

Creating a Podcast System that is RSS
Really Simple & Stress-free,
(not to mention cheap)

Jay Burrell, Tim Griffin & Kathleen Olivieri
 Information Technology Services



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Session Overview

The podcasting project at Mississippi State University created an environment where faculty can walk into a classroom, record their lecture, bring no additional equipment, and have that lecture published automatically. This technically-oriented presentation will highlight the development of the web-based system, the programming involved and hardware needed.



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Terms

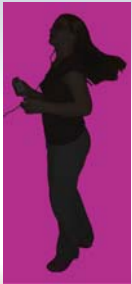
- Podcast
- Podcatching Software
- RSS
- Metadata
- HTML
- ID3 Tag
- mp3
- Software
 - javascript
 - apache
 - mysql
 - perl
 - php



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Session Agenda

- Project Background & Research
- “Aha” Moment
- Objectives – Driving Forces
- Hardware Components
- Programming Components
- System Overview
 - Capture Methods
 - Distribution Methods
- What’s Next



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Background

- Participated in a web conference
 - “Implementing Podcasting in the Classroom”
 - November 30, 2005
 - Purdue mentioned Barix Instreamer and Exstreamer
 - *only 3 members of the technical team participated*

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Background

- Charge Given December 12, 2005
- Be ready to podcast and support all that it entails on January 18, 2006
- Suggested that we purchase all equipment needed by winter holiday beginning December 20, 2005




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Contact: Kathleen C. Olivieri, PhD kolivieri@its.msstate.edu

Technical Team

- December 13 – 1st Team Meeting
- Diverted Resources
 - System Services unit
- Top priority project for technical team
 - Yet other essential responsibilities to maintain
- No prior podcast experience to hinder process



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Faculty Focus
Technical Team Assumptions


1. We understand that faculty have many demands on time within the **time frame of a lecture period**
 - Setting up PowerPoint, student response system, etc.
 - Students asking questions
 - Arriving to the classroom from previous class
2. Our belief of faculty's limited **time (not desire or ability) to learn** new technology

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Faculty Focus
Technical Team Assumptions

Assumptions led to **Principal Design Goal**

We wanted to design a system that would not interfere with delivery of content or other classroom/lecture demands of faculty



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Research – December 2005

- Commercially available products
 - Too expensive
 - Not scalable
 - “All in One” appliances
 - Not flexible, could not integrate with future projects
 - Some did not produce podcastable format



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Research – December 2005

- Researched podcast & recording projects
 - Variety of recording methods
 - Manual process for faculty or staff
- Recording options were cumbersome, required training and multiple steps
 - Upload recorded file to PC
 - Encode to a “podcastable” format (if not already)
 - Add metadata information
 - Upload file to server
 - Update web page or html/xml code



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Research – December 2005

Based upon our research

The Mississippi State University technical team wanted a quicker, less involved process for busy faculty (and busy staff too)



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Research – December 2005

- Turning point in our research
- From November web conference
 - Remembered Purdue; legacy infrastructure to send analog signals back to a central point to encode
 - Barix Instreamer & Exstreamer

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Aha Moment

A single comment by Head of ITS

“It really bothers me to take an analog signal, encode it to a digital form, transport across the network, and decode it from digital back to analog just so we can provide an input for a digital recorder which will encode back to a digital form...”

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Aha Moment

- Barix Instreamer and Exstreamer
- Challenge issued to staff to “see what you can do” with the Instreamer
 - Discovered that the audio feed from the Barix Instreamer can be captured as a file

Barix Instreamer became the **technology enabler** for the project

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Objectives

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Objectives – Driving Forces

- System with self maintenance
 - No full time staff to maintain system
 - No recurring funding yet
- Faculty Considerations
 - Time investment minimal to learn new technology
 - Teach in normal manner
 - Time limitations during class prevent complicated set up
 - Familiar web interface to record & manage
 - Faculty control and manage their own media, modifications, podcast specifications

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Objectives – Driving Forces

- Leverage existing resources
 - Classrooms with existing technology
 - Extensive campus network infrastructure
- Easily modifiable process for technical team
- Scalable to many rooms and faculty, courses

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Mississippi State University

Objectives – Driving Forces

- Programming Components
 - Open standards
 - Inclusion and capturing of metadata
 - Open ended to other media file types
- Hardware Components
 - Off the shelf products
- Media Management



