

9 Web Radio and Web TV

9.1 Web Radio

9.2 Interactivity in Web Radio

9.3 Web TV

Literature:

Chris Priestman: Web Radio, Focal Press 2002

Note: Chapters 9 and 10 Switched...

1. Introduction and Motivation

2. Digital Rights Management

3. Cryptographic Techniques

4. Electronic Payment Systems

5. Multimedia Content Description

Part I:

Content-Oriented
Base Technologies

6. Multimedia Content Production and Management

7. Streaming Architectures

8. Commercial Streaming Systems: An Overview

9. **Web Radio and Web TV**

10. **Communities, the Web and Multimedia**

Part II:

Multimedia
Distribution Services

11. Signaling Protocols for Multimedia Communication

12. Multimedia Conferencing

Part III:

Conversational
Multimedia Services

A British Radio Pioneer, 1924

- John Reith, *Broadcasting over Britain*, 1924
 - Later Director General of BBC
- “We are missing infinitely more than we are receiving ... Thought is probably permanent, and a means may be found to ally thought with ether direct and to broadcast and communicate thought without the intervention of the senses or any mechanical device, in the same manner as a receiving set is today tuned to the wave-length of a transmitter so that there may be a free passage between them.”
 - “free passage between them” clearly indicates bi-directionality!

Audio on the Web

- Web sites with audio content
 - Audio as an “add-on”
 - Audio as central purpose
- Delivery type of audio content
 - For downloading
 - For streaming
 - » Pre-produced content
 - » Archived streams
 - » Live streams
- Music Channels, Automated Web Jukebox
 - More or less “automated DJ” – generate playlists for specific audience
 - More or less interactive
- High-Quality download of earlier radio programmes (now “podcast”)
 - With or without cost
 - For documentation, for re-distribution

What Is Web Radio?

- Web radio is about *live audio streams*
 - Which may be composed from archives!
 - Which may be made accessible in archives as well!
- Audio content is delivered to large audience, in identical form for all listeners
 - No individual streams, no download (no “on demand” service)
- “Simulcast”: Traditionally produced radio program is transmitted in Internet simultaneously

Radio and Networks

- Sound-transmitting networks, seen systematically:
 - Wireless:
 - » Unicast: Radio intercom, Cellular phone networks like GSM
 - » Broadcast: Terrestrial and satellite radio
 - Fixed, wire-based:
 - » Unicast: Telephone network
 - » Broadcast: ???
 - Internet technology as the “great unifier”
- Radio and telephone are sister media
 - Early name for radio technology: “radio telephone”
 - » Telephone meant literally as “to speak to people far away”
 - » First radio communication used as point-to-point connection (cf. today’s “ham radio”)
 - Current development: Hybrid broadcasting/unicast solutions
 - » E.g. “DVB-H” (Digital Video Broadcast Handheld) and “DMB” (Digital Multimedia Broadcast) to mobile phones

Historic Parallels between Radio and Web Radio

- Technical problems with sound quality
 - Early radio transmission (1920's) were of poor sound quality, short wave radio still is today
 - Early radio transmission over the Internet was of poor sound quality, but the situation is improving rapidly
- The ever-repeated threat situation between new and old media
 - Early radio was considered a threat to news and entertainment industries
 - » Like TV for movie industry
 - Web radio as a threat for traditional radio, news, entertainment?
 - Lesson from history: Media grow into complementary, synergetic situation
- Driving force are amateurs
 - Early radio program development, at least in the U.S., driven by amateur stations
 - Exactly identical situation for Web radio today
- Private/public/commercial, funding models, ...

Radio and Democracy

- Bertolt Brecht, 1930:

“Radio could be the most wonderful public communication system imaginable, a gigantic system of channels – could be, that is, if it were capable not only of transmitting but of receiving, of making listeners hear but also speak, not of isolating them but connecting them.”

