



Creating a **National Gallery** of the **Spoken Word Online**

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**MATRIX: The Center for Humane Arts, Letters, and
Social Sciences Online
Michigan State University**

Presentation to the 2002 EU/NSF Digital Libraries All
Projects Meeting

March 25, 2002

Creating a **National Gallery** of the **Spoken Word** Online

A Digital Library Initiative
Phase 2 Project



Creating a **National Gallery** of the **Spoken Word** Online

GOAL: Develop the ability of digital libraries to preserve and deliver aural resources in a wide variety of useful formats.



The Partners

- A. Michigan State University**
- B. Northwestern University**
- C. University of Colorado**
- D. The Chicago Historical Society**

Importance of Aural Resources

1. **Speeches, interviews, and readings contain a wealth of information unavailable through text alone**
 - A. For **researchers** throughout the humanities & social sciences
 - B. For **teachers** as they bring material to life
 - C. For **students** working on class projects
 - D. For **librarians** and **archivists** as gateways to online repositories
 - E. For **general public audience** wanting a deeper understanding of important events in American politics and society



Importance of Aural Resources

2. Aural resources have particular value for specific segments of the population

- A. For the **visually impaired**
- B. For **students** who are aural learners
- C. For segments of society with continuing lively oral traditions, who are often **economically disadvantaged**

Challenges

Central Strategies for the Development of Digital Repositories to Deliver Multimedia Resources

1. Development of a Digital Repository for Long-Term Storage and Delivery of Multimedia Materials
2. Best Practices in Digital Sound Recording and Digitization
3. Watermarking Sound
4. Speech-to-Text Recognition
5. Delivery Technologies and Development of Alternative Delivery Interfaces
6. Gallery Development

1. Development of a Digital Repository for Long-Term Storage and Delivery of Multimedia Materials

A. Open Archival Information System Reference Model

- Methodology for creating an information ingestion, storage, and retrieval system
- Facilitates discussion between institutions on audience, preservation techniques, and dissemination
- An agreement between institutions that facilitates the sharing of information/files

