual budget is about $1 million, and he estimates that there are about about 250,000 regular listeners.

An intense workaholic, he is driven by a desire to create public spaces on the Inter-net as it grows increasingly commercial. He could just as easily start a commercial venture, but the prospect doesn't particularly interest him. "I couldn't do what I'm doing in a commercial company," Malamud insists. "I'm not beholden to investors or venture capitalists and I don't have to make a profit, which means I can do new things."

Malamud's peers in the computer industry generally speak glowingly of him. Some are puzzled by his lack of interest in making money. But everyone seems to be in awe of his creativity. "You never know what he's going to think of next," says Stephen Wolff, an engineer at Cisco Systems, Inc. 'And like a lot of people who have terrific, huge-scale ideas, Carl's not always the easiest person to deal with."

Malamud inherited his technical bent from his parents - his father is a high-energy physicist, his mother a physiologist. He got his start in computers when, as a doctoral candidate in economics at Indiana University in 1982, he complained constantly to university officials about the computers. "Finally they said, 'If you're so damn smart why don't you come work here?'" he recalls. So he dropped out of the program and helped design the university's computer network. Malamud's site on the World Wide Web (http:

town.hall.org) contains more than 300 hours of audio. Visitors can listen to Robert Frost reading from his poetry, check in on a National Press Club luncheon or hear a recording of the recent United Nations 50th-anniversary celebration.

On top of the intensive planning for the world expo, Malamud has been engaged in a wrangle with the Securities and Exchange Commission over the SEC's federally mandated Electronic Data Gathering, Analysis and Retrieval system, or EDGAR. The database contains financial information on publicly traded companies. With a grant from the National Science Foundation, last year Malamud put the database on the Net, making it accessible free of charge to anyone with a computer and modem. He's going to drop the project in October but hopes the SEC will keep the data in the public domain.

The world's fair will be Malamud's most daring project. Once it's over, he plans to dissolve Internet Multicasting Service, taking the assets and distributing them to different organizations on the Internet. With that, he hopes to create cyberstations similar to his, scattered around the world. Once Internet Multicasting has disappeared, Malamud says, he plans to return to writing books and consulting. But those who know Malamud aren't inclined to believe him. "That might last about three months," says one friend. Then he'll have another idea.

Article 5 of 6
Financial

NETWORKINGS
Ideas Whose Time for Free Access Has Come
John Schwartz

06/29/1998
The Washington Post
FINAL
Page F20

If the World Wide Web could be felt and not just merely surfed, you'd be feeling a very big rumble in August. That's when technicians will begin connecting one of the largest single databases ever offered on the Web. It's the official record of the U.S. Patent and Trademark Office (PTO).

How big a deal is this? Bruce A. Lehman, commissioner of patents and trademarks, put it to me this way: "This database is the record of technology at this moment in time."

If some unimaginable holocaust were to zap the United States, he said, survivors could pull the PTO's backup tapes out of the Pennsylvania salt mine where they're stored and "entirely reproduce all of the technology of the 20th century." And now, he continued, "we are putting the entire library of the technology of our time on the Web, available with a few keystrokes."

If you're not impressed yet, you just might need to have another cup of coffee.

But before we say more about this new stuff, let's build up to it by discussing some very old stuff.

You might think this is a nation built of laws, or of power, or of money. But it's also a nation of ideas. This whole country, as Abraham Lincoln said at Gettysburg, was invented because of a "proposition": the once-crazy notion "that all men are created equal." To ensure the survival of the marketplace of ideas that helped them create the structure of the new government, the Founding Fathers made freedom of speech the Constitution's first amendment.

Just as important, they enshrined within that Constitution the notion of protection for ideas that might make people money through a system of patents and copyrights. There it is, right there in Article 1, Section 8: Congress shall have the power "to promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."

Jefferson, Franklin and many other prominent Americans present at the birth of the republic were scientists and inventors on the side. They knew the power -- and profit -- that can come from an idea. But like all of the great notions at the core of our nation, the system of patents and copyrights they envisioned was a delicate balancing act: On the one hand, the person who comes up with ideas deserves a degree of protection. On the other, those ideas become infinitely more powerful when shared and built upon.

All right. Now let's click forward a couple of hundred years and many millions of patents later. I was sitting at my desk when the phone bleated its electronic tone. I picked it up and heard the unmistakably impish voice of Carl Malamud, one of the Internet's more provocative guys.

Malamud believes that government information belongs to all the people and ought to be freely available on the Web. He is on one side of a long-standing tug of war with companies that profit by packaging government information and reselling it to businesses and consumers.

