
DVB
Digital Video
Broadcasting
the next wave
http://www.dvb.org

Why digital broadcasting?

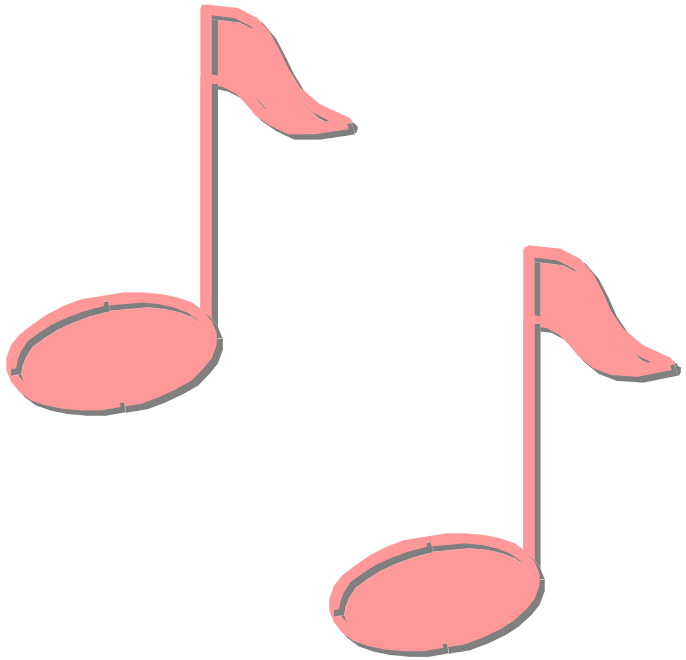
- More efficient use of spectrum
- Robust signals
- More channels
- Better pictures
- Requires less bandwidth
- Signals easy to process
- More computer-friendly

What is the DVB Project ?

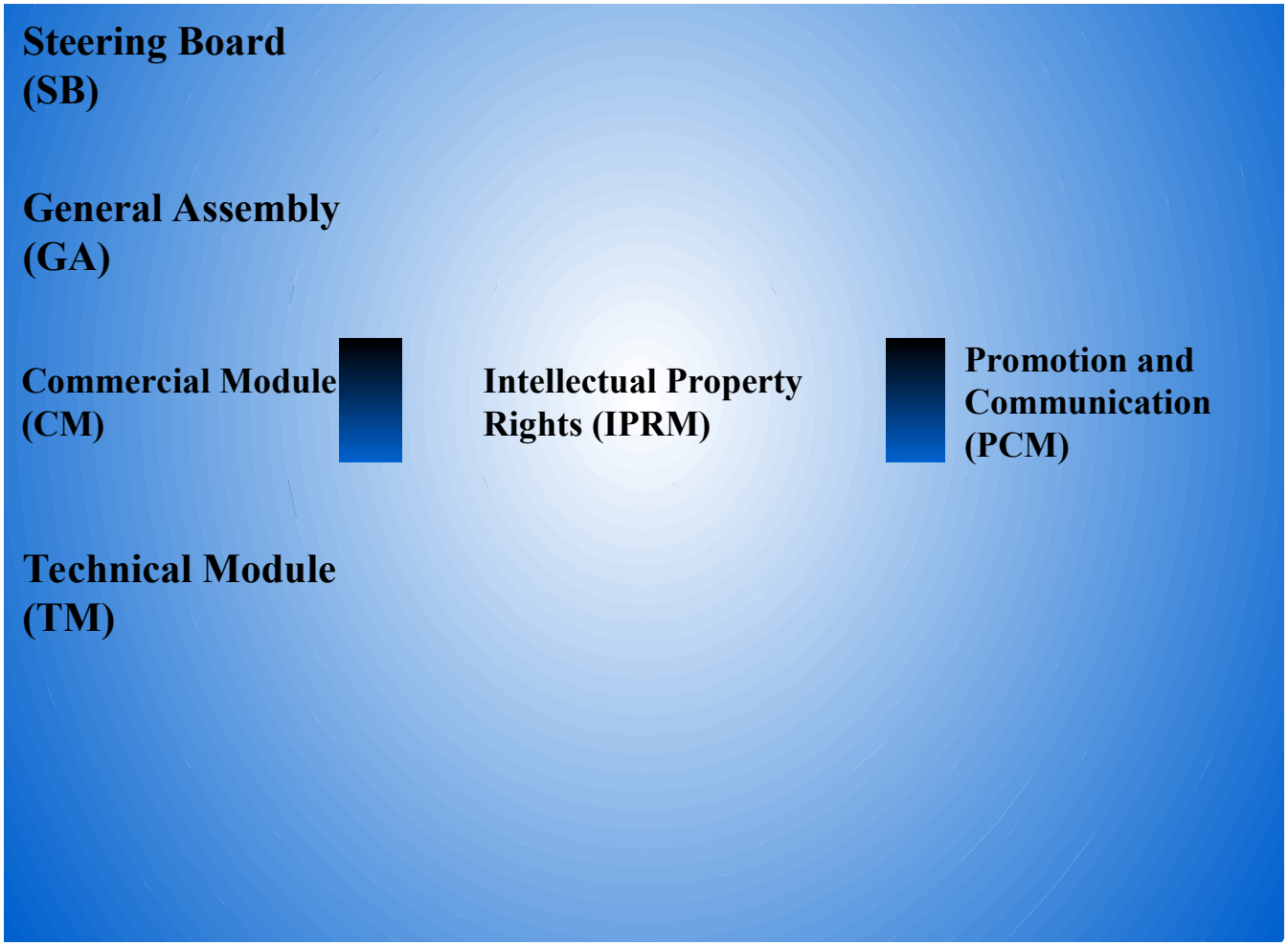
- A market-led initiative to standardise digital broadcasting worldwide
- DVB was formed in September 1993
- DVB now has more than 220 members from more than 30 countries:
  - Broadcasters
  - Manufacturers
  - Network operators
  - Regulatory bodies

What is DVB's mission?

