

Digital TV

–

More than TV ?

# Digital Production

Digital cameras

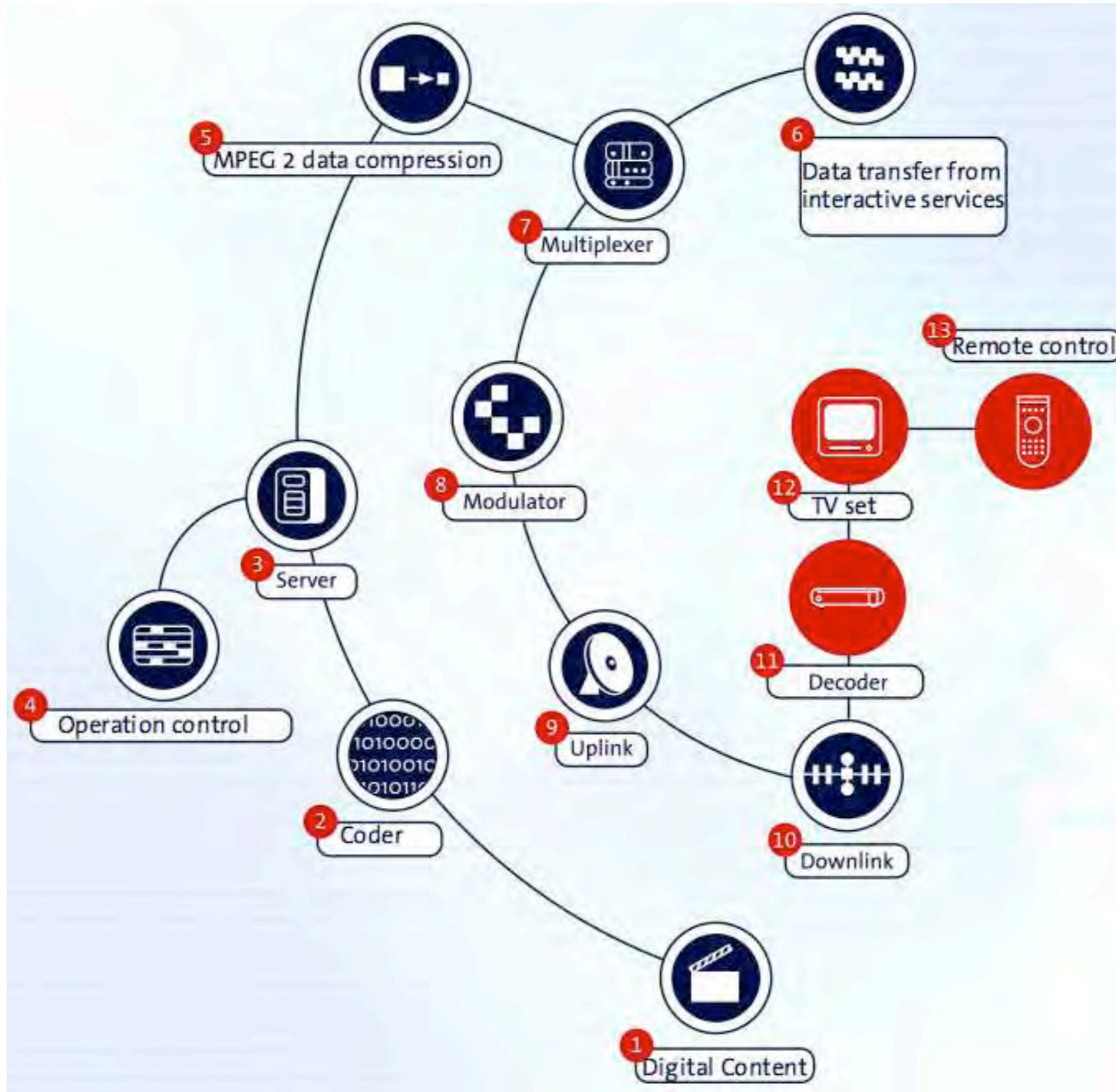
Digital video standards

Digital editing

Digital storage  
in expectation of a tapeless world (2010)



# Digital Playout



# Standards and Technologies

## Digital **Television**:

DVB (Europe, Australia, Hongkong, parts of South America)

ATSC (USA, East Asia)

ISDB (Japan)



## Digital **Coding**:

MPEG 1-21



## Digital **Radio**:

DAB

DRM

# DVB

Members of DVB are operating in 35 countries.