Through his Internet Multicasting Service, he has had a hand in pushing an incredible amount of such information into the ether, most notably filings with the Securities and Exchange Commission, the Federal Election Commission and the Government Printing Office. He's often helped force those government agencies to take over and improve the online operations. So whenever Carl calls, I figure I'm in for a pretty interesting

ride.

This time he had his sights set on patents, one of the biggest kahunas out there. They've long been available by mail and at one of 70 national patent libraries, but he was agitating to get them online. He was calling me to say he was fed up with waiting. After Malamud made his frustration known through the New York Times, a Washington-area Internet entrepreneur anonymously ponied up $500,000 and told Malamud that he should just do what big business does and buy the patent information himself -- and then give it away.

Malamud started working round the clock and began quietly telling journalists that his bare-bones patent Web site would open its virtual doors on July Fourth.

Then last Thursday, Commissioner Lehman made his announcement. First will come trademark text libraries, in August, followed by trademark images and patent text in November. Patent images will begin appearing in March 1999. The full text of the 2 million patents dating back to 1976, along with trademarks from the 1800s onward, will be online, Lehman said, joining 20 years of patent abstracts and full AIDS-related patent databases that his office already makes available online.

That will be the start, the patent office says. The grand aspiration: that one day every single patent going all the way back to the beginning will be online.

The new databases will be searchable by key word -- a crucial feature that Malamud had no plans to provide since he assumed others would jump in to fashion innovative tools for exploring the trove. "For the first time in history," Lehman told me, "patent info will really satisfy the intent of the Constitution." Anyone with access to the Web will be able to share the wealth of the world's creative genius; "Now just-ordinary people will be able to have that information at their fingertips."

Those who currently profit by reselling patent data still will be able to do so, Lehman predicts, by finding ways to help users draw needles of usable information out of that vast haystack of data.

Malamud is withdrawing his Web patent effort, and he praises the Clinton administration for making this treasure available to us all. "It's a good thing," he said when we talked. "The intellectual property market is going to change because of this."

Lehman denies that Malamud's campaign figured in what the PTO will now do. Putting the database on the Web site, he notes, has been in the works for some time and is a key element of both Vice President Gore's "Reinventing Government" initiative and Commerce Secretary William M. Daley's efforts to boost electronic commerce.

But before launching the site, the PTO had to first ensure that its patent reviewers had access to the full database, Lehman said, and then a separate system for the general public had to be developed to ensure security. These things always take longer than activists would like. "Like everyone, he wanted it yesterday," Lehman said of Malamud with a sigh.

However it happened, I'm just overjoyed that this vast data tsunami is going to hit the Net. I think about people like my pal Scott Campbell, a New York inventor who drives down to Washington a few times a year to do patent research, who now will be able to do much of that work from his home.

I think of high school students who might someday be inspired by examining online the images of Thomas Edison's patent application for the first phonograph. I'm wondering what ideas will be sparked by their searches.

And I know that somewhere, the Founders are smiling.

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Places to Go

The U.S. Patent and Trademark Office can be found at http://www.uspto.gov/. You can read Lehman's announcement of the online patent initiative at http://www.uspto.gov/

web/offices/com/speeches/aba9806.htm.

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U.S. SEC to Take Over Venture Offering Internet Access to Filings

By Mark H. Anderson And Jared Sandberg

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WASHINGTON -- The U.S. Securities and Exchange Commission, in a fundamental policy shift, has decided to take over an expiring nonprofit project that offers free Internet access to corporate filings made with the agency.

The move means millions of corporate filings, including regular financial reports and stock and bond registrations, will continue to be available, 24 hours after they are filed, to anyone with a computer and modem. The SEC plans to offer its service beginning Oct. 1, the day after the two-year-old nonprofit venture ends.

"I'm delighted," said Carl Malamud, president of the Internet Multicasting Service , which operated the project with New York University. "This is a textbook example of what happens when industry, government and public-interest groups all work together to solve problems for the taxpayer."

For weeks, Mr. Malamud has been lobbying the SEC to offer filings from its own "page" on the Internet's World Wide Web. He said his service has proven quite popular, as more than 3.2 million corporate documents have been retrieved by users.

"Taxpayers and shareholders have already paid to compile this information -- they should not have to pay again," SEC Chairman Arthur Levitt said Sunday in announcing the initiative at a speech before a National Association of Investors Corp. convention in Nashville, Tennessee.

The SEC traditionally has made corporate documents available to the public primarily through a large reference room at its headquarters in Washington. The agency greatly eased access to the filings a couple of years ago when it began requiring companies to file electronically rather than on paper. Private companies developed high-priced corporate databases that Wall Street firms and others pay to access. But low-cost access for small investors through the Internet Multicasting Service had to be funded through a grant from the National Science Foundation and others.

