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TVoIP - Convergence at Last

alexander.adolf@micronas.com

TV Mobile World and TVoDSL World Conference 2007

About me

- Alexander Adolf received a **Dipl.-Ing. (FH)** degree in Data and Information Technology from the Georg-Simon Ohm University of Applied Sciences in Nuremberg (Germany) in **1995**.
- After developing **GSM** terminals for **Nortel**, he entered the **digital media industry** in **1996** and joined **BetaResearch** as a Senior Software Developer.
- For BetaResearch, he helped in the **commercial launch** and operation of **Premiere**, the **first digital pay-TV** operator in the German-speaking countries.
- In **1997**, he joined the **DVB TM-GBS** technical experts group, which he is **chairing since 2000**.
- Since **2001** he is with **Micronas**, a leading independent provider of innovative application-specific semiconductor system-solutions for consumer and automotive electronics, and is heading the team for middleware and application software stacks.
- Mr. Adolf is a member of the Association of Engineers in Germany (**VDI**).

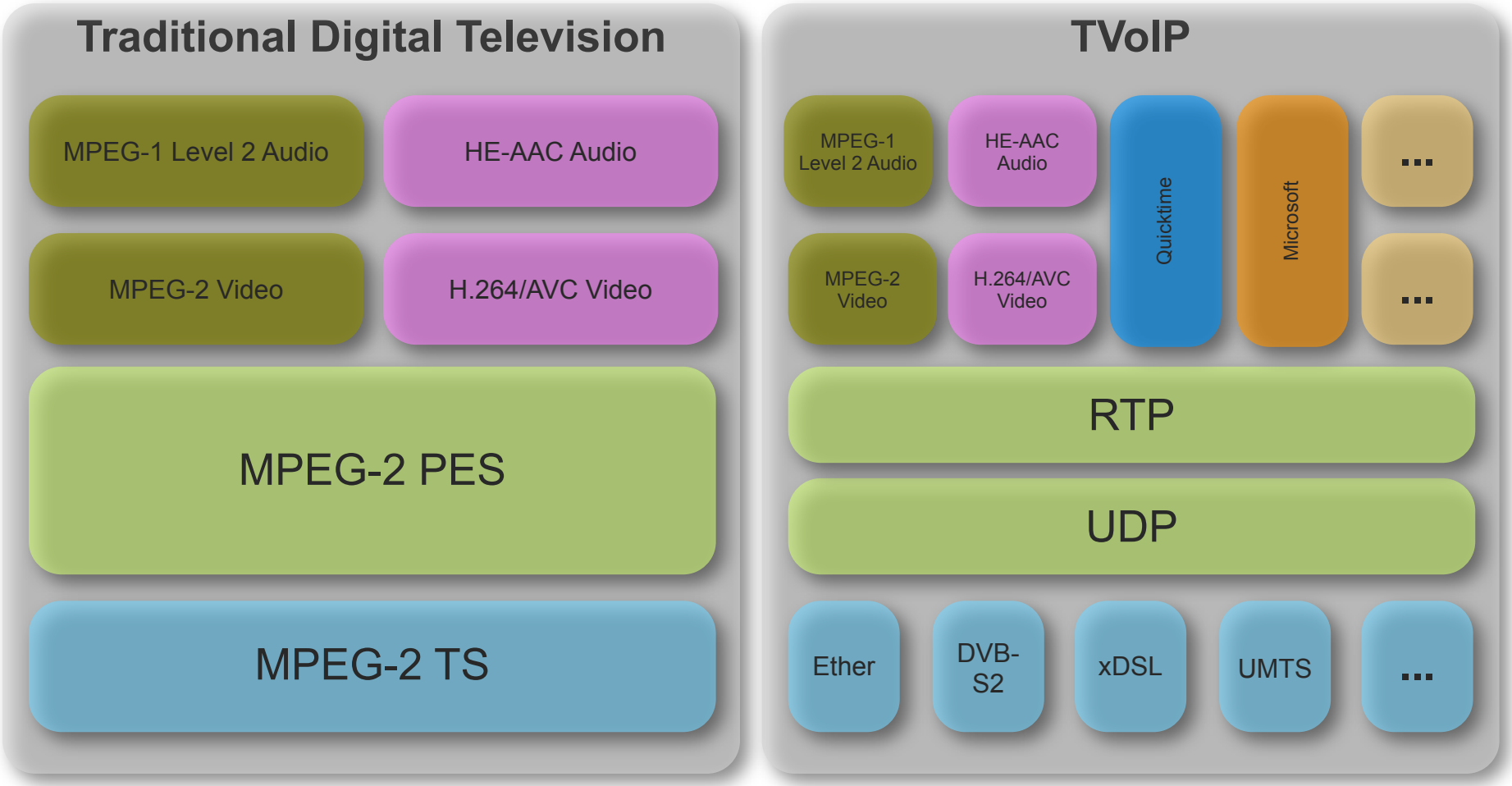
Overview

- What is TVoIP?
- Why is IP Streaming the Decisive Step Forward for Broadcasters and TelCos/MobileOps?
- DVB standards for TVoIP
- Network architectures
- Wrap-up

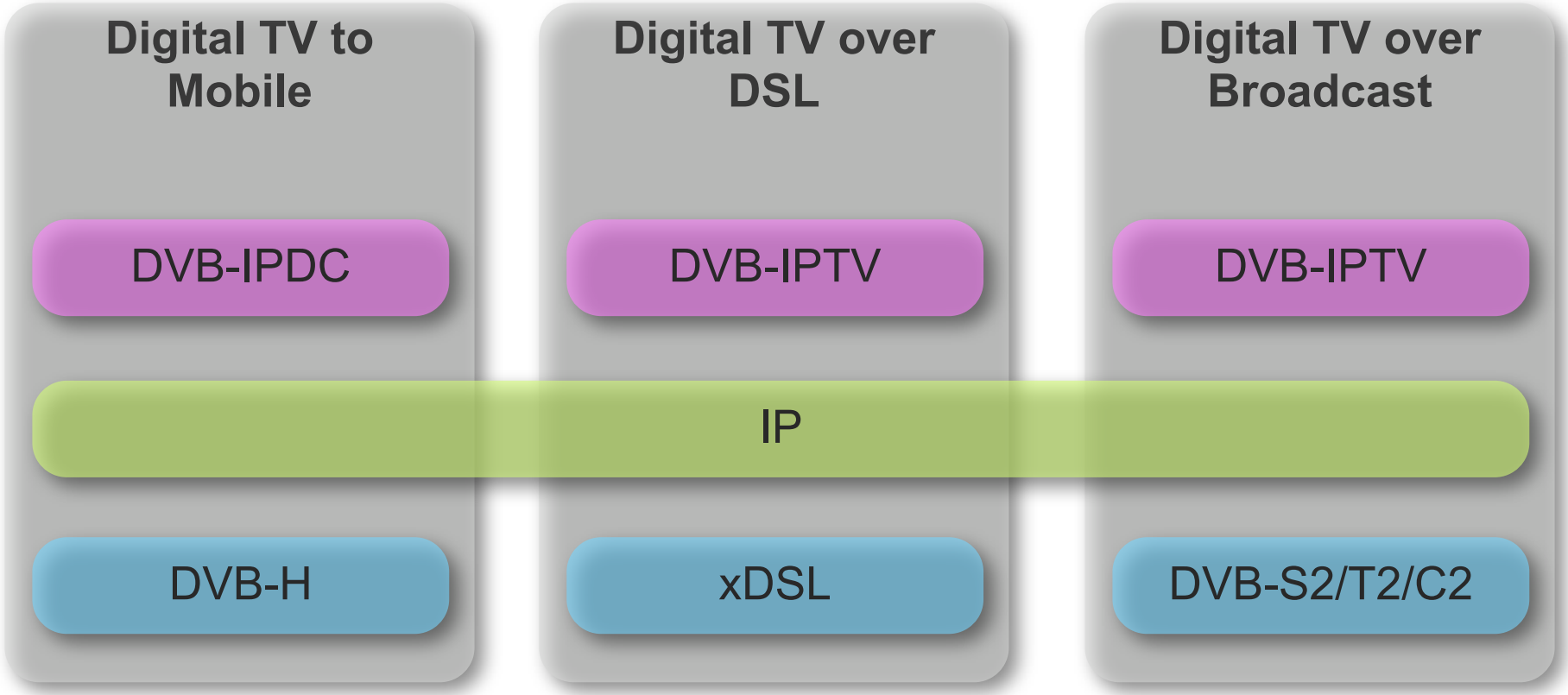
Introduction:

What is TVoIP?