 - Bertolt Brecht even conducted amateur experiments with the new medium “radio” himself
- Radio, if not restricted by monopolies, is a decentralized, democratic medium
 - Web radio may be the way to remove the constraints (frequency shortage) which have led to monopolies
 - Web radio removes spatial constraints of radio (global medium)
- “Vertical” organisation (centralized, hierarchic, top-down) vs. “horizontal” organisation (decentralized, peer-to-peer, bottom-up)
 - Radio started as a horizontally organized experiment

Types of Web Radio Stations/Programmes

- According to traditional sectors of the radio industry:
(Lewis/Booth: *The Invisible Medium*)
- Sector 1: Early European Model
 - Public service and state radio as governmental organisations, often monopolies
 - » Web radio as additional distribution channel, as platform for global services, for cross-media effects with other parts of Web presence (information, shop)
- Sector 2: American Model
 - Commercial enterprises funded through advertising
 - » Web radio as platform for advertising (for the traditional broadcast)
 - » Web radio as additional source of revenue (through e-Commerce)
- Sector 3: Alternative
 - *Community stations (free radio)*, see www.amarc.org
 - *Underground stations*
 - Web radio as a cheap technology, avoiding also many licensing problems

Playback Software

- Streaming players (see chapter 8)
- Integrated software for audio/video collections
 - E.g. iTunes

Stream	Datenrate	Kommentar
▶ 50s/60s Pop		
▶ 70s/80s Pop		
▶ Alt/Modern Rock		
▶ Ambient		
▶ Americana		
▶ Blues		
▶ Classic Rock		
▼ Classical (18 Streams)		
1.FM ~ Otto's Baroque Mu...	128 kBit/s	Classical Baroque
1.FM ~ Otto's Classical M...	128 kBit/s	Otto's Classical selection
Classic FM	96 kBit/s	24/7 light classical (popular) music choice.
Classical Guitar on Sky.fm	128 kBit/s	A mix of Classical, Spanish, and Flamenco ...
Classical Guitar on Sky.fm	24 kBit/s	A mix of Classical, Spanish, and Flamenco ...
Classical WGBH 89.7 - HD2	128 kBit/s	WGBH Classical HD
ClassicalMusicAmerica	56 kBit/s	Since 2000, unique & relaxing!
IranianRadio.com - Traditi...	128 kBit/s	Persian Traditional Music (Sonati)
Magnatune Classical	128 kBit/s	Renaissance and baroque - direct from the...
Mostly Classical on Sky.fm	128 kBit/s	Relax... it's good for you!
Mostly Classical on Sky.fm	24 kBit/s	Relax... it's good for you!
radioioClassical	128 kBit/s	Cutting-edge mix of modern classical with...
radioioClassical	64 kBit/s	Cutting-edge mix of modern classical with...
radioioClassical	32 kBit/s	Cutting-edge mix of modern classical with...

Time-Limited Simulcast

```
<smil>
<!-- bayern2radio_m20_red.smil -->
<head>
  <meta name="(C) Bayerischer Rundfunk" content="Bayern2Radio" />
</head>
<body>
<audio src="rtsp://a921.1674124645.c6741.g.lr.akamaistream.net/
  live/D/921/6741/v0001/reflector:24645" dur="43200s" />
</body>
</smil>
```

2004:

Zeitbegrenzung im Internet

Livestreaming verursacht für den Bayerischen Rundfunk hohe Kosten. Der Bayern2Radio-Stream schaltet sich nach 35 Minuten automatisch ab, um ungenutzte DauerLivestreams zu kappen. Damit ist gewährleistet, dass auch in Zukunft jeder, jederzeit die LiveStreams des Bayerischen Rundfunks hören kann, auch wenn nach 35 Minuten der Player neu gestartet werden muss.

