U N I V E R S I T Y O F M I S S O U R I
IAT Services

PODCASTING & VODCASTING

A WHITE PAPER

DEFINITIONS, DISCUSSIONS & IMPLICATIONS

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Defined

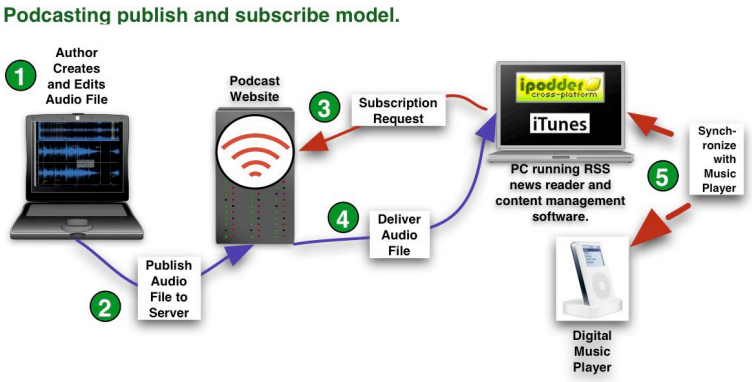
What is Podcasting?

The word "podcasting" is an amalgam of the word broadcasting and the name of the popular MP3 player from Apple Computer called the "iPod". It's a bit of a misnomer in that it implies that an iPod is required to podcast. In fact podcasts can be used with a variety of digital audio formats and play on almost any MP3 player or portable digital audio device - as well as any brand of desktop computer or laptop.

To define it: Podcasting is the process of capturing an audio event, song, speech, or mix of sounds and then posting that digital sound object to a Web site or "blog" in a data structure called an RSS 2.0 envelope (or "feed"). RSS stands for Real Simple Syndication and is an agreed specification of XML tags used to define objects which can be subscribed to through a "RSS news reader" (see glosssary). Using specialized news readers like iPodder or iPodderX, users can subscribe to a Web page containing RSS 2.0 tagged audio files on designated web pages and automatically download these files directly into an audio management program on their personal computer like iTunes, Windows Media Player or MusicMatch. When a user synchronizes their portable audio device with their personal computer the podcasts are automatically transferred to that device to be listened to at the time and location most convenient for the user.

Many have compared podcasting to Tivo® or a DVR (digital video recorder) because of it's "time-shifting" ability. In some aspects it is similar, but it is also different in that the recorded content is delivered in it's final format to a portable device that is independent of the recording device.

A Metaphor



Podcasts follow a simple publish and subscribe model but with a convenient twist. Imagine the following scenario: You've just heard about a great new magazine where each week a number of influential people from your profession are interviewed and share highly personal knowledge and advice - sounds interesting. You fill out the request form for your free 1 month trial and send it in. When the publisher receives your request they notify the distributor, where the latest version of the magazines are stored, and tell them send you the latest copy of their magazine each week. The distributor calls United Parcel Service (UPS) to schedule regular pickup / deliveries of your magazine. UPS picks up your magazine from the distributor for same day delivery. The UPS courier delivers the magazine to your house and puts it in your mailbox. But (... and here's the twist) instead of going out to the mailbox to pick up your magazine, Ralph, your trained Rotweiler, goes out to the mailbox grabs your magazine and places it - gently - in your briefcase. The next morning , as you ride the train to work, you open your briefcase to read the magazine you know is waiting for you there.

VODcasting (also called "vlogging") - the "VOD" stands for "video-on-demand" - is almost identical to podcasting. The difference is that the content is video versus audio, and the content is more likely to be played on a laptop than a PMA (personal media assistant) due to their newness and relative expense.

How It Works

Doing a Podcast

Podcasts are rapidly increasing in popularity because they are simple to produce and very inexpensive to deliver. At it's simplest, all that is required to create a podcast is a personal computer with a sound card, an inexpensive or built-in microphone, sound editing free ware, and an internet connection with access to a Web site. Because of the low cost of entry, anyone can be a publisher, or more accurately a broadcaster with their own "radio" show.

VODcasts are a bit more complex and require a slightly larger investment in equipment and time, but still fall well into the technical and financial realm of anyone with a digital video camera and a higher-end desktop or laptop personal computer.

