

Outline

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 2. Media on the Web
 3. Interactive Web Applications
 4. Communities, the Web, and Multimedia
 5. Digital Rights Management
 6. Cryptographic Techniques
 7. Electronic Payment Systems
 8. Multimedia Content Description
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 10. Web Radio, Web TV and IPTV
 11. Multimedia Content Production and Management
 12. Multimedia Conferencing
 13. Signaling Protocols for Multimedia Communication
 14. Visions and Outlook
- Part I:
Web Technologies
for Interactive MM
- Part II:
Content-Oriented
Base Technologies
- Part III:
Multimedia
Distribution Services
- Part IV:
Conversational
Multimedia Services



10 Web Radio, Web TV and IPTV

10.1 Web Radio

10.2 Web TV

10.3 IPTV

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 (Example: last.fm)
 - 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”
- (Broadcasting) 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”)
 - Under discussion: 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.”

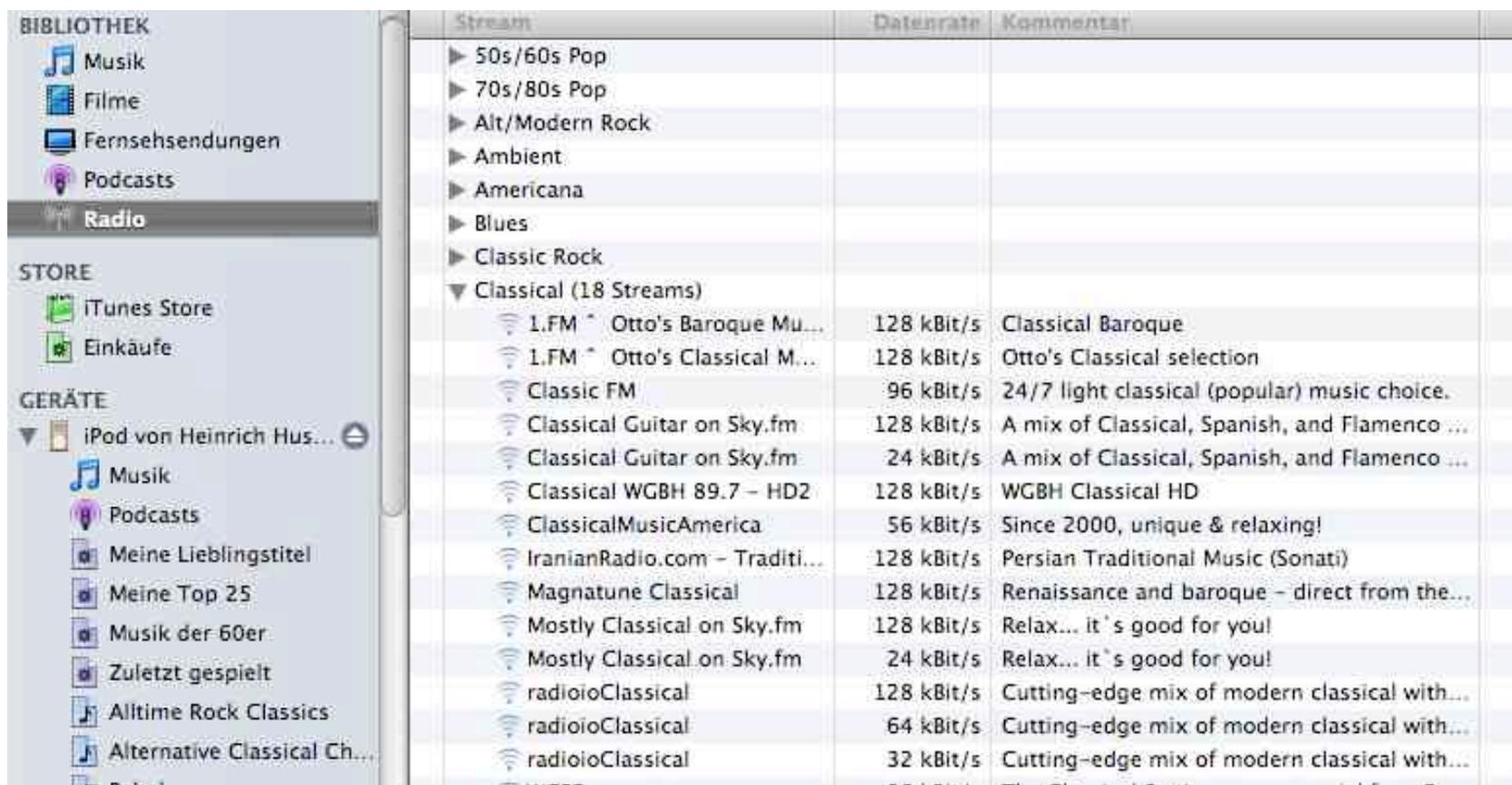
 - Bertolt Brecht even conducted amateur experiments with the new medium “radio” himself
- Radio, if not restricted by monopolies, is a decentralized, democratic medium
 - Web radio may be the way to remove the constraints (frequency shortage) which have led to monopolies
 - Web radio removes spatial 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 (also 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 9)
- Integrated software for audio/video collections
 - E.g. iTunes