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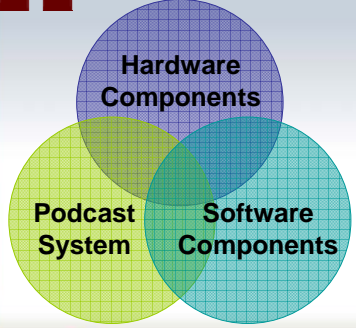
Timeline

From Charge to Go Live 6 weeks

December	January 2006	February 2006	March 2006
Charge	1 st Demo	Go Live	
Equip Purchased			
Developed Process		Refined Process	
Web Application v.1		Web Application v.2	
	Testing		Faculty Assessment
		Student Assessment	

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Components for Our Success



Assembled disparate technologies in a manner beyond their original design to achieve an innovative system

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Hardware Components



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Live Capture Components

Component	MSU Selection
1. Audio System (microphone, amplifier)	Classroom Technology Lectern
2. Audio Encoder	Barix Instreamer 100
3. Media Server	AMP Server
4. Transport Mechanism	Campus Data Network

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Classroom Technology Lectern

- 50 existing technology enabled classrooms
- Equipment Added
 - Barix Instreamer - Audio encoder
- Line level signal from the audio amplifier into the Barix Instreamer
- All audio from lectern captured
 - PC, DVD, VHS, etc.




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Barix Instreamer

- Why the ITS team likes the Instreamer
 - Reliability – Powered on 24x7 without problems. Network issues do not seem to affect the unit.
 - Ruggedness – The units have been in extreme heat situations and have stayed cool.
 - Quality Audio – With one of the lowest encoder rates (16KHz, 16Kb/s) the audio quality is excellent.

 **3 Live Classroom Examples**

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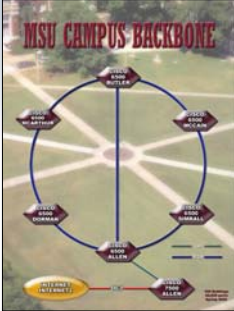
Barix Instreamer

- Even More Reasons ITS Likes the Instreamer
 - Standards based encoding technology
 - Cost Effective - Less than \$350
 - Standards based SDK to provide extensibility
 - Able to use many different encoding rates
 - Provides SNMP monitoring protocols

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Campus Network

- Network must be robust enough to handle additional load
- MSU owns fiber network interconnecting all of our campus buildings



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Programming Components

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Language Selection

- Programming not platform dependent
 - Many flavors of platforms in use on campus
 - Did not exclude platforms when selecting programming components
- Simple design
 - Enhances the ability to keep it agile, etc
- Open source
 - Allows additions of modules as needed
- Standard languages
 - Long term maintenance due to attrition of staff
 - Agility and portability

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Language Selection


- Many tools and languages available
- Project selected
 - apache
 - mysql
 - perl
 - php
 - javascript
- Web applications
 - Straight-forward, portable



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“Live” Audio Levels


- Faculty member can see audio levels they are sending at any given moment
- Custom JavaScript
 - Code installed on the Instreamer
 - Web page displays a graphical "level meter"



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mp3 Stream Capture


- Custom code to capture the mp3 stream to a file directly on the podcast system AMP server
 - Written with perl
- Ported an mp3 cleanup tool
 - trims the beginning and end of the file based on mp3 frame boundaries.
 - Drops frames that are not valid



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ID3 Tags


- Populate the ID3 tags with database metadata
- Faculty enter metadata through a web application
 - Faculty enter course metadata at registration
 - Episode metadata is automatically populated, yet can be edited at time of live recording



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“Upload” Applet

- Faculty can also upload other mp3 audio and mpeg4 video via web application
- Metadata and ID3 tags updated to reflect user input
- Faculty perspective
 - Metadata entry at upload time
 - Easy way for faculty to upload



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Podcast System



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System

- Designed basic functions to be flexible
- Driven by objectives and leveraging existing assets



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podcast.its.msstate.edu

Podcasting Mississippi State University

Welcome to Podcasting at MSU

Manage Podcasts

Podcast Listings

Instructions

Pilot Phase Information

Basics

What is Podcasting?
Podcasting is the latest on demand technology that allows you to download audio files onto the Internet via an automatic "feed". The audio files can be downloaded to your computer or the files can be saved to an iPod, portable mp3 player, etc. The "on demand" technology allows students to take audio files with them wherever they go.

