

Making VOD a Reality for IPTV: Challenges and Solutions

Mark Magee

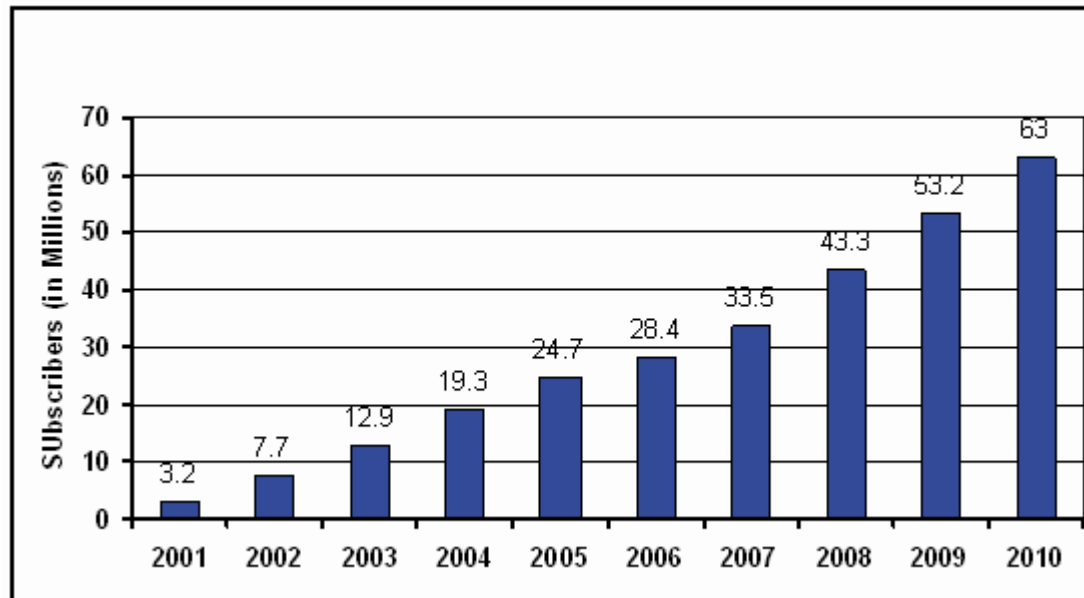
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TELECOM@NAB2007



Explosion in Global Video “On Demand”

Cable VOD Enabled Subscribers in the US 2001 - 2010



Source: Multichannel News 2006

Global VOD market (Cable + IPTV + Broadband) expected to grow from ~\$2 Billion in 2006 to \$13 Billion in 2010 with over 150 Million active subscribers worldwide

Source: Tekrati/iSuppli 2006

The IPTV Delivery Revolution

- **Global IPTV subscribers will reach 14.5 million in 2007, up 200 per cent from 4.9 million in 2006...**
- **By 2010, worldwide IPTV subscribers will amount to 63 million...**

**Source: iSuppli Market Intelligence, January 2007*

Video Delivery: The Good News

- + Users want “on demand” experience
 - + Explosion of video content choices
 - + HDTV is now at critical mass
 - + Content owners experimenting with new models
 - + Telcos entering the video marketplace
-

= **AAAAH!**

Any video

Any time

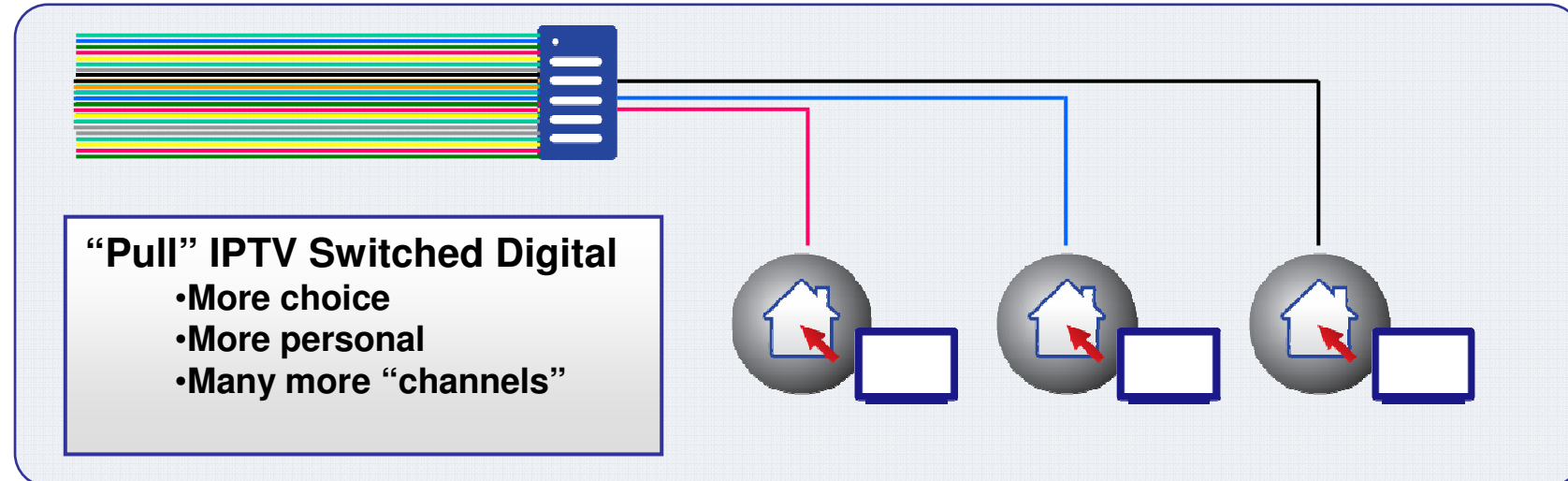
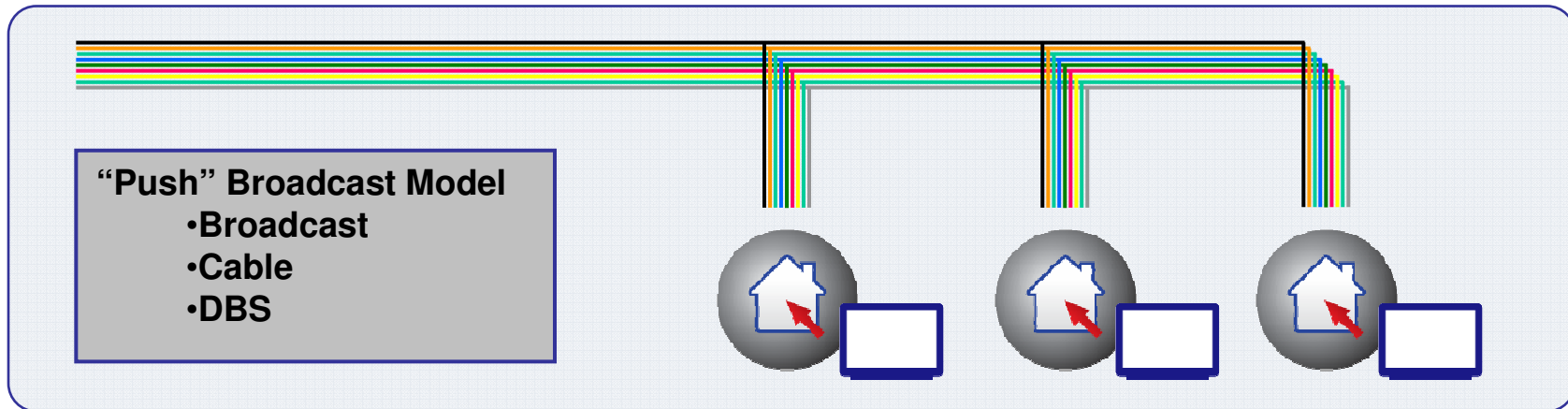
Any place