Side-by-Side Comparison



Completing the Picture



What is “TVoIP”? (1/2)

- “TVoIP” is television (“TV”) over Internet protocol (“IP”)
- to be seen in contrast with traditional digital TV
  - which was TV over *X* over MPEG-2
  - where *X* can be DVB, ATSC or ISDB-T
- in traditional digital TV data link, transport and content encoding (aka. “codec”) are **coupled**
- in TVoIP data link, transport and content encoding (aka. “codec”) are **separate**
- this allows for technological convergence and enables cross-marketing of services between broadcast and data networks

What is “TVoIP”? (2/2)

- this is a DSL and Mobile World congress, so what’s this “TV” and “broadcast” thing anyway?
- “TV” refers to the content and means **video-centric**, **non-interactive** services
  - live TV
  - Near Video on Demand (NVoD)
    (movie starts every 15 min)
  - Content on Demand (CoD)
- “broadcast”
  - refers to delivery of content over a **uni-directional** network, i.e. in a **one-to-many** mode

Why is TVoIP new?

- as a **TelCo**, you will argue that you are already offering video-centric, non-interactive services over IP
- as a **MobileOp**, you will argue that you are *just about* to offer video-centric, non-interactive services over IP
- but... both of may be **missing** some important details
  - your networks are bi-directional
    - **not uni-directional**
  - your streaming often is point-to-point (multiple one-to-one sessions going on simultaneously)
    - **not real mutlicast** (one-to-many), same content to everyone at the same time in real-time
  - most of the time you are offering Content on Demand
    - **not** real **live TV**

Why is IP Streaming a Decisive Step Forward?

The Step Forward (1/2)

- As stated on slide 7 IPTV and IPDC **break the coupling** between
  - data link,
  - transport and
  - content encoding (aka. “codec”).
- Why is this important?
- Because it allows for **technological convergence** and enables **cross-marketing** of services between **broadcast and data networks**.

The Step Forward (2/2)

- How does it do that?
- By separating these layers, each of them becomes an **interoperability** layer:
  - content encoding (aka. “codec”)
    - audio-visual content only needs to be produced **once**
  - transport
    - complete services including metadata can be encapsulated in whatever transport the network provides; services only need to be packaged **once**
  - data link
    - the same transport packets can be carried across any data link layer; services become **portable** between network types

But Of Course There is No Free Lunch...

- To make all this portability and interoperability work in commercial deployments, you have to ensure that the **metadata** is compatible across platforms.
- **Metadata** is data about data. Examples for metadata in the TV environment:
  - Electronic Programme Guide (EPG)
  - Service Discovery & Selection (SD&S)
  - Promotional Information (“Press red to purchase now”)
- If the data models don’t match, **re-selling a service on a different platform** becomes very costly (if not impossible)
- If metadata is not harmonised between platforms, **hybrid terminals** become very costly

Important Technology Gap

- For *real* live TV, i.e. using a live, real-time audio/video encoder, there is an important missing element in the technology portfolio: **lip sync**.
- **Today's IPTV** works because you're using **pre-encoded content** which was encoded off-line. Hence the resulting stream is pristine with no jitter etc. It's **just like playing a DVD**.
- But if you use a live, real-time encoder to stream the content as it is encoded, you have to cater for **different jitters and propagation delays being applied to audio and video**.
- Fact: **RTP as it is cannot cope with live, real-time encoders**. Hence lip sync doesn't work if content is encoded live and in real-time.
- **DVB is working on a solution to amend RTP** to enable the use of live, real-time encoders.

DVB Standards for TVoIP

What is DVB?

