IPTV – the re-invention of Television

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Making It Happen: Global Spreading

"During an on-stage presentation, (IPTV) got big cheers."

"IPTV will change the way we get TV programmes"
– BBC, March ’05

"I want my IPTV!"

Newsweek
IPTV Buzzword Bingo

- Non-linear television
- Electronic Program Guide (EPG)
- TV over IP a.k.a. IPTV (streaming aspects)
- Personal Video Recorder (PVR)
- interactive Television (iTV)
- Players & Business Models
  - Telco vs. Broadcasters vs. ISPs
- Regulations
  - DRM
  - Digital Divide
- Digital Rights Management
  - Codecs
  - Enforcement through framework/platform
- PC vs. Set-top-box vs. Microsoft Media Center vs. Handset
- Satellite vs. Cable vs. Cellular Systems
- NextGenTV middleware → NextGenMHP?
- New apps → personalized, interactive, ambient-aware, cooperative TV → community TV

What is IPTV? Some Definitions …

- IP is used as Network Layer Protocol and contrary to traditional cable or broadcast and Satellite TV, IPTV uses digital broadband networks such as ADSL etc to transmit the data
- IPTV is a method of delivering HDTV television and on-demand, rich media content that uses an IP network as the medium
- Transmission of content is done between a so called playout center and a terminal (e.g. STB, PC, Mobile Phone)
- A TV over IP solution typically streams between 50 and 150 TV channels over an IP network
- IPTV uses a two-way communication to handle viewer requests to access media resources and to provide interactivity
- Set top boxes can be used to descramble the signal and displays the video stream on a TV set
- The term “Triple Play” is often used with IPTV. It simply means offering Voice, Video and Data (Quadruple → adds mobile)
**Triple-Play** – a combined Service with TV, Data and Telefony

- Voice over IP
- Internet/Data
- Video
- Triple Play
- Quad Play
- Mobile TV (UMTS, etc.)
- WAP, GPRS, UMTS-Data-Cards
- Mobilfunk
- Interactive TV

**IPTV User Interface**

IPTV brings digital TV, VoD, VoIP, Internet access, media downloading and other services …
the Triple-Play Race

Potential Triple-Play-Platforms

Cable Networks
- VoCaTV
- Broadband-Internet (IPoCaTV)
- CaTV

Fixed Networks
- Analogue ISDN VoIP
- Broadband-Internet (xDSL, FTTx, SAT)
- IPTV

Mobile Networks
- Mobile Telephony
- Mobile Internet (UMTS)
- Mobile TV (DVB-H, DMB)

Problems:
- Return channel
- Bandwidth, QoS and Multicast Functionality
- Bandwidth (Mobile), Frequencies (Broadcast) and Coverage

IPTV: Next-Generation TV

- IPTV is not:
  - Video streaming over Internet
  - TV on PC
  - Best-efforts video services
  - unclear business model

- IPTV is:
  - TV services over managed IP networks
  - Broadcast TV
  - All types of On-Demand TV/Video
  - Electronic Program Guide - EPG
  - "Connected Entertainment"
**General IPTV Architecture**

- **Live Media**
- **Live Encoder**
- **Live Streaming Server**
- **Home PC**
- **IP**
- **IPTV A/S e.g. Subscriber Management**
- **VOD Streaming Server**
- **On-Demand Media**
- **On-Demand Encoder**
- **TV via STB**

Source: Microsoft

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**IPTV growth prognosis**

- The analysts view (Gartner):
  - This year 3.3 million people use IPTV frequently in Europe
  - By 2010 about 17 million people will use IPTV services according to a report from technology market analysis firm Gartner
  - Despite the robust growth in users, IPTV will struggle over the next five years to become a mainstream revenue opportunity for telecom carriers. Competing against entrenched Pay TV and free-to-air terrestrial TV providers who deliver good quality programming for free, carriers will resort to low-priced services and bundles to drive initial subscriber uptake.
  - As a result, carriers’ IPTV revenue in Western Europe during the period will grow from 336m€ in 2006 to only 3 bn€ by 2010.
**Triple-Play Markets**