When rumblings began a couple weeks ago that the free Internet service would end soon, Mr. Levitt said keeping the project going was a "highest priority" for the SEC. Several private firms then came forward to offer various "free" plans to fill the impending gap.

However, Mr. Levitt said all of the offers "would in some way limit the amount of information available or else attach too many commercial strings." For instance, one private-sector offer allowed free access for only 10 minutes and another allowed users to look at the information free but made them pay to download it to a computer, said SEC Chief of Staff Michael Schlein.

The SEC will package the corporate filings with its separate Internet service that offers access to agency policy initiatives and announcements, Mr. Schlein said. The service will replicate many aspects of the nonprofit venture. SEC officials plan to work on improvements, although they said it was too soon to know what might be changed. A new World Wide Web address will be announced in September.

Private Entrepreneurship for the Public Good

by David Morris
Institute for Local Self-Reliance

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> "He is no different from (CBS founder) Bill Paley or Edward R. Murrow in creating the new cyberspace model," said Eric Schmidt, chief technology officer at Sun Microsystems Inc. "He sees himself as an information entrepreneur and a change agent."
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> If you believe Schmidt is talking about Bill Gates, please turn in your modem. The object of Sun Microsystem's admiration is the far less well-known but far more innovative Carl Malamud, a 39 year old Visiting Professor at the Massachusetts Institute of Technology Media Lab who just a few days ago added yet another victory to his already impressive record of using private entrepreneurialism for the public good.
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> Malamud came to the internet just as it was converting from text to images, from a small network of military and academic researchers to the mass communications medium we now call the world wide web. In 1993, he established the Washington, D.C.-based non-profit, Internet Multicasting Service(IMS). As David Bank wrote in 1995 in the Denver Post, Malamud "has a vision of an electronic community that includes more than shopping malls and movies. He is trying to construct public places in the electronic world--free concerts, public libraries, open government." Says Malamud, "there needs to be a public space on the Internet..."
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> One of Malamud's first initiatives was to persuade the government to make public information truly public. Washington spends billions of dollars gathering data but has been remarkably reluctant to allow its citizens free access to that information. Thus citizens have to pay twice: once to gather the data and a second time to access it, usually from private companies.
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> In the mid 1980s the Securities Exchange Commission(SEC) spent almost $80 million to create the electronic EDGAR data base, which contains corporate annual reports, proxy statements and other filings made by nearly 75 percent of the nation's public companies. In 1993, Malamud asked the SEC to post that data on the web. It refused, partially at the urging of a private information industry that was earning a reported $250 million a year for selling repackaged EDGAR data.
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> In true entrepreneurial fashion, Malamud ran up a $40,000 debt on his credit card, solicited other contributions and purchased the EDGAR data. In January 1994, over the vigorous objections of the SEC and other government agencies, IMS began to post the full text of SEC documents, several years of patents, the Congressional Record and other public documents on a web site appropriately named www.town.hall.org.
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> Malamud announced that he would provide the service for 18 months, giving the public a taste of truly accessible public information. Then he would shut it down and urge users to demand that their government assume that responsibility. Eighteen months later almost 20,000 people were using the IMS web site each day. The SEC blinked. Commission Chairman Arthur Levitt Jr. announced, "I think it's enormously impressive that so many members of the public found this service useful. Because of this, I raised this issue to highest priority at the Commission." In October 1995, the SEC began to offer its corporate data free. Today the site receives more than 500,000 visits a day.
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> But the Patent and Trademark Office(PTO) still refused to provide free public access to its public data. This May, after five years of frustration, Malamud issued a challenge. By July 1st, if the PTO still refused to provide that service, IMS would purchase the entire Patent and Trademark database and make it publicly available on the web. Then at the end of the year, "I'll pull the plug out from the users and give them Al Gore's e-mail address."
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> Bruce Lehman, the Commissioner of the Patent and Trademark Office defiantly responded, "What Malamud wants us to do is permit people to download the entire database. If he can do that we'd be out all $ 20 million we now receive in fees. Why would anyone want paper?"

Malamud insisted that the federal government should not view itself so narrowly. The PTO is not a private corporation seeking to maximize its revenue but is a public corporation whose goal should be to promote the common good. To Malamud, the common good required public access. Making the entire patent database available to any college student with 100 gigabytes of disk storage capacity would touch off an explosion of scientific creativity.

A few days ago, a week before Malamud's deadline, the PTO gave in. The agency announced that, beginning in August it would post trademark data to the web and beginning early next year, all patent data. Malamud generously announced that he was "thrilled".

An entrepreneur for the public good. In the age of Bill Gates, I find Carl Malamud delightfully refreshing.

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His columns regularly appear in the St. Paul Pioneer Press