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
 - Today: Mainly background music and car receivers
- 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 Internet Radio

- A radio receiver should look like one, even if it is Web radio...
 - Standalone Internet radio devices
- Product pioneers around 2000:
 - Kerbango, SonicBox
- General problem:
 - Streaming is power-intensive
 - Device receiving and processing the audio signal from Internet preferably runs on mains electricity
- Trend 2009/10: Broad range of products



Kerbango's Internet Radio



SonicBox device



Logitech Squeezebox



DNT IP2go

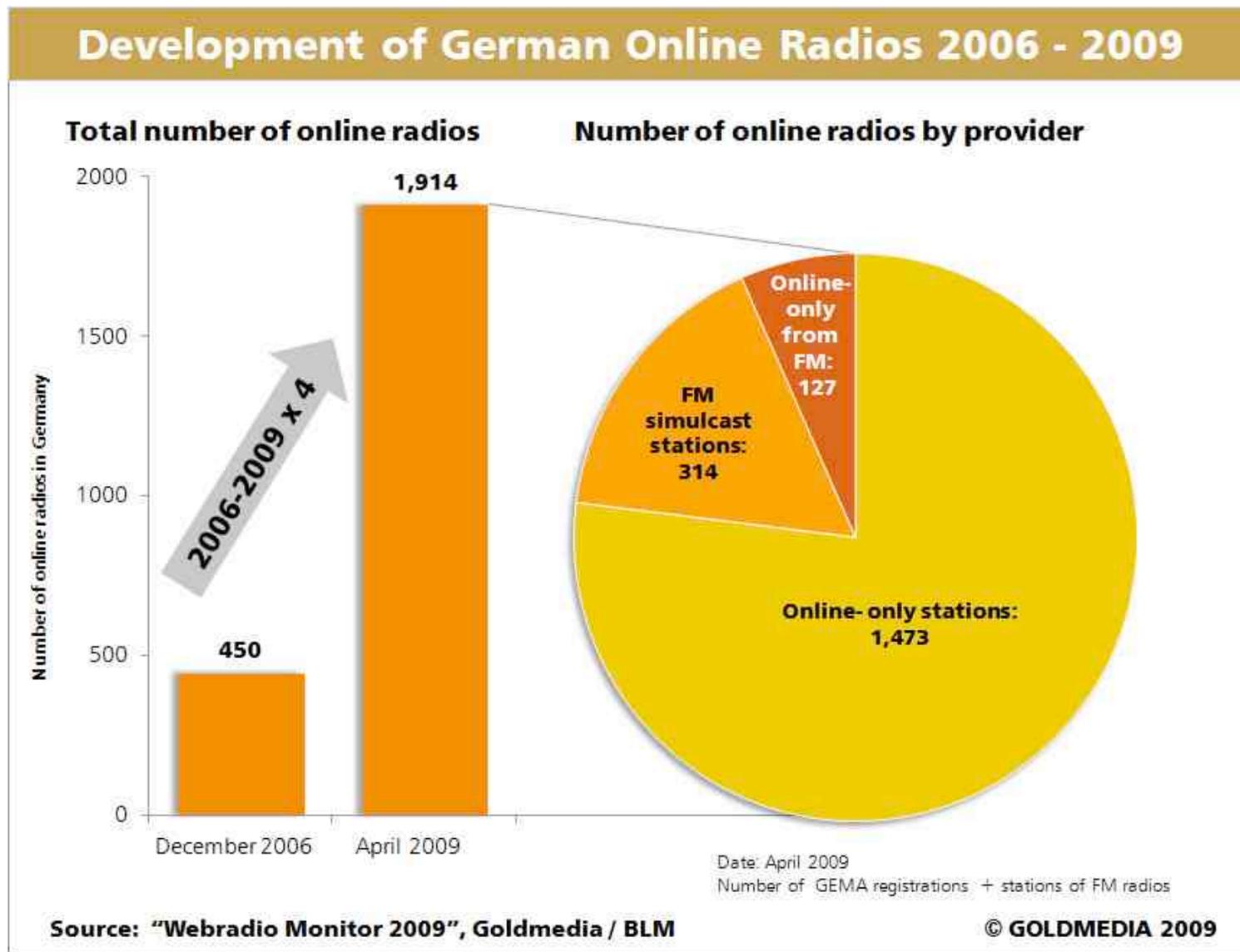


DNT IPmicro

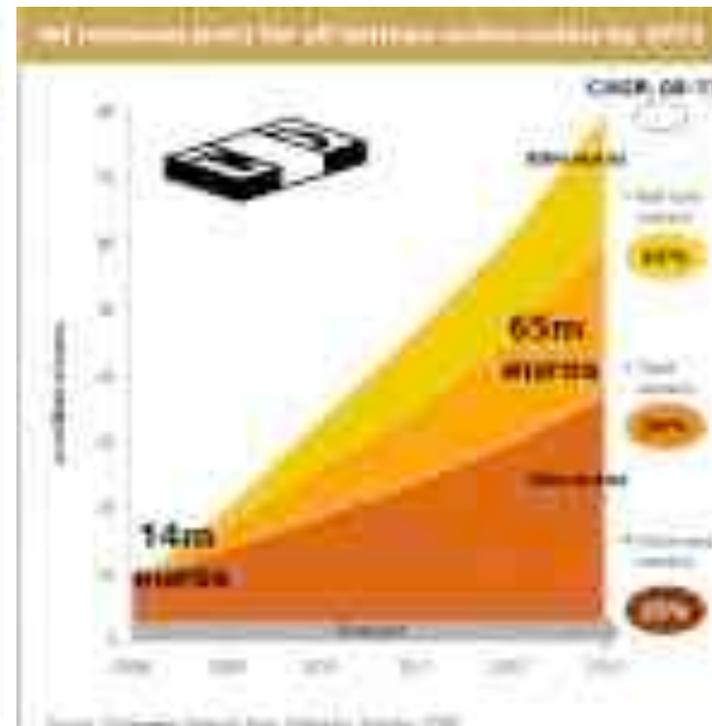
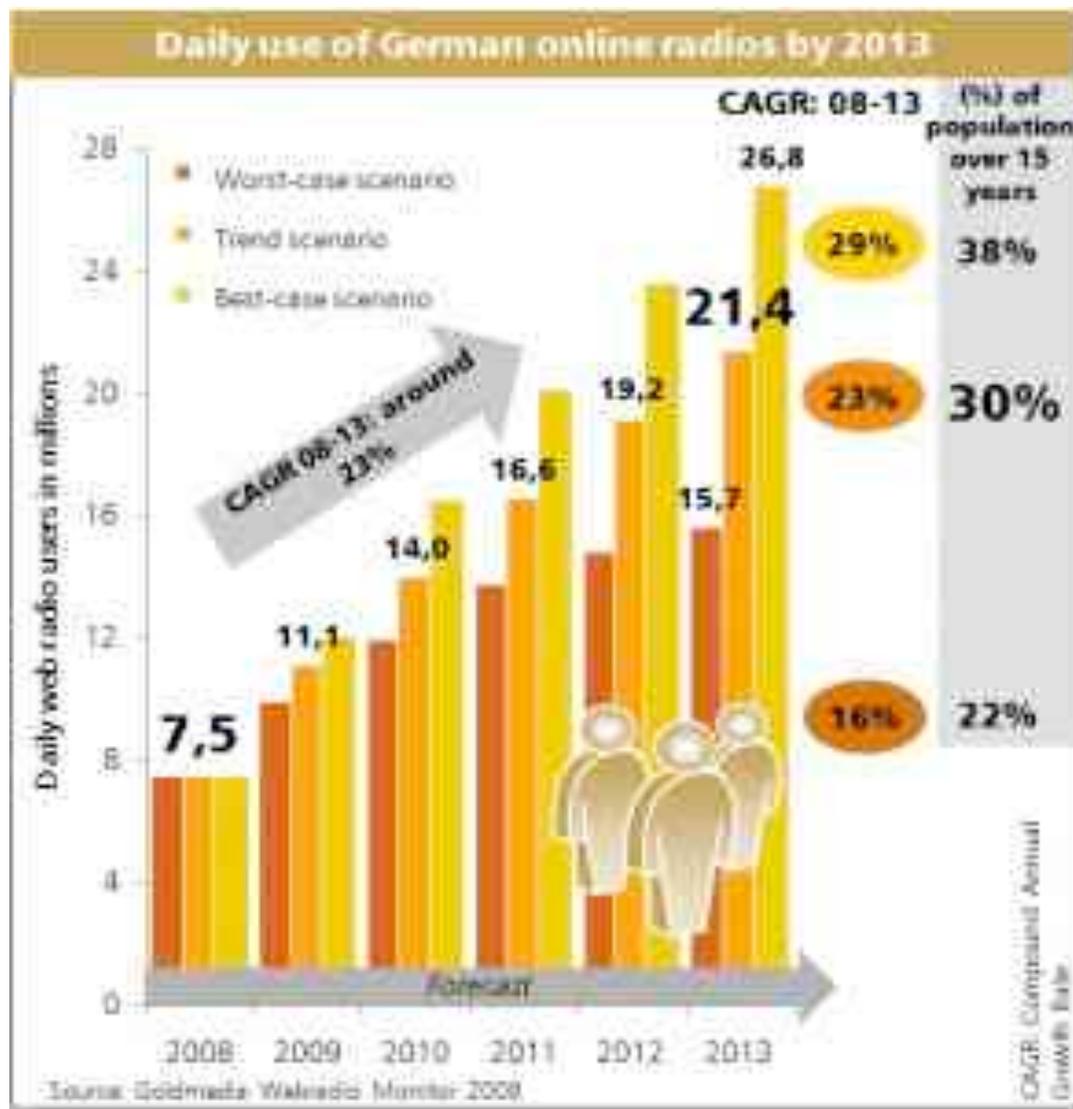
Lessons Learnt for Designing the Platform

- 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...