- The creation of a harmonious, market-driven digital broadcast market for all service delivery media media

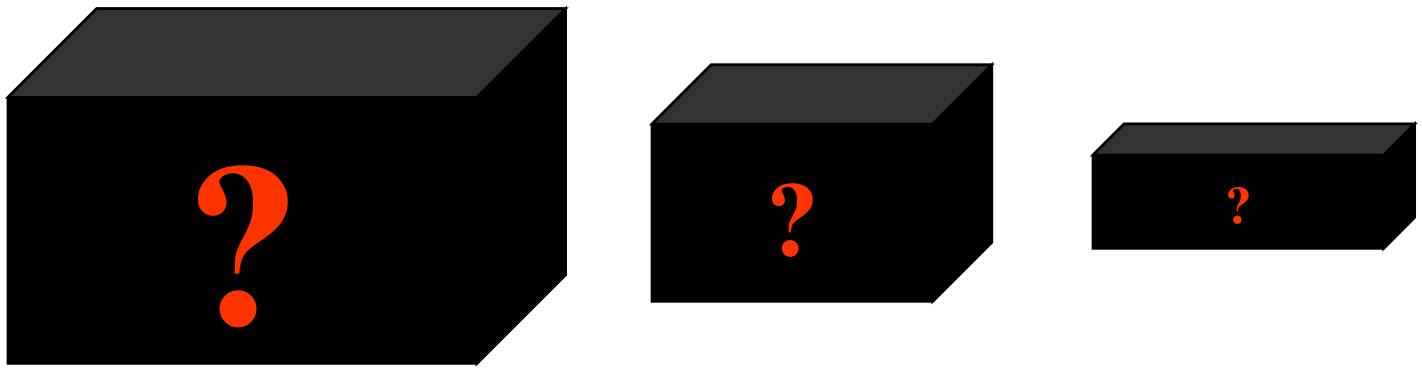


Structure of the DVB Project

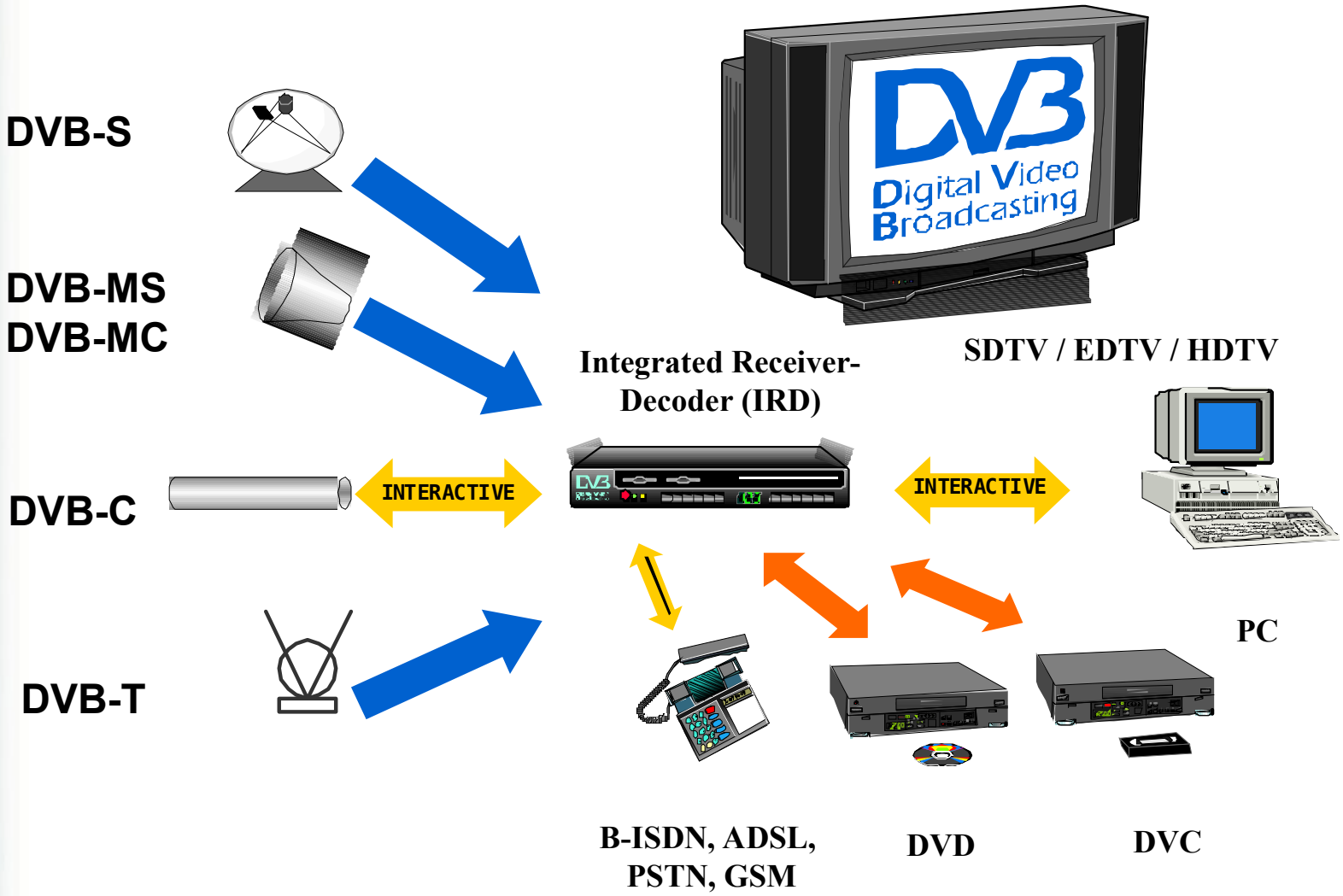


The receiver of the future

- Could be a Set Top Box
- Could be a TV set
- Could be a PC plug-in card
- or a digital device of some kind...



