



# Hybrid TV - MHEG-5 Interaction Channel for Hybrid IP/Broadcast platforms

Presentation to ETSI/EBU  
9<sup>th</sup> September 2009



# Agenda

- Introduction to S&T
- Interactive TV in 2009
- MHEG-5 Overview
- MHEG-5 International Markets
- Online TV developments
- MHEG-5 Interaction Channel details
- Summary and Contacts



# Strategy & Technology

- Independent company
  - Offices in London (UK), Denver (USA), Hong Kong (SAR)
- Works exclusively in digital interactive TV
- Leads MHEG-5 specification activity in ETSI
- Products cover complete end-to-end middleware solution:
  - Redkey™ MHEG-5 engines to receiver manufacturers
  - MHEG-5 applications to broadcasters and operators
  - MHEG-5 playout equipment (Object Carousels)
    - Customers include Sky (UK), Arqiva, Freeview Australia, Freeview NZ, Kordia, Canwest, TVB (HK), Digicable (India)
- Also supplies playout equipment for MHP and Tru2way (OCAP)
  - Customers include RAI in Italy, Broadcast Australia, ABC, Time Warner Cable, Cisco and Motorola
- Founder member of IMPALA (International MHEG Promotion Alliance)



# Middleware enables New Content

To enable additional content and services, middleware must be specified and deployed (ideally on all receivers in a market)

This enables interactive content and applications including:

- Enhanced or Platform EPG / Mosaic
- Enhanced TV formats (programme related)
- Digital teletext and broadcast information services
- Games
- Placeholders and HD Switching (broadcaster control)
- Video stream selection ('multi-view' applications)

*And with Interaction Channel and IP connectivity :*

- On-line video and audio (pull on-demand) – hybrid receivers
- Richer / deeper text and graphics content
- t-commerce for shopping channels; voting/participation TV



# MHEG-5 Background

- Developed in ISO-MHEG group and DAVIC in 1995
  - Intended as UI for DAVIC interactive services and VOD
- Standardised in ISO 13522-5
- Adopted by UK for DTT launch in 1997 in D-Book
- UK Profile includes text, graphics and DSM-CC carousel systems
- Profile evolved to UK Profile 1.06 (current)
- ETSI standard ES 202184
- International profiles now include New Zealand (Maori characters), Malaysia, Ireland, Australia (HD), South Africa and Hong Kong (Traditional Chinese)
- D-Book 6 profile for Freeview (DVB-T2) and UK Freesat include:
  - IP Interaction Channel
  - PVR support
  - Improved graphics
  - HD compatibility
  - Persistent storage
- Latest profile draft ES202184 r 2.1.1 submitted for ETSI standardisation
- Now included within CI+ as the 'CI+ browser' user interface



# MHEG-5 Rollout

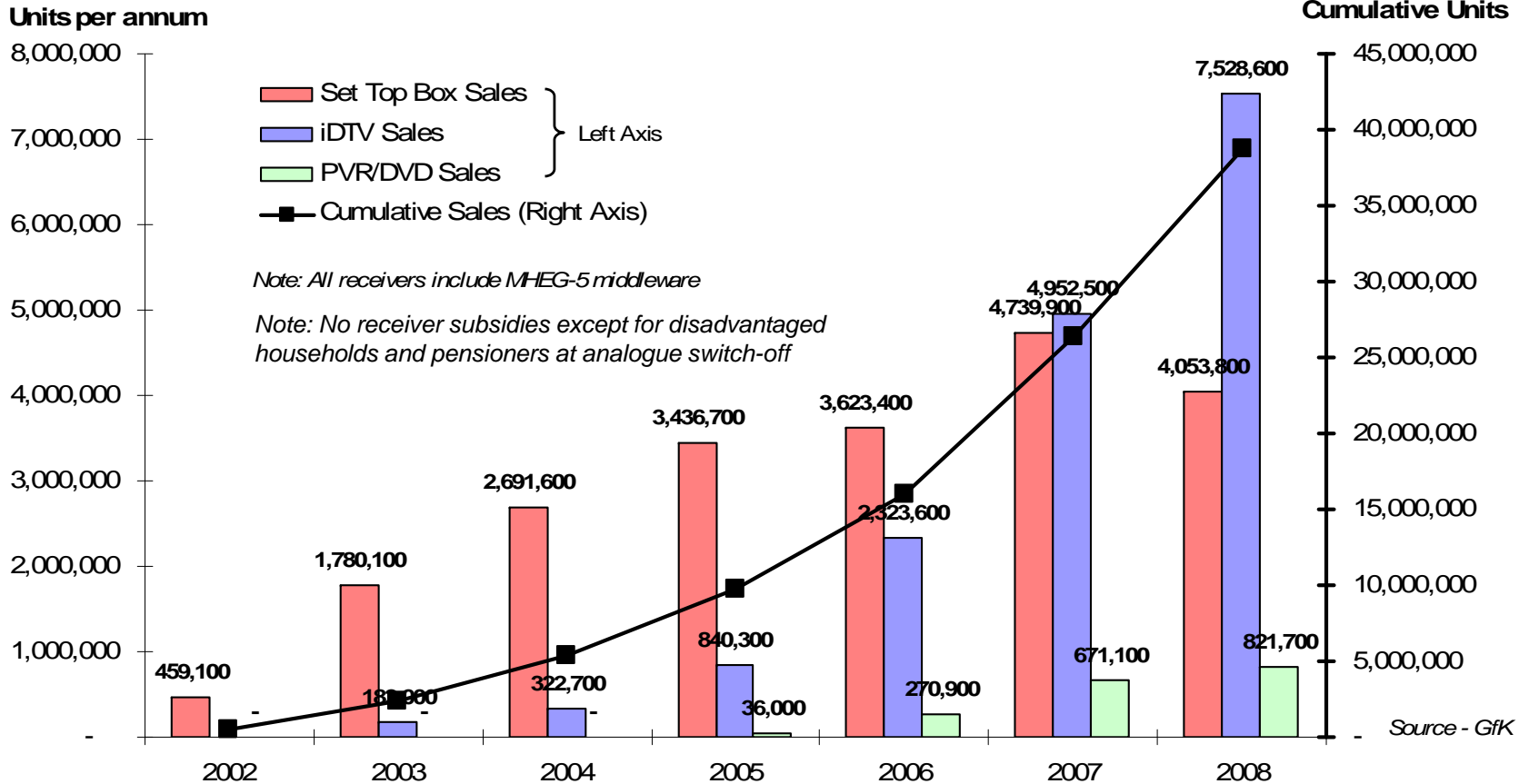
- Successfully deployed in UK Freeview
  - >40m receivers sold; >12m receivers sold in 2008
  - 99% UK Freeview platform penetration
- Launched on UK Freesat in May 2008 – approx 500,000 receivers sold
- Launched in New Zealand in May 2007 with >250,000 receivers sold
  - DVB-S MPEG-2 SD and MHEG-5
  - DTT launched April 2008 with MPEG-4 H.264 HD;
- Launched in Hong Kong in June 2008 with >500,000 units sold (34% of mkt)
- Launched in Germany (as MultyText) by Technisat - September 2009
- Future launches include:
  - UK Freeview HD in 2009 (DVB-T2)
  - India in 2009 on Digicable Pay-TV (DVB-C)
  - Freeview Australia in 2010
  - Malaysia in 2009/10
  - Ireland in 2010 with RTÉ and OneVision
  - South Africa in 2010
- Wide integration into iDTVs in Europe and Asia
  - >70% of EU receiver sales now iDTV. MHEG now in all leading brands, both as native and/or as CI+ browser
- Supported in Windows 7