Internet Radio Market (1)



Internet Radio Market (2)



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

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, photos 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 Radio / Music Shop Integration 2004

The screenshot displays a web interface for 'Webradio Antenne Bayern' and its integrated 'Music Shop'. The interface is split into two main vertical sections: a blue radio player on the left and a yellow music shop on the right.

Webradio Antenne Bayern (Left Panel):

- Header: 'Webradio Antenne BAYERN' with a logo.
- Time: '11:14 Uhr' and navigation links '>> Homepage >>'.
- Station: 'Antenne Bayern Rockantenne'.
- Current Broadcast: 'Aktuelle Sendung: Extra', 'Aktueller Titel: >> ANASTACIA, SICK AND TIRED'. A note says 'Songs anklicken und im Shop bestellen'.
- Audio Player: Shows 'Playing 65Kbps 4:34/Live' with a progress bar and playback controls.
- News: 'News: Frankfurter Polizei-Vize zu Geldstrafe verurteilt...' with a '>> mehr' link.
- Footer: 'powered by TISCALI' and a 'ROCK ANTENNE' logo.

Music Shop (Right Panel):

- Header: 'Music Shop Antenne BAYERN'.
- Navigation: 'music', 'charts', 'neuheiten', 'specials', 'überblick', 'suche'.
- Search Results: 'Ihr Suchergebnis:' with a search bar and a 'Seite drucken' button.
- Filters: 'Sortiert nach:', 'Medium:', 'Veröffentlichungstermin:', 'Verfügbarkeit:' with dropdown menus.
- Results: 'Anzeige: 1 bis 25 von 176'. Page navigation: 'Seite: 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | > <'.

Interpret	Medium	EUR	Lieferbarkeit	Actions
>> Amos, Tori: Under The Pink	CD	19,99	Innerhalb einer Woche	bestellen, merken
>> Anastacia: 50 Anos De Forro	CD	17,99	Innerhalb 3-4 Wochen	bestellen, merken
>> Anastacia: Anastacia (2004)	CD	14,99	Artikel am Lager	bestellen, merken
- Service: 'Warenkorb', 'Kontakt', 'AGB'.

Web Radio / Music Shop Integration 2007 (1)

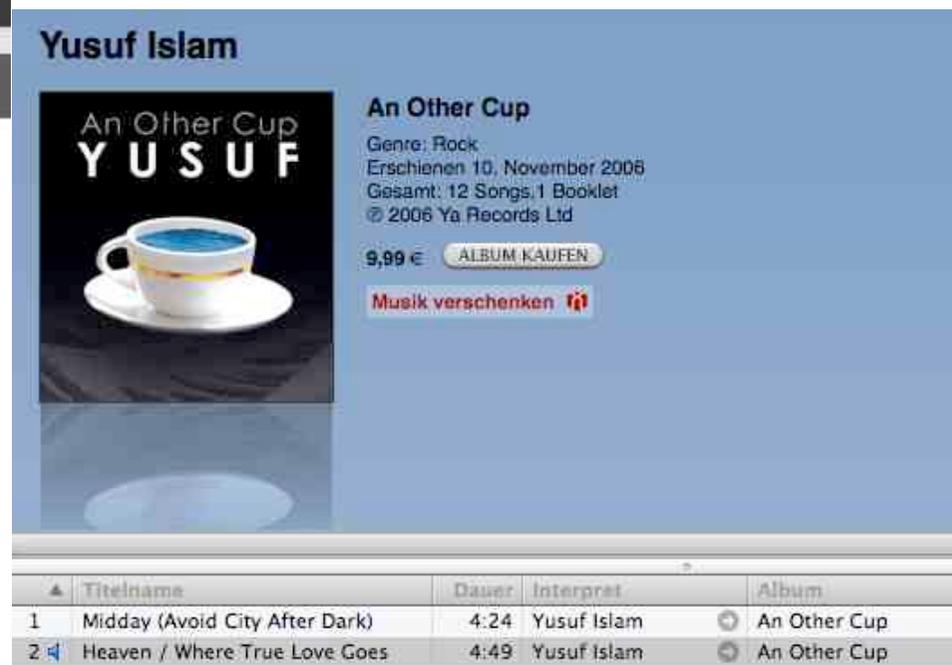
The screenshot shows the 'ANTENNE BAYERN' website interface. On the left, there's a 'WebCam' section with a live video feed. The main content area is split into two columns. The left column shows the current broadcast: 'ANTENNE BAYERN am Abend' with a picture of Florian Weiß. Below this, there are options for 'MEDIA PLAYER STEREO' and 'MP3 STREAM MONO'. The right column shows the current track: 'Cat Stevens alias Yusuf' with the song title 'Heaven Where True Love Goes'. Below the track information, there are buttons for 'Stargalerie', 'Download', 'CD-Shop', and 'Songsuche'. Two black arrows originate from the 'Download' and 'CD-Shop' buttons and point towards the Musicload website screenshot below.