2007: 12 Stunden

Experience of Radio Listening

- Experience formed by receiver technology:
 - 1930s: Large valve radio as important “furniture” in the living room
 - 1950s onwards: TV taking over as centre of living room
 - 1960s: Transistor radios make radio receivers portable, enable car receivers
 - 1970s: Stereo high-fidelity systems change expectations of audience
- Market niche for Web radio:
 - High-quality terrestrial radio (FM) has limited local range
- Competitors for Web radio:
 - Wide-range (global) radio of good quality
 - » Satellite radio
 - » DRM (Digital Radio Mondiale)
- Web Radio experience:
 - Weird technical configurations, computer as playback device?
 - Vision of the Internet: “Invisible technology” – embedded into daily life

Physical Devices for Web Radio

RIP - Death occurred in March

- A radio receiver should look like one, even if it is Web radio...
- Standalone Internet radio devices:
 - Kerbango (no longer available)
 - Penguin Web radio
- Portable small devices connecting (wireless) to an online PC:
 - Variants:
 - » Sound output through home stereo set (portable remote control)
 - » Sound output through portable device
 - Example:
 - » 2000: SonicBox (no longer available)
- General problem: Device doing the actual streaming (receiving and processing the audio signal from Internet) is running on mains electricity
 - Streaming is power-intensive



Kerbango's Internet Radio



SONICBOX.COM

Diese Domain steht zum Verkauf. Geben Sie hier Ihr Gebot ab

Case Study: Penguin Radio (1)

2004: A dream based on Linux...

The screenshot shows the PenguinRadio website interface. At the top, there's a navigation bar with links for 'PenguinRadio US', 'PenguinRadio PDA', and 'PhoneRadio-WAP'. Below this is a main content area with a headline 'The PenguinRadio is the future of radio.' and a sub-headline 'Original Concept Ideas'. The main text describes the device as a stand-alone Internet appliance designed to free music from your PC. On the left side, there's a sidebar with a navigation menu including 'Home', 'Penguin Directory Search', 'Music', 'News', 'Sports', 'Regional', 'Religious', 'NonTraditional', 'Tech Support', 'Press', 'Corporate', 'Music Store', 'PhoneRadio.com', and 'Contact'. Below the sidebar, there are several promotional banners for '800MB webspace', 'XML', and 'SHOPPING'. At the bottom of the main content area, there's a section titled 'Design Image #4' and another paragraph about the device's capabilities.

Case Study: Penguin Radio (2)



- 2006/2007:
 - The hardware device exists (ca. US\$ 200)
 - Extremely simple user interface, no PC needed
 - » Special configuration and troubleshooting rather complex
 - Missed the trend to Wireless LANs – adapter required
- How to find a market niche?
 - See solutionsradio.nl
 - Custom-made solutions for closed user groups
 - » Church radio, ethnic radio, radio for the blind

Case Study: Apple AirTunes



- Introduced in 2004/2005 with Airport Express
- Adapter from Wireless LAN to stereo set
- Practical problem: No user interface
- How to control the iTunes computer?
- Special wireless remote control?

From AirTunes to Apple TV

- Influence factors:
 - Higher bandwidth enables video streaming
 - TV set offers visual display for interface
 - Large disk drives become relatively cheap
 - Through podcasting users are familiar with scheduled content update
- Solution:
 - Consumer electronics device connected to TV and sound system
 - Synchronisation from computer through Wireless LAN



Lessons Learnt for Designing the Platform

- The user's situation, expectations, feelings have highest priority
 - Users do not perform extra steps just to use the technology
- Introducing new hardware is extremely difficult
 - Must seamlessly integrate with existing devices
 - ...or be completely stand-alone and innovative
- Audio and Video solutions are converging in many ways
 - Radio as a special case of TV
 - Happens not only with Web radio...