Any device

High quality

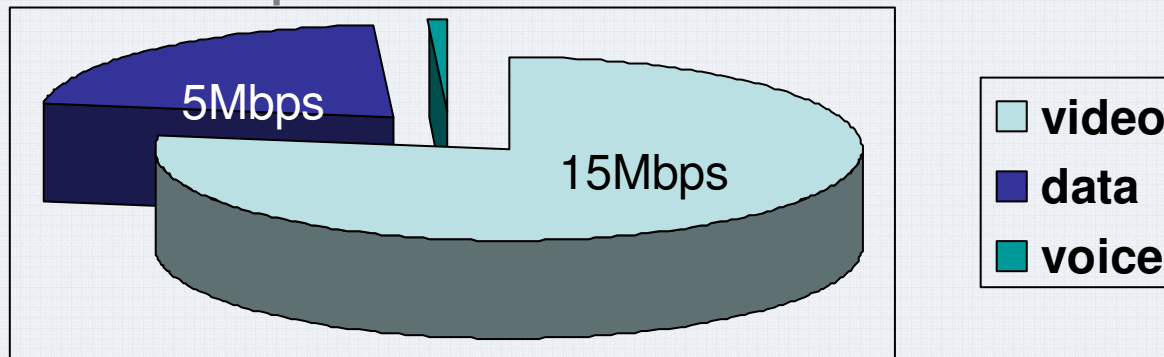


IPTV: A Fundamental Shift in Video Delivery



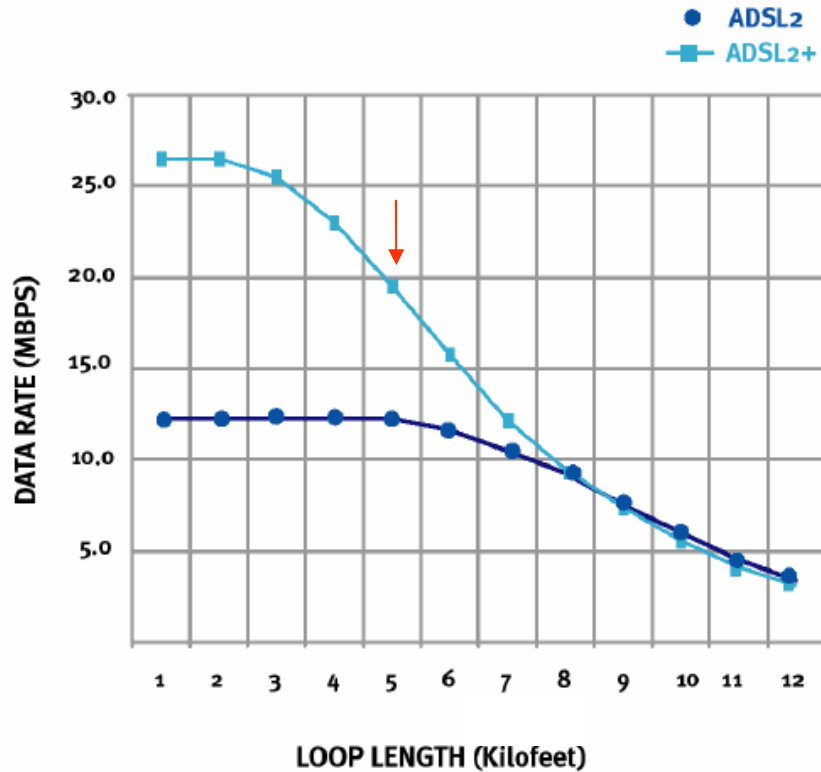
IPTV Video: Service is Bit Rate Constrained

- Last mile is the constraint
- Some operators have 20Mbps to the home with ADSL2+
- Many have much less – ADSL, longer loops
- Efficient video compression is critical



Efficient Compression is Critical for IPTV

High-Speed Data
SD Channels
HD Channels



20Mbps
@1.5km

5 Mbps
2 Mbps
2 Mbps
2 Mbps
9 Mbps

Content is King

National Content- **Stable**

Mainstream: From major studios and production companies

Community Content- **Rapidly Growing**

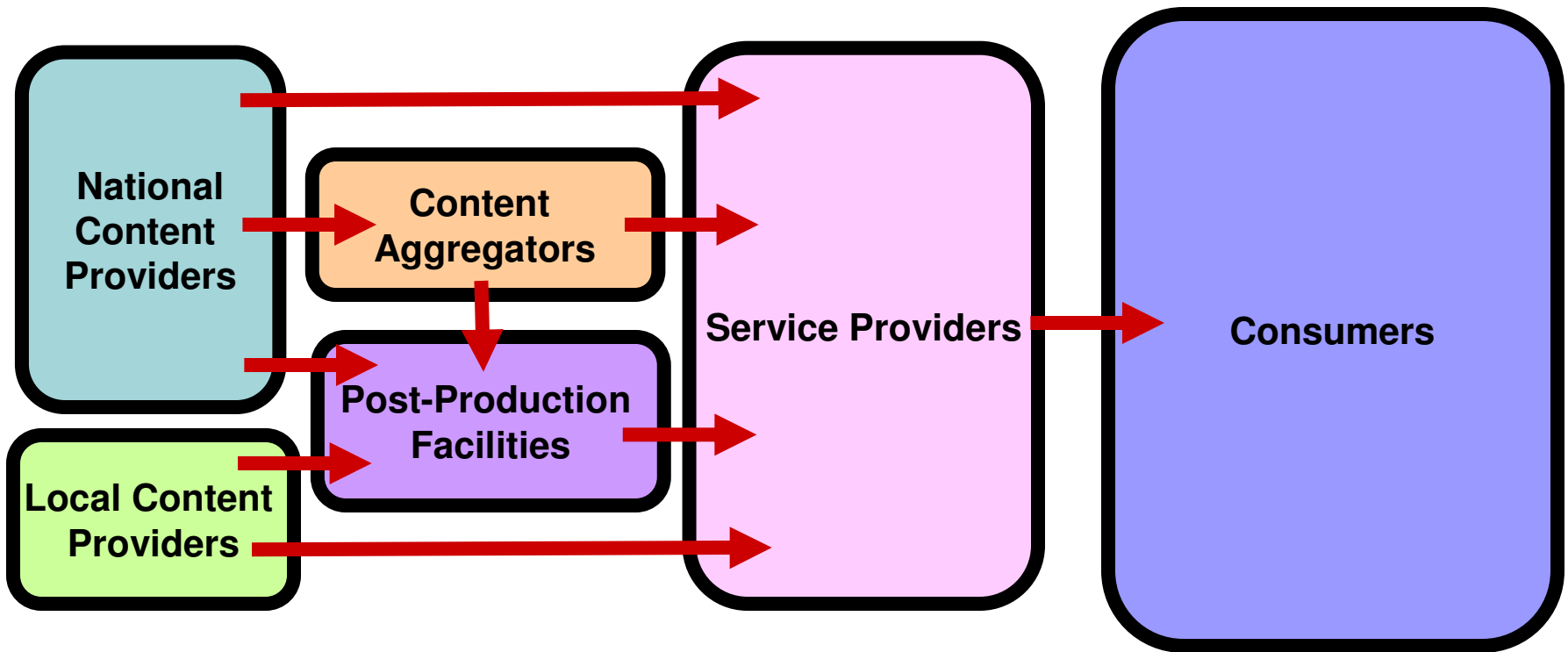
Focused on local community niche interests