The screenshot shows the Musicload website interface. The top navigation bar includes 'Start', 'Musik', 'Hörbuch', and 'Video'. Below this, there are links for 'Charts / Specials / Playlists / Neuheiten / Preishits / Nonstop'. A search bar contains the text 'Cat Stevens Alias Yusuf Heaven Where T' and has a search icon. Below the search bar, there are links for 'Allgemeine Hilfe' and 'Hilfe zu 'Suche''. The main content area shows search results for 'Yusuf (Cat Stevens): An Other Cup'. The album cover is visible, along with the track list: 'Midday / Heaven / Where true love goes / Maybe there's a world / One day at a time /...'. The price is listed as 'EUR 14,99'. There are buttons for 'Details', 'bestellen', and 'merken'. The bottom of the page has a footer with 'Bitte geben Sie als Suchbegriff nicht mehr als 50 Zeichen ein.'

Web Radio / Music Shop Integration 2007 (2)



musicload



iTunes

Web Radio / Music Shop Integration 2010 (1)



Web Radio / Music Shop Integration 2010 (2)

antenne BAYERN

Stefan Meixner

ANT **LIVE** Radio hören

Login: Spitzname **login** | Jetzt kostenlos anmelden | Passwort vergessen | Suchbegriff eingeben

Programme: **Programme** | Musik & Stars | Nachrichten & Service | Events | Audio & Video | Spiele | Club

Webradio | Moderatoren & Team | Sendungen | Frequenzen | Comedy | ANTENNE BAYERN on Tour | Kontakt

Antenne.de / Radio / Sendungen

Das lief im Webradio

› **Channel: ANTENNE BAYERN**

Rolling Stones mit "Honky tonk woman" lief am 13.01.2010 um 16:49 Uhr

Patrick Nuo (» [Fotos](#)) mit "Undone" lief am 13.01.2010 um 16:45 Uhr

Welcher Titel lief im Radio?

Musik, die Sie im Programm

ANTENNE BAYERN

An welchem Tag und um wieviel den Titel gehört?

16 | 52 | 13.0

suchen

Undone - 5"
Patrick Nuo

Maxi: 5 Titel, 17:33 min
Genre: Pop
Typ: MP3
Qualität: 256 kbit/s
€ 4.99

Titelliste

	Titel	Interpret	Format	Preis	Aktionen
1.	Undone - Roth & Jost Radio Version -- Roth & Jost Radio Version	Patrick Nuo	MP3 (3:34 min)	€ 1.29	
2.	Undone - Time Tools Radio Mix -- Time Tools Radio Mix	Patrick Nuo	MP3 (3:42 min)	€ 1.29	
3.	Undone - Acoustic Guitar Version -- Acoustic Guitar Version	Patrick Nuo	MP3 (3:40 min)	€ 1.29	
4.	She's Like The Wind	Patrick Nuo	MP3 (3:37 min)	€ 1.29	
5.	Take Me To The Moon	Patrick Nuo	MP3 (3:00 min)	€ 1.29	

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

10 Web Radio, Web TV and IPTV

10.1 Web Radio

10.2 Web TV

10.3 IPTV

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
- 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
- Interactivity of TV programs?

Web TV Simulcast

- Many streams available
E.g. de.wwiTV.com lists 155 TV streams only for Germany



n-tv.de
20.12.2004 11:44 Uhr

Der Tag | **Wirtschaft & Börse** | Chat & Foren

Begriff

Übersicht
n-tv Programm
Politik
Wirtschaft
Sport
Formel 1
Vermischtes
Kult & Kultur
Lesen & Hören
Essen & Trinken
Computer
Automobil
Reisemagazin
Dossier
Wetter
Finanzmagazin
Partnersuche

CDU

Der letzte Tag im Amt? Noch mehr Kohle für Meyer

Nach den Enthüllungen über Zahlungen des Energiekonzerns RWE droht CDU-Generalsekretär Laurenz Meyer als Weihnachtsgeschenk der Rauswurf. Medienberichten zufolge will CDU-Chefin Angela

Nebeneinkünfte für Politiker?

n-tv Umfrage
CDU-Generalsekretär Meyer steht wegen RWE-Zahlungen unter Druck. Dürfen Politiker Nebeneinkünfte haben? [weiter](#)

US-Lauschangriff
El Baradei wehrt sich

Neuer Streit um Dosenpfand
"Chaos-Strategie" des Handels

"Verleumder entfernen"
Forgeard steckt Ziele ab

Werben um die LSE
Euronext plant Gegenangebot

Strohmann für Gasprom?
Yukos-Tochter geht an Nobody

"Nehmt Ölbestände ins Visier"

Appell an "sein Volk" Saddam spricht

NsdqC	2135.20	-0.51%
NsdqF	1619.50	+0.56%
Nikkei	11103.42	+0.23%
EUR/\$	1.3358	
Gold	441.975	
ÖiBrent	43.10	

- American Express Gold Card + USB-Stick 128 MB oder Reisetrolley - jetzt kostenlos!
- 6% mit BMW Spar&Invest. Die Erfolgskombination mit dem Top-Zins.

