



televisionary

TANDBERG television

Part of the Ericsson Group



The Evolution of IPTV

Are you my televisionary?

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www.tandbergtv.com

Practical / Real World Experience



70+ US Telco IPTV Customers in 4 years

Where are we now?

- ~200 Telco's delivering multi-channel linear (live) video services (IPTV & ATM BB TV via NLC's Platform)
- Many of the technological hurdles have been overcome or continue to improve (Access Network, Ecosystem, MPEG-4)
- Business cases are still in flux; video has been about customer retention not necessarily profit
- VOD & other On-Demand Content becoming more critical
- Scalability issues persist: VOD, middleware, infrastructure, etc.
- Bundles -Television, Broadband, Home Telephone & Mobile
 - Joint billing has been the one unifier

Essentially on par with competition today – So what's driving IPTV to evolve?

IPTV – What is it & why?

- IPTV is *NOT* the same as BBTV or over-the-top television that utilizes the open internet with no guaranteed QoS
 - IPTV is a closed network, switched video stream delivery system that utilizes IP encapsulation, multicast, & QoS
 - IPTV service providers are primarily wireline Telco's with xDSL or FTTx network infrastructures
 - Seeing wider adoption in Master Planned Communities, MDU's & Enterprise markets with the introduction of MPEG-4
-
- Why did Telco's adventure into video arena?
 - Competition: Sub loss; CLEC's & Cable getting into the voice business
 - Community service or personal projects; smaller local providers wanting to provide a local service
 - New revenue generation; but not quite sure how.....

That's where we were... Where are we now and where are we going?

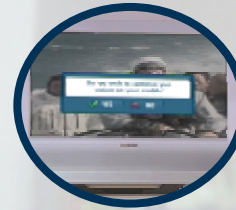
IPTV 1st Generation



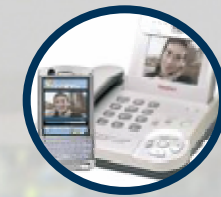
MPEG-2 (SD)