- Local ads and “infomercials”
- Hunting and Fishing, Health & Fitness–on–demand, Real Estate–on–demand
- High school football game, town council meetings, school play, concerts, parades, local news, evening magazine
- Education, Religion, Government, Homeland security

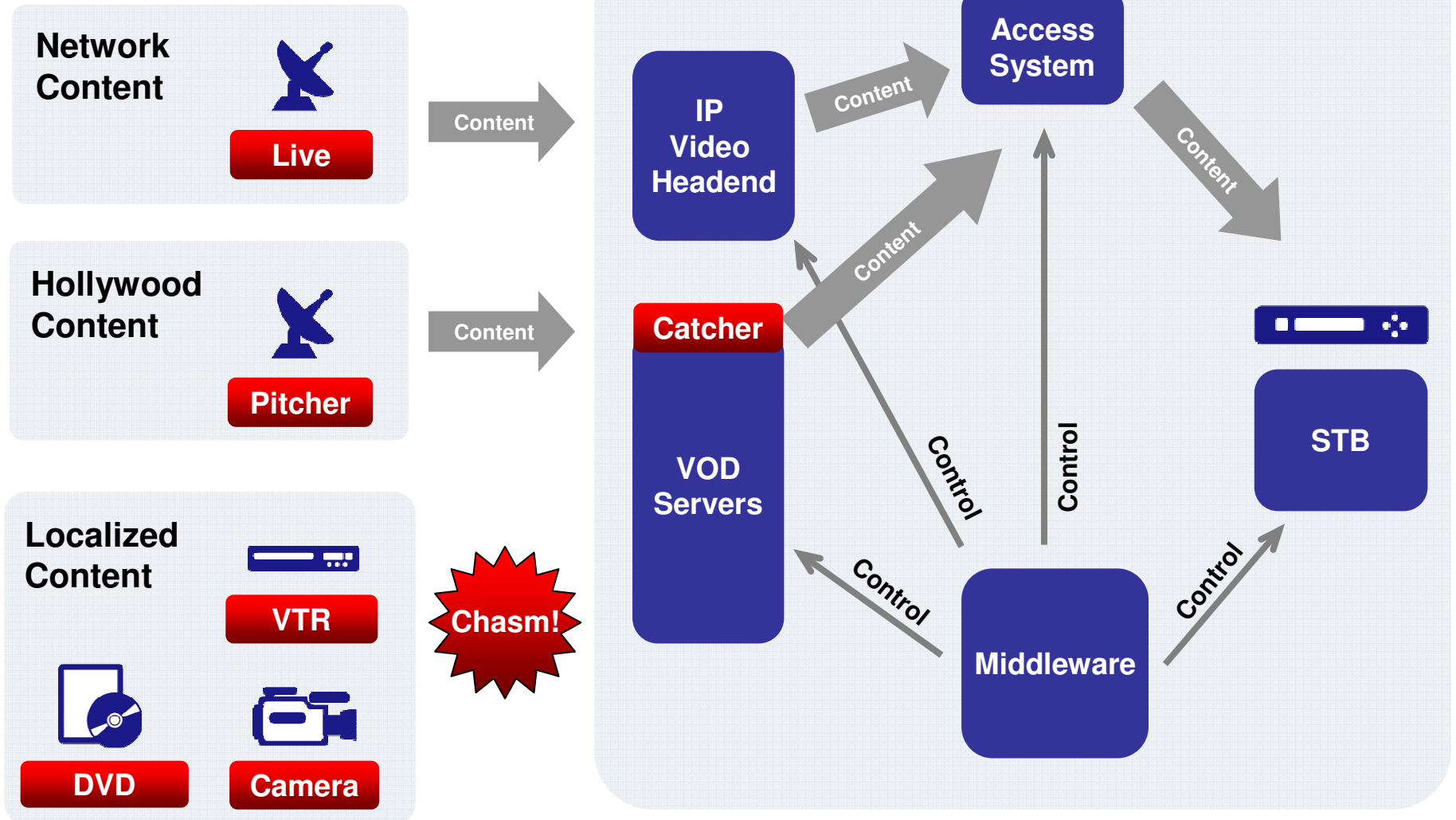
Other!