TV-Highlights

Web TV as Business Model

Nutzen Sie unsere kostenlose Callback-Funktion! Suchen

Follow me!

Produkte Services Technologien Unternehmen Kunden Partner Deutsch

Willkommen bei TV1.EU – Europas führendem Unternehmen für Online Video Technologie.

Der One-Minute Pitch
Erfahren Sie in 60 Sekunden was TV1.EU auszeichnet.

Show-it PLUS™
So einfach haben Sie Fotos, Videos und Audiofiles noch nie publiziert.

Erfolgreich mit Web TV
Schnell und kosteneffizient Zielgruppen erreichen.

Europas führende Plattform
Der one-stop-shop für Online Video basierte Geschäftsmodelle.

One Minute Pitch
Internet World 2009

CBS Interactive

Neueste Meldungen: Neue Ski-Saison, neues Web-TV. Ski amadé setzt auf Show-it PLUS von TV1.EU [RSS-abonnieren](#)

Source: tv1.eu

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

The screenshot is divided into two main panels. The left panel features a photograph of a woman in a yellow top attending to a patient in a hospital bed. Below this is a CT scan image of a brain with the text 'Pacifica Medical Computerized Tomography (CT) Patient: Robby Quinn'. A handwritten note on a white card reads: 'Patient suffered a closed head injury leading to a cerebral contusion - Patient underwater an unknown length of time - Currently in a comatose state'. The right panel shows a woman in a black swimsuit and a man in a blue life vest on a beach. Below them is a Polaroid photo of a boat with the text 'DIVE BOAT'. A vertical sidebar on the right contains the text 'EXIT HELP WEB' and a filmstrip of small images.

Alaska Airlines

Patient suffered a closed head injury leading to a cerebral contusion -
Patient underwater an unknown length of time -
Currently in a comatose state

Pacifica Medical

Computerized Tomography (CT)
Patient: Robby Quinn

See behind the scenes photos of filming at sea.

Alaska Airlines

DIVE BOAT

The crew films boat to boat as Leslie (Heather Stevens) prepares to use a scuba tank wrench to knock out her boyfriend.

See behind the scenes photos of filming at sea.

EXIT HELP WEB

Levels of Interactivity in TV

(according to Johan Hjelm 2008)

- Level 1: Interaction with meta-information about the TV programme
 - Electronic/online program guide
 - Personal video recorder
- Level 2: User accesses external information
 - Teletext
 - On-device portals
- Level 3: User influences program by voting
 - Big Brother, Americal Idol etc.
 - May include chat and other interaction with other users
 - Either through separate phone/Web interaction or through Set Top Box
 - » UK, BSkyB: "red button" for interactive services, quite popular
- Level 4: Story or other content of TV program changed by interaction
 - TV converging towards games

Success Stories of Interactive TV?

- Voting is popular:
27 % of all young European users of mobile phones have voted or otherwise participated in interactive game shows via phone
- BBC:
During 2004 Olympics, more than 60% of viewers watched the event in an interactive way
- Johan Hjelm, based on research of EU project LIVE:
 - Interaction works best in documentaries and news
 - In fiction, people want interaction as unobtrusive as possible
 - Most viewers are not programmers, and they *may not know their own needs*
 - People want to belong to groups
 - TV viewers expect to be surprised

Future of Web TV

- Web radio and TV is slowly establishing itself on the market
- Interactive TV has been mostly unsuccessful
 - Success: Interaction in game and sports shows (voting based)
 - Success: Individual access to specific news and other factual information
- Developments with a positive effect on Web radio and Web TV:
 - Broadband domestic connections
 - “Always-on” Internet access
 - Better compression, lower streaming bandwidths
 - Improvements in mobile Internet access
 - Innovative portable devices
- Some change may happen when penetration of a truly interactive platform will be large enough to make media companies move.
 - Current attempt through **Blu-Ray player** devices
 - » BD-Live: Interactive online content accompanying BDs
 - » Streaming from Internet sources (YouTube and others)