1. Development of a Digital Repository for Long-Term Storage and Delivery of Multimedia Materials

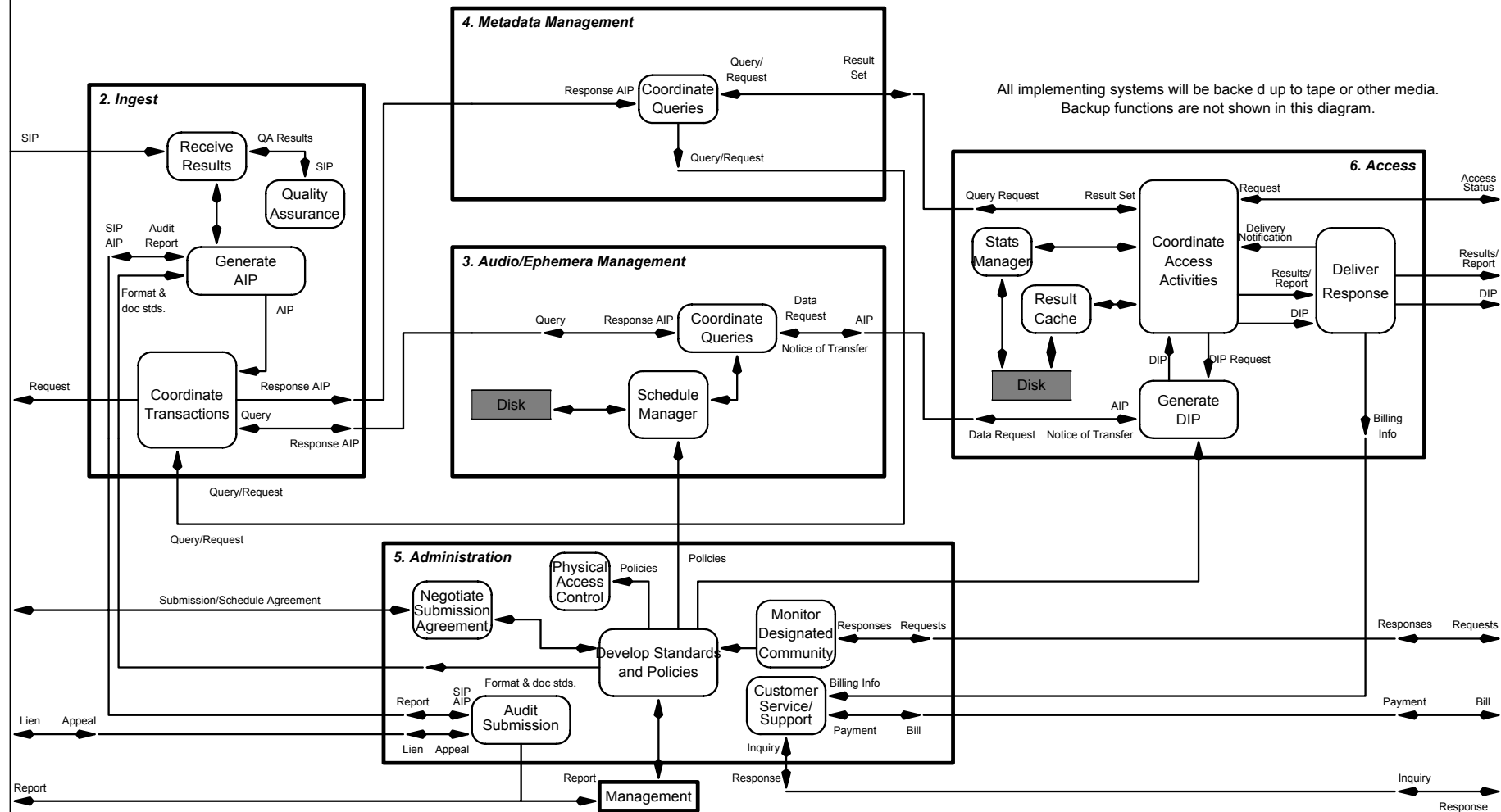
MATRIX Implementation of OAIS

- Provides standardized model for integrating searches across multiple repositories without taxing the resources of any one participating repository
- Provides users with a uniform system for addressing the diverse resources of all participants in a federated OAIS structure
- Allows OAIS compliant participants to exchange metadata and digital objects in a pre-determined fashion
- MATRIX delivery architecture is an adaptation of a true OAIS model
- MATRIX system functions to be a search integrator in a federated system of repositories

- AIP** Information package in storage format
- DIP** Information package in distribution format
- SIP** Information package in submission format
- Designated Community** Defined group of consumers who must be able to understand the contents of the archive

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DRAFT

*NGSW Delivery Archive
Composite of Functional Entities*

1. Development of a Digital Repository for Long-Term Storage and Delivery of Multimedia Materials

B. METS: Metadata Encoding and Transmission Standard

- A standard but flexible metadata schema for encoding descriptive, administrative, and structural metadata for analog and digital objects associated with a digital library.
- MATRIX has collaborated with the Library of Congress, Harvard, Berkley, California Digital Library, University of Virginia, NYU, and MIT in the development of the METS schema.
- Developed as an initiative of the Digital Library Federation, METS is under review by the DLF for acceptance as a recognized standard.
- The METS bucket approach allows for the integration of any kind of metadata as well as the seamless integration of legacy materials. This flexibility and level of modularity positions METS as essential tool for the exchange of digital objects and their associated metadata between repositories/institutions.

1. Development of a Digital Repository for Long-Term Storage and Delivery of Multimedia Materials

METS Administrative Extensions

- The METS community is developing extension schemas that afford a standardized method for encoding the administrative metadata (technical, digital provenance, and copyright) associated with a digital object.
- MATRIX has collaborated with the Library of Congress Audio-Visual Division, Harvard, and the Audio Engineering Society to develop a technical and digital provenance extension schema for analog and digital audio files.
- MATRIX will participate with partners from the METS community in the development of administrative extension schemas for image, video, and text objects.