Mobile Networks and Web Radio

- GSM network (current mobile phone technology in Europe)
 - Data services either through WAP (Wireless Application Protocol) or through *i-mode* (proprietary standard by NTT DoCoMo, Japan)
 - Bit rate around 9.6 kbps, circuit-switched transmission
 - » Congestions very likely, not usable
- GPRS standard on top of GSM (2.5 generation mobile networks)
 - Connection speeds around 26-56 kbps (in theory)
 - Handset processing speeds not sufficient, not usable
- UMTS standard (3rd generation mobile networks. “3G”)
 - Bandwidth theoretically sufficient (up to 2Mbps)
 - DVB-H or DMB tends to be integrated with UMTS devices and services, comprising audio broadcast

Copyright and Web Radio

- Fundamental problem #1:
 - Traditional radio (terrestrial, cable) receivable only within clear location limits
 - » Partially also true for satellite transmission
 - Web radio in general receivable globally
 - » Anything receivable in U.S. is subject to U.S. legislation!
- Fundamental problem #2:
 - Replication of digital content is very easy
 - Capturing Web radio streams
- Web radio stations are extremely “visible” - simple to trace!
- Example: U.S. DMCA (Digital Millennium Copyright Act) rules
 - Limits how often playlisted tracks can be repeated within 3 hours
 - Limits on the number of complete tracks from the same album played in proximity
 - Limits on pre-announcement of coming-up tracks
 - ... Targeted at fundamental problem #2

Live vs. On-Demand

- Live Streaming
 - More similar to traditional radio
 - DMCA rules (see previous slide) apply in U.S., similar rules in other countries
 - Copyright rules in principle similar to normal radio stations
 - » E.g. simple flat fees
- On-Demand Streaming
 - Jurisdiction not quite clear, highly similar to download offer (=selling)

Example: Clearchannel Stations

- Radio program was simulcasted on Internet
- Speakers of advertisements went to court
 - Special fees for higher audience numbers than agreed on
- Technical response:
 - Different versions for Internet and local radio broadcast
 - Advertisements are automatically adapted
 - » On locally broadcasted program: As before, with local significance
 - » On Internet: Advertisements are replaced with globally valid advertisements
- Problems:
 - Technically and in administration view: difficult
 - Adaptation to global standards may annoy listeners from local community

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Radio and Visual Information

- **Traditional radio** is a medium for the ears only
 - Most adequate interaction forms are also based on audio
 - » Telephone participation of listeners
 - Additional information may be shown visually (e.g. RDS)
- **Web radio** is a hybrid audio/visual medium
 - Interaction is mostly based on visual reception
 - Spectrum of intensity of visual information
 - » Sender logo only
 - » Subtitles with additional information
 - » Additional text (information, interaction)
 - » (Still) Pictures
 - » Video
- Selection of additional information vs. true two-way interaction

Simple Visual Interaction Forms for Web Radio

- Supporting text information (may be selectable by listener)
 - For music: Title, artist, composer, album, credits etc.
 - For music: Advertisement for upcoming live concerts
 - For news on current affairs: Source for information given, link to further info
 - Programme schedule, e.g. hint on repeated transmission later or on related programmes
- Pictures (may be selectable by listener)
 - Of presenters in action
 - Background about presenters or album
 - Advertisements
- True two-way interaction, *loosely integrated with programme*:
 - Participation in polls or votes
 - Email correspondence with station or other listeners
 - Chat with station and/or other listeners
 - On-air or off-air competitions

Complex Interaction Forms for Web Radio

- *Interaction highly integrated with programme*
- Interactive playlists
 - “Wunschkonzert” (musical request programme)
 - » Individual requests or democratic voting
 - » Automatic overall optimization of playlists
 - Requests may be sent in via Web, email, SMS, ...
- Upload of music and speech contributions
- Interactive games
 - e.g. Guessing of title, artist, ...
- Web radio enables *automatic interaction forms*
 - Little or no manual interaction on sender side
 - Is this still “radio”? Don’t we expect a live moderator?

Web-based Program Guide

- Often listening takes place over different platform (e.g. car radio)

Web Radio / Music Shop Integration 2004

Web Radio / Music Shop Integration 2007 (1)

ANTENNE BAYERN ARTUELLE SENDUNG: >> Florian Weiß ANTENNE BAYERN am Abend

ARTUELLER TITEL: >> Cat Stevens alias Yusuf Heaven Where True Love Goes

Bitte wählen Sie einen Player:
Multicasting Info

>> MEDIA PLAYER STEREO >>>>

>> MP3 STREAM MONO >>>>

Download

CD-Shop

Songsuche

musicload

Start Musik Hörbuch Video

Charts / Specials / Playlists / Neuheiten / Preishits / Nonstop

Startseite

YUSUF Yusuf (Cat Stevens): An Other Cup

Midday / Heaven / Where true love goes / Maybe there's a world / One day at a time ...