Content Pipeline



IPTV Content Flow



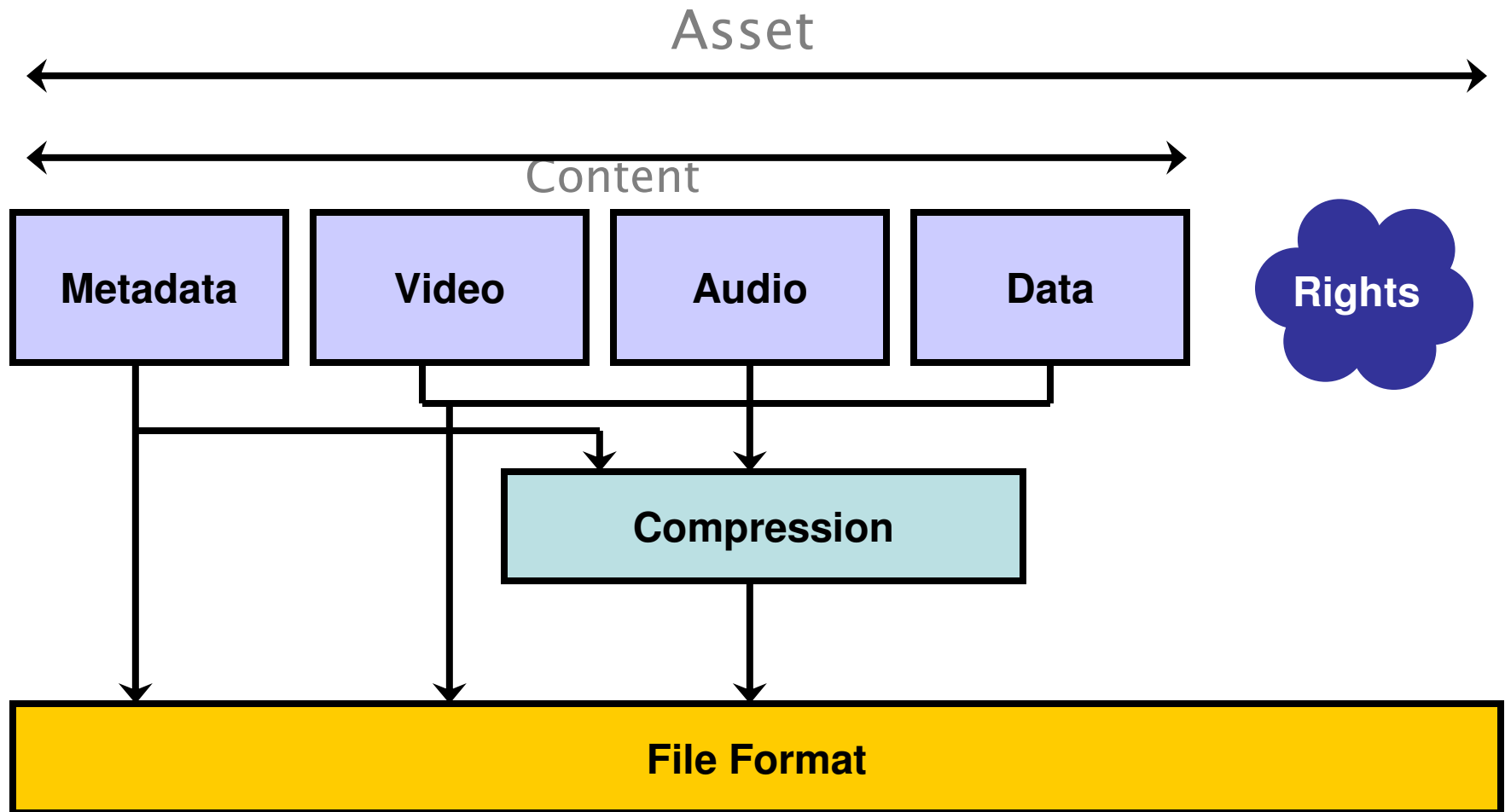
VOD Acquisition Challenges

- Assortment of incoming physical media & formats
- Visual quality and bit budget management
- Minimizing time-to-air for max competitive advantage
- Diverse target playback devices and formats

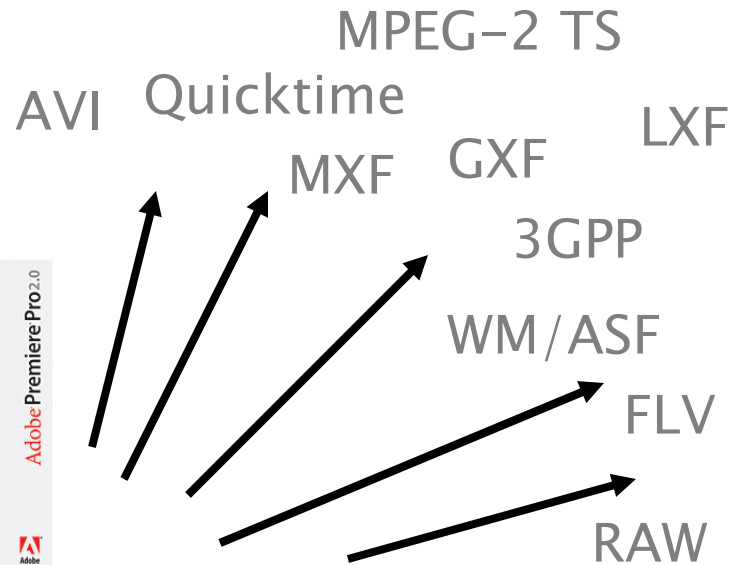
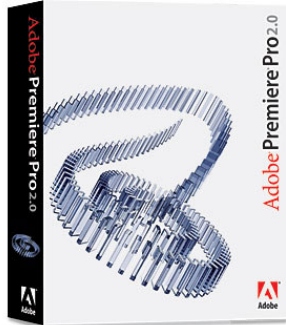
Digital and Analog Baseband Sources

- **Signal Sources: SD/HD VTR, DVD player, “Live” feeds**
- **Formats: NTSC, PAL**
- **Video Processing**
 - Digital: SDI/HD–SDI, SMPTE–259/292
 - Analog:
 - SD and HD input, BNC
 - HD: YPbPr, RGB
 - SD: YPbPr, RGB (component mode)
 - Composite/YC (composite mode)
- **Audio Processing**
 - Digital:
 - 2+ channel 16/24–bit AES/EBU,
 - 48/96/128KHz Sample rate
 - 16/24–bit SMPTE–259 SDI embedded audio
 - Analog:
 - 2+ channel balanced, XLR
 - 16/24–bit D/A, 48KHz Sample rate

Generalized File Format



Multi-format File Sources



- MXF D10 (IMX)
- MXF DV25
- MXF DV50
- MXF DVCProHD
- MXF JPEG 2000
- MXF MPEG-2 I-frame
- MXF MPEG-2 Long GOP

Other!

- Omneon OP1a IMX (MXF)
720x512i, 720x608i
- Omneon DV (QuickTime)
720x486i, 720x576i
- Omneon IMX (QuickTime)
720x512i, 720x608i
- Omneon MPEG-2 IBP (QuickTime)
720x480i, 720x512i, 720x576i, 720x608i, 1280x720p, 1920x1080i
- Omneon MPEG-2 I-frame (QuickTime)
720x480i, 720x512i, 720x576i, 720x608i, 1280x720p, 1920x1080i

Multi-format Ingest and Convert to MPEG-4 AVC

- Support for digital and analog video and audio sources
- Multi-format file reader
- Support for Closed Captions, Teletext, Subtitles
- Real time performance
- Device control

