9 Web Radio and Web TV

Literature:
Chris Priestman: Web Radio, Focal Press 2002

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
  - 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. todays "ham radio")
  - Current development: Hybrid broadcasting/unicast solutions
    - » E.g. "DVB-H" (Digital Video Broadcast Hybrid) to UMTS 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

Web-based Program Guide

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

Time-Limited Simulcast

```
<smil>
<!-- bayern2radio_m20_red.smil -->
<head>
 <meta name="(C) Bayerischer Rundfunk"
       content="Bayern2Radio Real Audio 20 kBit/s" />
 </head>
<body>
<audio src="rtsp://a921.l674124645.c6741.g.lr.akamaistream.net/
       live/D/921/6741/v0001/reflector:24645" dur="2100s" />
</body>
</smil>
```
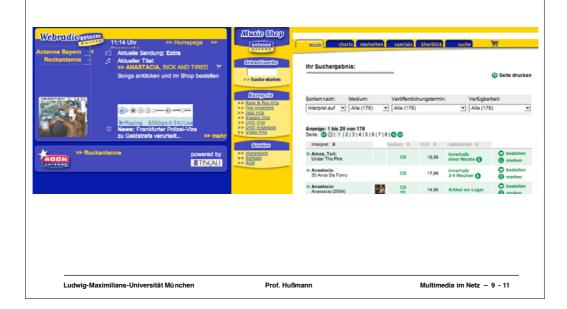
Zeitbegrenzung im Internet

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.

Web Radio / Music Shop Integration

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
- Experience formed by production technology:
  - Microphones, amplifiers etc covering increasing frequency and dynamic ranges
  - Magnetic tape (starting from 1945 mainly) enables pre-recorded programmes
  - Portable recorders open up new possibilities for program content
  - Improved editing and post-production technology makes production much more flexible
- 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

- A radio receiver should look like one, even if it is Web radio...
- Standalone Internet radio devices:
  - Kerbango radio: AM/FM/Internet radio tuner in 1950s design
- Portable small devices connecting (wireless) to an online PC:
  - Variants:
    » Sound output through home stereo set (portable remote control)
    » Sound output through portable device
  - Examples:
    » iM Radio (formerly SonicBox)
    » ...
- General problem: Device doing the actual streaming (receiving and processing the audio signal form Internet) is running on mains electricity
  - Streaming is power-intensive

Example: Penguin Radio

Example: Apple AirTunes

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 kps (in theory)
  - Handset processing speeds not sufficient, not usable
- UMTS standard (3rd generation mobile networks. "3G")
  - Bandwidth theoretically sufficient (up to 2Mbps)
  - DVB-H may be integrated with UMTS 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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9   Web Radio and Web TV

9.1   Web Radio

9.2   Interactivity in Web Radio

9.3   Web TV

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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

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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?

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

Vision: 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)
- Special services for travellers, …

9 Web Radio and Web TV

9.1 Web Radio

9.2 Interactivity in Web Radio

9.3 Web TV

Literature:
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
- Possible end systems for Web TV:
    - Computer
    - TV set
    - PDA, mobile phone
    - Special mobile devices (e.g. combined with DVD player)

Examples of Live Video Streams in the Internet

- Three examples from a book of 2002, revisited in 2004:
- QuickTime TV channel:
  - www.apple.com/qtv/
    - » has been removed, only trailers
- Real Live Events
  - www.guide.real.com/live/
    - » has been removed, only downloads
- Live Music in pay-per-view mode
  - www.livemusic.com/
    - » has been turned into a pure music site (hob)

- The market is changing permanently and quickly!

Live TV Overview - 2004

Watch TV from GERMANY!				
Website (source)	Stream1	Stream2	Live?	Information
1-2-3 TV			Y	Home shopping TV.
ARD Tagesschau			N	The most popular German news program on demand.
Bloomberg	45K	300K	Y	Financial News from Germany.
BTV 4U	300K		Y	Local TV station with programs for the region Baden-Württemberg.
Bundestag	45K	300K	Y	Live broadcast from the Bundestag.
DW-TV	45K	300K	Y	Worldnews.
GA			Y	On demand news from General-Anzeiger Bonn.
GIGA TV	300K		Y	NBC europe.
Landtag NRW	45K		Y	The State-Parliament of Northrhine-Westfalia.
NOA4	110K		Y	Norderstedt on air 4. Local TV station.
n-tv	300K		Y	Information TV.
Phoenix	100K		Y	News, documentations, debates. Transmission sometimes interrupted.
Raze TV			Y	Horseracing TV.
RTL			N	Look for the video-lounge for recorded news broadcast.
Spiegel TV			N	A lot of archieved news, reports and previews
Strip news			Y	Naked news from Germany!
Tagesschau	250K		N	News.
TV Halle	350K		Y	Local TV of Halle city in Germany.
VIVA Plus			Y	Music station (VIVAïs little sister).
VIVA TV	100K	346K	Y	Music TV station.
WDR			Y	The main news programs of the Westdeutscher Rundfunk are shown live. Other streams available on the website.
WDR Sportschau			N	Recorded sport events available on website.
ZDF	350		Y	On of the main public TV stations of Germany.
ZDF	300K		Y	On of the main public TV stations of Germany.
ZDF Heute			N	Recorded news broadcast and special reports.

mediahopper.com

Web TV Simulcast

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

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 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.

Hinweise

Vorlesung am 11.01.2005 muss leider ausfallen!

Schöne Feiertage!