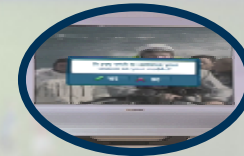
**Interactive
Program
Guide**



**Video On
Demand**



**Caller ID on
TV**



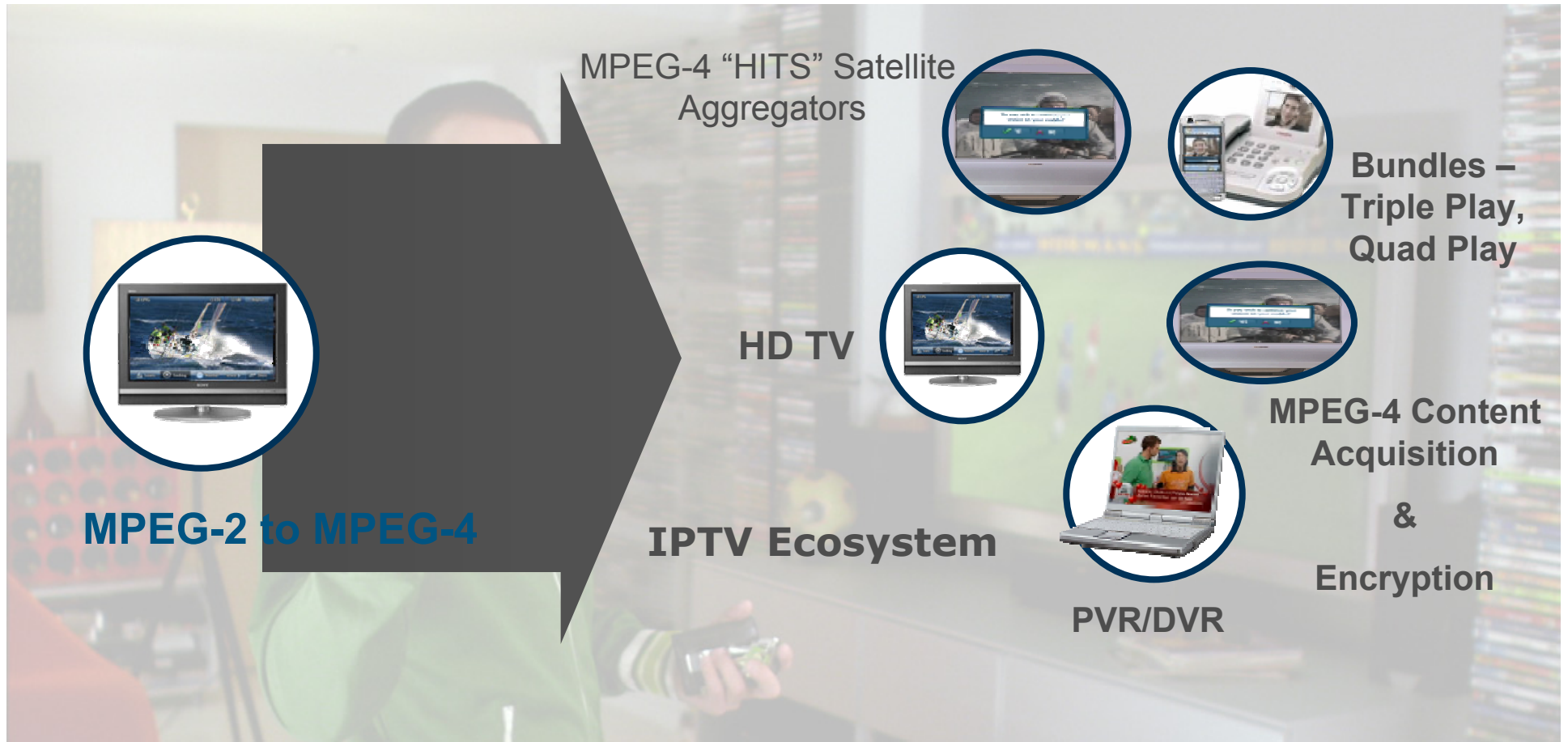
**Parental
Controls for
channel viewing
& blocking**



**Web access
from TV**

All Digital TV

IPTV 2nd Generation



Digital Divide

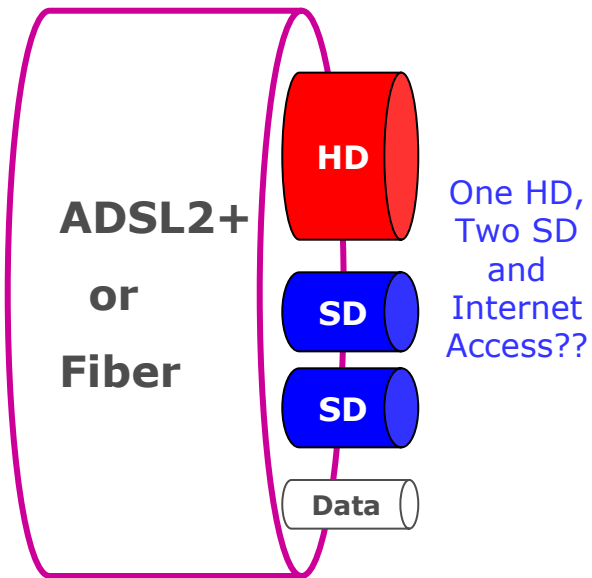
3rd Generation - TV as we know it is changing



The New Individual Television Experience

Typical IPTV Drivers

Bandwidth to Customers is Dictated by Loop Characteristics . .