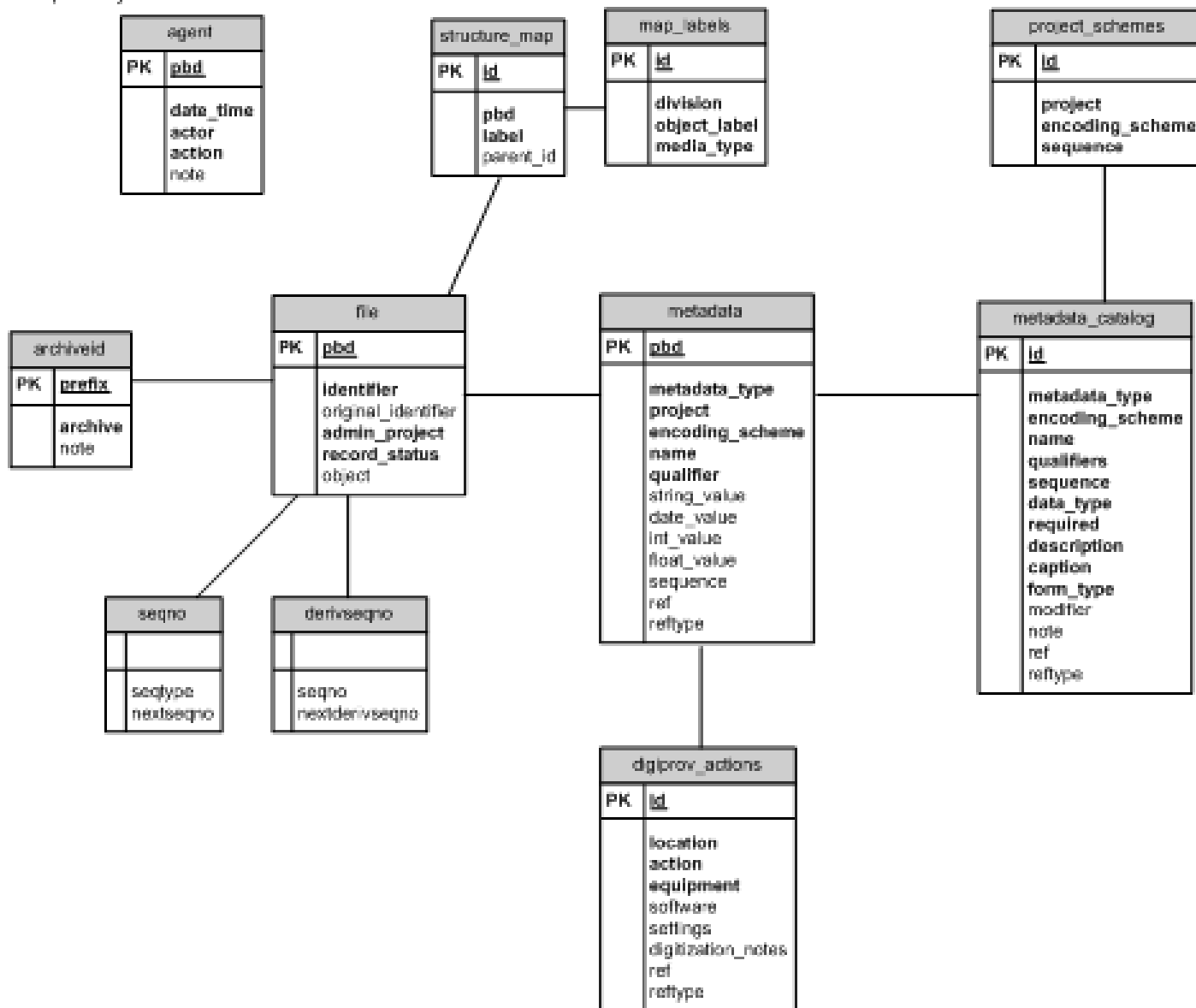
1. Development of a Digital Repository for Long-Term Storage and Delivery of Multimedia Materials

METS Implementation

- MATRIX is researching and collaborating with others to develop the most efficient method for creating, ingesting, storing, and delivering XML via the web.
- MATRIX has explored 2 possible methods of implementation:
 - 1. XML Database** – working with Tamino and Ipedo as possible solutions for an xml, web based digital repository.
 - 2. MYSQL Database** - MATRIX has developed a **relational database** that provides the functionality of METS and the XML Schema Language as well as the ability to easily produce METS XML files in the future
 - Schematized database design uses the principle of name-spacing and the avoidance of statically defined tables to develop a database model that is infinitely scalable and affords the ability to integrate any number of different metadata standards.
 - Storing information about each element facilitates **workflow** by allowing the creation of customized ingestion and administration forms and the creating of dynamic forms.