![Graph showing available Service-Level and Triple-Play Usage](image)

**IPTV in Europe**

- France is far ahead by IPTV adoption
- Germany is a „wired“ market with a mixture of several analogue and digital access technologies
- Other countries like France and Spain already offer a IPTV infrastructure, available to the customer.
- Gartner predicts that by the end of 2006, almost half of Western Europe's IPTV subscribers will be based in France
- This might change with the start of Deutsche Telekom's Microsoft TV project based on VDSL access technology
International Successful Examples of Triple Play

- **iliad**
  - Bis zu 24/1 Mbit/s Breitband-anschluss, VoIP und TV (2004)
  - **Customers**: 1.300.000 Triple-Play, davon 18% auch Pay-TV (69% der Breitbandkunden)
  - **ARPU**: Umsatz je Kunde 386 €/Jahr über alle Kunden – 10% für VAS Umsätze

- **PCCW**
  - Bis zu 8/0.8 Mbit/s Breitband-anschluss, VoIP und TV (2004)
  - **Customers**: 550.000 Triple-Play, davon 70% auch Pay-TV (66% der Breitbandkunden)
  - **ARPU**: 138 €/Jahr extra für Pay-TV Customer (starker Pay-TV Markt)

- **FASTWEB**
  - Bis zu 20/1 Mbit/s Breitband-anschluss, VoIP und TV (2003)
  - **Customers**: 180.000 TVoDSL, davon 66% auch Pay-TV (30% der Breitbandkunden)
  - **ARPU**: Umsatz je Triple-Play-Kunde 1121 €/Jahr vs. 807 €/Jahr für Dual-Play-Kunden

- **Free**
  - Bis zu 24/1 Mbit/s Breitband-anschluss, VoIP und TV (2004)
  - **Customers**: 550.000 Triple-Play, davon 70% auch Pay-TV (66% der Breitbandkunden)
  - **ARPU**: Umsatz je Kunde 386 €/Jahr über alle Kunden – 10% für VAS Umsätze

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In Addition to Triple-Play: other Players

**Alternative Providers**

- **Net-independent VoIP Provider**
  - Vonage: Worldwide Voice and Video over IP

- **Mobile Network Provider**
  - O2: Fixnet-Mobilnet-Substitution

**Add-on Services**

- TV/Video
- Telephone
- Internet/Data
- Broadband-Access

**Micro-Publishing/Social Web**

- YouTube
- Facebook
- Micro-Publishing/Social Web
  - Usergenerated Content e.g. Video-PodCasts, Video-Blogs,...

**TV over Internet**

- SEEtv
- NEEPTV
- Worldwide Streaming of TV-channels (1900+ Channels)

**TV on Demand/Shift-TV**

- Q8
- RIZ
- OTT
- Worldwide Delivery of Video on Demand – e.g. with time limited Usage

**Video-on-Demand**

- Google
- Maxomai
- Video on Demand – e.g. with time limited Usage

**Download -to-Own**

- Electronic Selling of Videos

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Quelle: Fastweb (2005), PCCW (2005), Free, A.T. Kearney
**New Service Opportunities**

**Expansion Opportunities**
- Interactive Entertainment
- E-Commerce & Betting
- Personal Content Storage
- Community Services
- Communication Services
- Personalised Advertising
- Communication/Storage
- Identification/Profile/Presence
- Payment

**Triple-/Quadplay**
- TV/Video
- Internet/Data
- Tele-fon
- Mobile

**Problems**
- Bandwidth & QoS
- In-Flat Distribution
- Rights & DRM
- Interactivity

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**IPTV service requirements**

- Broadband, highly sensitive traffic
  - Video traffic is highly sensitive to delay and packet loss (unlike traditional HTTP based services)
  - Massive capacity requirements: video on demand with at minimum 2-4 Mbit/s per user and up to 18Mbit/s for HDTV
- Multicast
  - Needed to ensure service scalability