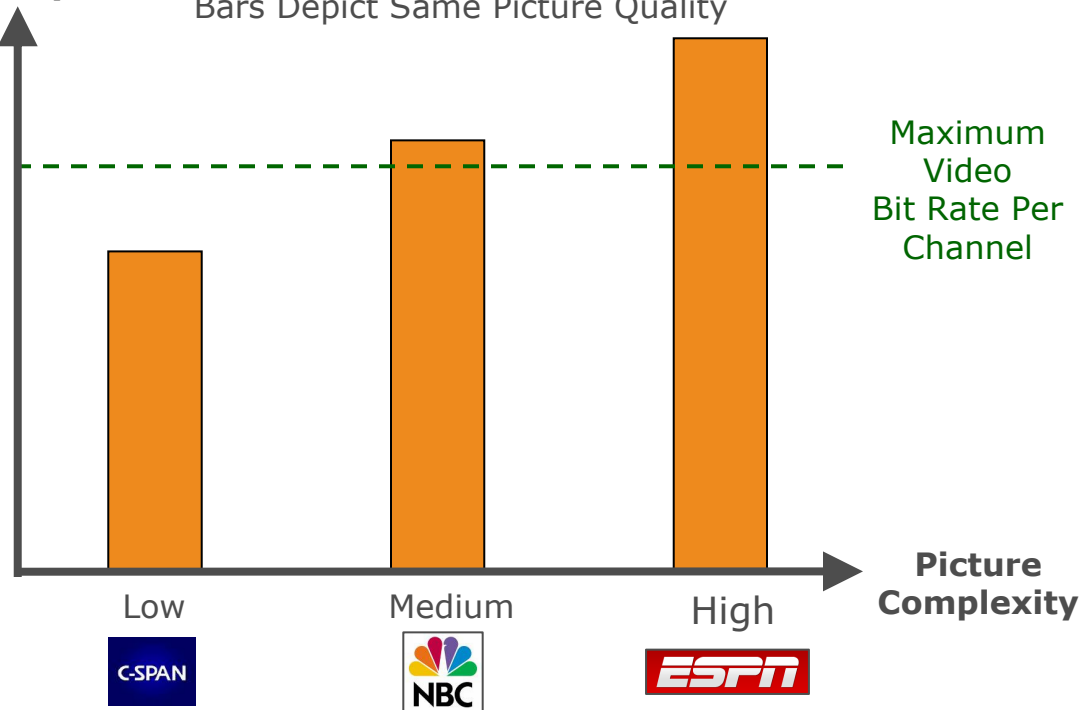


. . Simultaneous Channels Per Household Must be Competitive

. . Video Bandwidth Available for Each Service Is Constrained By Customer Offering .

SPTS Bandwidth (Mbs)