1. Development of a Digital Repository for Long-Term Storage and Delivery of Multimedia Materials

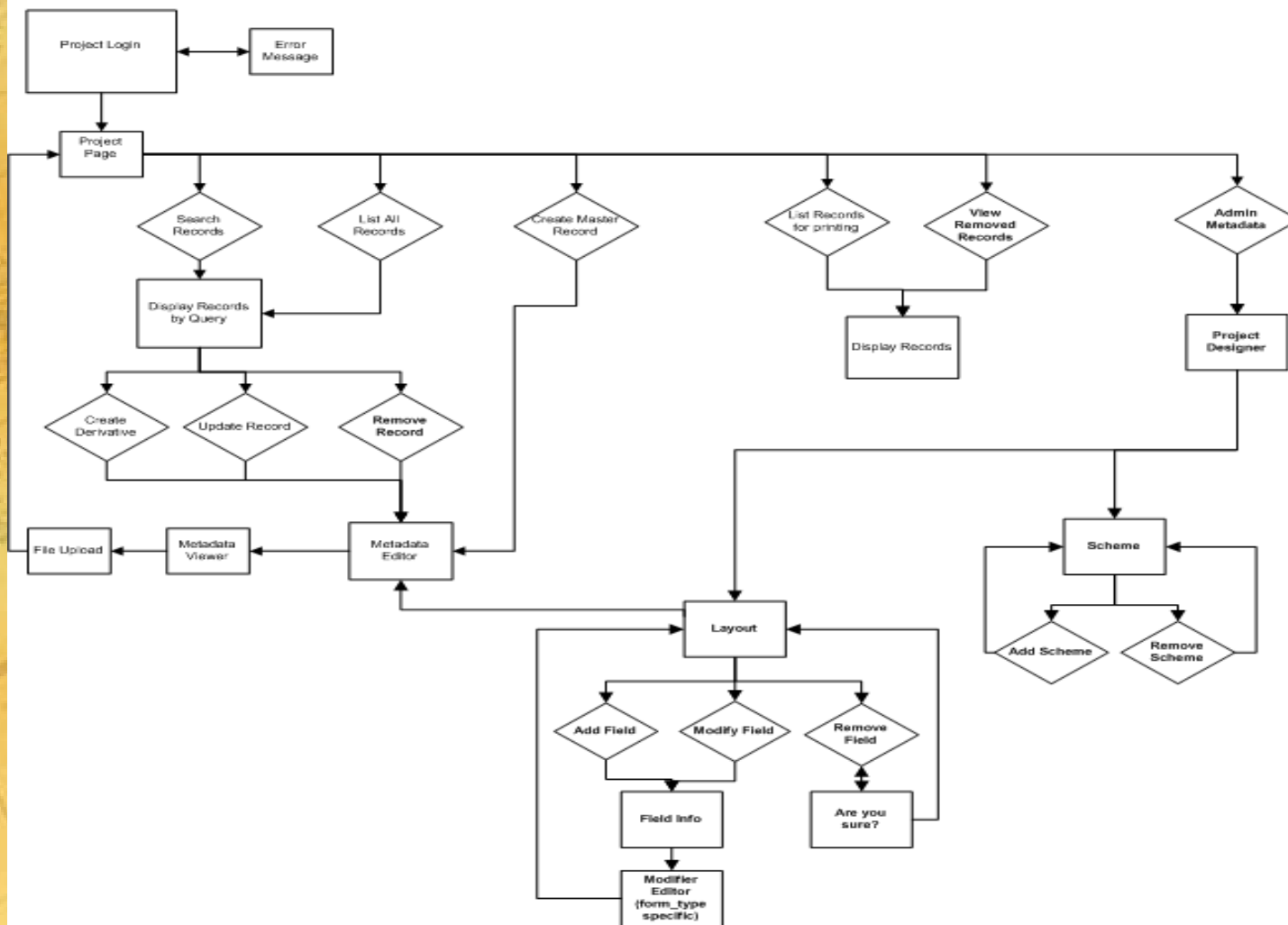
Digital Repository V. 1.1



1. Development of a Digital Repository for Long-Term Storage and Delivery of Multimedia Materials

v1.2

Repository Flow Chart



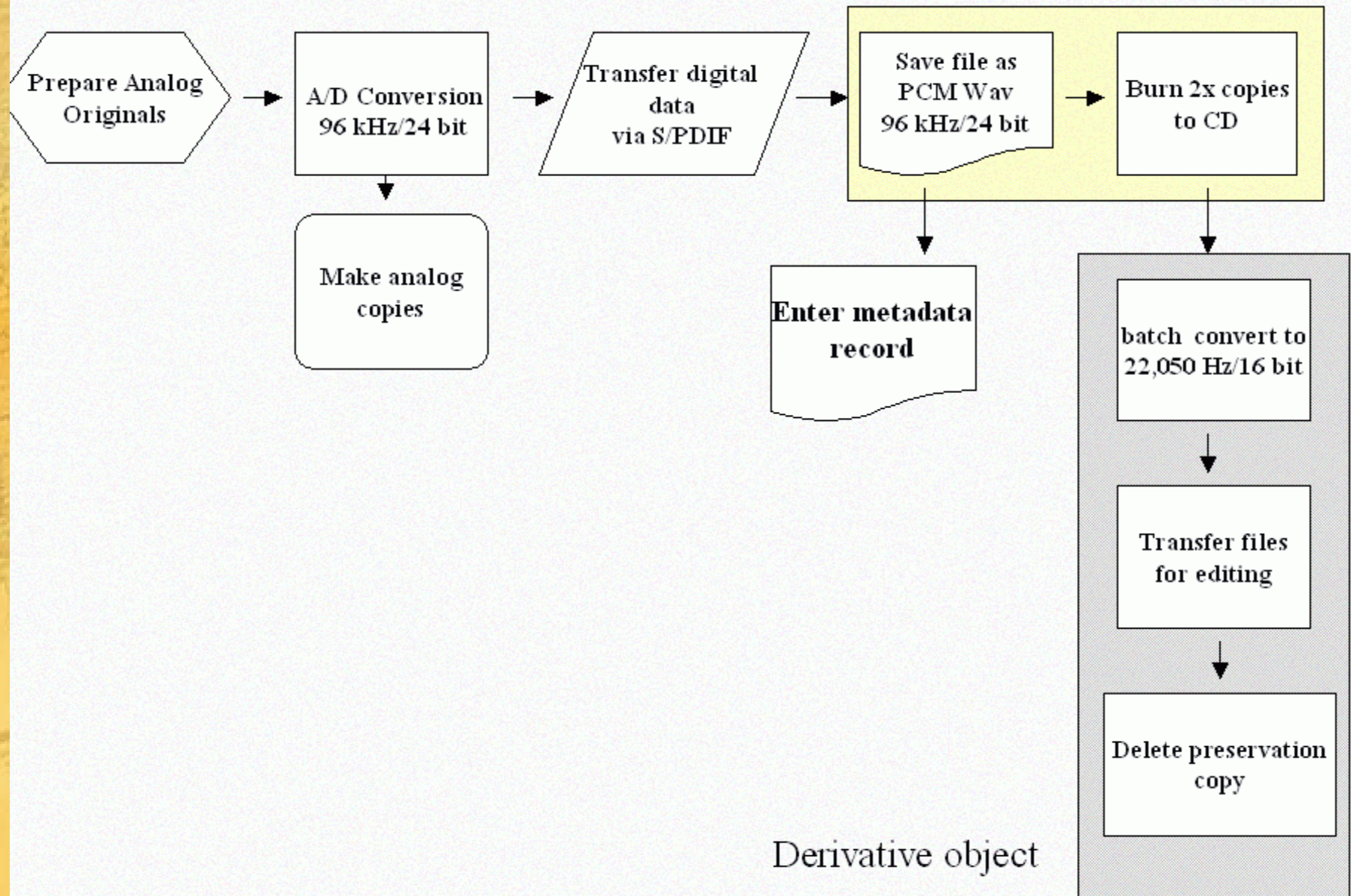
2. Best Practices in Digital Sound Recording and Digitization