# Freeview market success



### UK Freeview Retail Sales 2002-2008





- Joint venture between BBC and ITV
- Launched in UK in May 2008
- Over 100 channels in SD and HD
- Free to view – no subscription
- Standards:
  - DVB-S/S2
  - SD/HD MPEG-4 H.264 AVC
  - MHEG-5 (enhanced Freesat profile)
- Available to 98% of UK homes
- Conformance testing by DTG
- *Note: >10m UK households already have an 'HD Ready' TV*





- HD-MHEG and MHEG IC included in specifications for Freeview HD for all receivers
  - Platform uses DVB-T2
- Rolls out from October 2009 – in particular towards deployment in volume before World Cup 2010



- Freeview New Zealand is a consortium of Free-to-air broadcasters
- Launched on DVB-S in 2007 and DVB-T HD in 2008
- Standards:
  - DVB-T:
    - SD/HD MPEG-4 H.264 AVC
    - MHEG-5
  - DVB-S:
    - SD MPEG-2
    - MHEG-5
- New Zealand MHEG Profile published by Freeview NZ
- Conformance testing by DTG Testing UK
- Key requirement was a platform EPG using MHEG-5
- Launched an integrated EPG-PVR solution in December 2008 with accurate recording, series links and broadcaster recommendations



- Operated by TVB as the leading broadcaster in Hong Kong
- Launched in August 2008 with interactive news services for Beijing Olympics; now provides stock market, weather and other applications
- Standards:
  - DMB-T (China National Standard)
  - SD/HD MPEG-4 H.264 AVC
  - MHEG-5 (Hong Kong profile)
- Hong Kong MHEG Profile published by ASTRI
- Conformance testing by HKSTP Labs using DTG Testing Test Suite
- Over 30 receiver brands have integrated MHEG-5
- Enhanced profile with IP support now under consideration



# EPG examples

**3** Sat 26 May

4.20am Magna aliqua ut enim  
5.05am Tempor incididunt ut labore et

**6.00am** Exercitation ullamco laboris nisi ut

6.40am Nostrud exercitation ullamco

8.00am Quis nostrud exercitation ullamco ...



**TVONE, 0.22am**

Aliquip ex ea commodo consequat duis aute irure dolor in reprehenderit in voluptate velit esse.

PGR

◄ Prog ◀ Chnl ■ Prev Day ■ Next Day

**OK** Watch TV **EPG** Now/Next

**AERTEL** 1241 23/10/08

Channel **1** Fri 25 Jul

◀ **RTÉ ONE** ▶

Sit amet	11:50
Enim ad minim	13:00
Aliquip ex ea commodo conse...	13:55
Consectetur adipisicing elit	15:15
Commodo consequat	16:25
Dolore magna aliqua	16:55
Exercitation ullamco laboris ni...	17:10



/opt/xml/Service 1

Consectetur adipisicing elit sed do eiusmod tempor incididunt ut labore et dolore magna aliqua ut enim ad minim veniam quis nostrud exercitation ullamco laboris nisi.

**GUIDE** Get Switched On!

**Text** Aertel **OK** Watch ■ Now-Next ■ -24 hours ■ +24 hours



# EPG Examples



TV Guide  
7.30pm Weds 22nd Oct



8:00-8:30 The New Inventors: Hosted by James O'Loughlin, the program highlights the brightest new inventions in Australia.