The aim of DVB:

»Our vision is to build a content environment that combines the stability and interoperability of the world of broadcast with the vigour, innovation and multiplicity of services of the world of the internet.«





# DVB-C

Digital cable seems to be the ideal technology for the DVB aims. A cable modem can provide a return channel for all sorts of user interaction.



In several European countries, especially Germany (57% of the TV households are cable connected) the digital switch is belated. Regarding the opportunities of interactive TV the »window of opportunity« seems to be closed: 4 millions of German DSL users enjoy broadband interactivity over the telephone line and not over their cable connection. The German provider T-Online will even offer a DSL box that has to be connected with the TV set and delivers expensive »premium« content.

Cable networks offer several opportunities for the delivery of paid content: monthly subscription, per-per-view etc. The prerequisite for these is an conditional access module in the receiver. The digital installations add the possibility to create multimedial user interfaces with EPGs and teaser content. If a cable modem is connected, all transactions can be executed immediately via the return channel.

# DVB-T

DVB terrestrial operates in several European countries (GB, Finland, Sweden ...) and also in Singapore. The German roll-out started in Berlin, where 200.000 DVB-T receivers are sold and the analog transmission is switched off. The audience in Berlin can select between 28 TV channels and two additional data channels – which require MHP enhanced receivers.

25% of the DVB-T users in Berlin are former cable customers who selected the cheaper solution.

The vantages of DVB-T are: possibility to distribute local, nearly »cellular« content, portable and even mobile reception with small antennas.



# DVB-H

Digital broadcast for handhelds,  
e.g. PDAs or mobile phones.

Video: 320x240px, MPEG-4, 15fps

Audio: AAC 32–128 kbps

Data rate combined: appr. 300–380 kbps



Aimed at the joint utilization of  
digital terrestrial television and telecommunications.

»There has been no convergence of transmission technologies and no convergence of distribution services, thus far. But the convergence in content distribution, and technology and system convergence in user equipment is happening.«

Goeran Wahlberg, Nokia Corp.'s director for Concepts and Technology.

DVB-H could solve the bandwidth problem of IP based video transport which hinders the success of streaming concepts for mobile devices. The mobile user can interact with a content which is distributed via broadcast on the same device.

# Handheld + PVR



## Memory Stick Video Recorder

Resolution 160x112px .. 320x240px, 15fps, MPEG-4.  
Over 16 hours of video content in the lowest setting, or 4 hours in top quality with a 1gig Memory Stick Pro media card.