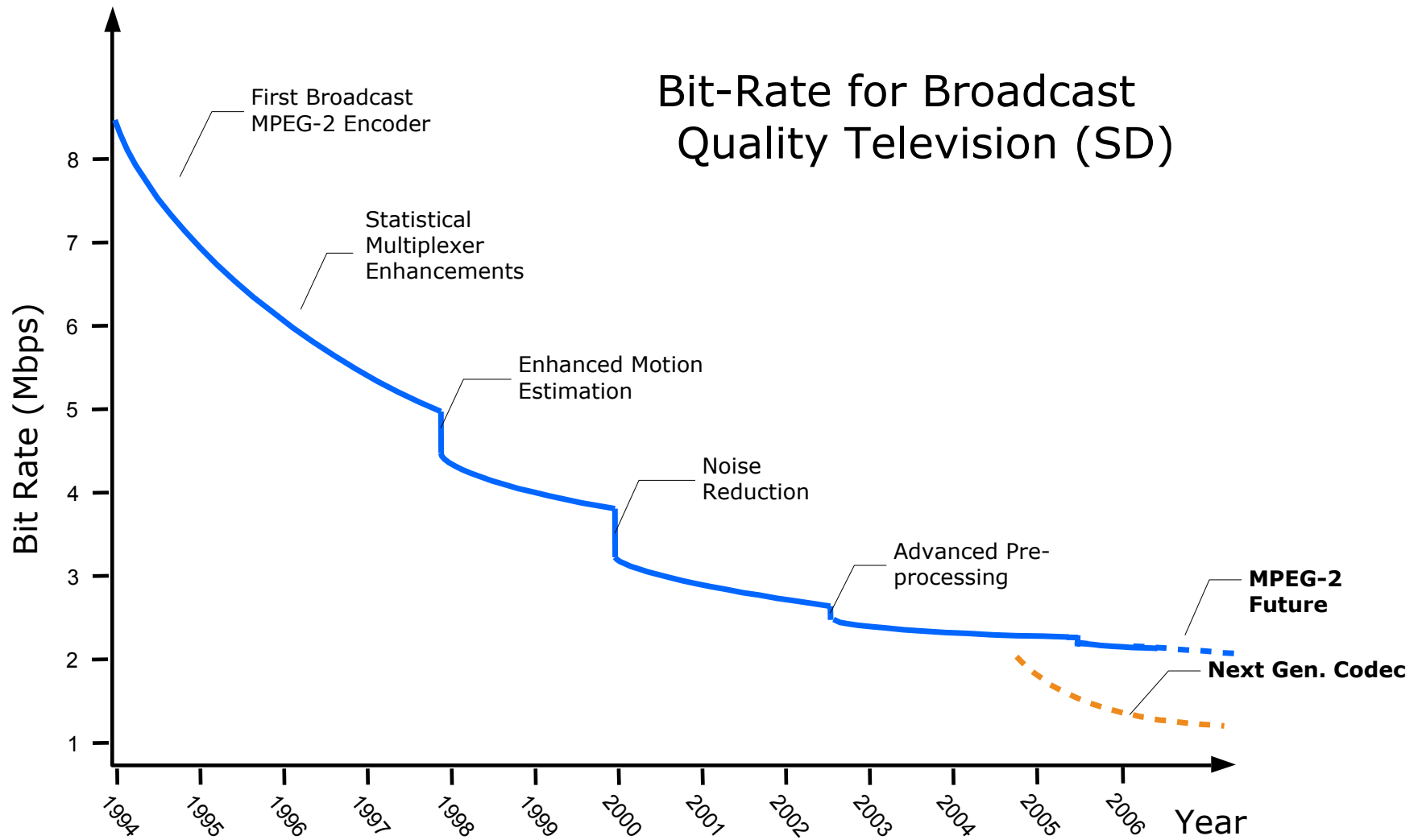
Bars Depict Same Picture Quality