Today	7.30pm	8.00pm	8.30pm
2 ABC	The 7.30 Rep...	The New Inve...	Spicks & Spe...
3 SBS	The Hairy Bik...	Inside Australia	Dateline
4 Seven	Crash Invest...	Medical Emerg..	Criminal Minds
5 Nine	Two and a Half Men		The Mentalist
6 Ten	Jamie's Ministry of Food		House

● Record   
 ● - 24 hrs   
 ● + 24 hrs   
 ● Favourites



TV Guide Now/ Next  
12.05pm Mon 20th Oct




All Channels    Favourites

2 ABC	Now	7.30pm	The 7.30 Report
	Next	8.00pm	The New Inventors
3 SBS	Now	7.30pm	The Hairy Biker's Cookbook
	Next	8.00pm	Inside Australia
4 Seven	Now	7.30pm	Crash Investigation
	Next	8.00pm	Medical Emergency
5 Nine	Now	7.30pm	Jamie's Ministry of Food
	Next	8.30pm	House








# Video on Demand

Video on Demand 



To select use left/right, to view press 'OK'

- ◆ Action
- Adult on Demand
- Adventure
- Ad Supported TV
- Animation
- Biography
- Catch Up TV
- Comedy
- Crime
- Drama

**Aliens (1986)**

Price: £3.95    Duration: 137 mins    Rating: R  
Rental duration: 24 hours

Film synopsis  Back 

Video on Demand 

To view press 'OK'



**Aliens (1986)**

Price: £3.95    Duration: 137 mins  
Rating: R    Rental Duration: 24 hours  
Genre: Action, Horror, Sci-Fi, Thriller  
Director: James Cameron  
Actors: Sigourney Weaver, Carrie Henn

Ripley, the only survivor from mankind's first encounter with the monstrous Alien. Her account of the Alien and the fate of her crew are received with skepticism...

Back 

Usage with CI+ enabled iDTVs





# Information / Stock Market

創富坊 恒生指數 13276.79 ▼ 262.42 國企指數 7395.16 ▼ 204.41 11:03:48

TVB

1 21°C 2月 12日

2 恒生指數 13655.04  
以上資料只供參考，務有延時。

3 新聞提要  
東區醫院委員會開會調查嬰兒遺失事件。 11:02

播映中 J2 台

冒險王

按數字 進入

中國建材 8.79 ▼ 0.14 3328 交通銀行 5.17 ▼ 0.18  
月；就業人口意外增加了1,200人。 中國鐵建(01186)獲  
0.21 ▲ 0.02 0553 南京熊貓電子股份 1.02 ▼ 0.01

11:05 2月12日 82% 22°C ▲ 25°C

10大活躍港股

3988 中國銀行	2.10	-0.01
2628 中國人壽	22.70	-0.60
941 中國移動	72.75	-1.75
2823 A50中國基金	9.84	-0.15
5 滙豐控股	59.35	-0.60
1398 工商銀行	3.48	-0.09
2899 紫金礦業	5.01	+0.16
939 建設銀行	4.00	-0.10
386 中國石油化工股份	4.25	-0.15
857 中國石油股份	6.14	-0.26

報價延時最少15分鐘  
● 返回

亞視電視有限公司  
ATV TELEVISION LIMITED

鄺凱迎  
亞視高級副總裁

電話訪問

律師林炳昌維持原判即入獄

倫國際 0.790 -- 0685 明報企業 1.250 -- 0686 GAY GIANO INTL 0.490 美元/瑞郎  
詠賽。西班牙 2-0 英格蘭。 世界盃外圍賽 1.1580

New profiles support Traditional and Simplified Chinese fonts



# Digital Teletext

Weather Today+3 S4/C

12:04 13 MAY 154

Temp (C)	Max	Min
Cardiff	-2	6
Swansea	-2	6
Newport	-1	7
Merthyr Tydfil	-2	5
Wrexham	-2	5
Rhondda	-2	5
Colwyn Bay	1	5
Rhyl	0	5
Holyhead	3	6
Llandudno	1	5

◀ Prev/Next Page

TV Back up Cymraeg Main Menu

S4/C

11:55 13 MAY 100

- Main Menu
- S4C Digidol
- Programmes
- Weather
- Children
- Learning Welsh
- Ffermio
- S4C2
- Access Services
- Help
- Sbectel A-Z

1 / 1

TV Exit Cymraeg Main Menu





# Video Stream Selection

**BBC NEWS** 11:46 11 Jul 1001

Sports headlines, updated throughout the day

To change audio, press UP, DOWN, LEFT, RIGHT

**BBC** ● HOME ● BACK ● INDEX

1 Press 1 for LATEST SPORTS NEWS 8:48

2 INSIDE F1

3 GRANDS PRIX

4 SCOTTISH OPEN

5 LIVE: THE ASHES

6 Sport Headlines

7 BBC TV Sport Listings

8 Sport Index

R. Barrichello 1:18.7

L. Hamilton 1:20.2


11:43 ich sees the riders trek 176km from Andorra La Vella to St Giron.

**BBC** ● HOME ● BACK



# Digital Teletext – Betting


**teletext** Home



- National & World News
- Local News
- Local Sport
- What's On Near Me
- My Film Favourites
- Racing & Betting**
- Motorsports Gallery
- Edit My Homepage

**Your Teletext Alerts:**  
Arctic Monkeys tickets [More...](#)  
HMV Music DVD clearout [More...](#)  
A7 Weekend Works [More...](#)

**JUST FOR YOU**  
Exclusive Arctic Monkeys track download



A-Z HELP SHORTCUTS MENU

**teletext** Racecard

**Kempton - 420. Each-Way 1/4 1-2. 1m 2f Flat.**  
Press Select to place a bet.

No.	Silk	Form	Horse/Trainer	Jockey	Odds
1		0-	Apocalypto/ EJ Creighton	Alan Creighton	40/1
2		7870	Mayfair's future/ JR Jenkins	TP Queally	8/1
3		090990	Time to Play/ TT Clement	J Quinn	3/1
4		58-4	Incarnation/ LM Cunami	Dane O'Neil	2/5

▼ Press down to view more...

A-Z LIVE VIDEO MY ACCOUNT MENU



# Health / Government Information



Fri 27 Apr 10:09  
Page 810

## ALCOHOL FACTFILE

65% of suicides involve alcohol  
20% of acute hospital admissions involve alcohol  
29% of men and 11% of women drink over the Sensible Limit  
12% of 9-15 year-olds drink

### What's the Question

How much do you really know about alcohol? Try our daily quiz. Today's question: What's the best way to sober up a drunk person?

a. Loads of black coffee

b. Famous fry-up!

c. Time to recover

Tomorrow: Is red wine actually good for you?