The Pod/VODcasting Process

The process for podcasting and VODcasting can be broken down into five steps. The complexity of those steps is dependent on the purpose of the content to be created and the quality level at which it will be produced.

I. Create or capture and edit the content.

II. Publish content to a web site or blog.

III. Subscribe to the content using an "RSS News Reader".

IV. Download the content into content management software (CMS).

V. Play content on download device or synchronize CMS with portable media player and play.

Required Tools and Equipment

Podcasting

I. *Audio capture tools.* Nothing will affect the quality of a podcast more then the tools selected to capture it with. A quality microphone is a good start, combined with audio software and a personal computer. The microphone can be connected to a tape player, digital recorder with a memory card, or directly to the "MIC" input on the editing computer. If you use some type of recording device you will need some way to transfer the captured sound to your computer for editing and packaging for the internet. The way the recorded content is transferred to the computer depends on the type of recording tool you used, so check the instructions that came with the device or the numerous web sites that discuss digital recording.

II. *Audio editing tools.* There are numerous excellent audio editing tools available for all computer platforms. Price is not necessarily an indicator of quality or features, as there are numerous quality shareware, freeware and open source packages that will do the job admirably - www.sourceforge.net and www.shareware.com are good starting places for recording tools. Key requirements are multiple track editing and multiple audio compression formats including, AIFF, WAV, ACC and MP3.

III. *File transfer software*. Once content files are created they need to be published to a Web site or blog using any traditional file transfer method; basic FTP/SFTP, HTTP upload, virtual drive (WebDAV), or server

upload will all work well. Also the software that is used for Web site or blog creation will probably transfer the content files to the desired location as well. Check the documentation of your Web or blog design tools for additional assistance.

IV. *RSS Enclosures.* Preparing the content for delivery requires it to be tagged via XML in a format known as RSS 2.0. The enclosure can be created with software designed to create RSS feeds or can be hand coded using your favorite text editor or WYSYWIG web design software. See the resource portion of this document for a list of editors and articles on creating a RSS enclosure.

V. *Specialized RSS news reader.* To automatically download the podcast requires a type of software called a RSS News Reader. It must be designed to specifically download podcasts to a specific folder on the subscriber's computer or can be modified to do so. Two packages to look at are iPodder (free - ipodder.sourceforge.net) for most popular operating systems, or iPodderX ($39.95 - www.ipodderx.com) for the Apple OS X.

VI. *Content management software.* There are a number of software tools that are available for managing podcasts or any other audio content. CMS software allows the user to sort and organize their content into "playlists" which can be scheduled to automatically synchronize with a media player when you connect it to your computer or at specified times of the day.

By far the most popular CMS for podcasting is Apple iTunes which allows users to manage their audio content on both Windows XP and Macintosh OS X computers. Microsoft's Windows Media Player and Sony MusicMatch for Windows XP are excellent alternatives to iTunes and provide the added advantage that they will manage and play almost any type of media including photos and video. They also work with a wide variety of media players from a number of vendors. iTunes will natively synchronize content with both an Apple iPod music player and other assorted MP3 players via associated plug-ins or applications.

VII. *A digital music player.* There are too many choices of MP3 players and media players to list in this document. Prices range from $15 for 32MB flash players to luxury $1500 multiple media wireless personalized players. Pricing is dependent on storage capability, features, styling and brand. The popular Apple iPods are priced from $99 to $499. Most of these players come with some type of content management software and methods for synchronizing with a desktop or laptop computer.

VODcasting

I. *Video capture tools.* Nothing will effect the quality of a VODcast more then the tools and techniques selected with which to capture it. However the quality required for a VODcast is dependent on the purpose of the VODcast. If the objective is to simply record an instructors lecture for future reference, then a simple $400 DV camcorder may be adequate, but you will need to have a strong understanding of the limitations of your camcorder to get the best results from it. However if the VODcast needs to meet broadcast standards or may be shown on a very large screen, much higher quality equipment may be required. A level of comfort and expertise will be required to get satisfactory results from the higher quality broadcast class equipment.