10 Web Radio, Web TV and IPTV

10.1 Web Radio

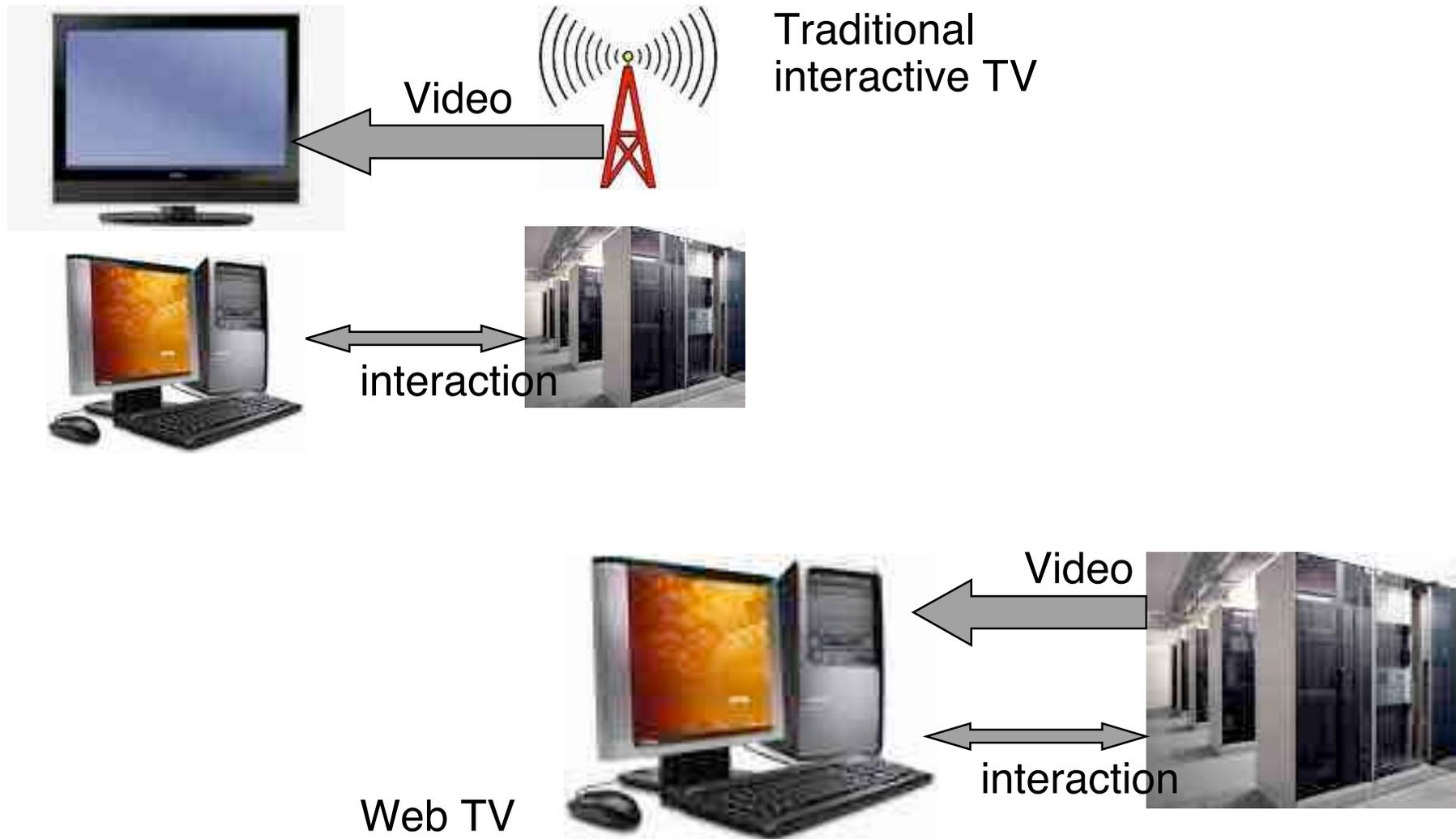
10.2 Web TV

10.3 IPTV

Literature:

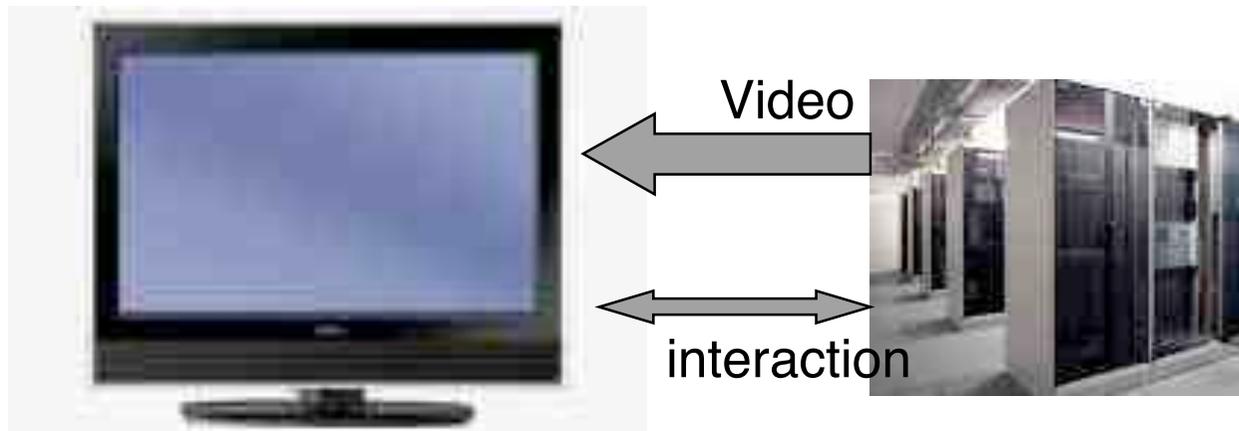
Johan Hjelm: Why IPTV? Interactivity, Technologies and Services,
Wiley 2008