What is a hangover?	810
Hangover cures	840
Alcohol and snoring	860
Your liver and you	880
Winter vitamins	900

● Take care at Christmas

next ◀▶

NHS Direct main menu ●



Fri 27 Apr 10:09  
Page 819

### What's the Question? – How to sober up a drunk person

c. Time to recover. CORRECT!

The best way to help combat the effects of alcohol is to sleep it off as it allows your body time to get rid of the toxic chemicals.

Drinking fruit juice and water when you wake up will help rehydrate you and give your hungover body a boost of vital vitamins.

Press red to return.

● Rest and relaxation techniques

◀▶ more

Keep active ▶◀

What's the Question? ●



# Games







# Interactive Advertising

**ABSOLUT PEARS**  
THE NEW TASTE OF TEMPTATION.

ABSOLUT PEARS - The new flavour from absolut. With a full-bodied, soft and ripe taste, it's the new definition of temptation.

For a recipe, Press the DOWN arrow key. ▼

FOR THE FULL EXPERIENCE VISIT:  
[www.absolutdrinks.com](http://www.absolutdrinks.com)

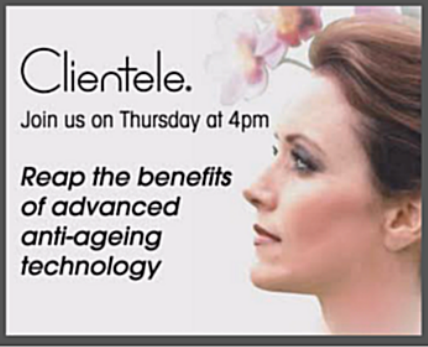
A promotional image for Absolut Pears. It features a bottle of Absolut Pears vodka in the center, surrounded by various objects: a pear, a silver watch, a white coffee cup, a red flower, and a martini glass. The background is dark, and the objects are reflected on a glossy surface.



# Shopping

Qcut 0800 52 42 32 8033 50 40 30 QVCActive

### QVC TV Guide

Today	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	
Coming Soon...	

Use Up & Down arrows then press OK

Return to tv Shortcuts How to order Back

You only need your QVC Membership and PIN number to order

Qcut 0800 52 42 32 8033 50 40 30 QVCActive

### Last Products featured on QVC

Steiff Limited Edition White Tag Artist Bear With Sketchbook	
Steiff Collectable Miniature Love Bear	
Steiff Classic Little Angel Bear	
Steiff Limited Edition Bear Of The Year 2004	

Use Up & Down arrows then press OK

Return to tv Shortcuts How to order Back

Shop in confidence with our 30-day money-back promise

# Multytext






## Regionalwetter Nordwest


Mittwoch 24.06.2009 14:20

[zurück](#)

- 1 **List/Sylt**
- 2 Helgoland
- 3 Schleswig
- 4 Kiel
- 5 Fehmarn
- 6 weitere Städte
- [Hilfe](#)

### Vorschau für List/Sylt

Do	Fr	Sa
 15	 17	 20
		



◀ Heute, Mi 24.06.2009, tagsüber ▶



- Freeview Australia has now published the final specifications for phase 2 receiver devices including MHEG-5 middleware
- Specification documents are available under NDA and controlled release from Freeview Australia
- Receiver spec and MHEG-5 profile require:
  - H.264 codec
  - IP connection with MHEG-5 Interaction Channel
  - MHEG HD graphics support
  - DSMCC File System Acceleration (non-volatile cache)
- The primary objective is to support a platform EPG application that will launch in 2010
- Hybrid Broadcast/IP services are also supported as a future option for broadcasters.





# Commercial drivers for Hybrid

- For the past 10 years, interactive TV was about text and graphics, with selection of additional broadcast AV streams
- Interactive TV is now evolving into provision of access to additional IP video services:
  - Online TV delivered over IP is developing rapidly with phenomenal success of YouTube, BBC iPlayer, etc
  - Currently most delivery is to the PC but consumers clearly prefer to watch on their TV
- *Remember – viewers watch TV to watch TV!*
- *Interactive TV is about content – Technology is just the enabler*



# Online TV creates new opportunities

- Existing broadcast interactive TV delivers a rich viewer experience using MHEG-5 middleware
- Now the addition of IP connectivity with the MHEG-5 Interaction Channel opens up a wide range of new opportunities for additional content and services based around Online TV
- HBBTV, Widgets, Adobe Flash for TV, 'Canvas' and other technologies are proposed by some groups and manufacturers; however, many of these are some way from being ready for deployment or standardisation
- Some CE Manufacturers are doing deals with content owners and are positioning themselves as 'gatekeepers' with control of the portal providing access to Online TV content
- BUT unless a conformance regime exists in a horizontal market then deployment will be risky for all parties



# Commercial requirements

- To support online TV from a Free-to-Air broadcaster's point of view requires:
  - Standardised products and
  - Conformance regime so that interoperability is achieved over a wide range of consumer devices to create a mass audience
  - Seamless viewer experience whether content delivered over broadcast or IP
  - Simple and straightforward user interfaces
  - Content security, especially for HD services
  - Launched from broadcast services – an extension of the broadcast service for branding and control



# IP delivered services

- The Internet is a layered system
- IP delivery does not demand HTML presentation
  - e.g. YouTube on iPhone does not use HTML
- www content must be repurposed for TV display
  - Whether using MHEG Interaction Channel or other standards
  - Designed for Remote Control user interface and normal TV viewing distance
    - For example, BBC iPlayer
- Information for applications can usually be delivered from existing content management systems
  - Using XML-compliant interfaces
- Communications layers of Internet can deliver many types of data
- So, not “*internet on TV*” but “*TV delivered via the internet*”