- DVB is a global industry consortium with **over 270 member organisations**
  (broadcasters, telcos, CE manufacturers, regulators)
- DVB operates **market-driven**
- DVB is active **since 1993**
- DVB **standards are adopted world-wide** in the broadcast industry
- For more information see www.dvb.org

DVB Standards for MobileTV

- DVB-H
  - **ETSI EN 302 304** *“Transmission System for Handheld Terminals (DVB-H)”*
  - **ETSI TR 102 337** *“Implementation guidelines for DVB handheld services”*
  - **ETSI TR 102 401** *”DVB-H Validation Task Force report”*
- DVB-IPDC
  - **ETSI TS 102 468** *“IP Datacast over DVB-H: Phase 1 specifications”*
  - **ETSI TR 102 469** *“IP Datacast over DVB-H: Architecture”*
  - **ETSI TR 102 470** *“IP Datacast over DVB-H: PSI/SI”*
  - **ETSI TS 102 471** *“IP Datacast over DVB-H: ESG”*
  - **ETSI TS 102 472** *“IP Datacast over DVB-H: Content Delivery Protocols”*
  - **ETSI TR 102 473** *“IP Datacast over DVB-H: Use Cases and Services”*
  - **ETSI TS 102 474** *“ IP Datacast over DVB-H: Service Purchase and Protection”*
- Service Purchase and Protection
  - ETSI TS 102 474 also contains an OMA DRM based profile