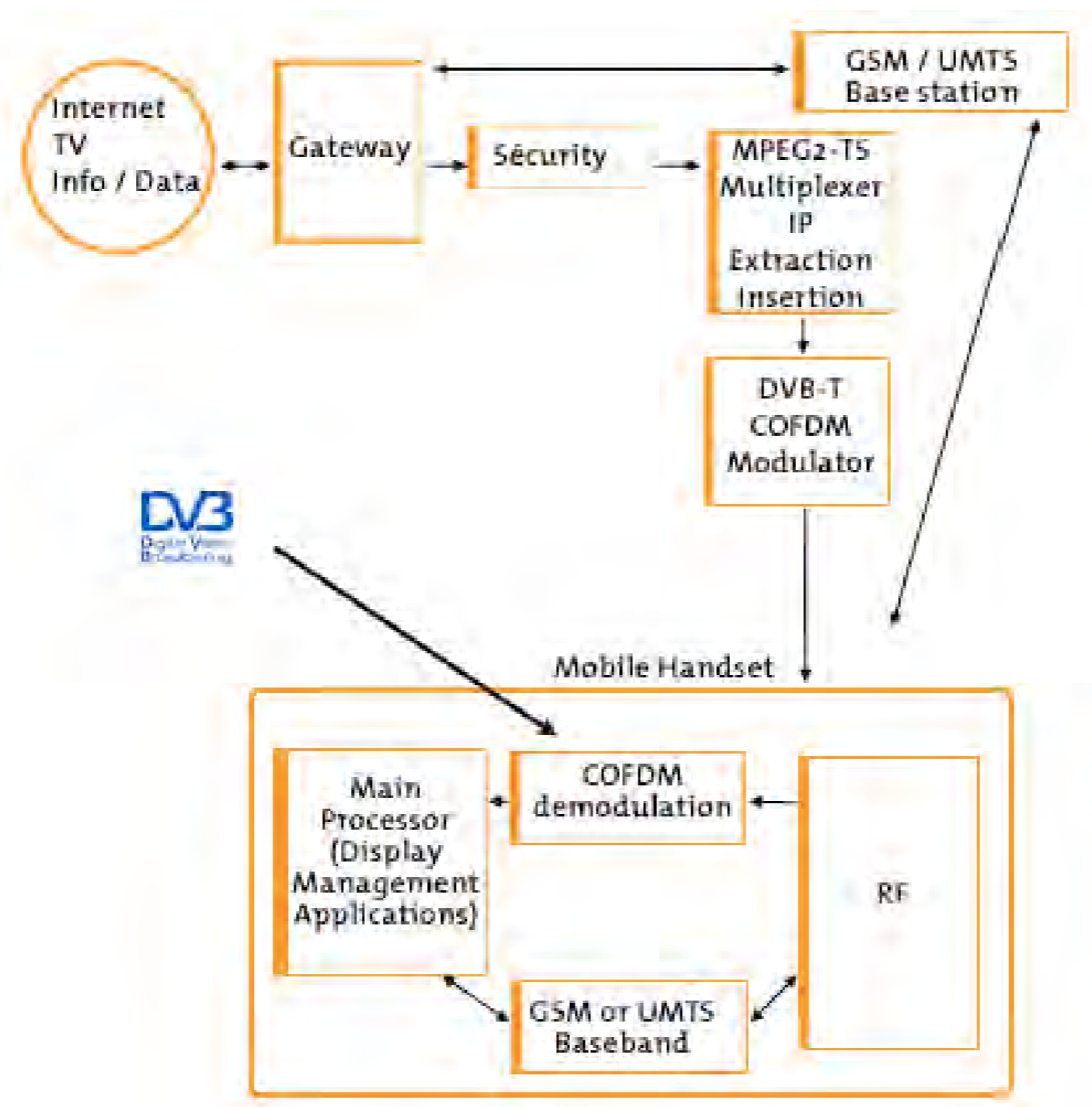


Recording Mode	HQ	SP	LP1	LP2
Bit Rate (video)	384 kbps	218 kbps	96 kbps	64 kbps
Frame Rate	15 fps	15 fps	15 fps	15 fps
Frame Size	320*240	320*240	160*112	176*144
Sampling Rate	24kHz	24kHz	24kHz	24kHz
Stereo/Mono (sound)	Stereo	Stereo	Mono	Stereo/Mono
Bit Rate (audio)	128kbps	64 kbps	32kbps	64kbps

## Memory Stick Media Recording Time

Approx. Recording Time	128 MB	256 MB	512 MB	1 GB
High Quality (HQ)	30 min.	55 min.	120 min.	250 min.
Standard Play (SP)	60 min.	105 min.	220 min.	460 min.
Long Play (LP1)	130 min.	230 min.	490 min.	1,000 min.
Long Play 2 (LP2)	130 min.	230 min.	490 min.	1,000 min.

# Services with DVB-T / -H and UMTS



# Chances & Pitfalls of Digital TV

More channels

Higher quality

Lower costs per channel

Increased turnover

Enhanced TV

Digital Media Network

Equal or lower quality

Higher costs per bandwidth

Equal audience

Audience is not innovative

# Enhanced and interactive TV

## TV

plus basic data (now and then, short info & long info)

## Enhanced TV

middleware (API = application programming interface) enables the delivery of multimedia content to the consumer

## Interactive TV

enhanced TV plus return channel (modem, cable modem; external channels: SMS ...)

## APIs in Europe

MHEG5, MediaHighway, OpenTV, Microsoft TV, MHP

# Example: ARD online channel 1998

**ARD online kanal**

- ▶ Nachrichten
- ▶ Wetter
- ▶ Multimedia-News
- ▶ ARD im Internet
- ▶ OK-Redaktion
- ▶ Hilfe
- ▶ OK-Programm