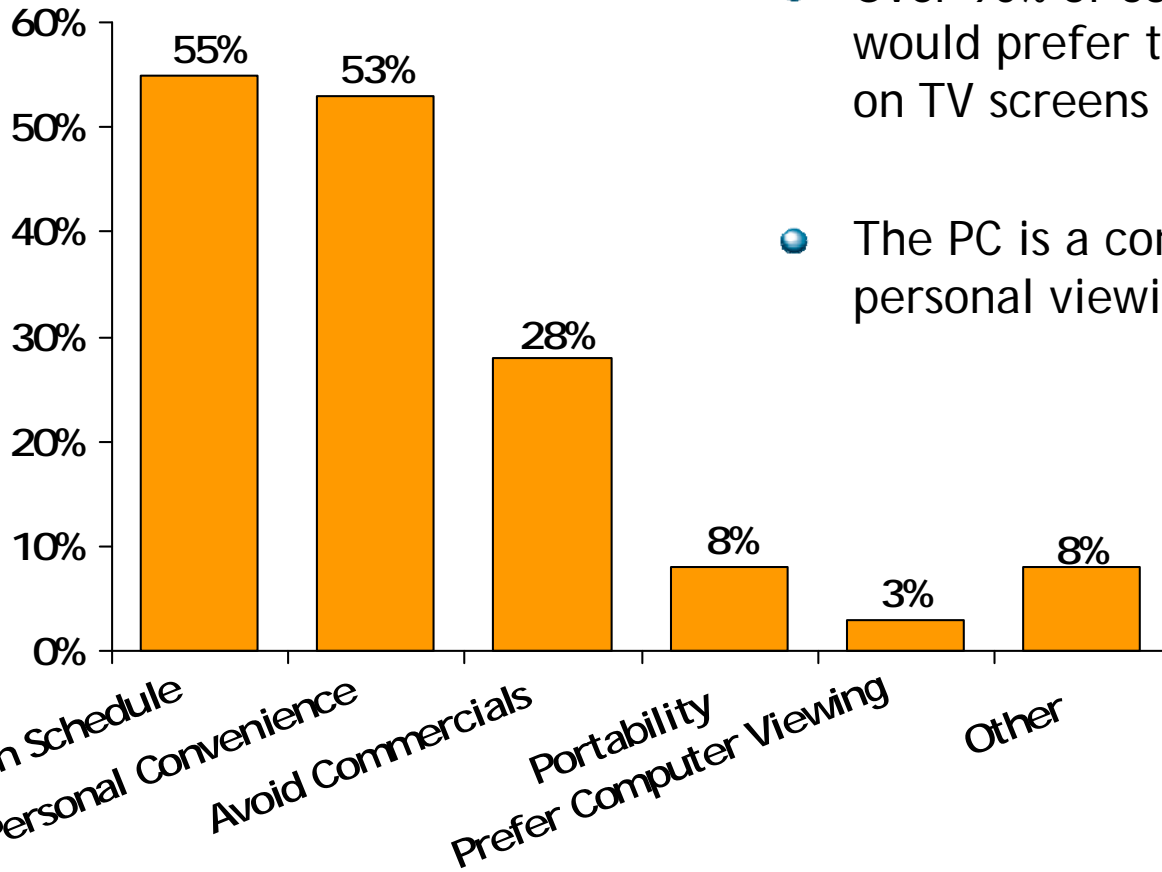


# Who Is Driving Online TV?





# Online TV Drivers (USA)



- Over 90% of consumers say they would prefer to watch TV content on TV screens
- The PC is a connected device and personal viewing platform