- Access Bandwidth
  - ADSL2+ (~20 Mbit/s) is just enough for one HDTV transmission to the customer (up to 18Mbit/s needed for one channel in 720p)
  - VDSL / VDSL2 (>= 50Mbit/s) is needed for multiple HDTV transmission and additional services like VoIP etc
**IPTV bearers**

- Access Media Types on which IPTV can be delivered
  - xDSL
    - xDSL is very common in Europe. With the introduction of VDSL also HDTV broadcasts will be possible by mid 2006
  - CATV
    - with a focus on PacketCable services IPTV over CATV will be more and more important especially on the US market.
  - 3G / UMTS
    - Low quality video streaming is already available to the customer. With the deployment of HSDPA and multicast capabilities, UMTS will be more and more interesting for mobile IPTV services
  - MBMS
    - Suitable for low quality video (15 fps 176x144 + 12.2 kbps audio) but multicast streaming for cellular systems
  - DVB-C/S/T/H, DMB, MediaFlo
    - Digital broadcasting solutions with different capabilities (video quality, number of simultaneous channels, power consumption)

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**3G vs. DVB**

- **3G**
  - It is easy to charge for services (native to mobile comm. Networks)
  - Perfectly suited to deliver personalized and special interest content to individuals
  - Enables interaction as it has a return channel

- **DVB**
  - Cost efficient in the case of reaching large audiences.
  - Flexible and higher bandwidth as compared to 3G networks
  - Drawback is of course the missing of return channel
  - Free of charge: DVB streams might be received by the end users for free
**IPTV Standardization bodies**

- IPTV standardization has just started

- First ITU-T IPTV standardization meeting in April 2006 with all major SDOs
  - An IPTV FG (Focus Group) has been established for ongoing standardization activities

- **ETSI TISPAN 1.0** (Telecoms & Internet converged Services & Protocols for Advanced Networks) released by the end of 2005 mentioned IPTV for further studies

- **TISPAN 2.0** will have a special focus on IPTV and IPTV services

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**IPTV Standardization bodies cont.**

- ATIS is a US based body that deploys and promotes technical and operations standards for the communications and information industry

- ATIS IPTV Interoperability Forum (IIF) was established by mid 2005

- some standardization work has been done resulting in

  IIF IPTV Architecture Requirements document

  - This document has also been presented to ETSI TISPAN and DVB as a potential base for their standardization work
IPTV Standardization bodies cont.

- **DVB**
  - Within DVB there are two groups working on IPTV standards:
    - CM-IPTV (Commercial Module IPTV)
    - TM-IPI (Technical Module IP Infrastructure)
  - TM-IPI has finished the Phase 1 DVB-IP Handbook by the end of 2005. It is aimed at deployment of services with MPEG-TS. Phase 2 started in 2006 will deal with new content formats, home networking, authentication and data integrity.

IPTV Standardization bodies cont.

- Other SDOs concentrating on IPTV:
  - DSL Forum
  - DLNA (Digital Living Network Alliance)
  - ISMA
  - HGI (Home Gateway Initiative)
IPTV in Mobile Standardization

- Multimedia Broadcast Multicast Service (MBMS by 3GPP R6)
  - Max. 256 kbps
    - ok for QCIF (15 fps 176x144 + 12.2 kbps audio)
    - No dedicated uplink!
  - Korea: S-DMS
  - Europe: S-DMB → 3GPP R6 MBMS compliant
  - MBMS Subset: Cell Multimedia Broadcast (CMB) by Huawei already available

- TISPAN R2 Def (start: March 2006)
  - Support for IPTV
    - Broadcast
    - VoD (similar to DVB)
  - FMC (fixed mobile convergence)
  - Admission control

IPTV standardization bodies cont.