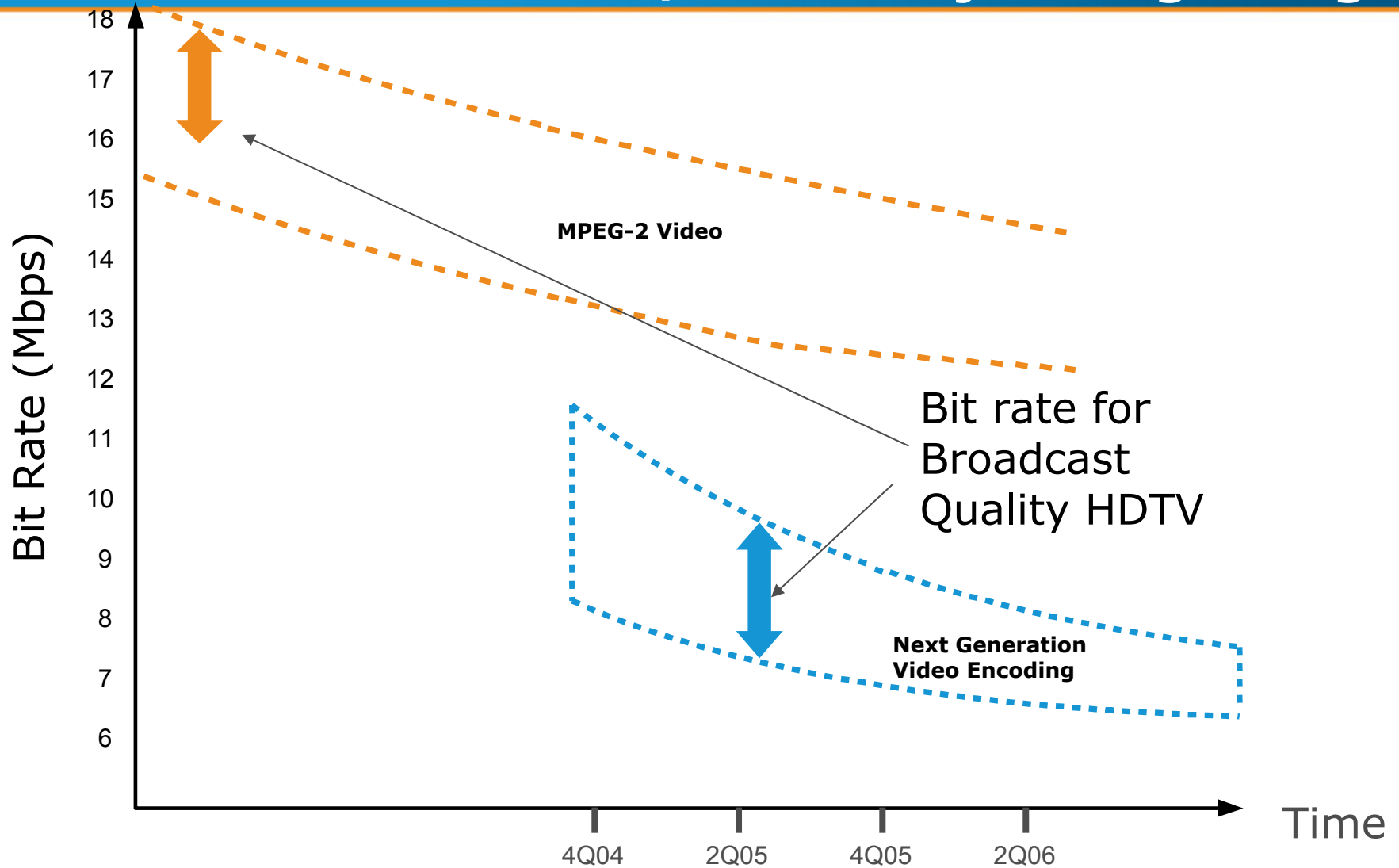
. . Video Quality Must be Competitive . .