Watch On Own Schedule

Personal Convenience

Avoid Commercials

Portability

Prefer Computer Viewing

Other





# BBC iPlayer Catch-up TV on PC

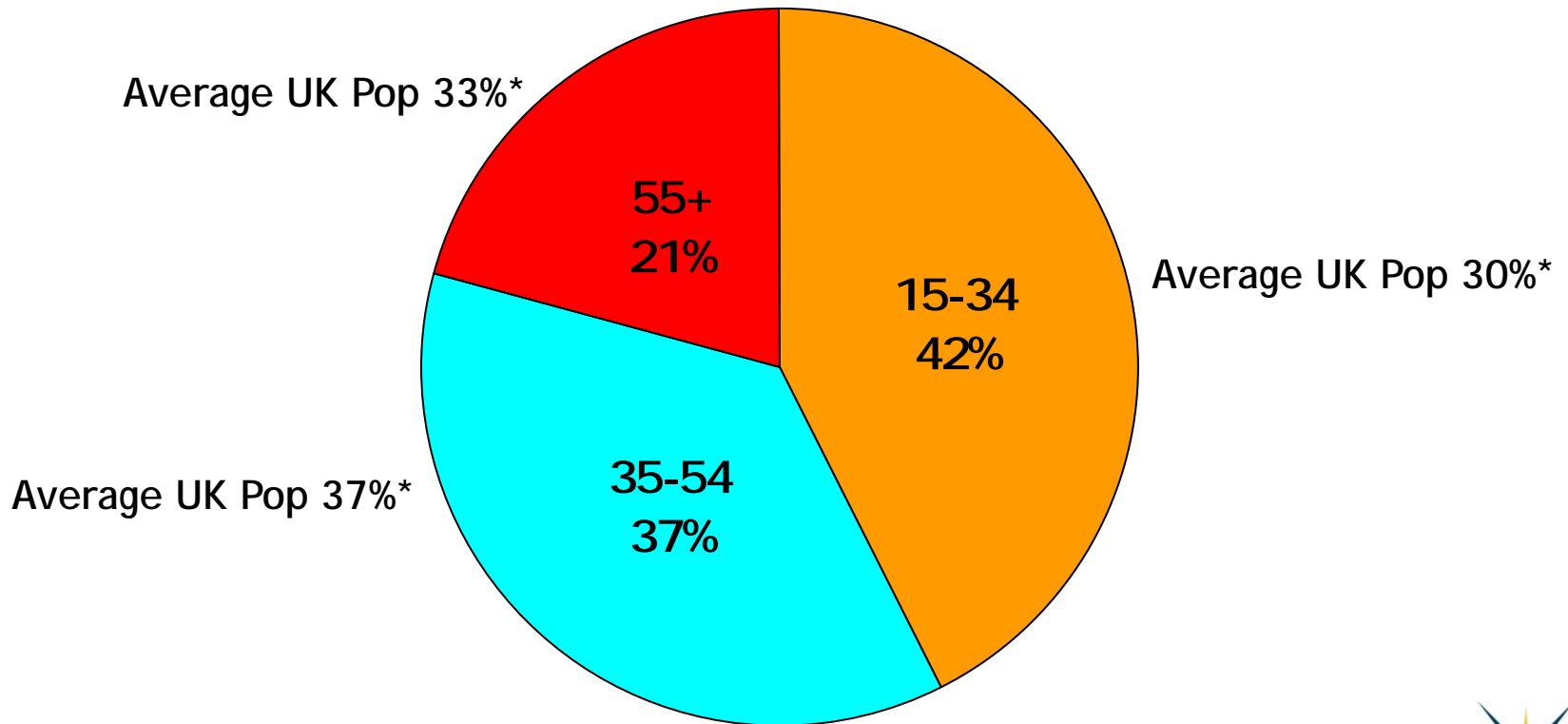


9th September 2009

Hybrid TV



# BBC iPlayer: Wide User Age Demographic



Data: BBC

\* % of UK national population excluding under 15s



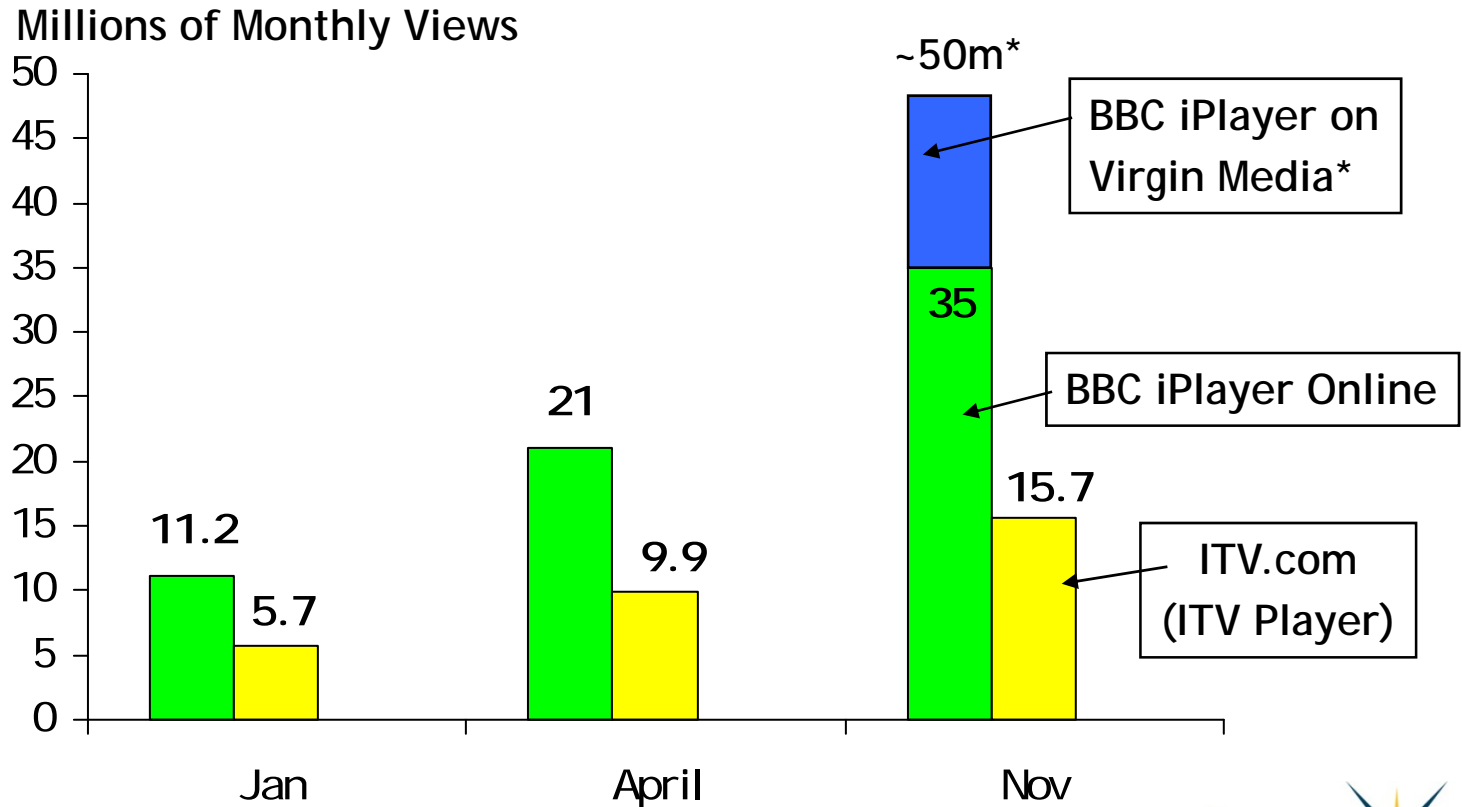
9th September 2009

Hybrid TV





# UK Online TV also In High Growth Phase





# Implications

- Note: Virgin experience shows that simple interface is good/sufficient for good user adoption.
- Online TV a major new global trend
- But actually at an early stage - <2% of viewing hours, <0.5% of ad revenue, 10% of Broadband users in USA & Europe
- Catch-up TV today, interactive and archive tomorrow
- Major driver for connected CE devices.
- ISP provision and QoS to the home is major enabler
  - debate in UK at present over ‘throttling’ of online video traffic for BBC iPlayer by ISPs
  - Who is going to invest in the broadband infrastructure to support good quality services? New business models will need to evolve to fund this
- Deployment of network capability is independent of client standard
- Provision of extensive CDNs required