Source: DVB-Forum
Example Services

- Microsoft TV IPTV Edition
  - Integrated software platform to deliver broadcast quality video and integrated services over broadband networks
    - Video on demand (VOD)
    - (multiple) picture in picture (PIP)
    - Instant channel change (ICC)
    - Digital / personal video recorder (DVR/PVR)
- About 600 servers will be needed to serve 1 million people

Microsoft solution: IPTV Edition

Connected Devices and Services

- Windows Mobile
- XBOX 360
- msn

Server Software

- Windows Server 2003
- SQL Server
- BEtalk Server 2005
- Windows Media Center
- Visual Studio .NET
- Digital Rights Management (DRM)
- XML
- Web Services

Client Software

Tools and Technology
Example Services cont.

- Deutsche Telekom decided to use Microsoft TV as their IPTV platform
  - VDSL will be used as access technology for the end user
  - With a bandwidth of about 50Mbit/s it will be possible to stream multiple channels (also in HDTV) and additional services to the customer
  - First services called T-Home will be available in mid 2006 in ten mayor German cities
  - FOKUS will take part in the T-Home field test

Example Services cont.

- IPTV @ home
  - Streaming of TV channels to your (local) network
    - Standard TV-cards are being used to stream Live TV from a PC equipped with a DVB-C/S/T to the local network via uni- or better multicast
**NextGenTV scenarios**

- Linear / Broadcast TV
- Linear Broadcast with Trick Modes
- Near Video on Demand (nVoD)
- Video on Demand (VoD)
- Networked Personal Video Recorder (nPVR)
- “MyTV” Podcasting
- Interactive TV (iTV)
- Audio
- Gaming
- More Advanced scenarios:
  - TV vs. Incoming telephone call
  - Tell my buddies what I’m watching to (See what I see...)
  - Send gift to buddy
  - (Shared) Favorites
  - Information on favorites

**NextGenTV Features – Must have!**

- Live TV & Recorded TV
- VoD, UPnP, PIP- picture in picture
- HD recording
- Customer groups can be provided with own look&feel
- (remote or network) PVR
- VoIP integration
- SMS integration
- Email indication/integration
- Mobile support (mobile TV)
**Next Generation TV**

Main focus
- IPTV, Interactive TV, Mobile TV
- NextGenTV Platform for converged environments
- NextGenTV in real environments (IMS, DVB-H/DMB, DSL, WCDMA)

**IPTV General Architecture & Roles**
IPTV General Architecture & Roles

Streaming
- Life TV
- DRM
- Access
- Home GW

Content Provider

Web Cam
- CRM
- QoS
- STB

Service Provider

PVR
- Billing
- Route / Switch
- Mobile

Network Provider

Profile
- Control
- HTPC

Customer

Identity
- Mgmt
- Phone

Portal

NextGenTV @ FOKUS - SE – Functional Overview
IPTV research @ FOKUS

- Establishment of a IPTV / NextGenTV testbed @ FOKUS
  - IPTV integration into IMS
    - NextGenTV IMS client
    - NextGenTV Core Network
      - NextGenTV A/S
      - NextGenTV Media Server

- Why use IMS for IPTV?
  - We need an instance for billing, DRM, i.e. service control
  - Until now there are no standards for IPTV
  - IMS is still under development too
  - IMS could be the enabler for controlled and standardized IPTV to different bearers, e.g. xDSL, CATV, UMTS, WLAN, etc.

IMS based IPTV
Logical architecture

Services Layer
- Application
- Application
- Application

Services Enabler layer
- Presence
- XDMS
- IM
- IPTV AS
- Content Provider (Life TV & VoD)

Control layer
- HSS
- P/I-/S-CSCF
- MS
- IMS Core

Access & Transport layer
- WLAN
- DSL
- Public Internet
- UMTS/CDMA
- DVB
- User Terminal
Ordering a DVB-H Broadcast via IMS
Note: Broadcast may need special encoding

- cam on nhieu
- Thank You
- Danke schön