VOD Acquisition Challenges

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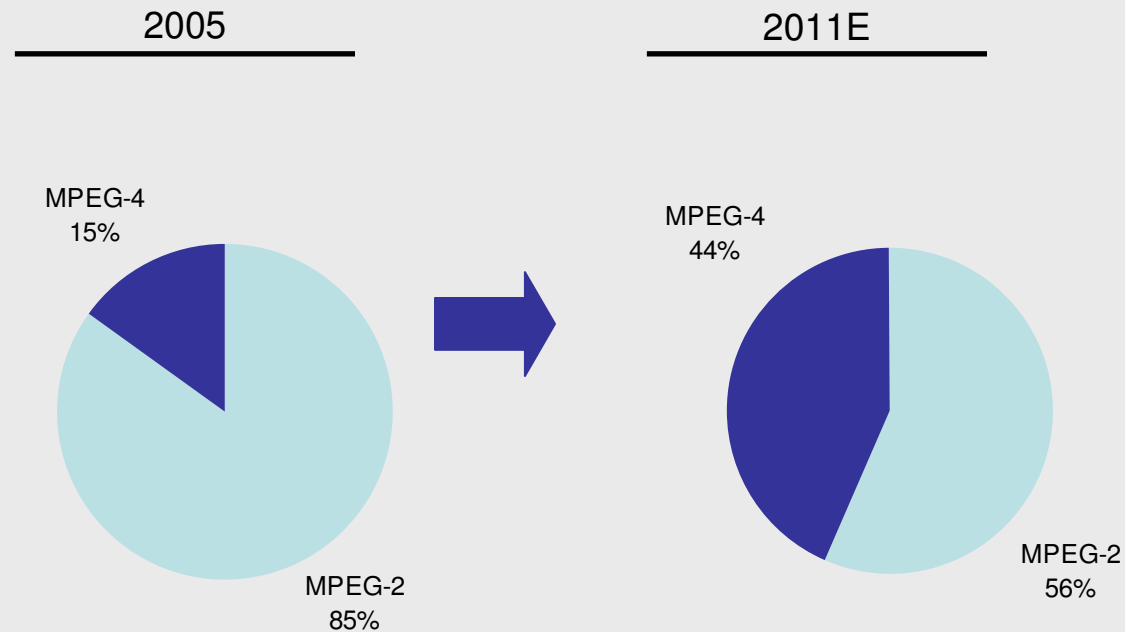
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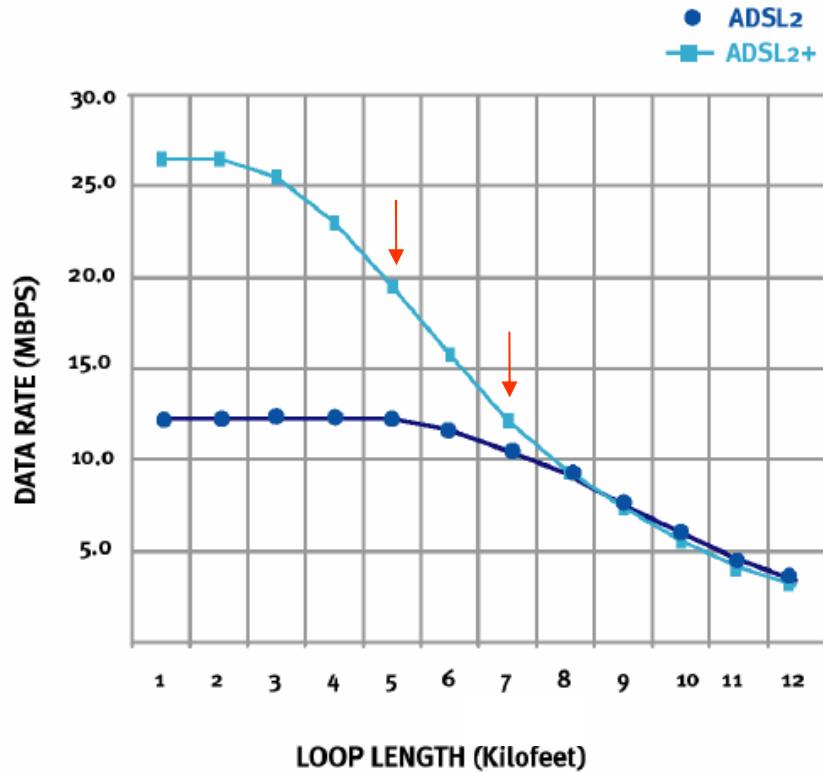
Global Transition to MPEG-4 AVC

MPEG-2 Encoders vs. MPEG-4 unit worldwide forecast

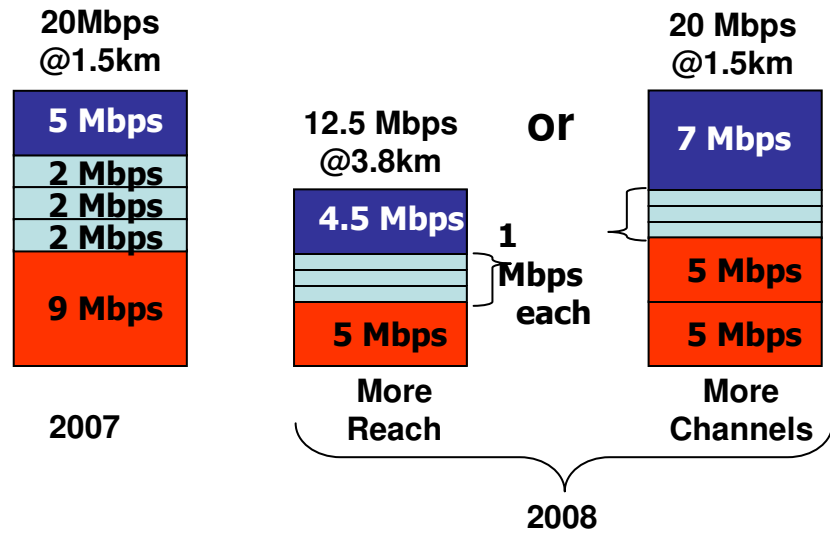


Source: Frost & Sullivan 2006

MPEG-4 AVC Video Compression is Key



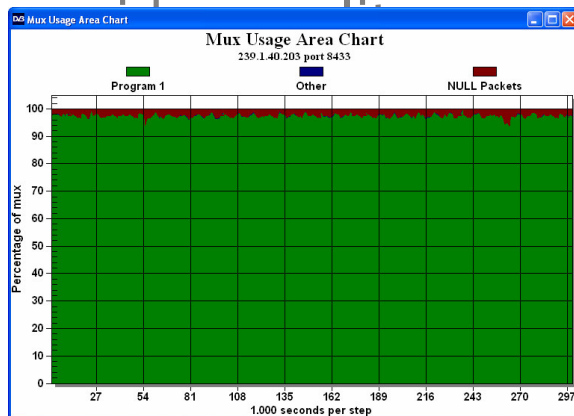
High-Speed Data
SD Channels
HD Channels



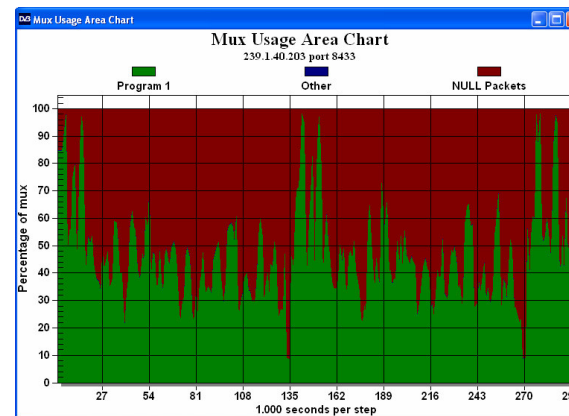
IPTV Bundles

Efficient Use of Bandwidth – capped VBR

- Encoders can operate VBR or CBR mode
 - CBR – output bit rate is fixed, video quality varies
 - VBR – output bit rate varies, video quality is fixed (DVDs)
- Capped VBR combines the best of both
 - Operator controls maximum bitrate allowed
 - The encoder uses the lowest bitrate it can to maintain