# MHEG Interaction Channel Technical Overview

- Extension to MHEG to enable communications over a broadband connection and a 'hybrid' delivery system.
- Enables broadcast applications (including simple portals) to get applications and data from on-line servers via IP connection
  - Enables voting, transactions, advertising, various services, local news etc
  - Simple to use remote control interface
- Incorporates streaming of 'over the top' Online video over IP at broadcast quality bit rates (at least 2Mbits/sec streaming support is required).
  - Leaving network issues to ISP
  - Using MPEG4/H.264 video over transport stream
- Incorporated in baseline specification for UK Freeview HD DVB-T2 receivers, UK Freesat and Freeview Australia
- BBC iPlayer is expected to launch on Freesat in Q4 2009 using MHEG Interaction Channel

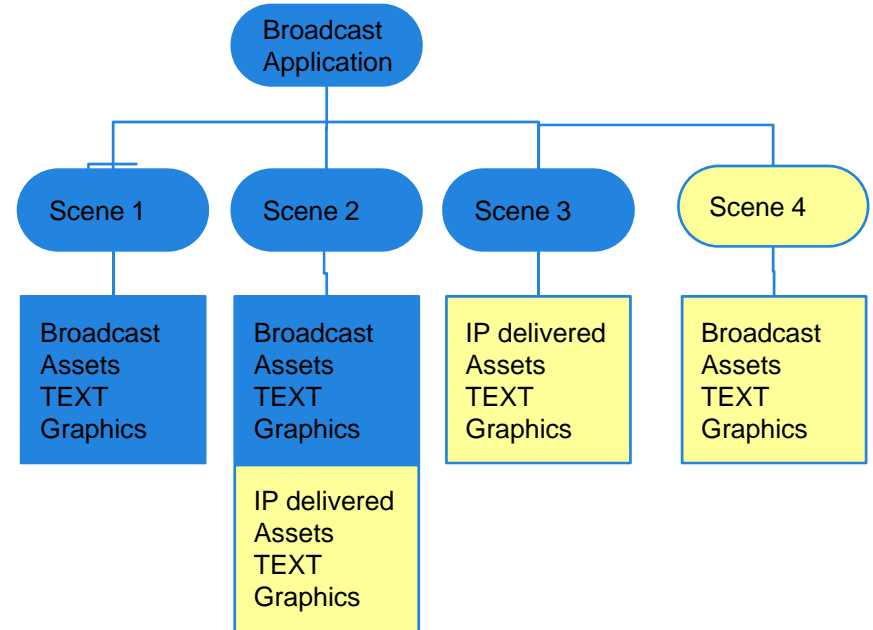
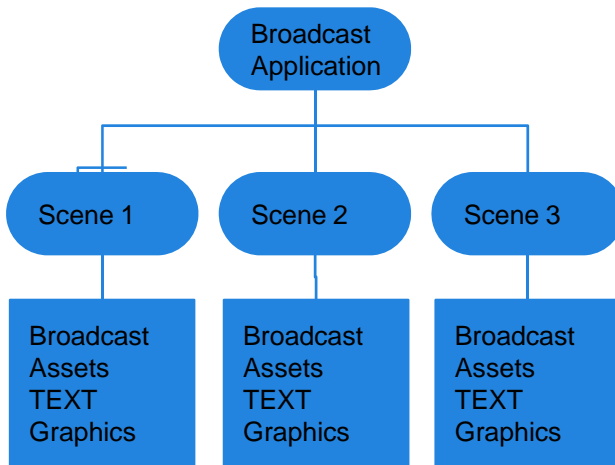


# Hybrid File System

- The MHEG Interaction Channel is an extension of the broadcast services
  - Can only be accessed/initiated via a broadcast application.
  - Reinforces the “Broadcaster Trust” model – content is always controlled by the broadcaster whether it is delivered over the air or via the internet.
- The Hybrid file system enables content from the broadcast carousel to be merged seamlessly with content delivered via the Interaction Channel.
- Applications can be created to handle receivers that have not been connected to the internet – offering broadcast carousel delivered content only.



# Hybrid File System



## **Broadcast Application**

Content obtained from  
DSMCC Carousel only

## **Broadcast Application**

Content obtained from  
DSMCC Carousel & IP connection



# HTTP & HTTP/TLS

- MHEG Interaction channel uses HTTP for connection to servers
  - Standard protocols used on the public internet
  - No need for any configuration of routers
  - Works with any IP connection
- HTTP/TLS enables secure connection with server
  - Security certificates delivered via the broadcast carousel reinforcing “Broadcaster Trust” model
  - Proven technology at the server
  - Enables secure transactions
- HTTP GET method used to retrieve information from server
- HTTP PUT method used to send information to the server



# Streaming Media

- MHEG applications can reference and display streaming media such as video and/or audio.
- HTTP streaming used for simplicity – should work on any network/ISP without the need to configure routers & firewalls.
- Playback is under full control of the application – the user interface is defined by the application author.
- Can use “playback” keys on remote control (where provided).
- Application has the ability to test connection speed
  - enabling management of user experience by not permitting access to high bit rate content that may cause playback problems.
- Guidance mechanism available to prevent viewing of inappropriate content – in line with playback of broadcast content recorded on hard disc