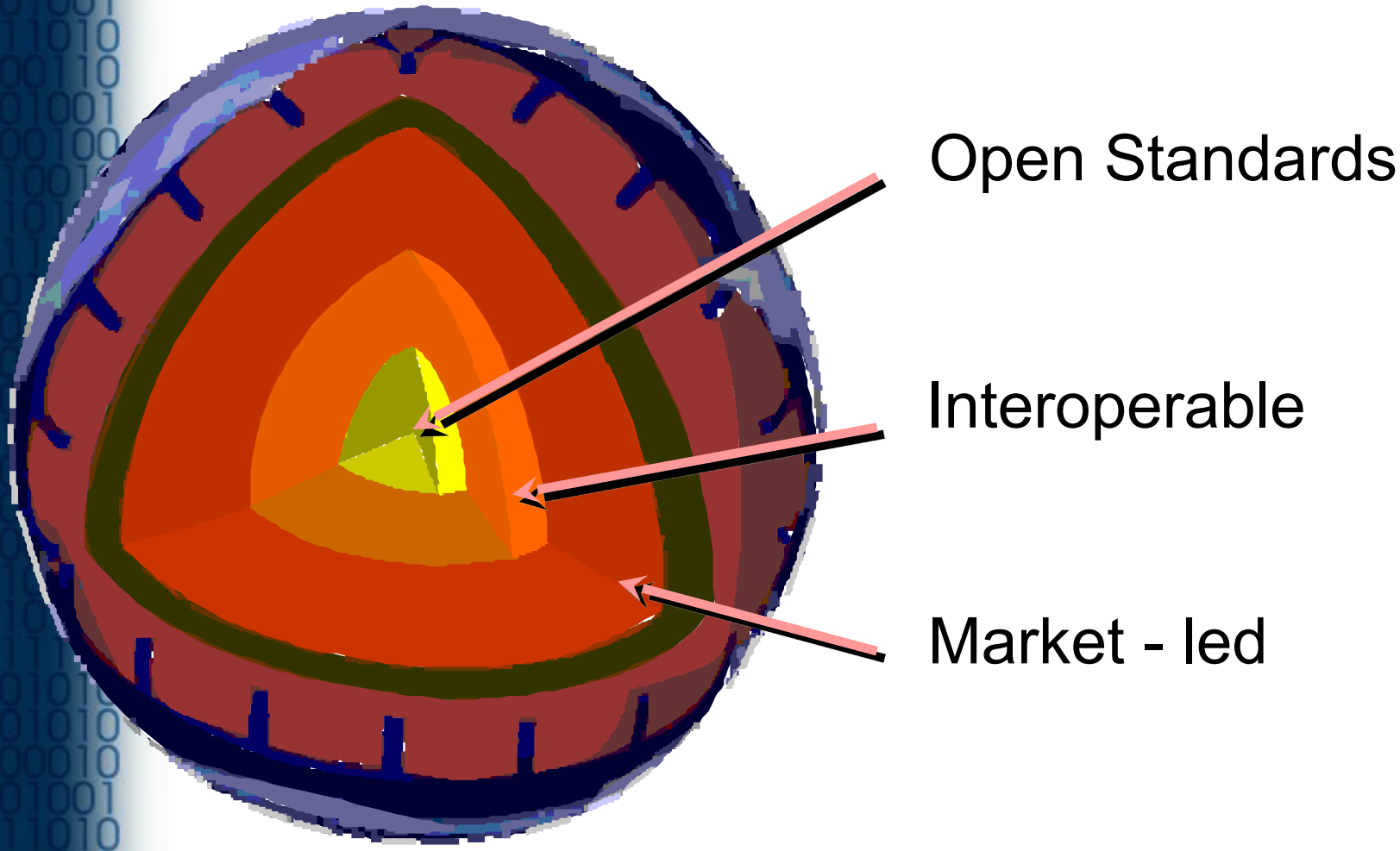
DVB in the home



A basis for “co-opetition”

- Active participation by all members of the broadcasting value chain
- Technical solutions answer commercial requirements
- Open to international organisations as long as they have a strong representation in Europe
- All members cover their own expenses

DVB Core Principles



Open Standards

- System specifications prepared by consensus
- Due process via ETSI
- Published by ETSI

ETSI

CENELEC

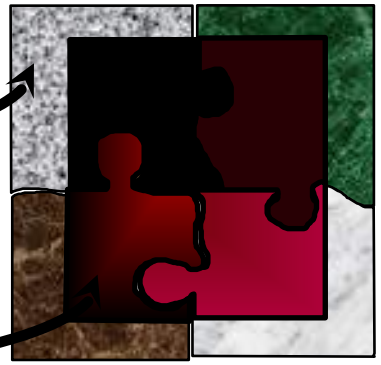
EBU
UER

Interoperable

- Systems developed as combinations of generic elements and application specific elements
- The aim is maximum commonality
- “Toolkit” approach

Application-specific

Generic



Market - led

- Commercial Module
  - Formulates commercial requirements
- Technical Module
  - Drafts and delivers specification
- Steering Board
  - Approves work item for the Technical Module
  - Approves TM output
  - Releases Blue Book to ETSI

Early decisions

- One of the first decisions was to use MPEG-2 compression for coding audio and video, and for the systems level.
- DVB transmission systems offer a “pipe” for MPEG data containers, into the home
  - satellite
  - cable
  - community antenna
  - terrestrial
  - microwave

Accomplishments

- DVB transmission systems are transparent for SDTV, EDTV, HDTV, for audio at all quality levels and for all kinds of general data.
- All DVB transmission standards are part of a family of systems that make use of maximum commonality in order to enable the design of “synergetic” hard- and software.

Covering all delivery media

DVB-S (satellite)

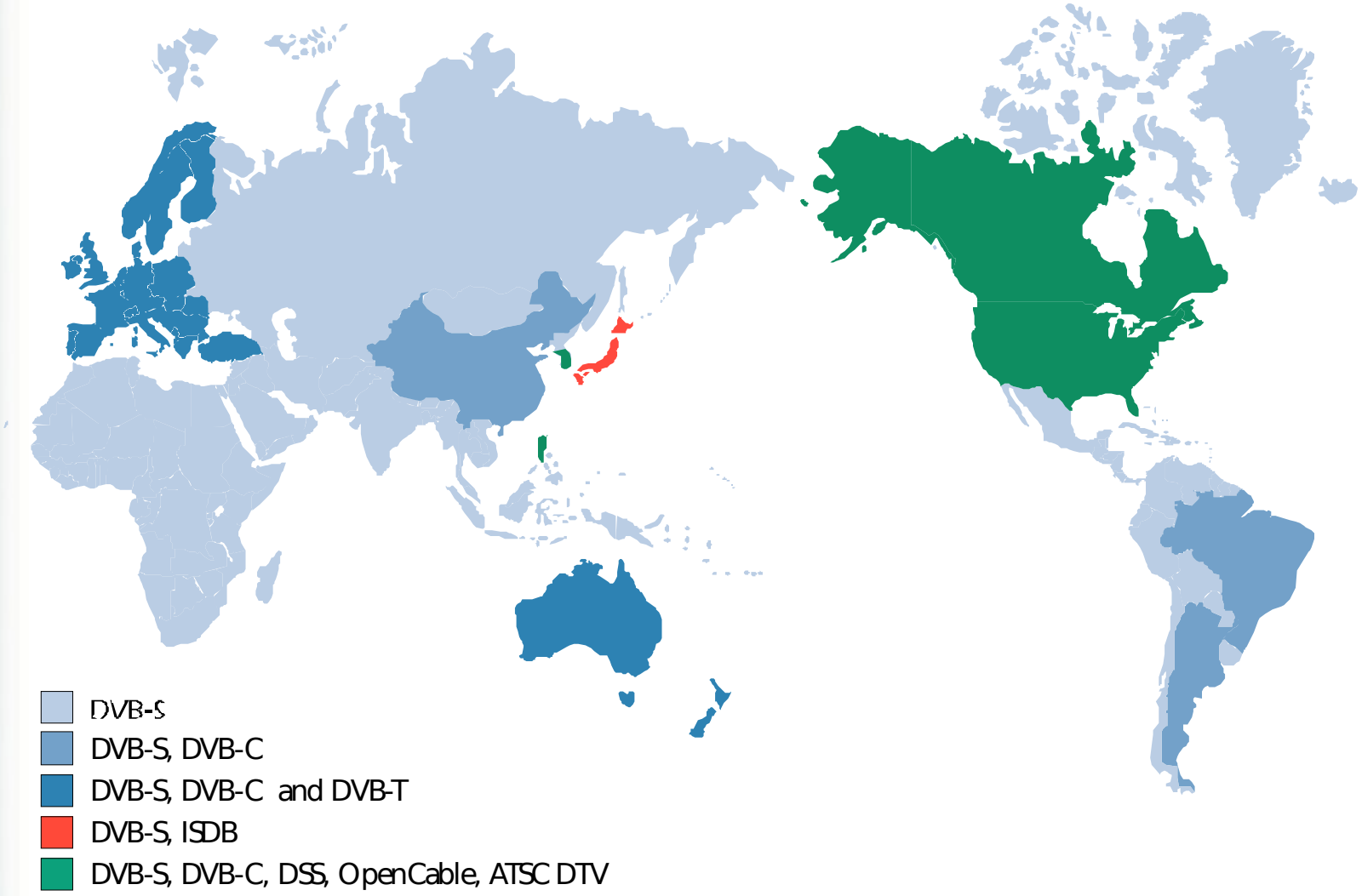
DVB-C (cable)