Traditional TV, Web TV and IPTV (1)



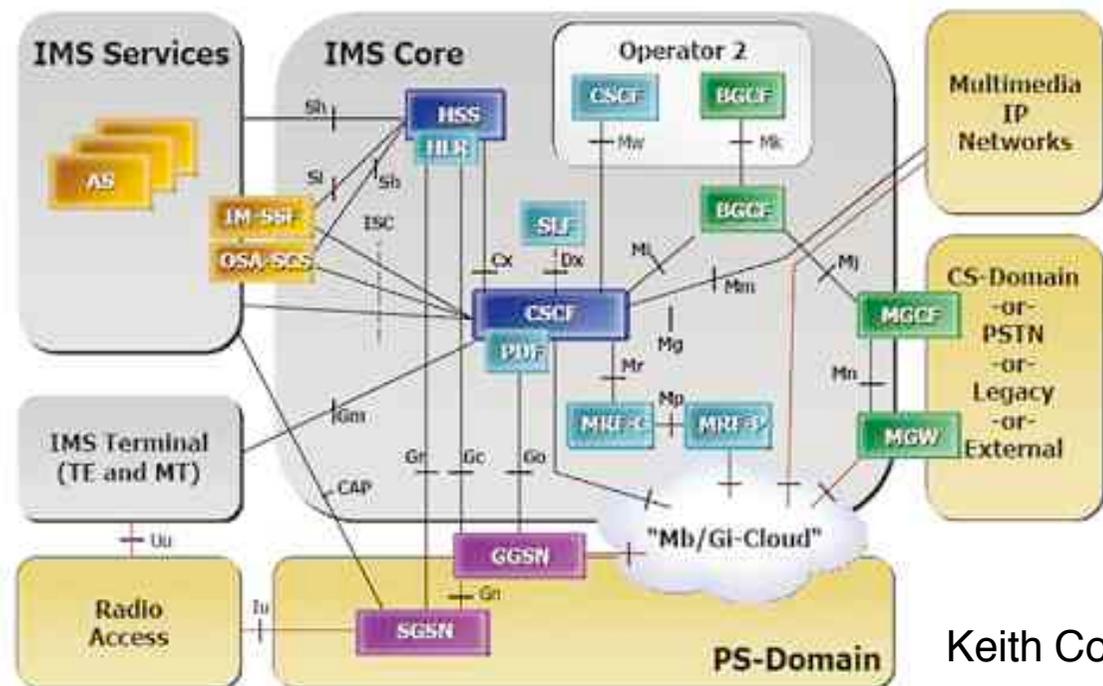
Traditional TV, Web TV and IPTV (2)

IPTV = Internet Protocol Based Television



- TV programme is carried over Internet
- IP protocol as unifying platform
- Radio broadcasting is eliminated from the setup

Internet Multimedia Subsystem IMS



CSCF = Call Session Control Function
 BGCF = Border Gateway Control Function
 HSS = Home Subscriber Server
 CS = Circuit switched
 PS = Packet switched

Keith Cobler/IMS Magazine

- IMS is an architectural framework from the telecommunication world
 - Original target: Multimedia over wireless networks beyond GSM
 - Generally targeted at fixed/mobile network convergence
- Some companies (e.g. Ericsson) promote IMS as standard for IPTV
 - QoS support in the core network is possible
- IMS architecture is complex (based on "Intelligent Network" architecture)

Possible Protocol Set for IPTV

- HTTP
 - For visual interfaces on TV set
 - Consequence: Design of HTML pages for distant viewing
- SIP
 - For managing communication sessions (see next lecture)
- RTP/RTCP/RTSP
 - For media streaming
- IMS QoS Management
 - ETSI TISPAN standard

Profile & Presence

- Users need to be authenticated for IPTV
 - Subscription management
- *Presence* information can be valuable for interactive TV
 - Who is online?
 - Who of my friends is watching this?
 - Real-time recommendations
- Presence can be managed in two ways:
 - Server/application based (e.g. Skype), heterogeneous solutions
 - Network based standard solutions
(e.g. presence support in IMS, based on 3GPP)

Set Top Box for IPTV

- Required features:
 - High speed Internet interface plus associated protocols
 - Streaming client
 - HTML browser, execution of Java programs, ...
- Option for TV-proprietary solution:
 - "Multimedia Home Platform" (MHP)
 - Standard for Set Top Boxes from DVB (Digital Video Broadcast)
- Generic option:
 - Universal PC platform as Set Top Box

Future of IPTV

- Currently, heterogeneous standards and competition amongst industry sectors is a problem
- Step by step, Internet standards are being integrated into home entertainment devices (e.g. WLAN connectivity)
- Broadband networks will make TV distribution by IP possible
 - Currently first services being rolled out for HDSL subscribers
- Will the future TV set have a built-in PC?
- Will the future TV set be just a monitor attached to a PC?
- Will the future TV set be a PC with some extra components?
- How much is the development influenced by trends towards network application serving, cloud computing?