**ARD DIGITAL**

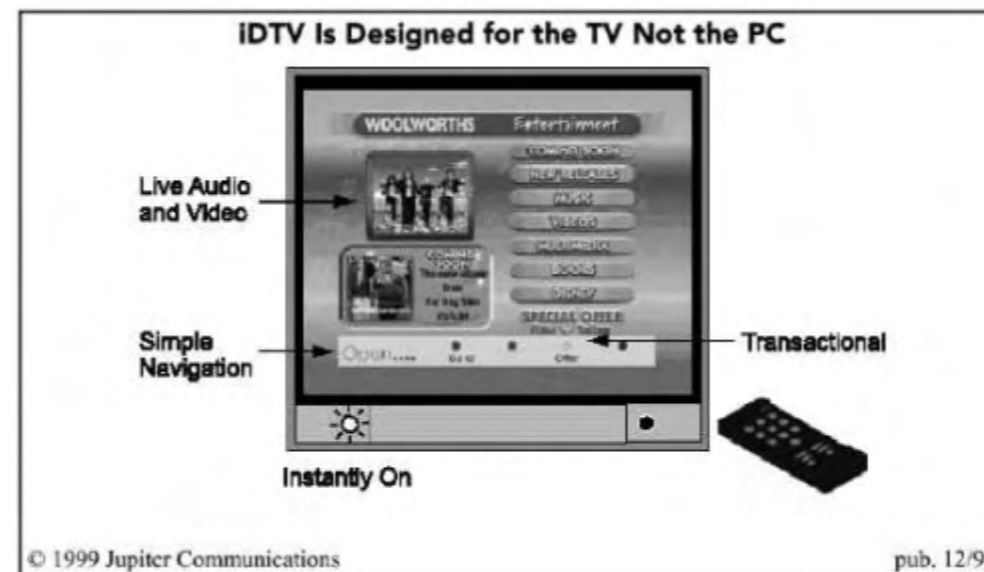
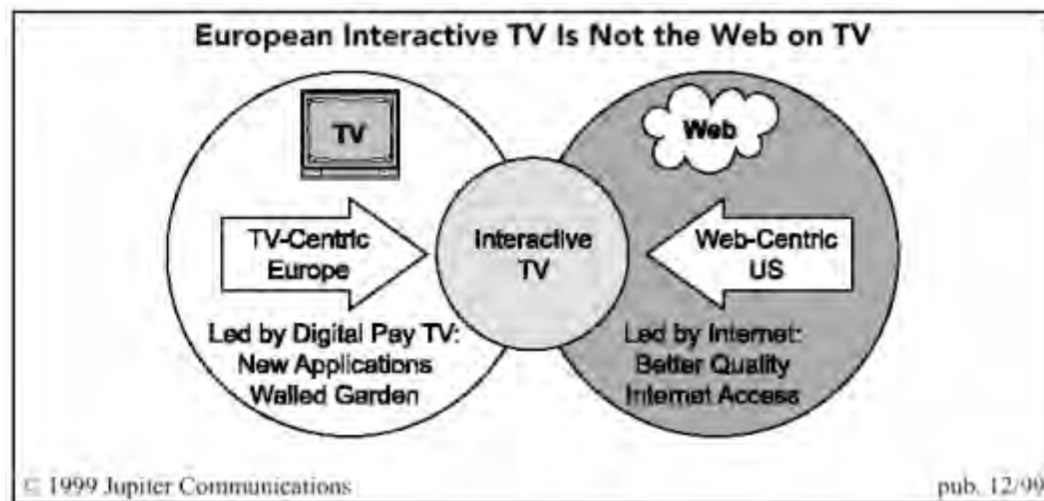
- ▶ Ocean Cities  
**Städte im Meer - Vision und Realisation**  

- ▶ Fenster Zukunft  
**Eine Bildgalerie der Weltausstellungen**  


Der ARD-Online-Kanal wird ab Mitte November 1998 dreimal täglich aktualisiert.

Der ARD-Online-Kanal - mehr als Internet, mehr vom Fernsehen.

# First lessons of multimedia TV programming



# Interference as enhancement :-)





# iDTV penetration in Europe

Country breakdown	2001	2002	2003	2004	2005	2006	2007
UK	7,915	10,515	12,384	13,575	14,019	14,085	14,002
France	3,452	3,863	5,608	7,632	10,049	12,109	13,529
Spain	2,522	2,717	4,001	5,401	6,718	7,692	8,487
Italy	1,758	2,710	4,907	7,301	9,360	11,441	13,320
Nordics	2001	2002	2003	2004	2005	2006	2007
Sweden	705	986	1,575	2,088	2,655	2,953	3,146
Denmark	387	633	929	1,428	1,808	1,886	1,925
Norway	403	542	768	956	1,196	1,344	1,450
Finland	73	122	228	399	630	908	1,188
Benelux	2001	2002	2003	2004	2005	2006	2007
Netherlands	99	189	317	566	906	1,494	2,180
Belgium	-	-	350	681	956	1,314	1,660
Luxembourg	5	11	17	25	36	50	64
Rest of Europe	2001	2002	2003	2004	2005	2006	2007
Germany	-	-	541	1,456	2,693	4,268	5,928
Switzerland	169	296	422	588	795	1,040	1,308
Greece	-	-	-	286	770	1,007	1,283
Ireland	118	148	207	278	359	437	513
Austria	-	-	-	156	242	349	484
Portugal	6	14	40	88	161	265	402

Source: Forrester Research, 2002

# Typical interactive TV services

## Publishing services:

- programme guides (EPG)
- information services (Weather, Traffic, Local news)

## Services synchronised with programme broadcasts (Enhanced TV):

- programme demonstrations
- additional information pop-ups, tickers in the OSD area
- parallel games
- interactive advertising

## Transactional services:

- T-Commerce
- Video on demand (VOD)
- Home Banking
- games on line

# Example: Electronic Program Guide



# Example: Digital Teletext and Multimedia Features



# Business Cases

## Walled garden (vertical market)

As many components as possible in the hand of one company: network, platform (API), conditional access and encryption, contract with customer, set top boxes, ...