II. *Video editing tools.* There are variety of video editing applications that are available covering the range of capability and pricing from free for the novice, to thousands of dollars for the expert. Movie Maker

from Microsoft and iMovie from Apple are both excellent products with which to create surprisingly sophisticated VODcasts. For the highest quality projects Final Cut Pro or editing products from Avid may be required.

III. *File transfer software*. Same as for podcasting.

IV. *RSS Enclosures.* Same as for podcasting.

V. *Specialized RSS news reader.* To-date we have not yet found news reader software specifically designed for VODcasting. Podcasting news readers like iPodder, iPodderX, and PlayPod will work, as well as stand alone generic news reader applications like Feedreader and Awasu.

VI. *Content management software.* iPhoto for the Mac and Adobe Album are both great products with which to organize your content. iPhoto can synchronize with the Apple iPod Photo and (currently) display stills. Rumor has it that a forthcoming software upgrade to the newest iPod Photo will also allow it to play MPEG 4 videos. Adobe Album allows organization and playback of VODcasts on a laptop computer. Although it will synchronize with some devices, none of these devices currently have video playback except for several models from Archos (www.archos.com).

VII. *A laptop computer or portable digital media player.* Although portable video devices are beginning to appear, the most popular playback environment for VODcasts is still the laptop or desktop computer. Interestingly, some of the units even have built-in personal video recorders (PVR) allowing for the creation of additional content which can then in turn be VODCast.

Required Skills

Podcasting and VODcasting both require basic computer abilities and an interest in learning several new, although easy-to-use, software packages. Most students enter the university technology environment with enough basic technical skills to easily create and distribute podcasts. VODcasting takes a bit more work and planning but it is still very much within the realm of most student and staff technical abilities.

However, as the importance of the message increases , generally, so does the level of effort to create high quality content. Higher quality audio or video generally require a higher level of technical expertise. Currently many podcasts are known for their "scratchy" or homemade personalities. As the popularity of podcasting grows we will see ever more sophisticated broadcasts with increasing production values and higher level of required technical skills. The School of Journalism at The University of Missouri has already committed to producing all future podcasts and VOD casts using "best practices" - a professional quality level for their podcasts and VODcasts which they are currently defining.

The area of podcasting that currently requires the greatest skill-set, is also the area that is evolving most rapidly and will soon open up podcasting to even greater numbers of individuals. The software used to manage and post the content to a Web site or blog is rapidly becoming easier to use and manipulate. At the current trend, posting audio and video content for podcasting will simply be a matter of dragging and dropping content to a virtual container where it will be automatically prepared for on-demand distribution.

Implications

Potential Uses for Podcasting and VODcasting at the University of Missouri

Even though the concept of podcasting is less than six months old, the sudden interest in podcasting and VODcasting comes from the numerous uses that the technology promises. The following table identifies different ways podcasting might be used and who would benefit from those uses.

POSSIBLE USES OF PODCASTING	PROSPECTIVE USERS
Record and distribute news broadcasts.	The entire campus community and general public
Students can record and upload their foreign language lessons to their instructor's Web site. The instructor can then listen to the lessons on their MP3 player at their convenience.	Students, instructors
Audio / video recruiting development brochures with personalized messages.	Prospective students and parents, development and recruiting personnel
Recorded teacher's notes	Student, teachers
Recorded lectures distributed directly to student's MP3 players.	Students, teachers
Recorded meeting and conference notes.	Students, faculty, staff, admin
Student projects and project support interviews.	Students
Oral history archiving and on-demand distribution.	Students, faculty
Sport event distribution.	Students, alumni, and public

Effect on Current and Future Infrastructure

Both podcasting and VODcasting represent challenges to the current infrastructure albeit in different ways. The effects of these new technologies will be outlined for the following areas: storage needs, bandwidth, security, supporting hardware, and other requirements.

Podcasting

BANDWIDTH	The basic audio objects recorded at 32 kHz for speech content uses about 250 KB for every minute (15 MB per hour) of audio. In our current network environment a one hour audio segment will take about 1-2 minutes to download depending on network congestion. Because many podcasts are scheduled downloads, they can be scheduled for odd times of the day to reduce demand on the network.