CBR



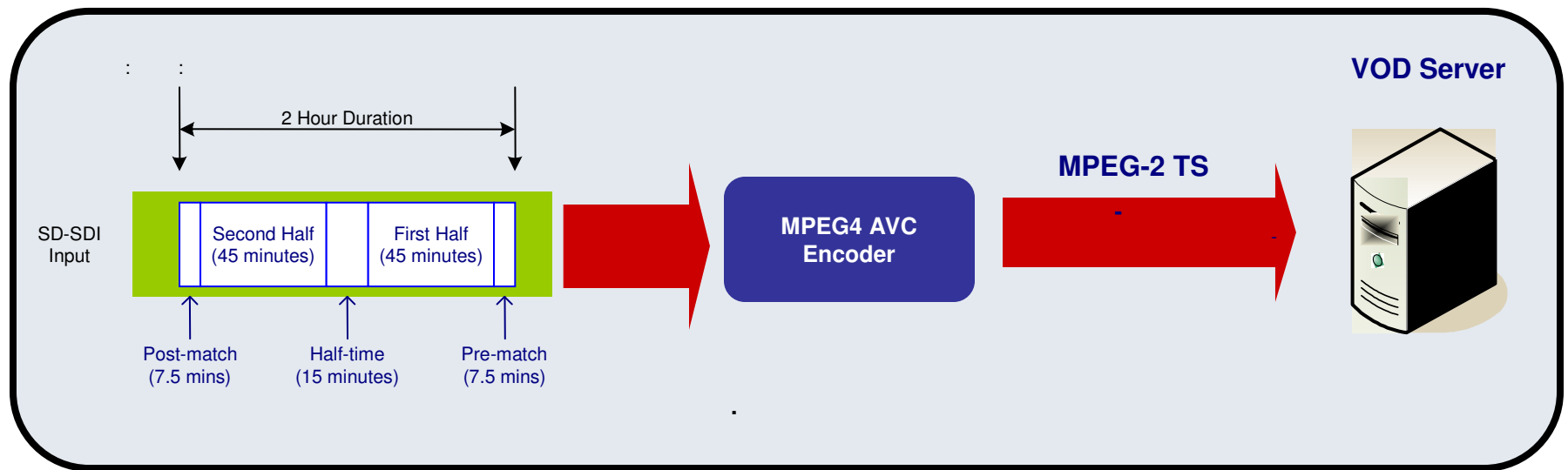
CF-CBR

VOD Acquisition Challenges

- Assortment of incoming physical media & formats
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“Time-Shift TV” – Sports Content Processing

- Freshly created assets
- Short shelf life
- Time to market is critical



VOD Acquisition Challenges

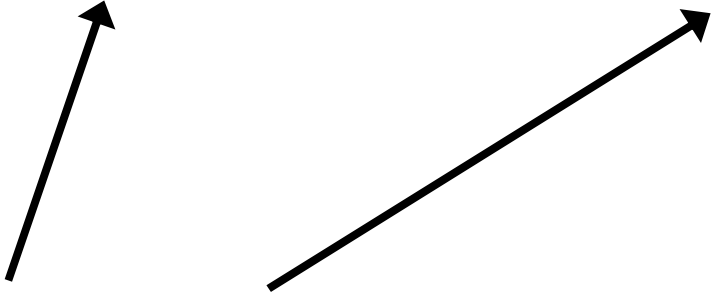
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Multi-format Output



MPEG-4 AVC

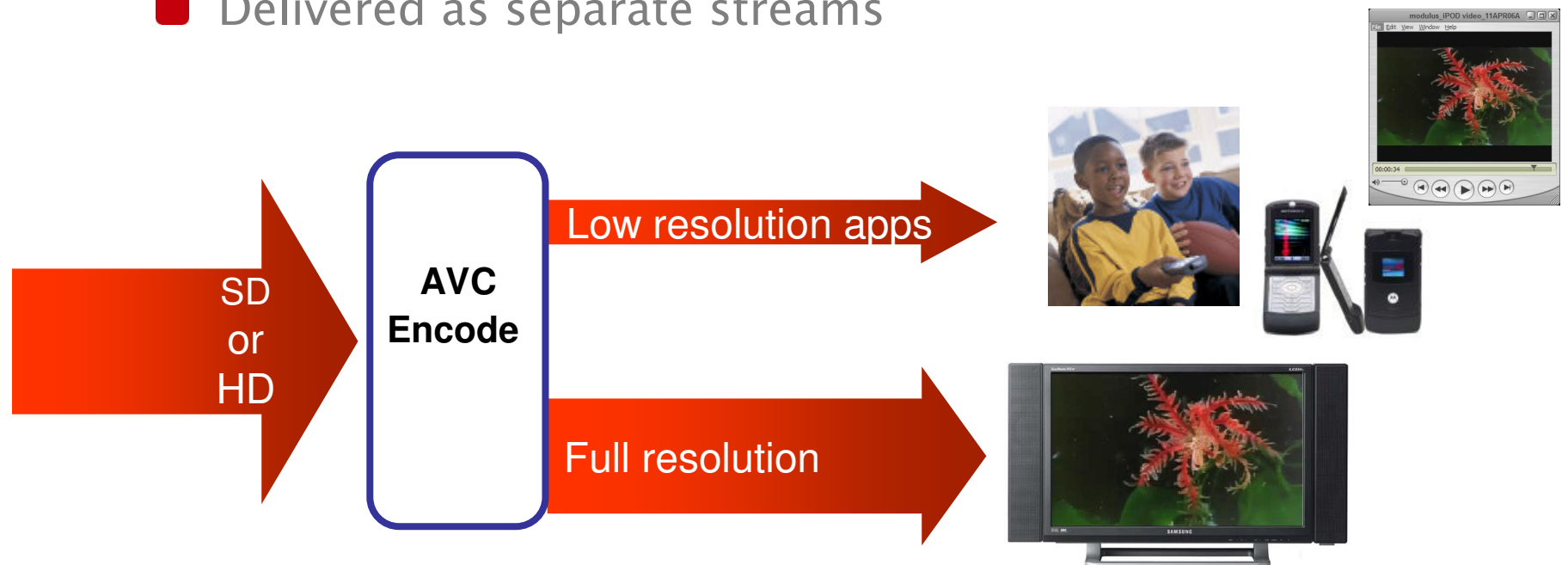


Movies, TV shows, games, and music.
Now playing on an iPod near you.

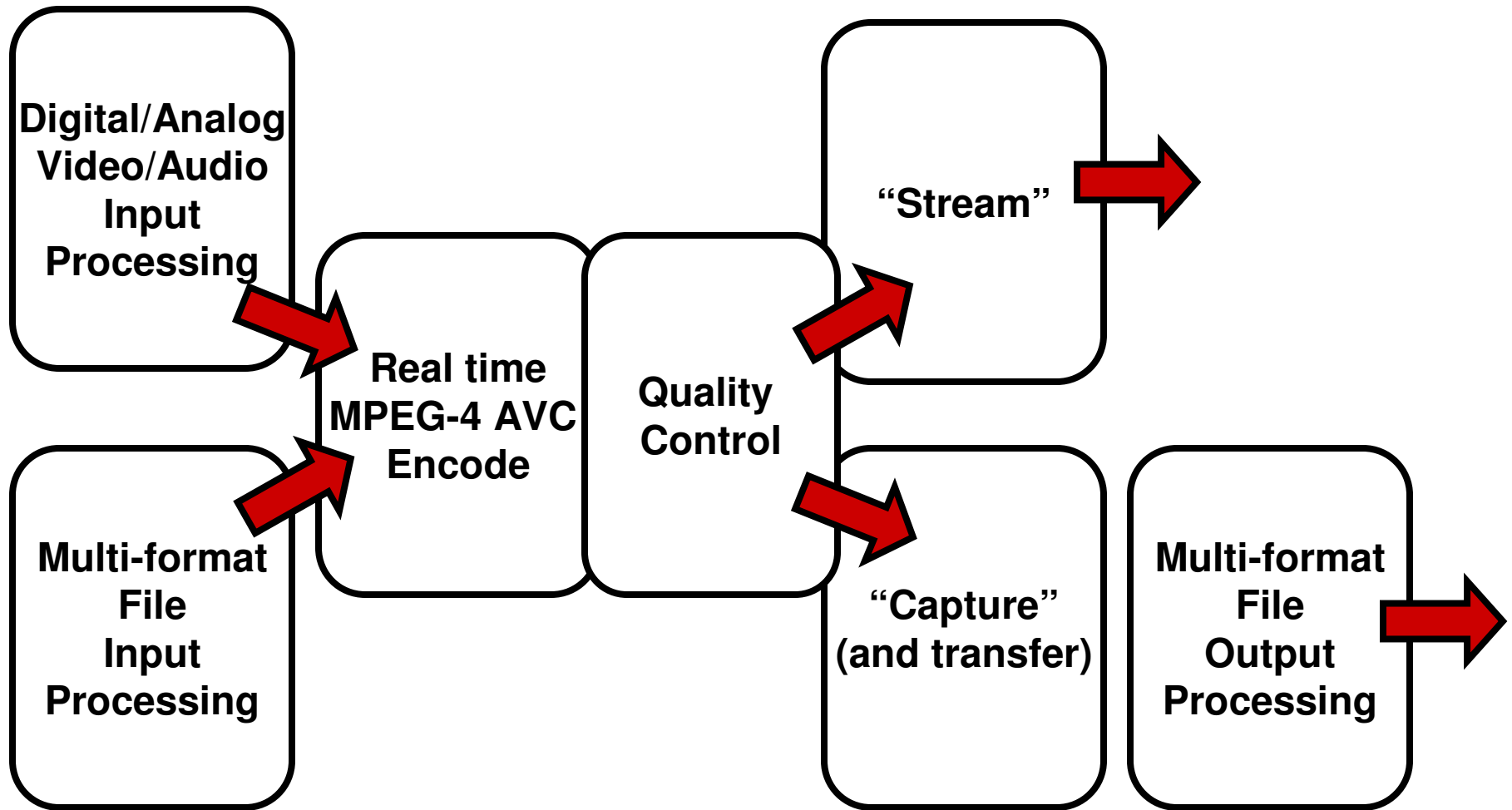
A row of five iPod screens showcasing various content: a music player interface, a video of a man singing into a microphone, a racing game featuring the character Lightning McQueen, the TV show 'The Office', and the game 'Bejeweled'.