DVB-CS (SMATV)

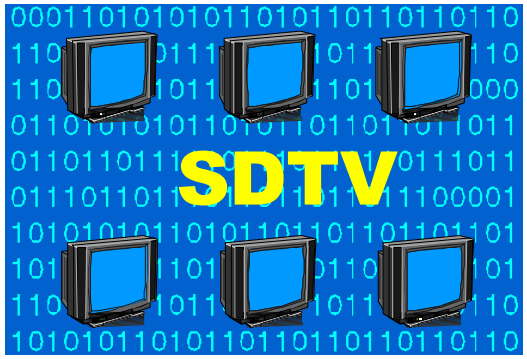
DVB-T (terrestrial)

DVB-MS/MC (MMDS)

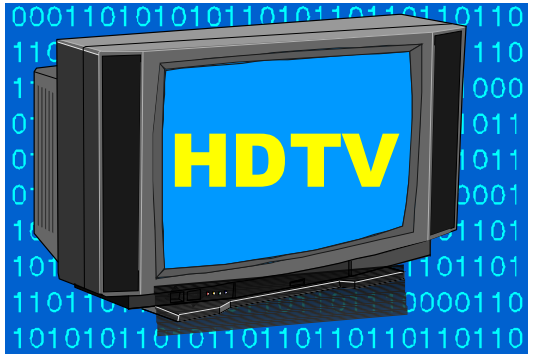
World Adoption of DVB



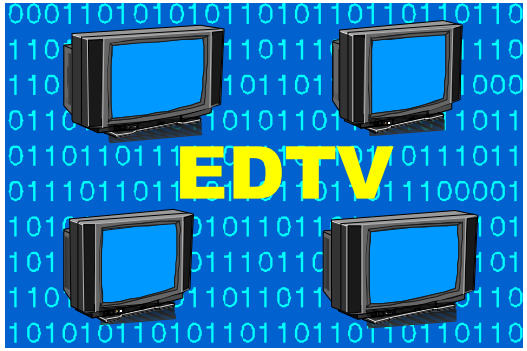
DVB Data Containers



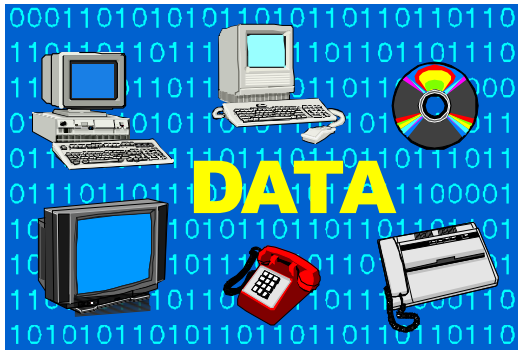
Standard Definition TV



High Definition TV

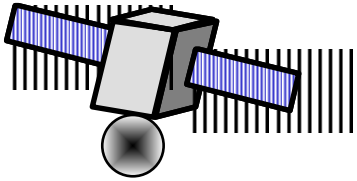


Multiple Channel
16:9 format
Enhanced Definition TV

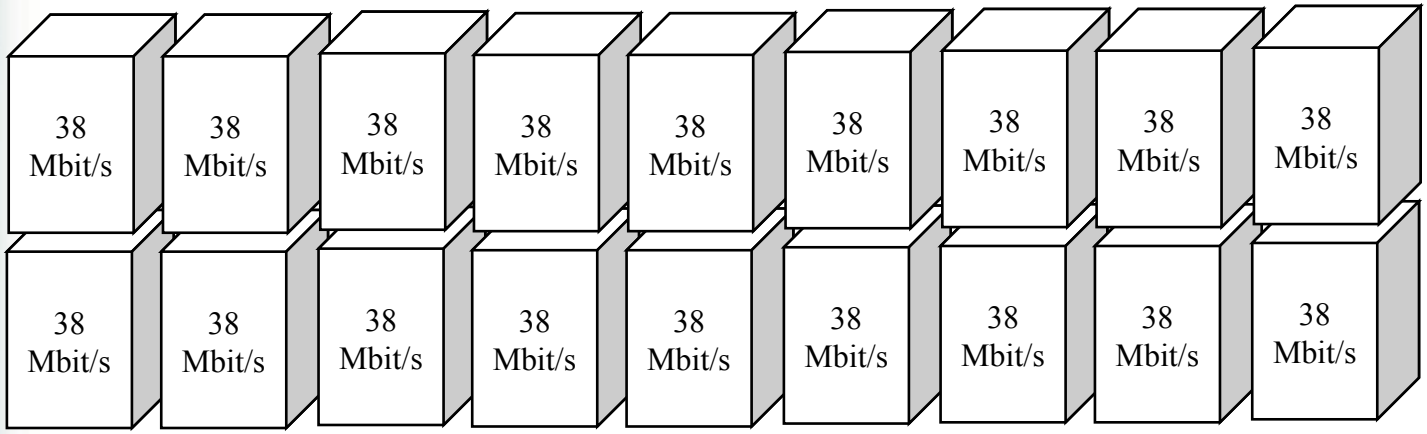


Multimedia Data
Broadcasting

Use of DVB Data Containers



18 transponders => 18 data containers



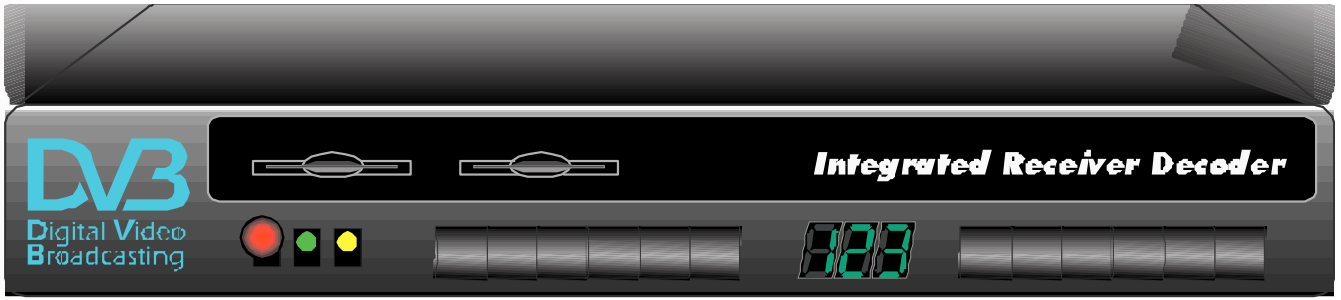
The capacity of each data container is sufficient for 4 to 8 TV programmes, or 2 HDTV programmes or 150 radio programmes or 550 ISDN channels or a mixture