STORAGE	At 15 MB per hour of speech based audio, the University could store approximately 65,000 hours of classroom audio on a single terabyte drive - more then the sum of all lectures at the University for a semester. Although the storage costs of this much valuable content are dropping dramatically, the bigger cost may be in the cataloging, searching and retrieval of this information. Because of it's linear nature and data structure, it will be difficult, at best, to catalog the contents of these files without a significant effort. Most likely the files will be simply "meta-tagged" using the original editing or publishing software with generic informations such as: title, author, participants, subject, size, date, and select keywords. Actually tagging every subtopic and "time-coding" the tag for search purposes will be done on only the highest value content, or when currently nonexistent software appears that can automate the task with a certain level of reliability.
SUPPORTING HARDWARE	Hardware requirements for podcasting are nominal. Any computer with an Internet connection and the ability of running Windows XP, Apple OS X, or Linux, has all the horsepower, storage, sound input/output, and memory required to create, edit, package and distribute a podcast. The only other equipment that is required is an external capture device with either an internal or external microphone. This includes both analog and digital recorders - analog recorders would require that captured content be transferred to digital format before editing and compression. To play podcasts, the user can use the personal computer to which the media has been downloaded or can use almost any brand of MP3 or digital audio player as long as the device supports some type of synchronization software running on the users computer.
SUPPORTING SOFTWARE	The software specifically designed for podcasting is just beginning to appear. There are two types of software required - publishing and subscribing. Current publishing software needs both an audio capture application - like Win Amp, Audio Hijack Pro, or Audacity, and and RSS editing package that will create an RSS 2.0 enclosure and deliver it to a web site or blog for distribution site - like FeedForAll or FeedBurner. Subscription software retrieves the specified content feeds, on-demand or on-schedule, and can place the content directly into the specified folder of a content management application like iTunes or Windows Media Player. These same applications allow synchronization of the podcast with the MP3 player or digital audio device.
OTHER REQUIREMENTS	A broadband Internet connection is highly recommended due to the relatively large file sizes and the amount of information that needs to be transmitted. Although dial-up could be used, the user would have to be selective as to the type and number of podcasts they would download.

VODcasting

BANDWIDTH	In our current network environment a one hour video segment will take about 10 minutes to download depending on network congestion. Because many VODcasts are scheduled downloads, they can be scheduled for odd times of the day to reduce demand on the network.
STORAGE	Depending on the resolution (for the purposes of this document we'll assume a frame size of 320 x 240 pixels). At 70 MB per hour of video the University could store approximately 10,000 hours of classroom video on a single terabyte drive. The storage and searching issues for video are similar to those for audio, although it may be a bit easier to catalog the video components. Since the nature of video editing lends itself to time-coding and often uses embedded markers and comments in the video editing process, with some editing foresight, searchable tagged "bookmarks" could be embedded in the digital file, aiding the ability of the user to skip directly to a desired location or video event. An example of this is the Sports Tech system currently being used by the Athletics Department. This content would lend itself well to a database driven portable on demand video solution.
SUPPORTING HARDWARE	Hardware requirements for creating VODcasts are more demanding than for audio. Required hardware would be a computer with an Internet connection and the following recommended configurations: • Windows XP and Linux , Intel P4 3.0 Ghz +, 140 GB, HD, 1 GB RAM, sound card • Apple OS X, 1.5 Ghz + PowerPC, 140 GB, HD, 1 GB RAM Other equipment required would include a video camera, ideally a DV cam (digital video) because converting analog video is time consuming and requires additional hardware. External microphones and lights may be required based on the location of filming and the quality of project required. To play podcasts, the user can use the personal computer to which the media has been downloaded or can use almost any brand of MP3 or digital audio player as long as the device supports some type of synchronization software running on their computer.
SUPPORTING SOFTWARE	The software specifically designed for VODcasting is, as it is in podcasting, just beginning to appear. There are two types of software required - publishing and subscribing. Current publishing software is primarily a video capture and editing package - like iMovie or Adobe Premiere Elements.. And then some type of software that will create an RSS 2.0 enclosure and deliver it to a web site or blog for distribution site - like FeedForAll, or FeedBurner. Subscription software retrieves the specified content feeds, on demand or on schedule, and can place the content directly into the specified folder of a content management application like iPhoto, Windows Media Player and DopplerRadio. These same applications allow synchronization of the podcast with a Pocket PC and Archos personal media assistant (PMA).