In a vertical market, the compromise with respect to set top box specifications is that between capital expenditure and revenue. The degree to which enhancements are displayed and interactivity provided is based on the likely incremental revenue (or avoided cost) that these services will yield.

## Open access (horizontal market)

As many components as possible are accessible for all market participants. The API should be open (if not Open Source). There are many regulations in the broadcast and telecommunications sector, and the high price of the distribution of content is also selective enough.

# T-Commerce (analog version)

Clip Shop

**JETZT  
BESTELLEN**

TOM PETTY



The Last DJ

**CD 74-11**  
**€ 14.95**

Bestell Hotline  
(01805) 22 3 22  
0,12€ / min

Next Show 17:30 Clip Quiz

**SMS Chat: 232355** (bis zu 0,49 € / SMS)

elvis: TP hat's nicht verlernt  
putzi: gibts eigentlich 'ne Tour zum Album  
xCut: Live ist olle Tom der absolute Hammer  
Carola: Hat jemand Tom Petty live gesehen?

# T-Commerce (digital version)

The screenshot displays the Domino's website interface. At the top left is the Domino's logo with the tagline "The Pizza Delivery Experts". The main header area features a large image of a pizza with the text "Visit meal deals to view our amazing new offers". Below this, there are three smaller images showing different food items: a pizza, a salad, and a chicken strip.

On the left side, there is a vertical menu titled "Meal Deals" with the following options:

- Pepperoni Meal Deal
- Vegetarian Meal Deal
- Hawaiian Meal Deal
- Sky Meal Deal 1
- Sky Meal Deal 2**
- Sky Meal Deal 3


Below the menu is a "help assistance" button. At the bottom left, there is a "skyactive" logo and a "local rate" button.

On the right side, the "Sky Meal Deal 2" is highlighted with a price of £14.48. The description reads: "1 Large Vegetarian Supreme, 1 Garlic Pizza Bread, 1 Chicken Strippers".

At the bottom right, there are two buttons: "Main menu" and "View order".

At the very bottom, there is a navigation instruction: "Use UP & DOWN arrows then press SELECT".

# TV-Banking



## Identificazione Utente

Codice Utente 00632820

Password \*\*\*\*\*

CPI \*\*\*\*

Entra

Cambia Password

A	B	C	D	E
F	G	H	I	J
<b>K</b>	L	M	N	O
P	Q	R	S	T
U	V	W	X	Y
Z	0	spazio		
1	2	3	azAZ	
4	5	6	canc	
7	8	9	invio	

Premere Ok per nattivare la tastiera virtuale e immettere i dati

ok conferma    ↕    seleziona    i guida    esc indietro



# Interactive advertising

1. Ford Focus

2. Smart

3. MTV / Nescafé / Pong

# Hull – Kingston Interactive Television

Hull – the city with the white telephone boxes – has a unique iTV system: TV over DSL.



# USA

**ATSC** Advanced Television Systems Committee

**FSIP** program and system Information Protocol

**DASE** DTV Software Application Environment (first steps in Korea)

Until July 2007 all TV sets sold in the USA must have a digital receiver module.  
A terrestrial TV station only gets a new license if it is offering at least one HDTV channel.

## HDTV / SDTV

**Table A3** Compression Format Constraints

vertical_size_value	horizontal_size_value	aspect_ratio_information	frame_rate_code	progressive_sequence
1080 <sup>2</sup>	1920	1,3	1,2,4,5	1
			4,5	0
720	1280	1,3	1,2,4,5,7,8	1
480	704	2,3	1,2,4,5,7,8	1
			4,5	0
	640	1,2	1,2,4,5,7,8	1
			4,5	0

**Legend for MPEG-2 coded values:**  
aspect\_ratio\_information: 1 = square samples, 2 = 4:3 display aspect ratio, 3 = 16:9 display aspect ratio  
frame\_rate\_code: 1 = 23.976 Hz, 2 = 24 Hz, 4 = 29.97 Hz, 5 = 30 Hz, 7 = 59.94 Hz, 8 = 60 Hz  
progressive\_sequence: 0 = interlaced scan, 1 = progressive scan