Baseband system

- MPEG-2 audio and video
- Guidelines for first receivers
- Teletext transport system
- New graphics and subtitles specification
- Service Information
- Data broadcasting

Receivers

- Guidelines for external interfaces
- Guidelines for cable headend interfaces
- Guidelines for data streams to be recorded

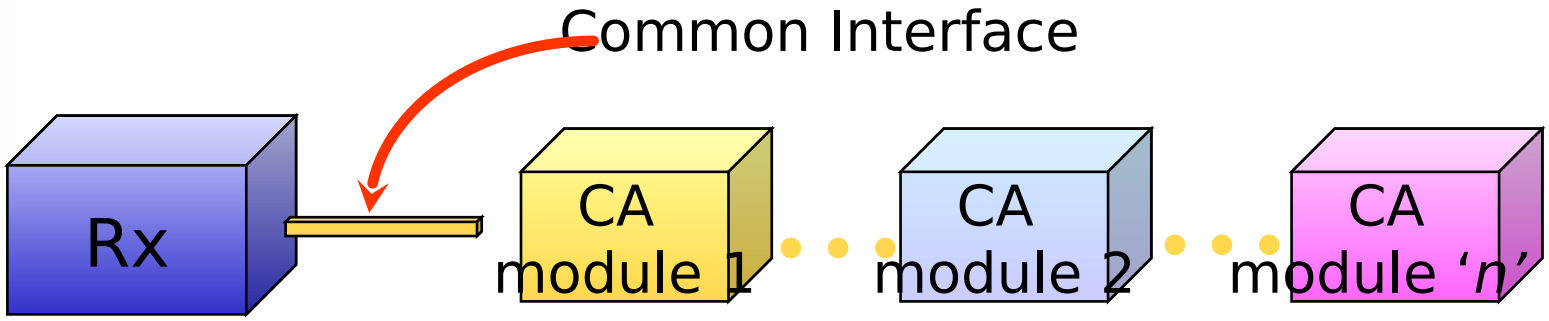


Conditional Access

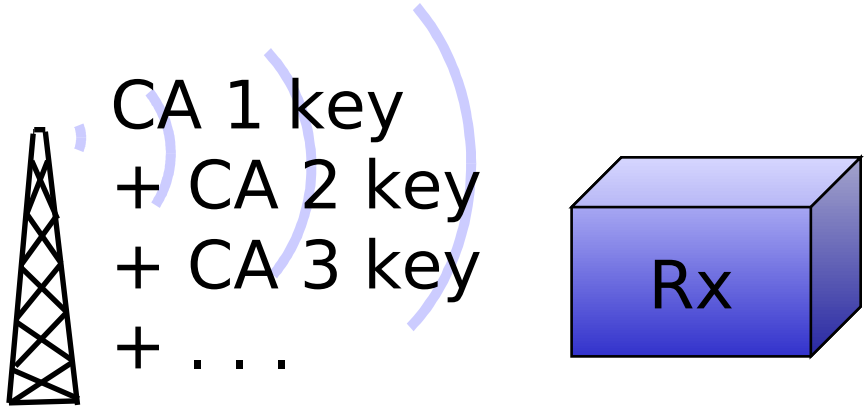
- Common Scrambling Algorithm
- Common Interface (MultiCrypt)
- Code of Conduct and technical specification for SimulCrypt
- Suggestions for anti-piracy legislation