OTHER REQUIREMENTS	A broadband Internet connection is mandatory due to the large file sizes and the amount of information that needs to be transmitted. If the popularity of this technology takes-off there could be requirements for a content reservation system so that the available bandwidth and server capacity are not overwhelmed by a sudden demand for a specific piece of content. For example, if a teacher unexpectedly makes available their video lectures the day before a Psychology 101 final, we could find 500+ students all scrambling to download a 100MB file in a very short period of time.

Other Implications

Because the content types are significantly greater in storage and bandwidth requirements than text or image based files, podcasting and VODcasting will make their presence know on the existing infrastructure. In the event that a very popular class or student created "show" is released, the electronic "buzz" created by the wide variety of communication tools can quickly create tremendous demand for large amounts of content. Thus flexible and directable bandwidth may be required as well as

As the technology grows in popularity so too will the desire and demand to associate revenue with the content. Pod/VODcasting lends itself to a variety of revenue generating opportunities including subscription, sponsorship, product placement, as well as traditional blatant and indirect advertising. Revenue generation may seem antithetical to the mission of a public education institution, but with diminishing federał/state funding dollars and the rising popularity of on-line and lifelong learning, the repurposing and sale of content , All of these require supporting infrastructure as well as management tools or policies as previously discussed. By far the biggest issue generated by the evolution of these and other new technologies is aggregation of the content and then redistributing the appropriate content to the appropriate presentation device. Finding a way to search, present, and repurpose content across the greatest number of existing and upcoming mediums requires a concerted and centralized plan/effort that needs to be considered before unanticipated infrastructure consequences occur from a sudden acceptance of a particular creation/presentation technology.

Pedagogical Implications

The pedagogical implications of podcasting and VODcasting are intriguing. There are some simple and obvious uses, like recording classroom lectures and making them available for student notes. Even though this is technically easy to do, not only would a standardized recording process have to be set up, but more importantly, a permissions based distribution architecture would have to be established to limit access of the class content to approved class members. This could be done through the current WebCT and Blackboard architecture, or something completely new - again pointing to the fact that global content management and distribution in the University community is a growing issue.

Beyond simple recordings of lectures, a variety of other uses to enhance learning can be imagined for podcasting - in fact many of these are already being tested. Following is a sample list of ways that podcasting might be used:

- Audio recordings of textbook text, made available for students by the chapter, would allow students to "read" or review texts while walking or driving to class. It could also be a significant aid to auditory learners.
- Students could record and post project audio and video interviews which could be automatically downloaded to an instructors laptop or MP3 player for review. This wold be an enhanced version of what is currently being done in the J-School).

- The same could be done for language lessons where students forward audio of their pronunciation dialogues. They could even swap these with peers for peer review before turning in the final form to the instructor.
- Oral reports recorded and archived.
- Musical resume's. Music critique.
- Libraries of bird sounds that the budding ornithologist c ould receive via seasonal subscription and take with them to the field.
- Downloadable library of high resolution heart sounds for medical students.

Beyond the technical opportunities and issues, both podcasting and VODcasting raise other significant issues. Some of the questions already being asked:

- How does podcasting or VODcasting challenge the current "talking head" model of classroom lectures ? If all lectures are available via video and audio, do students need to go to class? How often? Why? How do we keep them in class?
- Who owns the content, the school, the instructor, the user? Can this content be used outside of the university community? How is it protected or secured to the owner or subscriber.
- Who's going to edit the content? What are the guidelines for editing? What's real - what's not?
- How is copyrighted material tracked and/or verified?
- Can we make money from this?

Evolutionary Path

Both of these technologies are evolving rapidly and will become significant players in media distribution. As the tools to capture content become more prevalent and easier to use, variations on the theme will occur at a surprising pace. Already variations are occurring. Mobile blogs, called moblogs, currently allow individuals with Internet enabled camera phones to instantly submit photo images from their phone directly to the moblog, which are then in turn automatically transferred to someone else's phone through a Macromedia Flash enabled browser. Users are testing using their phones for sound recording and submitting those to specific sites that dynamically turn the file into a podcast. The new generation of videophones will naturally encourage the same thing for video.