Digital Audio Processing

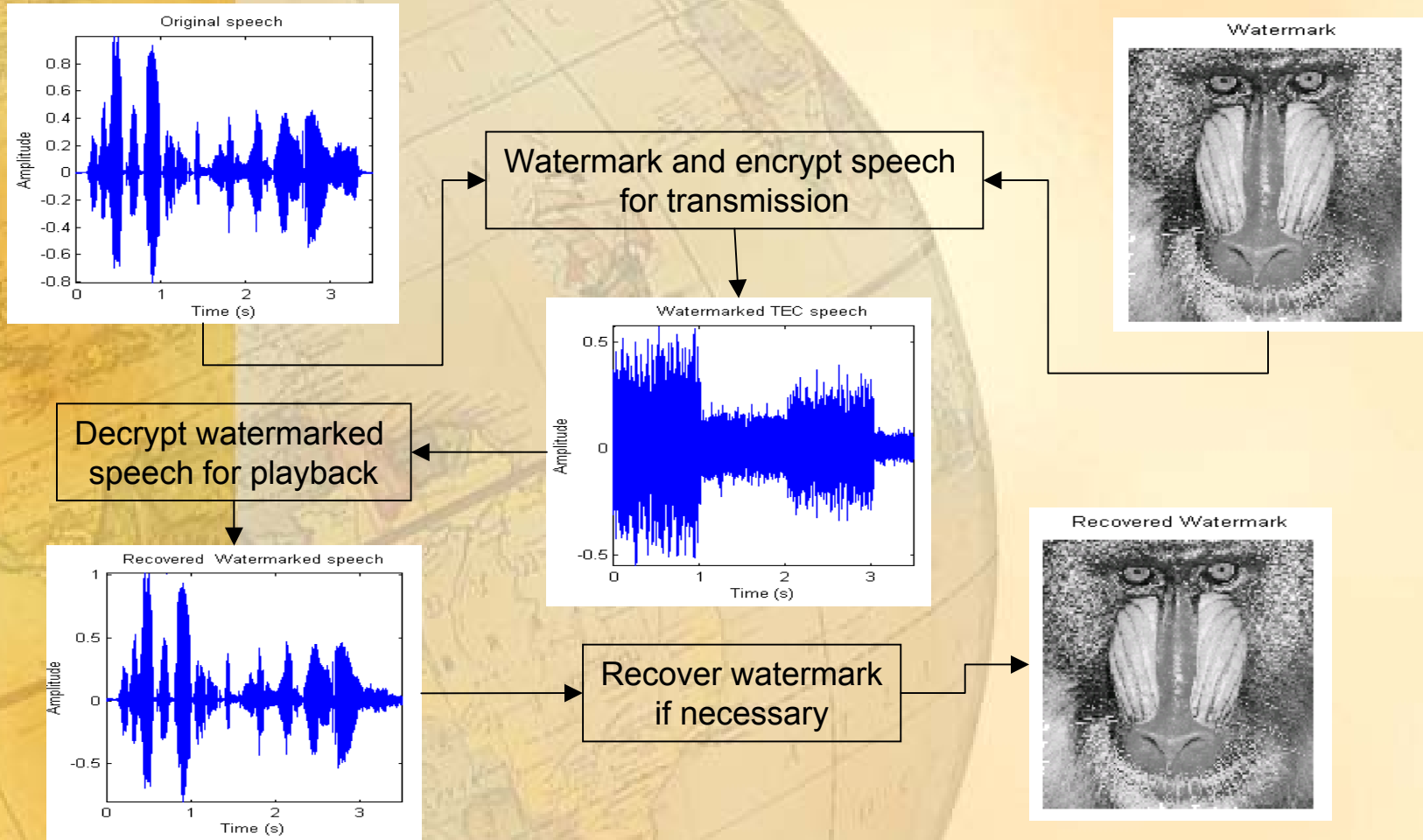
- State-of-the-art, stand-alone, oversampling A/D converter at 96 kHz/24 bit:
 - Wide frequency response and dynamic range,
 - Negligible quantization noise
 - Much reduced transient response with slow, mild roll-off, anti-aliasing filters
 - Compliance with the audio DVD standard
- Transfer of digital signal via S/PDIF interface;
- Robust DSP techniques for restoration and delivery purposes;
- Spectral analysis techniques for quality assurance.