. . . And What About Cost?

MPEG-2 Video Is Close to Its Limit ... but MPEG-4 AVC/VC-1 are just beginning!

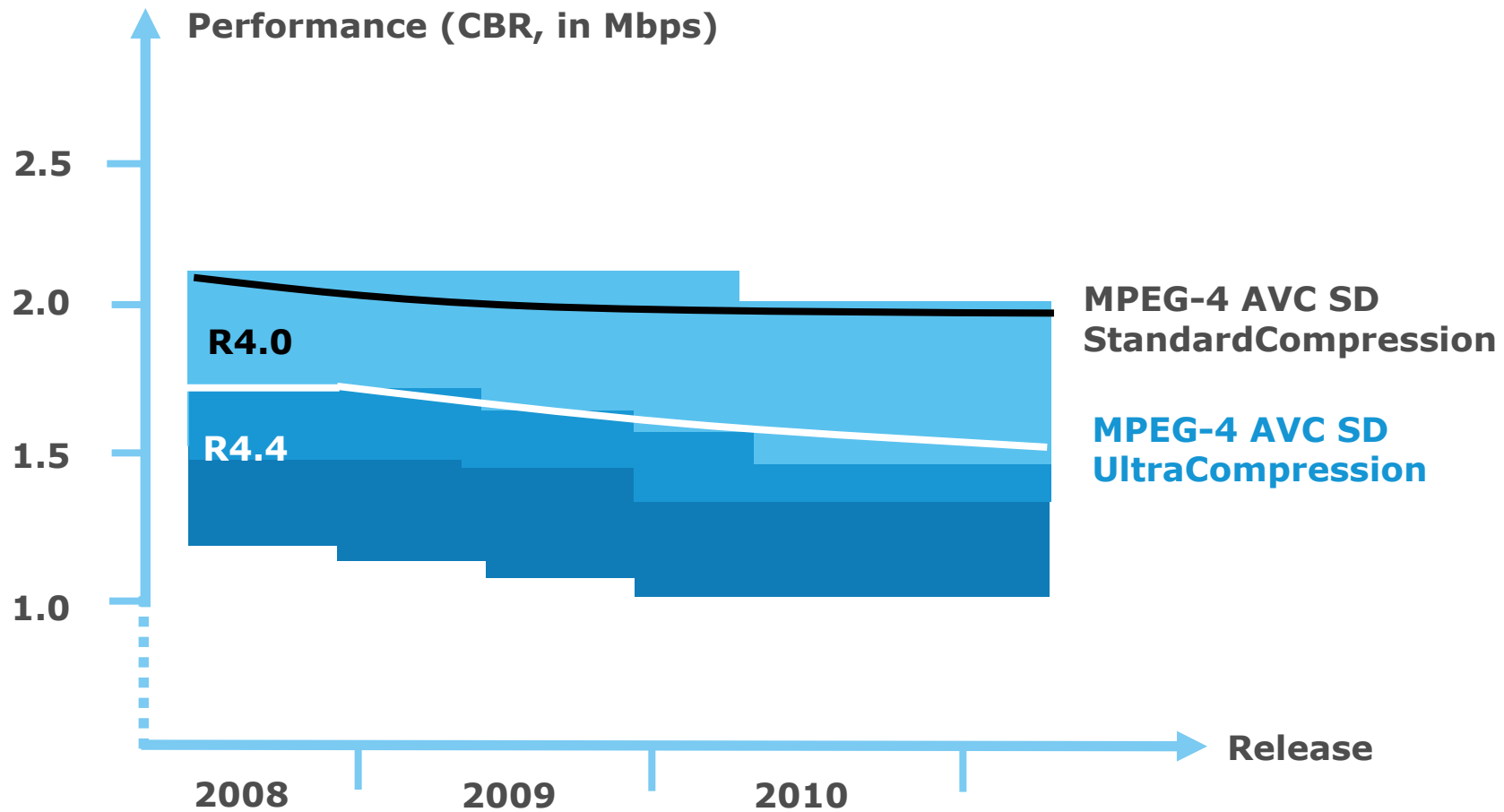


Similarly for HD: MPEG-2 Improvements Have Slowed ... but MPEG-4 AVC/VC-1 are just beginning!