These evolutionary steps are happening in weeks and months - not years. Defining their exact impact is impossible, but if the adoption and evolutionary trail of lifestyle digital tools in the last five years is any indication we will see highly useful, if not amazing, changes in the next five years.

Most likely pod/VODcasting will not replace traditional broadcast radio or television, but become an intelligent extension of it, offering more variety to a significantly larger audience from an ever increasing number of content providers and producers, each with their own unique, highly-targeted revenue models.

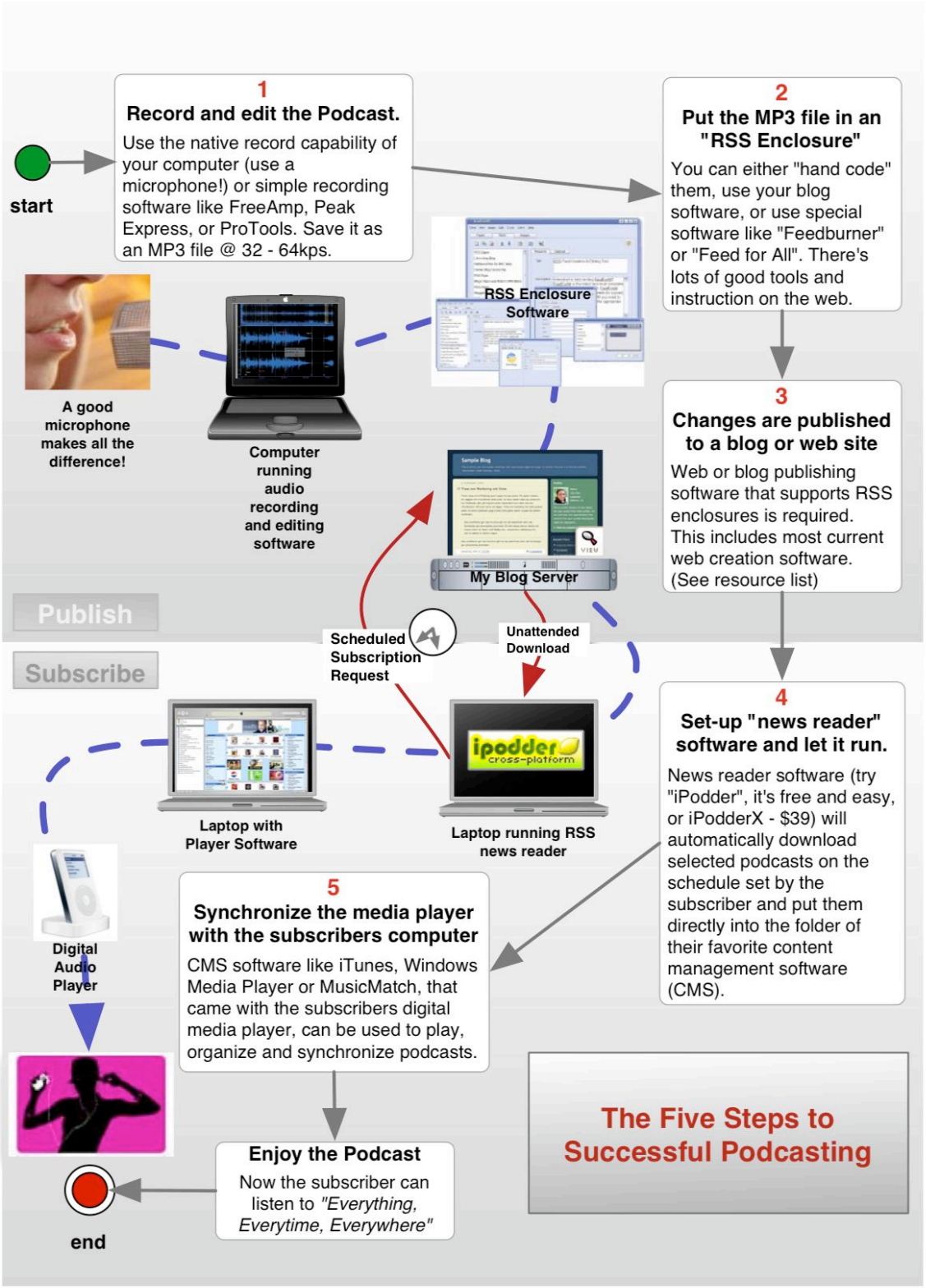
Conclusion

Podcasting and VODcasting, and their pending derivatives, are not fads. They are very real and very practical distribution technologies. The ability to time-shift content versus traditional broadcast distribution models expands student teaching and learning opportunities significantly. The supporting technologies