# Interactive TV in USA?

Enhanced TV and interactive TV:

Internet via Cable

WebTV resp. MSN TV (appr. 500.000 households)

DASE: specified as module of ATSC, no examples in the USA, only in Korea

# VoD: The roots

Denton, Tx. 1993

VoD killer application  
2,8 videos per month and household

Orlando, Fl. 1994-97

100 Mio. USD investment  
4000 participants. VoD, T-commerce, EPG, games

# Video on Demand

Video on Demand permits television viewers to choose, view and pause a program whenever they want. Quality VoD requires a substantial broadband connection (up to 5 Mbps) to every user. It also requires a server that can support a unicast delivery system with multiple viewers requesting the same program at different times.

While VoD has suffered many unsuccessful attempts, the dramatic drop in cost of hard drive and fiber-optic technology makes VoD financially viable today in various targeted applications – most notably in the hotel industry.

Three competing technologies offer some of the capabilities of VoD at a lower cost:

1. Near Video On Demand (NVoD) repeats a small number of popular programs at frequent intervals for large groups of users, but has no ability to pause or rewind the program.
2. Personal Video Recorders (PVR) such as TiVo pre-cache limited content on a hard drive in the viewer's set-top-box, offering full VoD functionality for favorite pre-selected programs.
3. Internet streaming provides the choice and control of VoD, at a much lower quality because of the lower bandwidth.

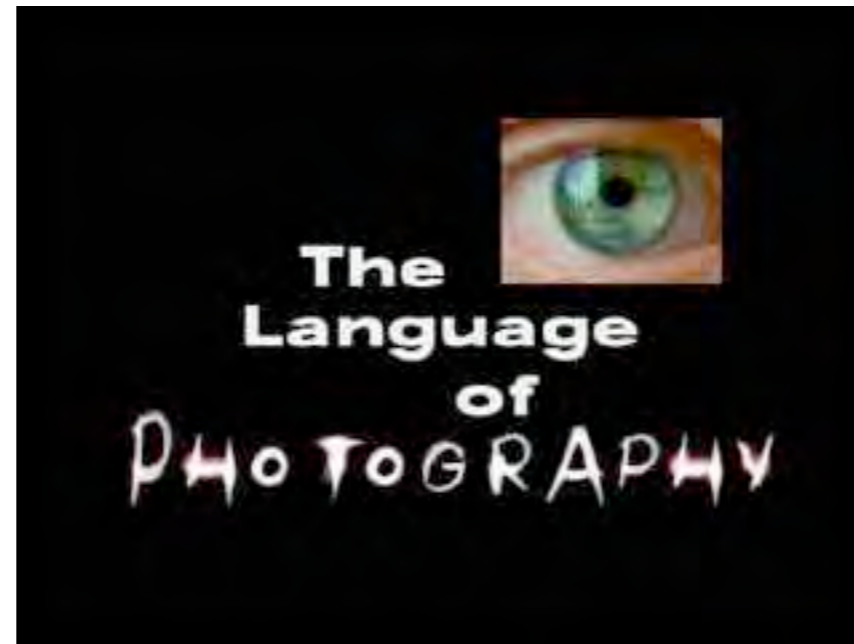
# VoD example AT&T



# Web TV example



Web homepage



TV homepage



»Go interactive« on TV screen



Logon in MSN network



Connection to MSN



# USA Digital Cable TV



- A HIGHLIGHT AREA** The LocalSource Home Page always displays the current date and weather for your community in this area. The Highlight Area on other pages provides highlighted information for the category you have chosen.
- B BANNERS** Links to additional information.
- C NAVIGATION BAR** Links to a specific area. Highlight the on-screen arrows and press **OK** to view additional topics.
- D LOCATION BAR** Indicates where you are. The **LAST** button on your remote returns you to the last screen viewed.

## NEW YORK TIMES | April 4, 2002, Thursday Interactive TV Is Finally Here, Sort Of

By JENNIFER 8. LEE (NYT)

ABSTRACT - Number of households with interactive television is expected to climb by end of 2002 to more than 15 million households; services include video on demand, expanded content for ESPN and Weather Channel, local information and selling channels; **two-way interactivity with television programs appears to be far off because of cost and consumers' resistance to convergence of television and computing**; cable provider Insight exemplifies trend toward interactivity with services that include local weather, traffic and music performances.

# Convergence – Divergence

Convergence – what kind of convergence?

1. Convergence of devices.

PC and mobile phone, TV and PDA ...

2. Convergence of production.

»Write once – distribute to many platforms«. The golden age of CMS.