DVB Standards for IPTV

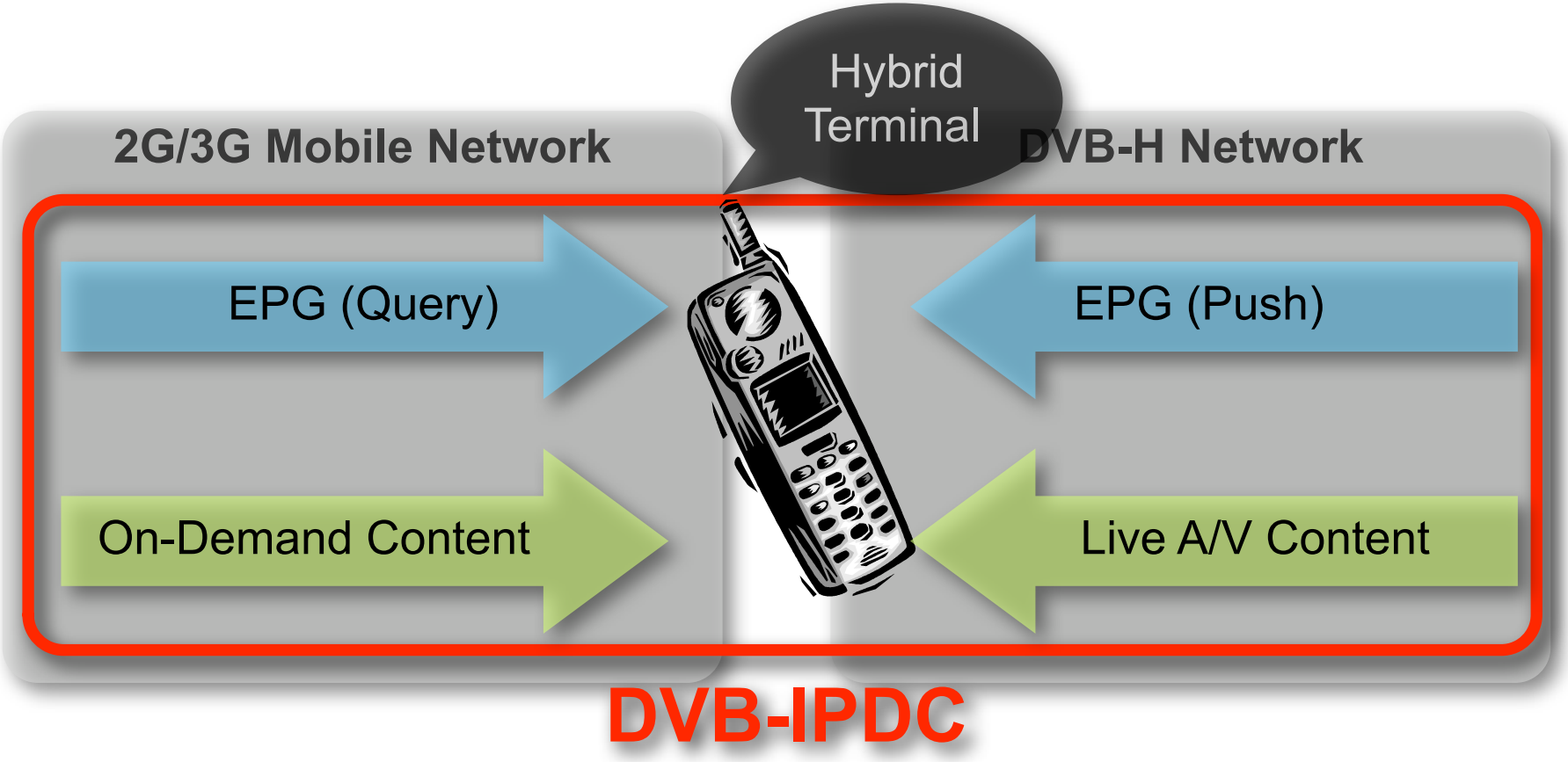
- DVB-IPTV
  - **ETSI TR 102 033** *"Architectural Framework for the Delivery of DVB-Services over IP-based Networks"*
  - **ETSI TS 102 034** *"Transport of MPEG-2 Based DVB Services over IP Based Networks"*
  - **ETSI TR 102 542** *"Guidelines for DVB IP Phase 1 Handbook"*
  - **ETSI TS 102 813** *"Transport of DVB Services over IP-based Networks: IEEE1394 Home Network Segment"*
  - **ETSI TS 102 814** *"Transport of DVB Services over IP-based Networks: Ethernet Home Network Segment"*
- DVB Metadata and PVR
  - **ETSI TS 102 539** *"Carriage of Broadband Content Guide (BCG) information over Internet Protocol (IP)"*
  - **ETSI TS 102 323** *"Carriage and signalling of TV-Anytime information in DVB transport streams"*
  - **ETSI TS 102 823** *"Carriage of synchronised auxiliary data in DVB transport streams"*
  - **ETSI EN 300 468** *"Specification for Service Information (SI) in DVB systems"*
  - **ETSI TR 101 211** *"Guidelines on implementation and usage of Service Information (SI)"*
- Plug&Play
  - DVB builds on the plug&play connectivity provided by DLNA and UPnP