Do I need an iPod?
No, an iPod or other mp3 device is not required to subscribe to our feeds. The iPod adds convenience to your portable digital music with an internet connection to all that is needed.

How do I get started?
Simply download and install the iTunes software onto your computer. Then subscribe to the podcast following the instructions below. iTunes will download the audio files after that, make it easier for the user probably if your subscription.

[Detailed information for technical users](#)

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Class Registration

Register Class

Database

- RSS file and directory structure created automatically
- Course metadata and access control saved

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Record

Web Page

Authenticate

Select Course

Enter Episode

Metadata (optional)

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Record

Start Recording

Audio Levels

Stop Recording

Record Options

File Saved on Server

Upload File

Email to Faculty

Automatic Updates to RSS, Web & Database

Podcast Available

Process Takes Seconds

- Complete process is automated except for starting the recording

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Capture/Record Methods

Component	MSU Selection
1. Classroom Environment	Classroom Technology Lectern
2. Interactive Video Classrooms	Polycom
3. Portable mp3 Recorders	M-Audio, Marantz
4. Digital Video	Neuros

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Classroom Environment

Technology Enhanced Lectern

Microphone

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Contact: Kathleen C. Olivieri, PhD kolivieri@its.msstate.edu

Interactive Video – Polycam

- All audio from the Polycam which includes the local and remote site is fed into the Instreamer
- Uses VCR record-out connection on the Polycam

Live Classroom Example

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Portable mp3 Recorders

- Technical Team Requirements
 - Record directly to digital mp3 format
 - Good quality audio
 - Portable
 - Multiple inputs
 - USB connectivity to PC
 - Low cost
- Recorders
 - Marantz PMD 660
 - M-Audio Microtrack 24/96

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Distribution Methods Technical Team Assumptions

- Portable mp3 player not required
- Authentication required to listen
 - MSU Community
 - Registered Students
 - Open to Public
- Specific podcatching software not required
- Integration with existing course management system

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Distribution Methods

Component	MSU Selection
1. Podcatching Software	Listener Choice
2. HTML View	Podcast Web Page
3. Course Management System	WebCT

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Podcast Listing

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Podcatching Software

- Students select software
 - iTunes, Windows Media, Juice, etc
- Subscription link
 - Web page

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HTML View


- Web page dynamically built using Feedsplitter



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Distribution Methods

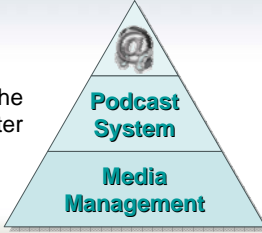
- WebCT
 - Javascript for inclusion within WebCT
 - Sent to faculty when class registered
 - Faculty integrate with WebCT



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Media Management


- Building Block of the podcast system
- Included in the podcast system
- Basic management functions
 - Faculty empowered to manage metadata at the time of recording or later
- Enables searches on web applications, etc.



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Future Plans

- Video Podcasting
 - Live capture of video
 - Convert existing video files
 - Neuros mpeg4 Recorder 2 Plus
 - Firestore FS-M
 - Camtasia
- Podcast Editing/Production Options
 - Camtasia
 - Audacity
- Plan to expand integration with ERP system



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Digital Video Recorder

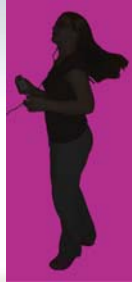
- Technical Team Requirements
 - Record directly to universally accepted digital format
 - Good quality
 - Save to portable media
 - Portable device
 - Low cost
- Testing Neuros mpeg4 Recorder 2 Plus
- Promising results



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Summary

- Define objectives – driving forces
- Hardware Components
 - Audio System
 - Audio Encoder
 - Media Server
 - Transport Mechanism
- Software Components
 - apache
 - mysql
 - perl
 - php
 - javascript
- Podcast System



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Mississippi State University

Poster Session

Mississippi State University

Creating a Podcast System with Faculty & Student Input

Faculty Input

IT Solution

Mississippi State University

Podcasting

Mississippi State UNIVERSITY

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Questions?

Podcasting

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