Conditional Access

- **MultiCrypt**

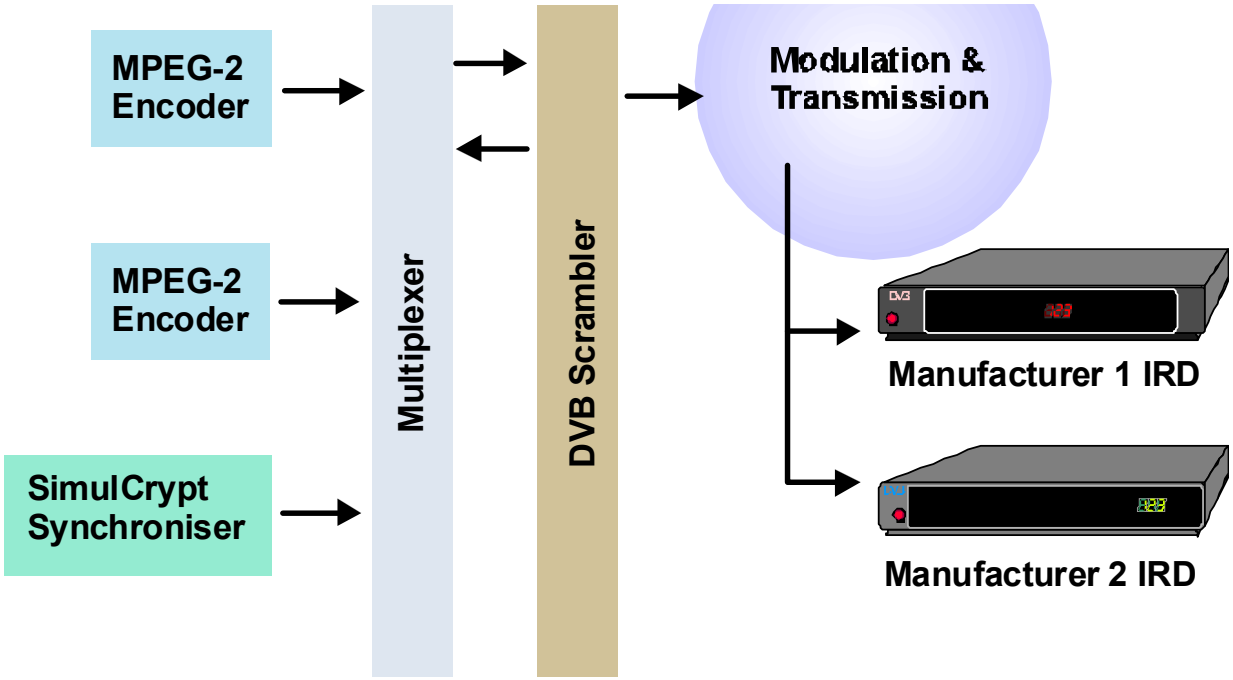


- **SimulCrypt**



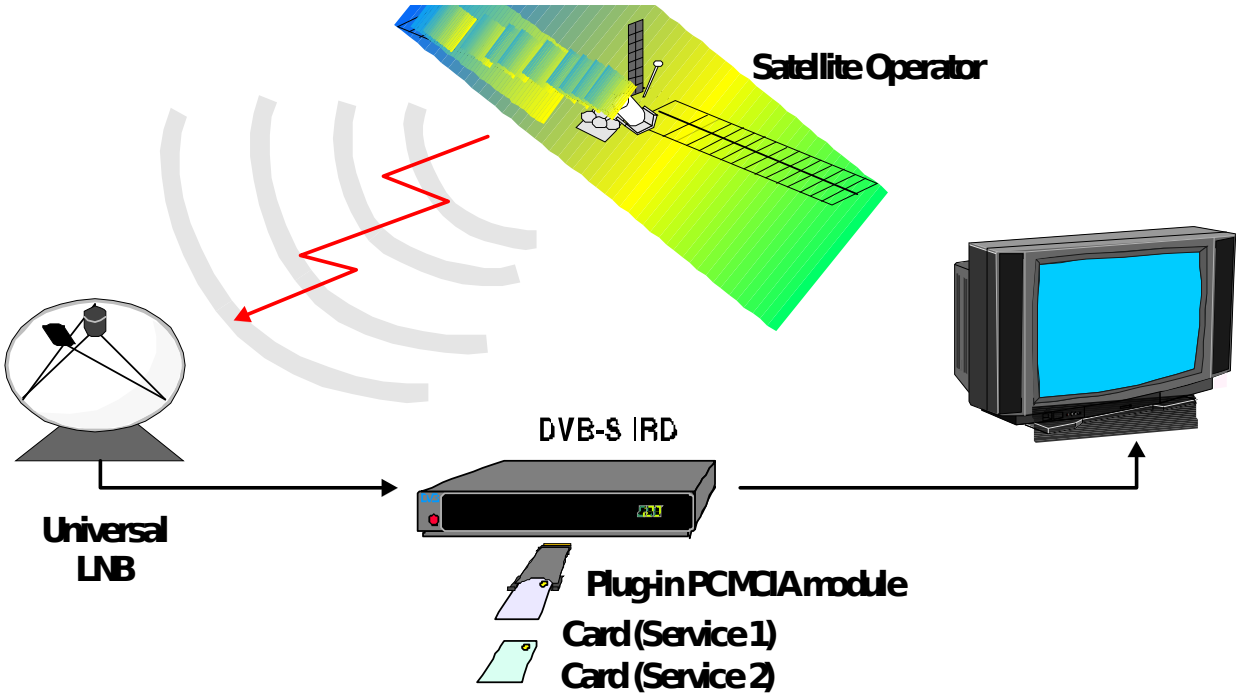
SimulCrypt is economical

- One programme will be received by many different decoders
- Needs special commercial agreements



Multicrypt is flexible

- One decoder can receive many different programmes
- no special agreements required



Interactive services

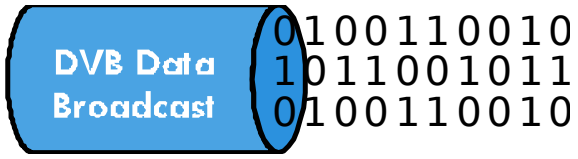
- Network-independent protocols
- A full set of network-dependent “Return Channels”
  - PSTN & ISDN
  - CATV
  - DECT
  - GSM
  - LMVDS

Data Broadcasting

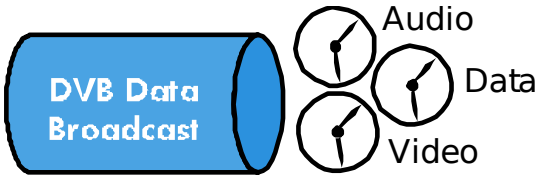
- DVB transmission standards do not distinguish between audio, video, data
- The DVB data broadcasting specification can be used to transmit data which itself may incorporate audio and video
  - e.g. Internet pages using “streaming”

DVB data profiles

- Data Piping
  - asynchronous, non-synchronised, end-to-end delivery of data through DVB networks.

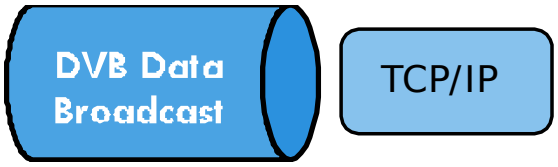


- Data Streaming
  - streaming-oriented, end-to-end delivery of asynchronous, synchronous or synchronised data through DVB networks.

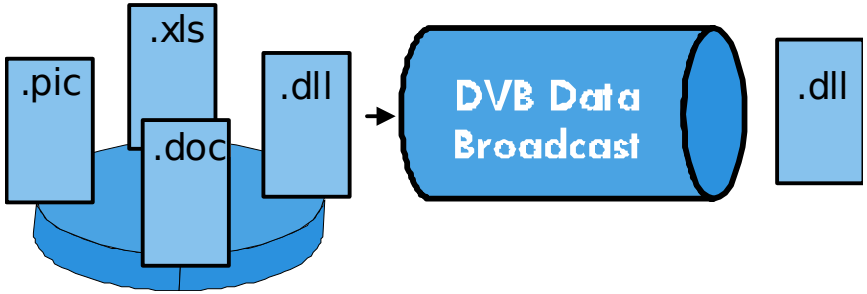


DVB Data Profiles (2)

- Multiprotocol Encapsulation
  - data services that require the transmission of “datagrams” via DVB networks.