Artikel am Lager EUR 14,99

CD Details bestellen merken (Details hier)

Preis inkl. MwSt., ggf. zzgl. Versandkosten

Bitte geben Sie als Suchbegriff nicht mehr als 50 Zeichen ein.

Ludwig-Maximilians-Universität München Prof. Hußmann Multimedia im Netz – 9 - 29

Web Radio / Music Shop Integration 2007 (2)

musicload

Start Musik Hörbuch

Charts / Specials / Playlists / Neuheiten

Startseite

Musik

Hörbuch

Musikvideo

Musicload Nonstop

Klinkealtöne

musicload

cat stevens heaven

Musicload

Es wurden keine Artikel gefunden, die zu Ihrer Suche cat stevens heaven passen

Yusuf Islam

An Other Cup

Genre: Rock

Erschienen 10. November 2006

Gesamt: 12 Songs, 1 Booklet

© 2006 Ya Records Ltd

9,99 € ALBUM KAUFEN

Musik verschenken

iTunes

▲	Titelname	Dauer	Interpret	Album
1	Midday (Avoid City After Dark)	4:24	Yusuf Islam	An Other Cup
2	4 Heaven / Where True Love Goes	4:49	Yusuf Islam	An Other Cup

Ludwig-Maximilians-Universität München Prof. Hußmann Multimedia im Netz – 9 - 30

Setting Up a Web Radio Station?

- In principle, it's easy: Any computer can be a radio station
 - Needs to be connected to the Internet permanently
- Scalability
 - For larger audiences, professional hosting services may be an alternative
- Defining the audience
 - Specialized audiences, differentiation from existing offers, scale targets
 - Technical requirements (any 1995-up PC/Mac or latest technology only?)
 - Often: Audience limited by intranet (university, company)
- Live, archived or both?
 - Archive-only is possible with limited bandwidth
- 24-Hour global schedule
 - Staggered copies of programme (by start time)?

Vision of a “Killer Application”?

- The “I want this” button on the car radio
 - On the road, the button is simply pressed when interesting music plays
 - Later, online and in the music store:
 - » Selected music is offered for (selective) buying
 - “I want this” buttons on other devices?
 - » PDA, mobile phone?
- General requirement:
 - Automatic networking of various devices
- Possible path to solution:
 - Integration of music player and mobile telephone
 - Integration of “nomadic” devices into car user interfaces

Vision (2004): The Portable WebRadio Receiver

- Think about a combination of existing technologies:
 - Portable digital music player (e.g. Apple iPod) as receiver
 - » Has to be enhanced to receive music
 - Home server or Music Store or *Web Radio station* as source
 - Wireless broadband network as transmission medium
 - » UMTS in public area
 - » WLAN in private/office area, also targeting large-area coverage
- Music transmission over wireless network
 - Automatic handover to other WLANs/other networks if necessary
- What is the advantage over an analog portable radio?
 - Interactivity: “I want this”
 - Audio quality
 - Range of stations (e.g. listening to home radio station abroad)
- 2007: The iPhone is very close to a realization of the vision

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David Feinleib: The inside story of Interactive TV and Microsoft WebTV for Windows, Morgan-Kaufmann 1999