Multi-resolution Streams

- Full resolution for main stream
- Low res for EPG, browsing, mobile & VOD mosaics
- Delivered as separate streams



VOD Acquisition Workflow



VOD Acquisition Summary

Challenges

Solutions

Assortment of incoming physical media & formats

Support for multi-format analog/digital video & file ingest

Visual quality and bit budget management

MPEG-4 AVC encoding engine

Minimizing time-to-air for maximum competitive advantage

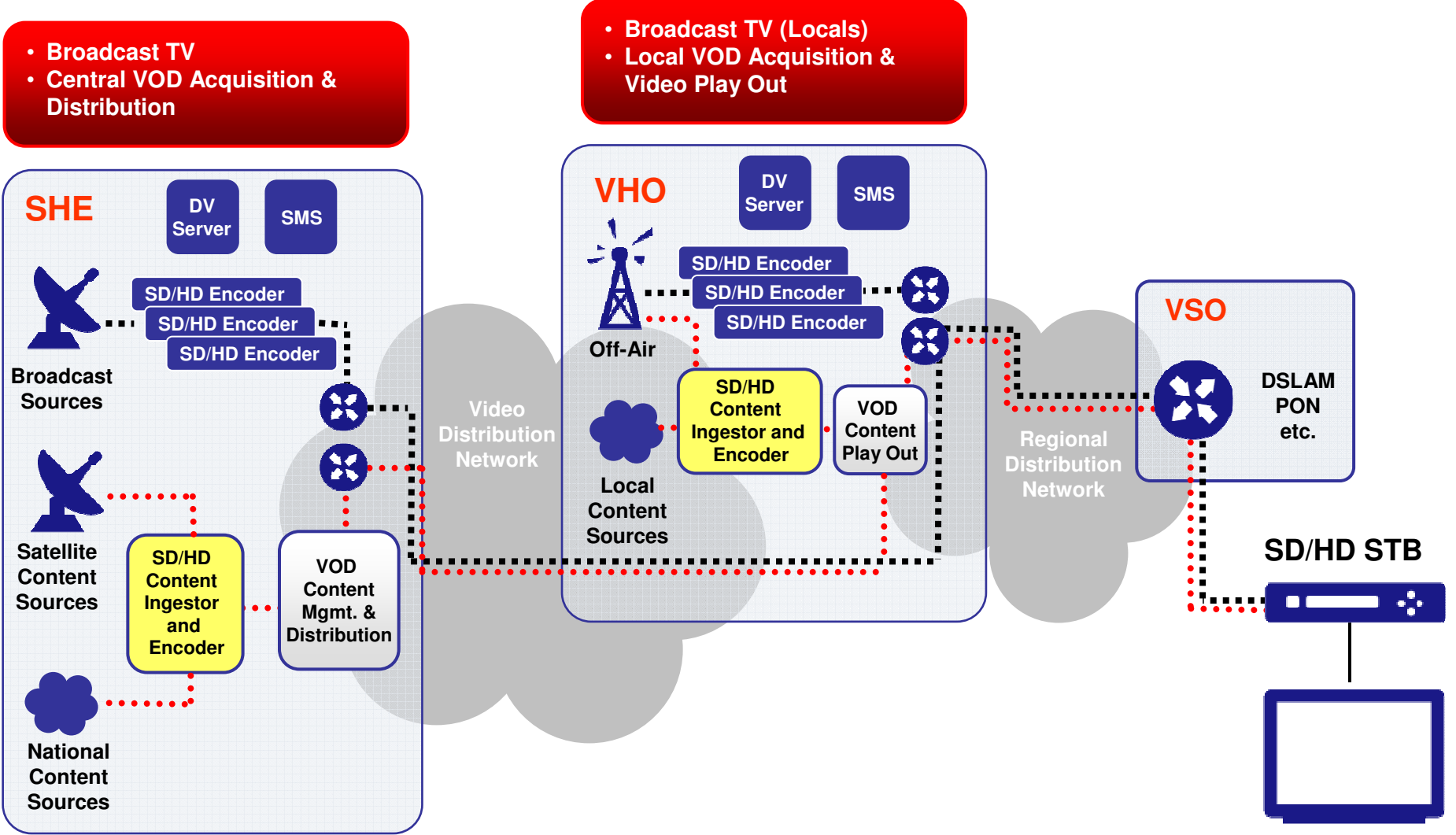
Real time encoding and transfer at SD & HD resolutions