Audio Digitization workflow

Master object



3. WaterMarking



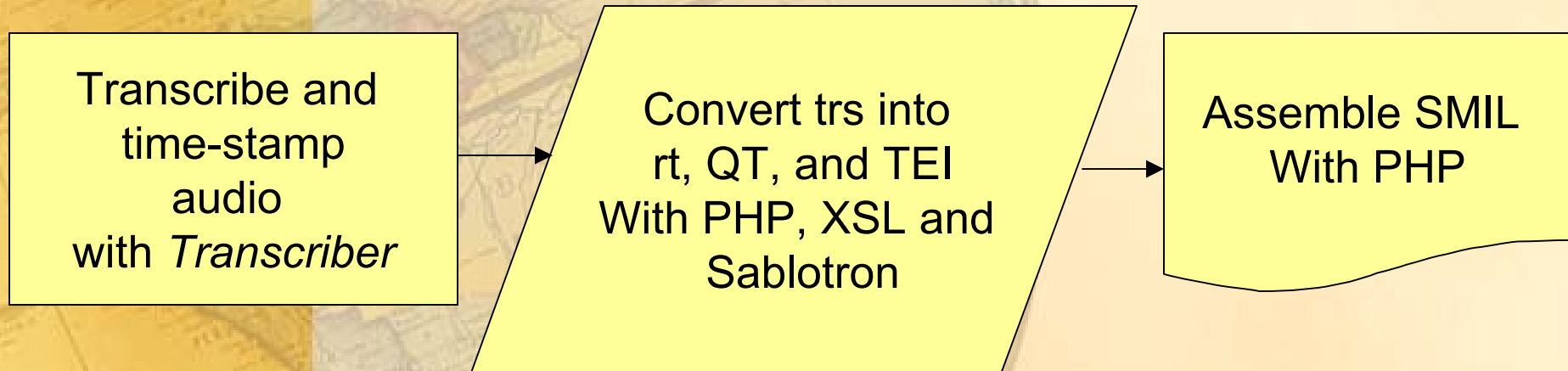
4. Speech-to-Text Recognition

- Using speech recognition to produce time-stamped, segmented (BIC) Bayesian Information Criterion, “dirty” transcripts for the purposes of:
 - Searching – on-the-fly, query-driven, streaming of most relevant portions of audio files
 - Research – making large bodies of text available to researchers for detailed qualitative and quantitative analysis
- Improving the accuracy of *Sphinx-III* and *Sonic* with an NGSW-specific language model

5. Delivery Technologies and Development of Alternative Delivery Interfaces

Digital Object Creation – SMIL

- http://www.historicalvoices.org/earliest_voices
- MATRIX has developed an application suite that assembles time-synchronized, multimedia:



5. Delivery Technologies and Development of Alternative Delivery Interfaces

Digital Object Creation – Flash

- <http://www.michigan-writers.org>
- Flash - time-aligned, animated, audio and text delivered with Flash

Digital Object Creation – Quicktime

- <http://www.africandl.org/>
- Multi-lingual, time-aligned audio and text assembled with SMIL, delivered with QuickTime in a custom "Multimedia Jukebox" window

5. Delivery Technologies and Development of Alternative Delivery Interfaces

Digital Object Creation – Text

- MATRIX has developed OCR-based technology to digitize non-traditional Roman-script indigenous language data (Pulaar):
- Custom “OCR training” methodology
- Unicode character set
- Unicode-based keyboard mapper (for Windows 9x)