Web Radio and Web TV

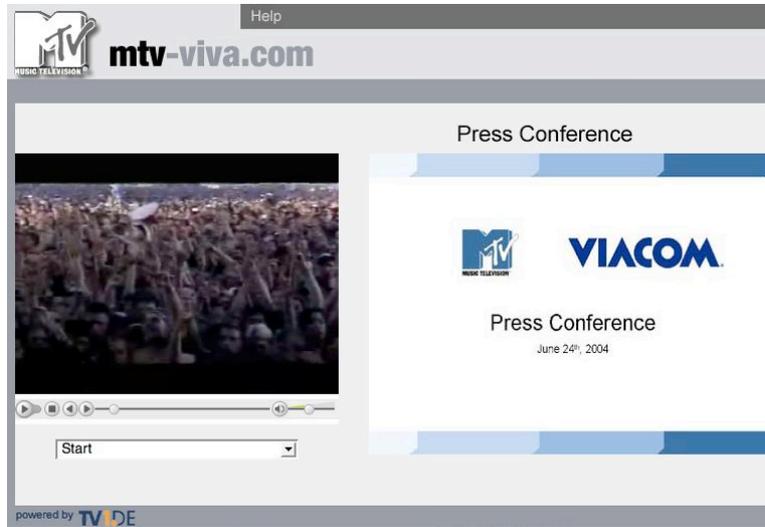
- In principle, the same questions as for Web radio:
 - Bandwidth problems
 - » much higher requirements
 - Separate medium or simulcast of existing medium
 - Live stream or download
 - Adequate end system
- Quality differentiation
 - Live stream with limited resolution compared to main program
- Possible end systems for Web TV:
 - Computer
 - TV set
 - PDA, mobile phone
 - Special mobile devices (e.g. combined with DVD player)
 - » As seen with DVB-T

Web TV Simulcast

- Many streams available
E.g. wwiTV.com
lists 114 TV streams
only for Germany

The image shows a screenshot of the n-tv.de website on the left and a RealOne Player window on the right. The website displays a news page with a search bar, navigation tabs for 'Der Tag', 'Wirtschaft & Börse', and 'Chat & For...', and a main article titled 'Noch mehr Kohle für Meyer' with a sub-headline 'Der letzte Tag im Amt?'. The RealOne Player window shows a news anchor sitting at a desk with a screen behind him displaying 'Deutsche Börse' and a line graph. The player interface includes a 'Playing' status, a bitrate of '300Kbps 1:13/Live', and standard playback controls.

Live Webcast of Business Events



Source: tv1.de

Microsoft WebTV and ATVEF

- ATVEF: Advanced Television Enhancement Forum Initiative
 - Industrial consortium: CNN, Disney, Intel, Microsoft, Sony, and others...
 - Defined standard 1997-1999
 - Triggers embedded into TV programme to activate Web-based content
 - » “crossover links”
 - » Using the Vertical Blanking Interval (Austastlücke)
 - To synchronize Web presentations with TV content
- Microsoft’s WebTV initiative
 - Selling set top boxes
 - » Web browser and ATVEF decoder
 - Providing interactive content through media partners
- Not successful (yet?)
 - ATVEF no longer supported in 2004
 - New approach based on Xbox game console?

Microsoft MSN.TV



- Short term commercial interest (2004):
 - TV as end system for Internet access (Web/email)
 - Integrated media player
 - No integration with TV programmes

Examples of Interactive TV from MS WebTV

- Enhanced versions of popular soaps like “Baywatch”, sports reporting, news, and game shows
 - For some time produced by NBC and other large stations
- Background information for TV drama:
 - Information of actors currently seen (name, pictures)
 - Information on location (including advertisements)
 - Additional views not visible on TV
 - “What happened until now” function
- Background information for sports programmes:
 - Players, team history, medal counts, ...
- Customized information in news programmes:
 - News tickers, headlines, travel news customized for individual viewer (selected by set top box)

Screenshot from Interactive Version of Baywatch



Technological Advances

- Web radio and TV is slowly establishing itself on the market
- Interactive TV has been mostly unsuccessful
- The following developments may have a positive effect on Web radio and Web TV:
 - Broadband domestic connections
 - “Always-on” Internet access
 - Resolution of net congestions by broader Internet backbones
 - Better compression, lower streaming bandwidths
 - Improvements in mobile Internet access
 - Innovative portable devices
- A big change may happen when penetration of a truly interactive platform will be large enough to make media companies move.