Diverse target playback devices and formats

Support for multi-format output streams and files



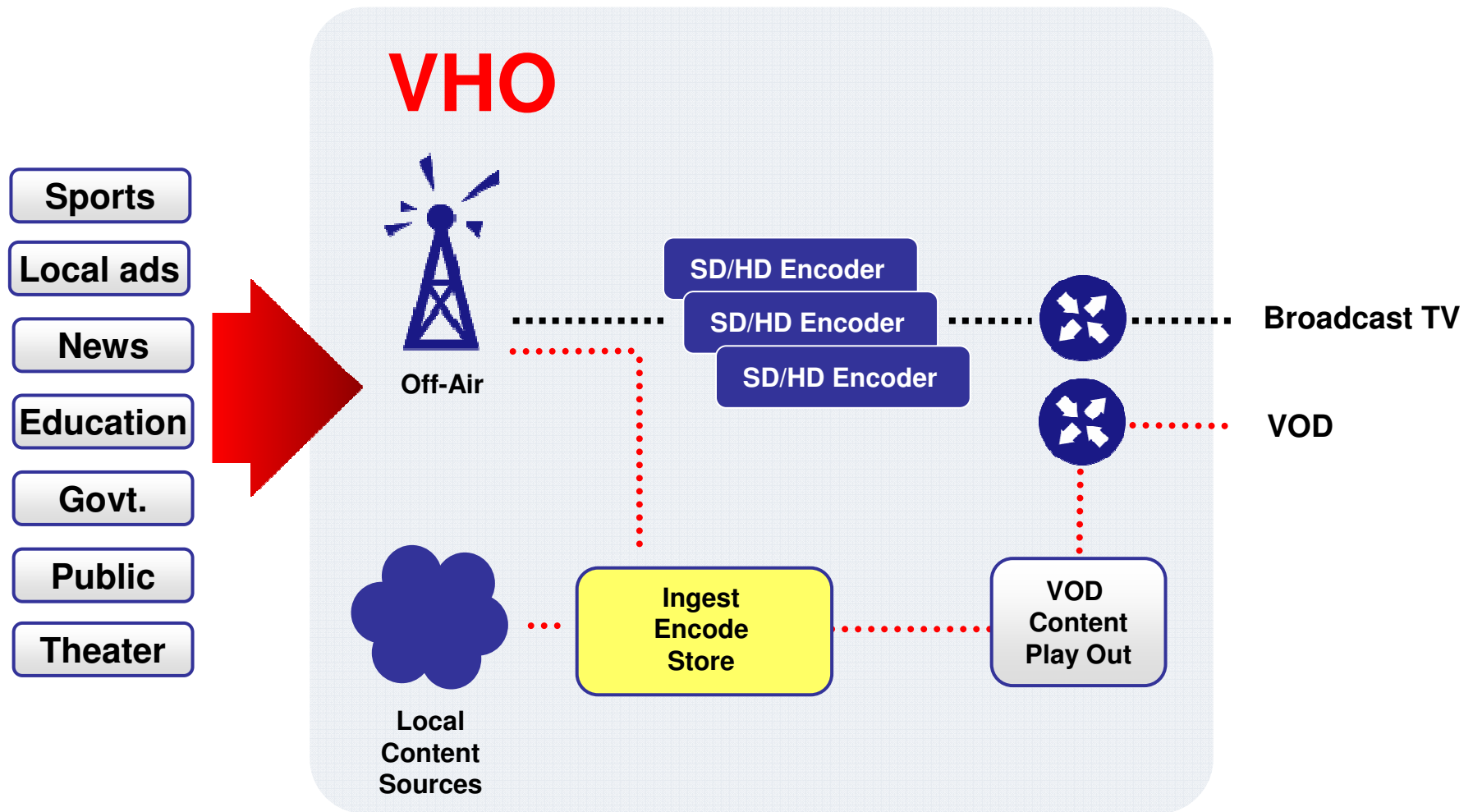
VOD Acquisition for Tier-1 IPTV Operators



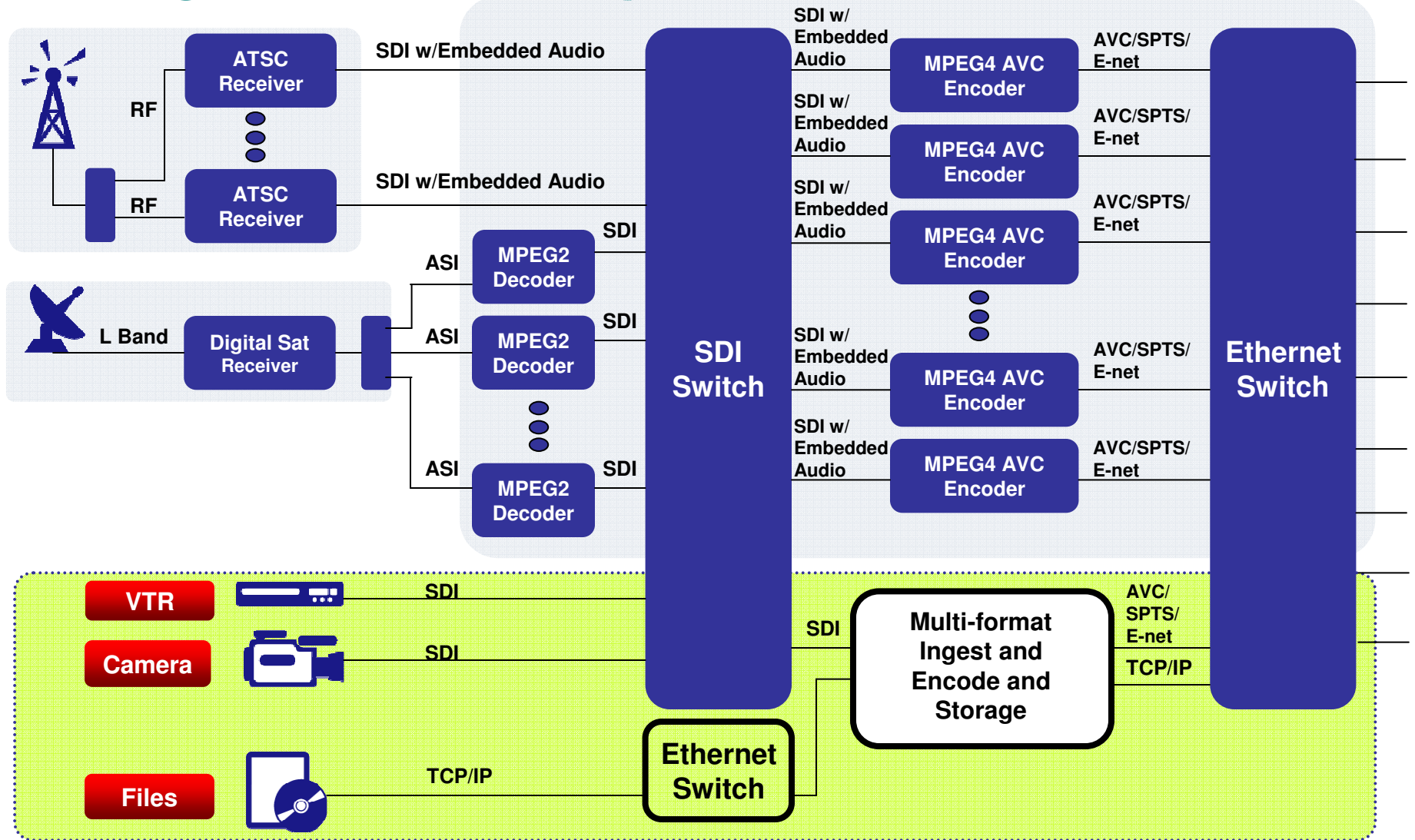
- Broadcast TV
- Central VOD Acquisition & Distribution

- Broadcast TV (Locals)
- Local VOD Acquisition & Video Play Out

Local VOD Acquisition



Adding Local VOD Acquisition to an IPTV Headend



Summary

- **Content is still King**
- **Local content is a differentiator**
- **Multi-format world is here to stay**
- **MPEG-4 AVC is delivering on its promise**
- **Content acquisition is a key for IPTV VOD**

Thank You

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