are relatively inexpensive and surprisingly easy to use - in fact easy enough to use that faculty and students will begin to actively produce and distribute content through this medium by summer semester 2005..

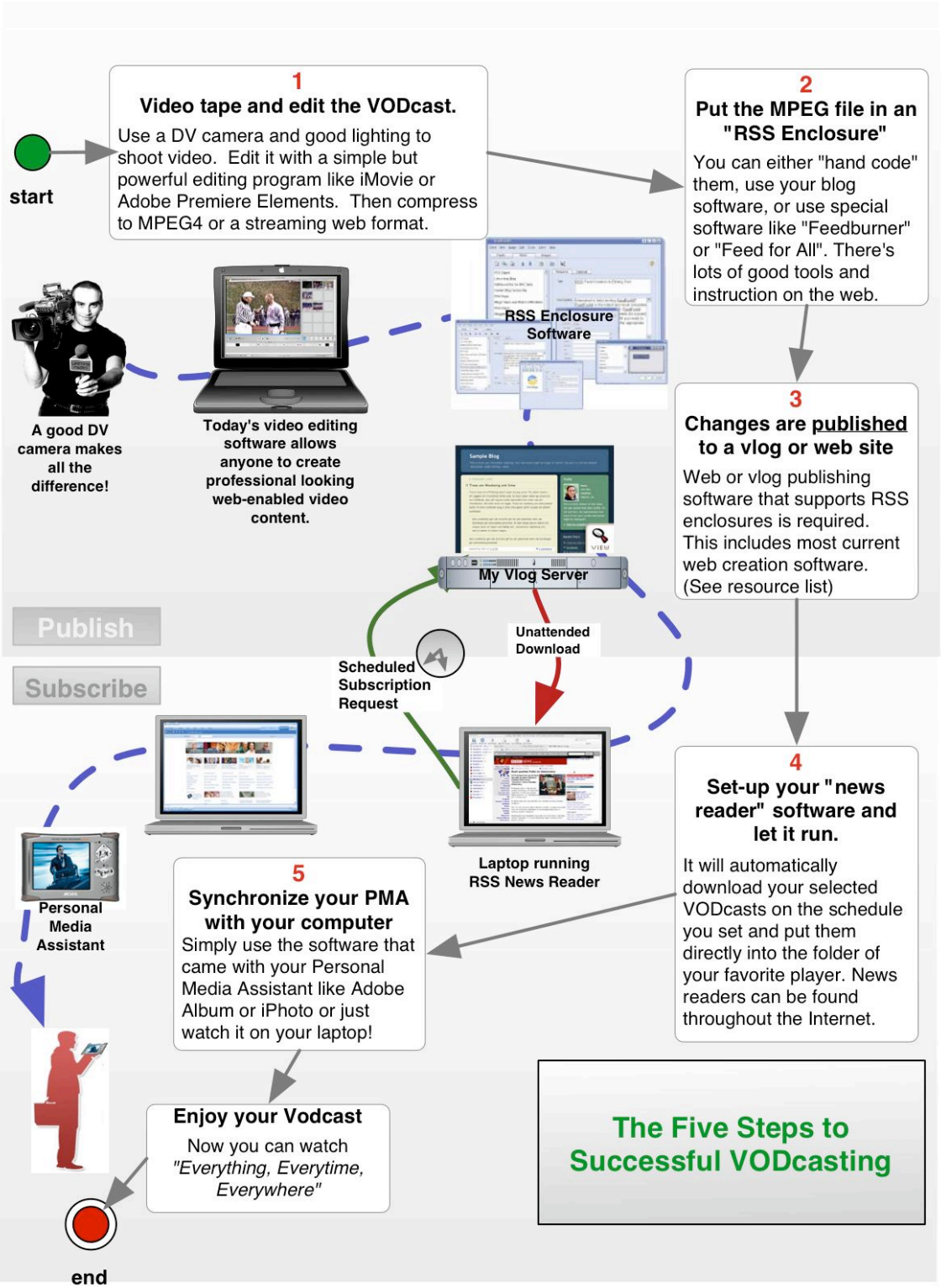
The rapid evolution of audio-photo-video recording capabilities through phones and inexpensive hand-held devices will create a flood of multimedia content. They will be immediately adopted by the current class of students and will be looked at with disinterest or uncertainty by many of the current faculty. Both distribution technologies will quickly create demand for more bandwidth and storage for that content, both for academic purposes and student-social activities. They will intensify the need for a centralized content management and monetization infrastructure, as well as an education support architecture to assist faculty in the integration of these technologies that will be demanded by the incoming class of students.