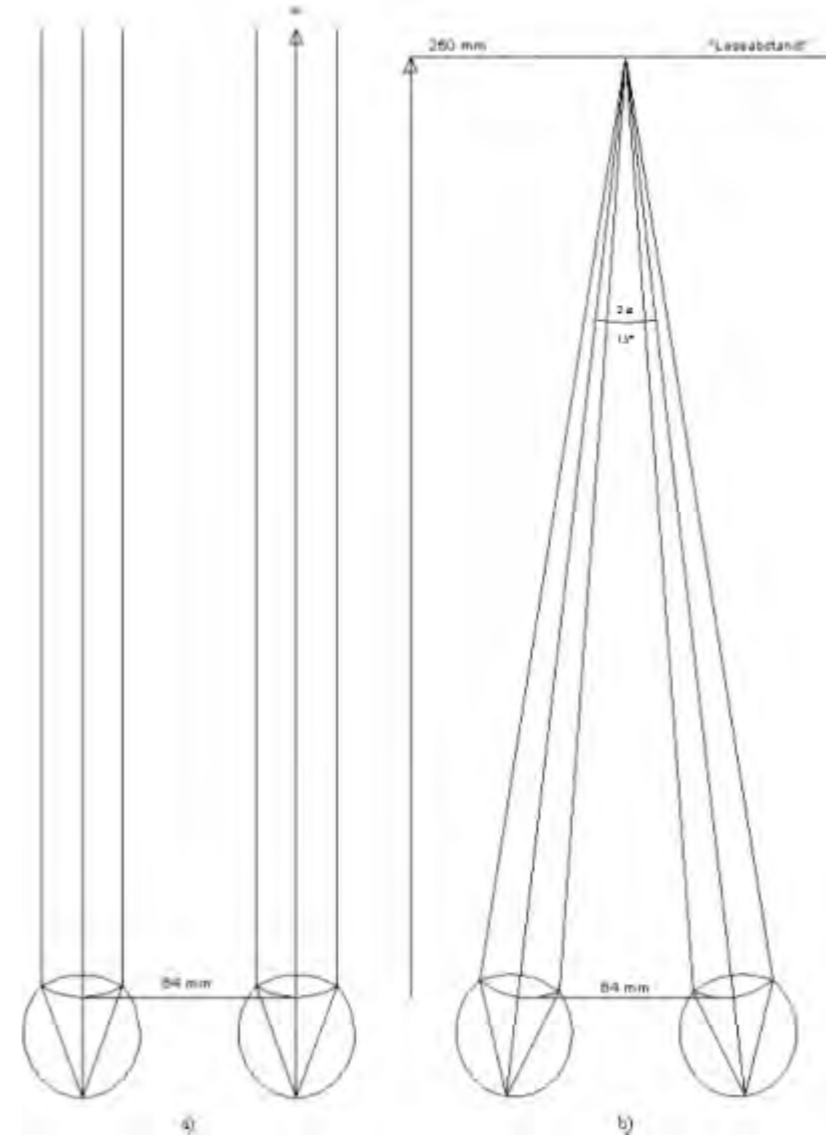
3. Convergence of content.

Platform specific, network specific and display specific content is desired.

4. Convergence of networks.

One-way, (crippled) two-way, store-and-forward ...

Conclusion: convergence should stay in the field of ophthalmology



# Interaction with media

## 1. simple interaction:

Multiple choice

Input fields and simple forms

order forms

## 2. communication:

E-mail?