5. Delivery Technologies and Development of Alternative Delivery Interfaces

Perceptual Research

- MATRIX, along with the MSU Department of Audiology and Speech Science, is conducting research into the influence of various multimedia formats on perceptions of oral history narratives in an educational setting.
 - Testing comprehension and memory retention as influenced by the addition of various media to sound
 - Establishing an acoustically and pedagogically optimal multimedia learning environment

5. Delivery Technologies and Development of Alternative Delivery Interfaces

Developing Varied Delivery Interfaces for Diverse User Groups

1. K-12 classes
2. University courses
3. Scholarly research
4. Media functionality
5. Public outreach
6. Differentially-enabled users



6. NGSW Gallery Development

Historical Voices

Historical Voices - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media

Address <http://historicalvoices.org/> Go Links

Now in **Hi-Fidelity**

Historical Voices

A collection of the earliest voices/recordings from the Vincent Voice Library at Michigan State University including Thomas Edison, Theodore Roosevelt, P.T. Barnum, and Booker T. Washington.

- Introduction
- Galleries
 - early voices
 - greatest hits
 - voices from the 1930s
- Teachers
- Students
- Search
- Timeline

ATR

history and politics
OUT LOUD

NEH NORTHWESTERN UNIVERSITY MICHIGAN STATE UNIVERSITY

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http://historicalvoices.org/earliest_voices/index.html Internet

6. NGSW Gallery Development

Earliest Voices

Earliest Voices - Microsoft Internet Explorer

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Address http://www.historicalvoices.org/earliest_voices/ Go Links

Earliest Voices

A Gallery from the Vincent Voice Library

With our facilities, a sovereign, a statesman, or a historian, can inscribe his words on a phonograph blank, which will then be multiplied a thousand-fold; each multiple copy will repeat the sounds of his voice thousands of times; and so, by reserving the copies and using them in relays, his utterance can be transmitted to posterity, centuries afterwards, as freshly and forcibly as if those later generations heard his living accents. Instrumental and vocal music - solos, duets, quartets, quintets, etc.—can be recorded on the perfected phonograph with startling completeness and pre-cision.

- North American Review: June 1888, vol 146, issue 379 pages 641-65

Introduction to Earliest Voices

- [Introduction to Early Voices](#)
- [America and Its Early Voices](#)
- [Introduction to Early Recording](#)

Exhibit - The Earliest Voices

- [William Jennings Bryan](#)
- [Eugene Debs](#)
- [Thomas Edison](#)
- [Samuel Gompers](#)
- [William McKinley](#)
- [William Taft](#)
- [Booker T. Washington](#)

Featured Voices

- William Jennings Bryan
- Eugene Debs
- Thomas Edison
- William Taft
- Booker T. Washington

Internet

6. NGSW Gallery Development

Flint Sit-Down Strikes

Page: 1

Date, 1993

remembering

The Flint Sitdown Strike

Before,
During, After...

NoteTab Light is the ultimate free Notepad replacement and a capable HTML

editor. A slimmer version of the award-winning Note Tab Pro, this slick application makes text editing a breeze. Move quickly around a stack of large files with a simple tabbed interface. Format your text

Write with the font of your choice, fixed-width or proportional.



The Strike...

NoteTab Light is the ultimate free Notepad replacement and a capable HTML

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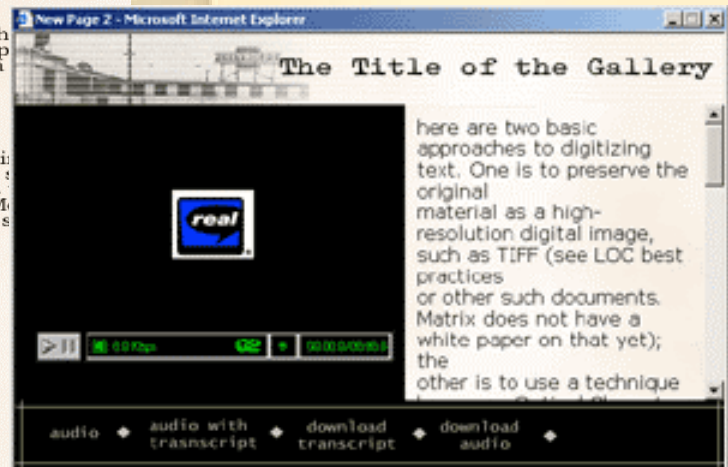
Write with the font of your choice, fixed-width or proportional.



The Aftermath...