But in this challenge is also the opportunity to provide all new classes of services for on-campus, distance and life-long learners. In fact the greatest opportunities for these technologies are in the ways they will be used that have not been imagined yet. The portable and on-demand nature of podcasting and VODcasting make them technologies worth pursuing, implementing and supporting.

How to Podcast



How to VODcast



Resources

The following resource list will be seriously dated before this document is distributed for the first time. The number of portals, Web sites, blogs, and vlogs that are providing podcast and VODcast services is literally changing by the hour. Many of these sites will continue to change and evolve with the technology. Some of them will eventually transform into full-blown news or entertainment sites before year's end. The items found here are a starting point.

Articles

Oct 8, 2004. "Podcasts: New Twist on Audio". Wired News article by By Daniel Terdiman.

Oct 23, 2004. "Podcast: Time-shifted radio listening gets a new name". Webtalk Radio.

Oct 28, 2004. "New Food for iPods: Audio by Subscription". New York Times article by Cyrus Farivar. (subscription required.)

Dec 2, 2004. "Personal soundtracks". The Guardian article by Ben Hammersley.

Dec 7, 2004. "Tivo for your iPod". A Newsweek article by Brian Braiker that describes podcasting to the layreader.

Dec 8, 2004. "The people's radio". An article on audiobloggers featured in The Independent.

Dec 10, 2004. "'Podcast' your world". Christian Science Monitor article by Stephen Humphries on podcasting.

Dec 30, 2004. "Podcasts bring DIY radio to the web". BBC News Online article on podcasting.

Jan 7, 2005. "Podcasting: The Next Big Thing?". KUOW 94.9 FM Puget Sound Public Radio (NPR) segment on podcasting.

Feb 7, 2005. 'Podcasting' Lets Masses Do Radio Shows. USA Today article by Matthew Fordhal.

Feb 7, 2005. 'Podcasting' takes broadcasting to the Internet CNN.

Feb 8, 2005. "Wave goodbye to radio" Portland Tribune article by Anna Johns.

Feb 9, 2005. "Radio to the MP3 Degree: Podcasting" USA Today article by Byron Acohido.

Feb 13, 2005. "'Podcasters' deliver radio-on-demand" New Scientist article by Celeste Biever.

Feb 16, 2005. "Millions buy MP3 players in US" BBC describes the take up of digital music players in the US.

Feb 19, 2005. "Tired of TiVo? Beyond Blogs? Podcasts Are Here" New York Times.

Feb 22, 2005. "Adam Curry Wants to Make You an iPod Radio Star" Wired.

Information

- Podcast & Portable Media Expo: Trade show and conference for podcasters.
- Podcast Alley: The podcast portal for everything about podcasting and a comprehensive listing of currently available podcasts (growing by more then 100 podcasts per day!).
- podCast411. How to Information for Podcasting. Including How to hand code an RSS Feed and How to Explain Podcasting to the Technically Challenged (Flashing 12s).
- Yahoo! Podcasters mailing list. A mailing list for podcasters and podcast listeners to communicate about podcasting for the iPodder platform.
- iPodder.org: The official IPodder website.