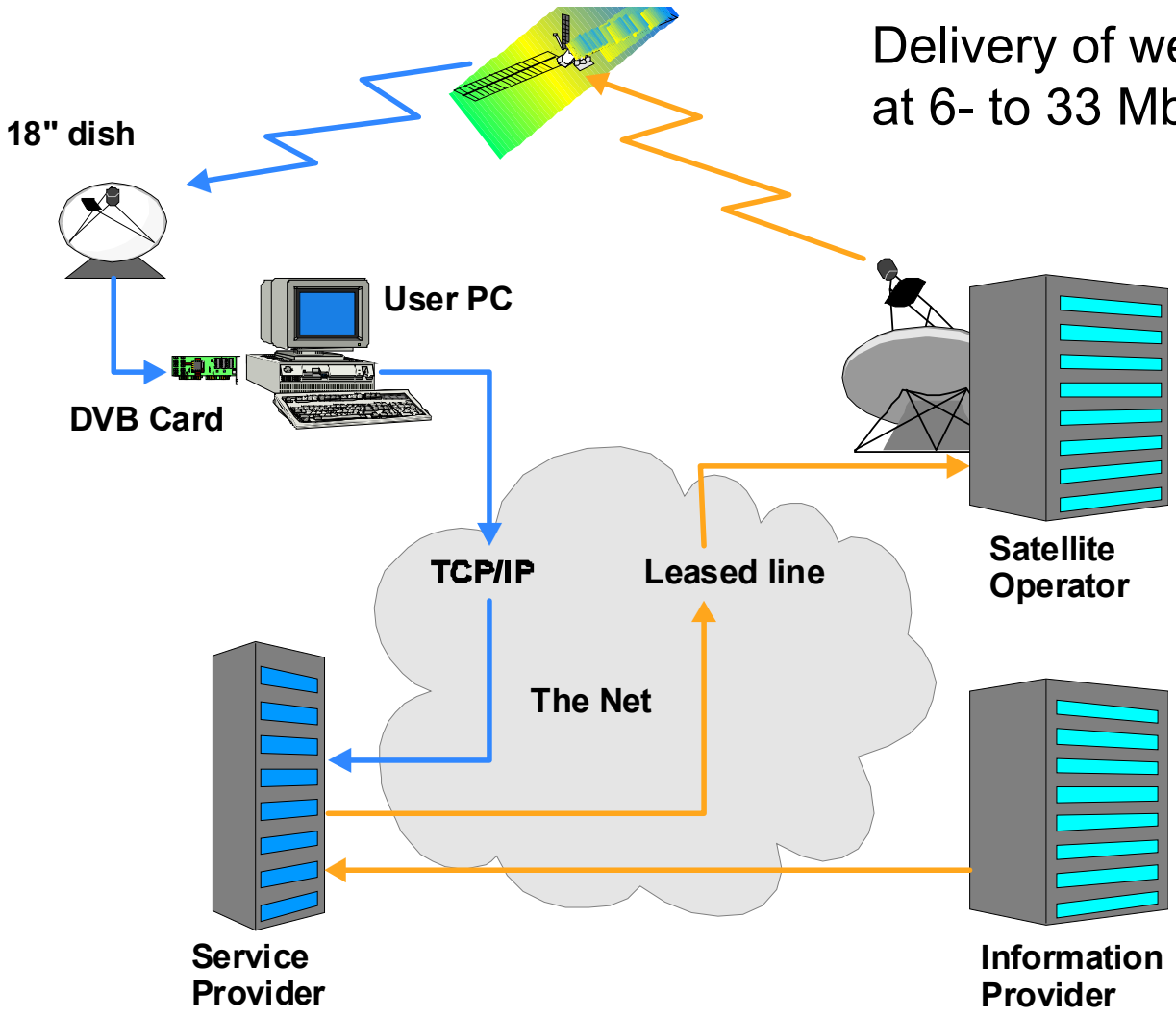


- Data Carousels
  - data services that require periodic transmission of data modules via DVB networks.



Internet over the air

Delivery of web pages
at 6- to 33 Mbit/s



Today's Issues

- High Definition Television
- Multimedia Home Platform
- Mobile Reception of DVB-T

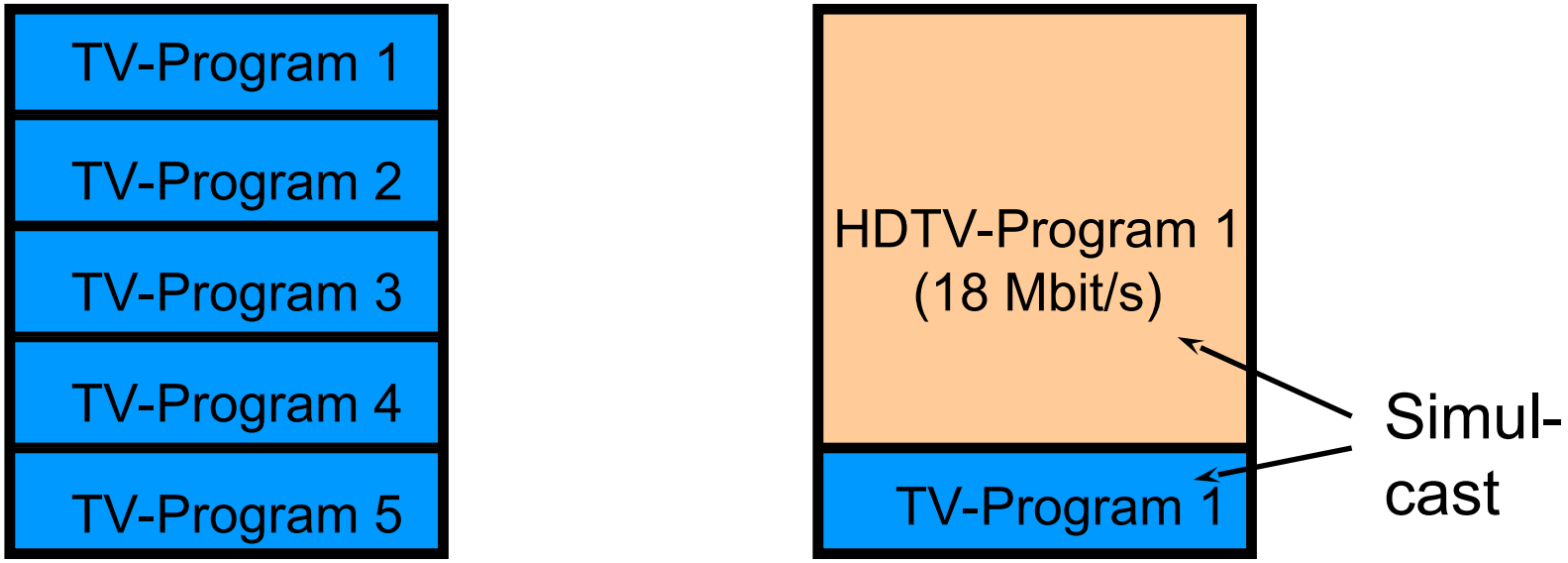
HDTV Guidelines

- DVB has issued HDTV receiver guidelines
  - HDTV and SDTV
  - for 50- or 60-Hz countries
- Issued by ETSI as **ETR 300 154, Draft Ed. 4**
- ETR 300 154 specifies:
  - Broadcast bitstreams and baseline IRDs
  - Bitstreams from storage applications and IRDs with digital interfaces
  - SDTV IRDs and bitstreams (50- and 60-Hz)
  - HDTV IRDs and bitstreams (50- and 60-Hz)

HDTV in the Real World

- HDTV or SDTV is an MPEG issue
- HDTV implementation will be very costly
  - need to replace the entire broadcast chain
  - need a cost effective display technology
  - Europe will do digital SDTV first and US will do digital HDTV first
  - For DVB this does not determine commercial priorities outside Europe
- DVB is ready for HDTV
  - is HDTV ready for DVB?