MPEG-4 AVC SD

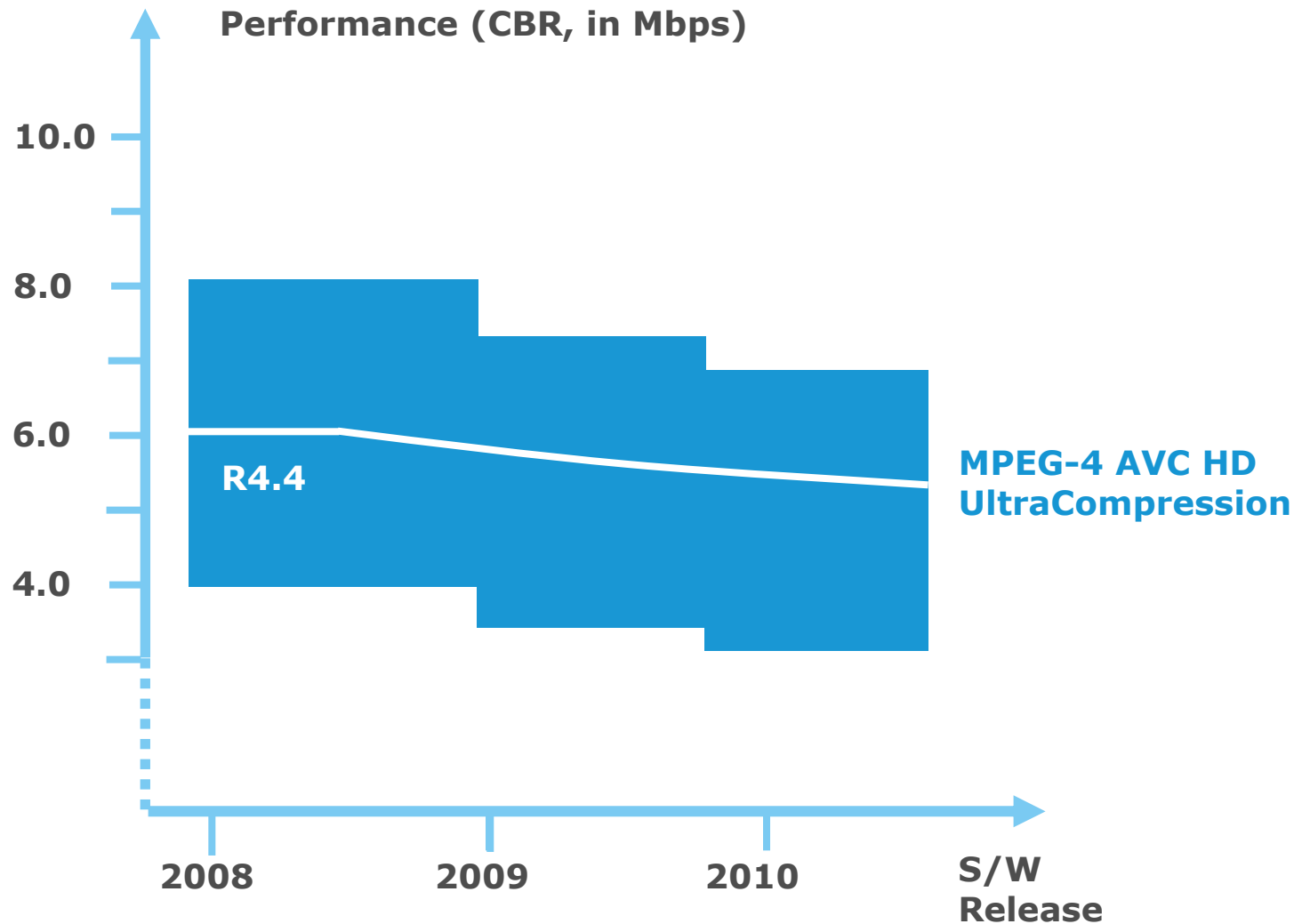
Unprecedented performance and value



UltraCompression offers a 20-30% performance improvement over StandardCompression

MPEG-4 AVC HD UltraCompression

Unprecedented performance and value



AND – Don't forget about Audio!

bit rate planning is gaining in importance*

Audio Channels	MPEG Layer II	Dolby Digital (AC-3)	Dolby Digital Plus	MPEG AAC-LC	MPEG HE-AAC
Stereo	192kbps	192kbps	96kbps	96kbps	64kbps
5.1	Not Supported	384kbps - 448kbps	320kbps	256kbps	160kbps

- Audio bit rates require more attention as video bit rates decrease
- Multiple languages per video service are common, increasing the number of stereo pairs
- Multiple, simultaneously broadcast audio codecs often required
- Separate audio channel can be assigned to PiP stream
- Audio transcoding may be beneficial
- Encoder offers a variety of bit rates and codecs to accommodate available network resources

***Bit rates represent commonly used configuration, not the configurable range**

Key Drivers of the TV experience



HD

Liner TV migrating to
Everything on Demand

Multiple screens

Three driving forces behind today's television evolution

iPlex IPTV Video Processing Platform



Comprehensive functionality

- Encoding
- Transcoding
- Transrating
- Streaming
- Multiplexing
- In-line scrambling
- Radio

Customizable and compact

- Highest density with 8 expansion slots plus 2 GE interfaces in a single rack unit
- Simultaneous support of various processing functions

Deployable in central or hub location

- Ground breaking price / performance
- Reduced operational cost: less equipment to maintain, less space, less power

iPlex VPP solution

- Designed specifically for IPTV
 - Provides required features, robustness (NEBS3), redundancy, flexibility and scalability
- Best picture quality at any encoding bit rate level
 - MPEG-4 HD at below 6 Mbps
 - MPEG-4 SD at below 1.5 Mbps
- Multi-functional
 - Encoding, transcoding, transrating, streaming, multiplexing and in-line scrambling
- Highest density in the market
 - Up to 8 streams per 1 RU, 160 streams per rack
- Field-proven platform
 - Deployed in over 100 IPTV accounts worldwide
 - Thousands of MPEG-2 and MPEG-4 AVC encoders and transcoders already deployed



iPlex receives four awards in 2007

- **IPTV World Series Awards**
Best IPTV Headend & Video Processing Technology
(March 2007)
- **The International Engineering Consortium
InfoVision Award**
(June 2007)
- **Cable & Satellite Product Award**
Best digital video processing technology
(September 2007)
- **The International Engineering Consortium
InfoVision Award**
(October 2007)





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Questions?