SMS

Multi user games

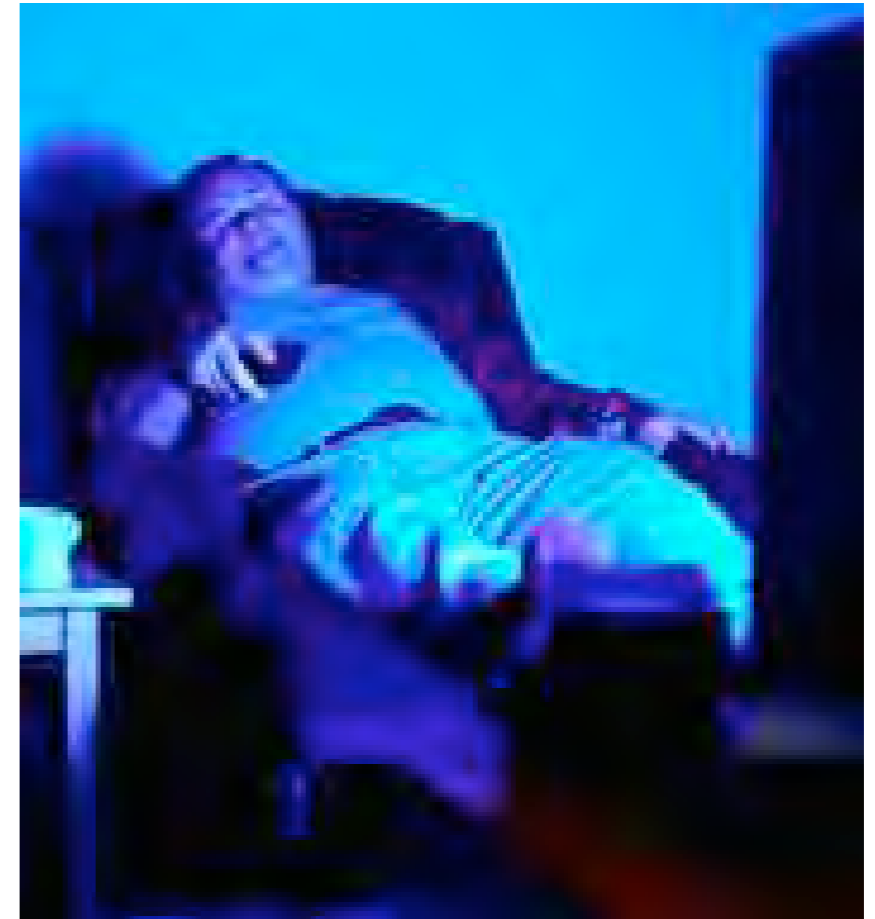
Chat

## 3. intervention:

MUD

control of actions in live programs

...



# Interactive Entertainment

**Gefühlsecht Chat**  
Dates \* Flirts \* Herzklopfen

(exodus) lol mast  
(madgirl12) abbta erger mich mal  
(exodus) mein korn ist für mich\*g\*  
(eve20) tag zusammen  
(madgirl12) lol  
(mast3r) exo den kannst du auch gern für dich allein haben :)  
(madgirl12) whos a freak like me??  
(mast3r) ich dachte eher so an cocktails und so  
(madgirl12) \*g\*  
(mast3r) halt alles was teuer is -g-  
(exodus) ein prosit, ein prosit, der gemütlichkeit \*sing\*  
(leinadbhv) \*\*\*  
(madgirl12) oh  
(exodus) lol mast  
(madgirl12) cousin erger mich mal

**Kontakt Börse Bremen**

- Partnersuche
- Treffpunkte
- Flirts
- Beratung
- Spiele

Schick Deine Chat-SMS an: **777-3435** powered by **bremen4u**

# Crossmedial data exchange

**Kontakt Börse Bremen**

- Partnersuche
- Treffpunkte
- Flirts
- Beratung
- Spiele**
- Startseite
- TV

**»Blind Date« Level 4**

Ordnen Sie die Lieblingsschuhe und die Wunsch-Kopfbedeckungen den Stimmen zu!

1		2		3		4	
5		6		7		8	

**Die Stimmen:**

Jan_1	<input type="text"/>	<input type="text"/>	Helmut	<input type="text"/>	<input type="text"/>
Marc	<input type="text"/>	<input type="text"/>	Jörn	<input type="text"/>	<input type="text"/>

**Kombination eintragen**

Wenn Sie eine richtige Kombination treffen, werden Sie zur Kontaktseite weitergeleitet. Stimmt keine Kombination, geht's weiter mit Level 5.

**Ihr Profil**

# Who is afraid of media ruptures?



NRK program with two video channels in two windows, SMS chat and polling

# Killer app in Portugal



Source: CaboTV

# MMS over TV

 **funkhaus europa**

[back](#) | **MMS viewer**

 Tracy Chapman



**FROM:** Erden Gürcan  
26.10.2003 18:30

Liebe Bettina, in diesem Flugzeug bist du aus Antalya von mir gegangen. Nun bin ich ganz einsam ohne dich. Wie geht es dir in Bremen? Dein Erden

[view full-size photo](#) | [reply](#) | [delete](#)

[> menu](#) [> back](#) [> services](#) [> help](#)



# The killer of TV advertising



# Conclusion

1. The production and distribution and all other technical components of TV will be digital (timeline 2010).
2. TV will not totally »converge« with other media, but will include and integrate more communication and interaction.
3. To avoid a further downgrading of its role in the digital media network, TV has to stress its core assets: excellent video, popular programming ...

Got the picture? Thank you.

Contact: [hero@weisses-rauschen.de](mailto:hero@weisses-rauschen.de)