HDTV in DVB Data Containers

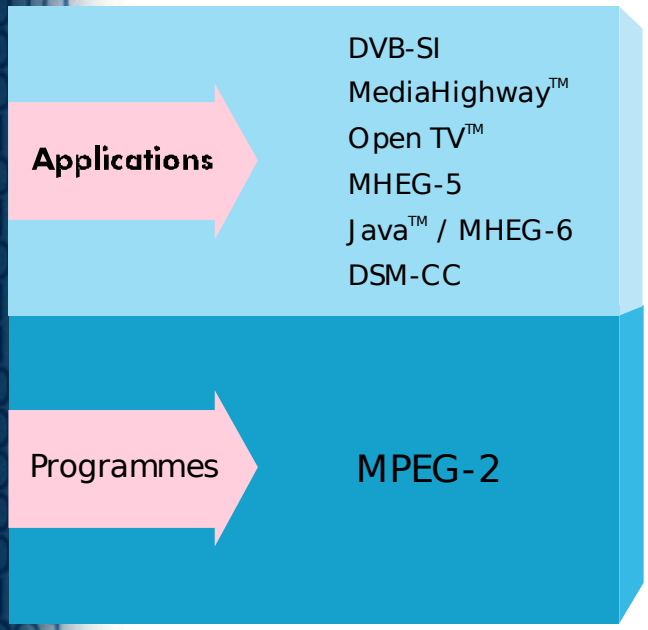


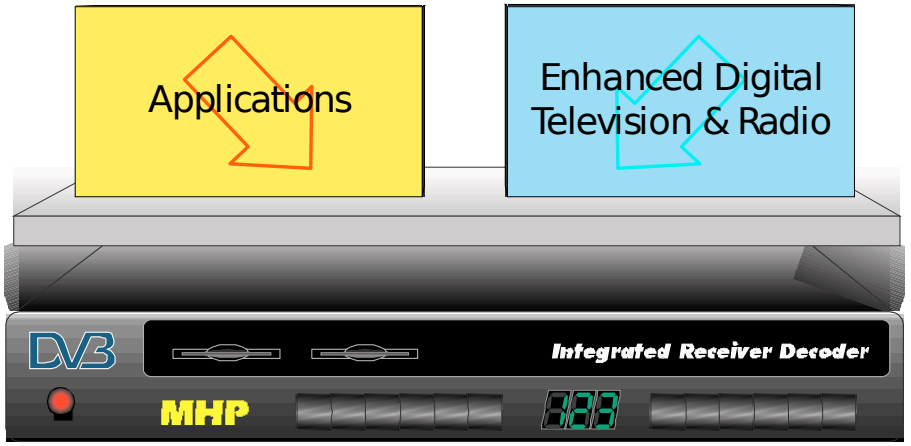
the introduction of HDTV

Total data rate in both cases: for example 22 Mbit/s
(Terrestrial transmission in 6 MHz channel, 64 QAM,
code rate 5/6, Guard Interval 1/16)

Multimedia Home Platform

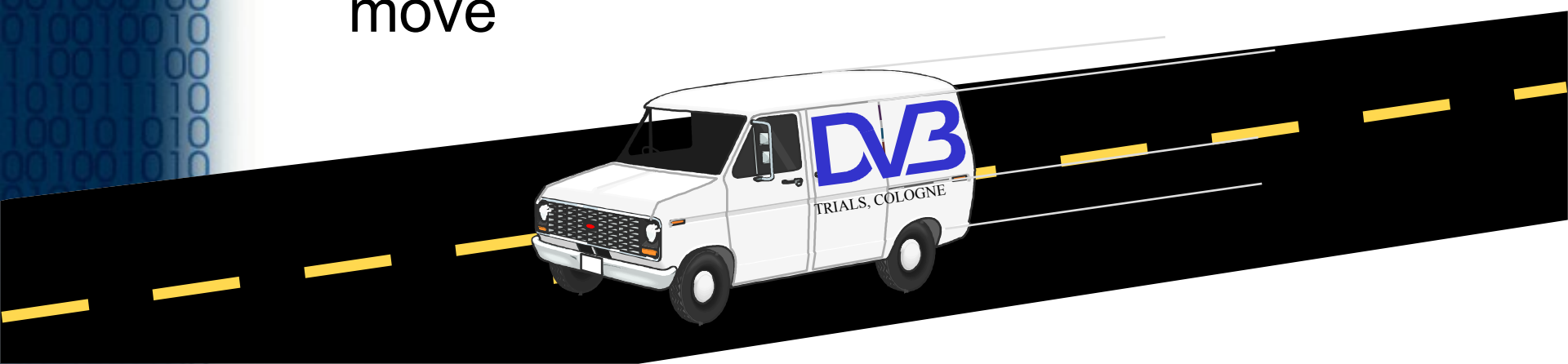
- DVB is building the IRD of the future
  - A platform for convergence
  - Local cluster + In home digital network
  - Resolving the Generic / Proprietary API issue





Mobile Reception of DVB-T

- Extensively tested throughout Germany:
  - DVB-T received successfully at 300 km/h.
  - Commuters watched DVB-T on trams
- A convincing demonstration of the ruggedness of DVB-T
- An opportunity for high speed data on the move



On the market, on the air…

- The “DVB Directory” lists:
  - over 250 DVB services
  - in 50 countries
  - on six continents
  - 93 manufacturers
  - hundreds of DVB-compliant products for cable, satellite, terrestrial, community antenna and microwave distribution
- A recent workshop on DVB-T hardware showed commercially available solutions from some 20 manufacturers

Conclusion

- DVB is a global technical solution for digital broadcasting via all kinds of media including interactivity and data services
- DVB-based services currently are operational on six continents
- After the worldwide transition to digital, DVB is the next wave.