NoteTab Light is the ultimate free Notepad replacement and a capable HTML

editor. A slimmer version of the award-winning Note Tab Pro, this slick application makes text editing a breeze. Move quickly around a stack of large files with a simple tabbed



6. NGSW Gallery Development

African Digital Library

The screenshot shows a web browser window titled "african_dl_v3 - Microsoft Internet Explorer". The address bar displays "http://www.africandl.org/new/". The website content includes a header for "African Online Digital Library" with navigation tabs for "Galleries", "Research", "Institutions", and "Best Practices". A "Featured Gallery" section highlights "Mosques of Bondoukou" with an image of a mosque. A "Research Highlights" section features "Digital Audio Metadata". A "New at the ADDL" section contains two bullet points: "Recently posted images from MSU Professor Ray Silverman, like the mosque shown at right, add a splash of color and provide a glimpse of life in modern West Africa. Our Bondoukou Gallery contains many such images and descriptions." and "Read our recently published guides to best practices in digitizing text and multimedia resources. Download them today from our 'Best Practices' site." The footer includes "African Online Digital Library 2002" and the URL "http://www.aodl.org". The browser's status bar at the bottom shows the current page URL: "http://www.africandl.org/new/galleries/bondoukou/mag_gall.html".

afrikan_dl_v3 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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Address <http://www.africandl.org/new/> Go Links

{African Online Digital Library}

Galleries Research Institutions Best Practices

Featured Gallery

Mosques of Bondoukou

Research Highlights

Digital Audio Metadata

New at the ADDL

- Recently posted images from MSU Professor Ray Silverman, like the mosque shown at right, add a splash of color and provide a glimpse of life in modern West Africa. Our Bondoukou Gallery contains many such images and descriptions.
- Read our recently published guides to best practices in digitizing text and multimedia resources. Download them today from our "Best Practices" site.

African Online Digital Library
2002
<http://www.aodl.org>

http://www.africandl.org/new/galleries/bondoukou/mag_gall.html Internet

6. NGSW Gallery Development

Michigan Writers Network

Michigan Writers Network - Microsoft Internet Explorer

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Address <http://michigan-writers.org/> Go

(Nouns) participation; co-tenancy, joint tenancy, coparcenary in common, possession in common, tenancy in common, joint stock, co-tenants, copartners, jointors, hotchpot, co-tenants, co-tenancy, co-tenancy; (Verbs) participate, share in; come in for a share; go shares, go snacks, go halves; share and a share in common, possess in common, be seized in common, have as joint tenants, possess as joint tenants, be seized as joint tenants

Michigan Writers Network

...creating an online community of michigan writers

Welcome Listserv Discussion Featured Writer Community Events Writer's Resources



Welcome! *Michigan Writers Network* is an online interactive community where all Michigan writers can share ideas, discuss their craft, and learn about the interests and current work of fellow authors. Whether writing by profession or for pleasure, we encourage all people interested in the craft of writing to join one or more of our [listserv discussions](#). Currently, these discussion are arranged around the categories of playwrighting, poetry, fiction, creative nonfiction, children's literature, and journalism.

Funded by a grant from the [Michigan Council for Arts and Cultural Affairs](#), and sponsored by Michigan State University's [MATRIX: The Center for Humane Arts, Letters, and Social Sciences Online](#), this endeavor is part of a larger initiative to support literature and creative writing within the state.

We are extremely pleased to announce that the inaugural [Featured Writer](#) for *Michigan Writers Network* is internationally renowned poet and essayist Thomas Lynch. Author of *The Undertaking*, *Bodies in Motion* and *at Rest and Still Life in Milford*, Lynch has recently won the American Book Award, The Great Lakes Book Award, and the Heartland Prize, and is widely publicized as "the most celebrated funeral director" in Michigan. In our interview, Lynch addresses this notoriety as "undertaker-poet," the vitality of the Michigan writing community, and his thoughts on the process of writing. Here we are pleased to feature multimedia presentations of both the interview and his recitation of three poems.



If you have any questions about the *Michigan Writers Network*, please do not hesitate to contact any member of our coordinating team:
Irv Palmer: mwn@mail.matrix.msu.edu

6. NGSW Gallery Development

Michigan's Arts and Humanities Touring Directory



6. NGSW Gallery Development

American Voices

American Voices - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites Media

Address http://matrix.msu.edu/mke/american_voices/index2.html Go Links

American Voices

THE INDIVIDUALS WHO SHAPED MODERN AMERICAN CULTURE

This gallery presents a collection of spoken-voice recordings of individuals who played an influential role in American life in the twentieth century. The voice recordings on this site remind us that these famous individuals were also living and breathing human beings who often expressed their thoughts with an emotional weight and dignity that is impossible to render on the written page.

[Home](#) [Introduction](#) [Browse by Category](#) [Sort Voices by:](#) [Search](#)

Internet



For Further Information:

**MATRIX: The Center for Humane Arts, Letters,
and Social Sciences Online**

- <http://matrix.msu.edu>
- [**matrix@msu.edu**](mailto:matrix@msu.edu)

National Gallery of the Spoken Word

- <http://www.ngsw.org>
- <http://matrix.msu.edu/ngsw>