DVB Standards for TVoIP

- DVB provides a **comprehensive set** of **open specifications** covering **all areas of TVoIP** (mobile, xDSL and broadcast)
- DVB provides **key technologies at all levels**:
  - base level: RF and channel coding, transmission standards
  - system level: metadata, system integration and cross-system compatibility
- Through **over a decade of successful history**, hundreds of man-years of work going into every major specification and **top-level industry expertise**, DVB specifications provide **unparalleled quality** and **world-wide acceptance**

Network Architectures

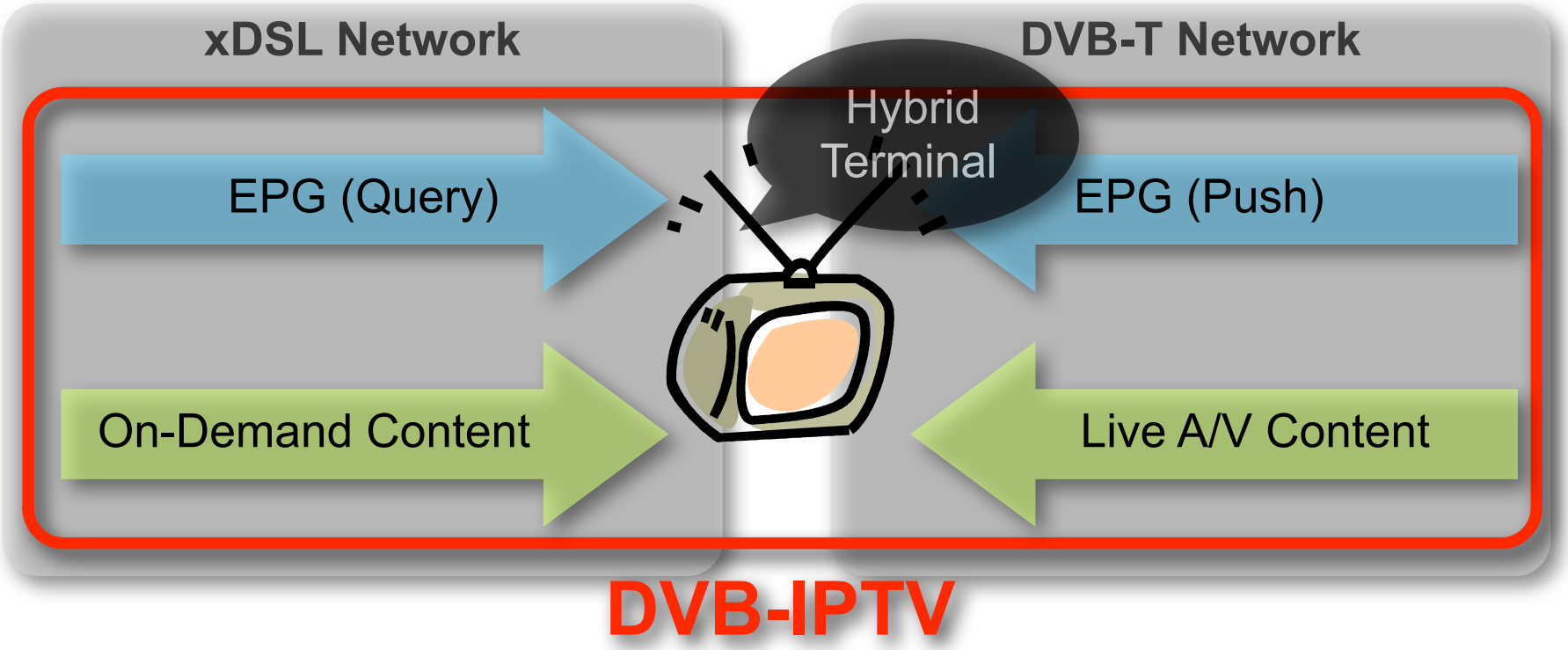
Mobile Networks and DVB-IPDC



Why a Hybrid Mobile Terminal?

- 2G/3G bandwidth is scarce
- These networks were not designed for one-to-many operation
- Hence live-TV type applications are not commercially viable using 2G/3G only
- DVB-H and IPDC offer a one-to-many network operating in frequency bands not far from 2G/3G. Hence similar antenna technology can be used (no extend-out antanna as with DMB).
- Combination of both, 2G/3G and DVB-H/IPDC allows the service and network operators to strike the balance between broadcast and interactive or individualised services to suit their business models.

xDSL and DVB-IPTV



Why a Hybrid xDSL Terminal?

- xDSL bandwidth is less scarce than for wireless technologies, but still costly to increase
- IP networks were not designed for large-scale one-to-many operations
- Hence live-TV type applications are not easily commercially viable using xDSL only (DSLAMs do 2 multicasts only, upstream routers need to be managed with IGMP; sparse/dense multicasting is not an easy choice to make)
- DVB-T offers a one-to-many wireless network. High spectrum efficiency at no additional infrastructure invest.
- Combination of both, xDSL and DVB-T allows the service and network operators to strike the balance between broadcast and interactive or individualised services to suit their business models.

Wrap-Up

Wrap-Up

- **DVB** provides **open, horizontal standards** for both, MobileTV and TVoDSL allowing for a convergence towards TVoIP
- The **technological foundation (IP)** is the same on both sides (mobile and DSL), **convergence** is logical and feasible.
- **Hybrid terminals** enable **attractive applications** and **favourable network architectures**.
- No free lunch: key to this convergence is **harmonised metadata**. DVB provides this.
- Service providers will be the first to look over the fence and strive for **cross-marketing across network types**.
  So be prepared!

Micronas Products in the Domain

- http://www.micronas.com/products
- non-exhaustive list:
  - IPTV over xDSL: DeCypher DHM 8100
  - DVB Broadcast: MDE 9517D and MDE 9518D
  - Analogue TV & FPD: VCT-Pro
  - Dual Channel PCI-Express Multimedia Controller: nGene APB 7202A (see “Products by Application”)
  - Single-Chip VoIP: UAC 355xB

www.micronas.com

Thank You Very Much for Your Attention!

www.dvb.org