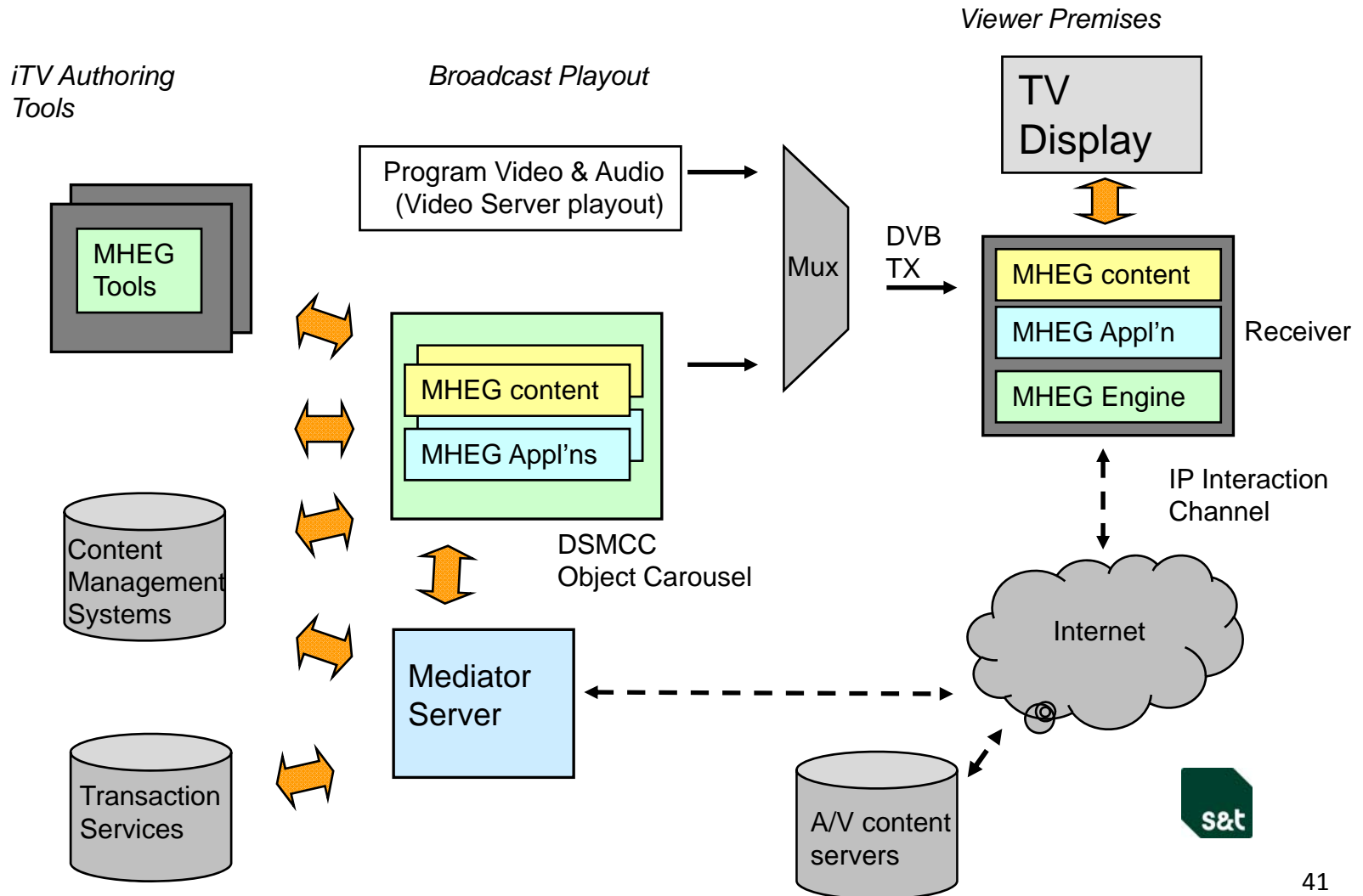
# Security

- Security is based on a Broadcaster Trust model
  - The broadcast stream is considered 'trusted'
  - User can only access online content permitted by the broadcaster (allowed server list)
  - Unrestricted access to HTML web content not permitted or possible
- Security certificates are delivered over the air in the broadcast carousel
- Applications delivered via the IP connection must be digitally signed and checked with a certificate delivered over the air to the receiver, protecting users from inappropriate content in the event of the internet server being hi-jacked.
- DRM strategies under consideration





# MHEG System Architecture





# Other applications with MHEG interaction channel

- Advanced advertising
- Audience measurement (where required)
- Secure transactions
- Micropayment and similar systems



# Rollout of MHEG IC

- On Freesat 2009
- On Freeview HD 2010
  - Component of standard receivers
  - Supported by silicon vendors
    - Eg Broadcom
- Submitted to ETSI for standardisation as part of ES 202184 r 2.1.1
- Already included in the specification for
  - Freeview Australia
  - Technisat MultyText in Germany



# Conformance

- A horizontal market requires a good conformance regime
- The MHEG regime has taken some while to develop and extend, but testing is now rolled out soon after the specifications and in time for pre-launch verification
- If you don't have a conformance regime, then rollout is risky and interoperability at risk



# IPR

- In more than 10 years of operation we have seen no essential IPRs relating to MHEG/DSM-CC
- We know of no others relating to the MHEG IC initiative
- Remember the MHP debacle
- Do you know what IPR issues exist in new initiatives like HbbTV???



# Summary

- MHEG-5 middleware has achieved very significant international success for broadcast interactive services due to receiver low cost and widespread manufacturer adoption
  - Complete industry supply chain already established and understood
  - No known essential IPR licensing
  - MHEG-5 Receiver technology cost is low enough to enable **all** receivers in a market to include the middleware, enabling broadcasters and operators to build business models around 100% audience penetration
  - Conformance testing is straightforward and effective and the test suite is readily available and understood
- The MHEG-5 Interaction Channel is standardised in Dbook 6 and ETSI and provides support for Online TV with Hybrid Broadcast/IP receivers – the major emerging business driver for online TV
- All major CE manufacturers have integrated MHEG-5 into their products; many chip sets offer MHEG middleware pre-integrated
- **MHEG with IC meets the stated commercial requirements of broadcasters**
- **MHEG-5 with IC offers a market-proven and standardised solution, available in production now.**



# Thank you!

Web sites: [www.s-and-t.com](http://www.s-and-t.com) and [www.impala.org](http://www.impala.org)

Contacts:

David Cutts

[david.cutts@s-and-t.com](mailto:david.cutts@s-and-t.com)

+447785 304723

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