Introduction to the UK

Richard Lindsay-Davies
Chief Executive Officer, DTG

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Welcome

House Rules

Wifi Password: **HbbTV15**

#HbbTVSymposium

HbbTV Symposium

@theDTG

Welcome to London

€18.3bn

UK TV industry revenue in 2014

26m

UK TV homes in 2015

10

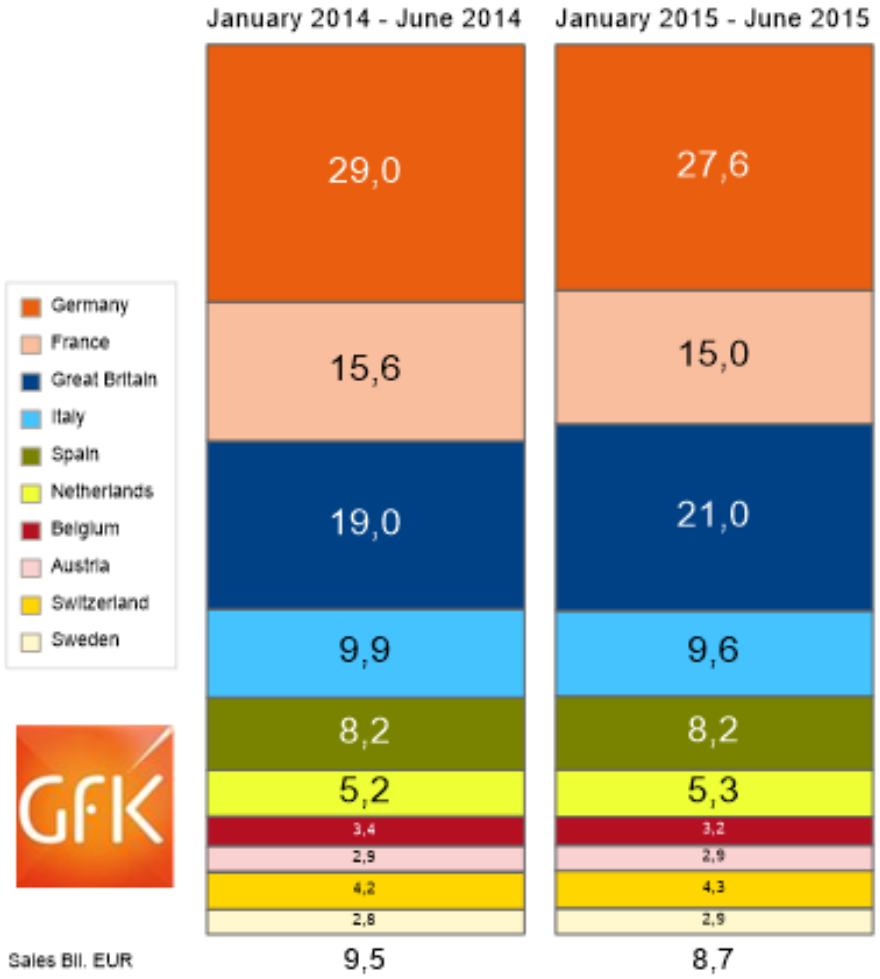
Free to air platforms

Country Shares & Development

Panelmarket EUROPE 10

CE Total

Sales Value %



	Jan 06-Dec 06	Jan 07-Dec 07	Jan 08-Dec 08	Jan 09-Dec 09	Jan 10-Dec 10	Jan 11-Dec 11	Jan 12-Dec 12	Jan 13-Dec 13	Jan 14-Dec 14	Jan 15-Jun 15
Germany	32	8	18	3	3	-2	-2	-17	-4	-13
France	26	15	-1	-1	-2	-10	-20	-15	-5	-12
Great Britain	30	10	-15	-10	-3	-17	-13	-16	9	1
Italy	23	7	-1	5	12	-20	-15	-18	-7	-11
Spain	31	13	-7	-9	2	-24	-18	-13	-2	-8
Netherlands	32	17	5	-16	-1	-15	-17	-17		-6
Belgium	29	15	-1	-7	-4	13	-19	-19	-6	-14
Austria	21	28	8	-1	7	-2	-5	-13	-1	-10
Switzerland	15	3	7	-5	13	-5	-5	-7	3	-6
Sweden	48	15	-12	-14	9	-10	-14	-9	-7	-6
EUROPE 10	29,0	11,2	-1,2	-3,9	2,0	-11,4	-11,9	-15,6	-1,4	-8,7

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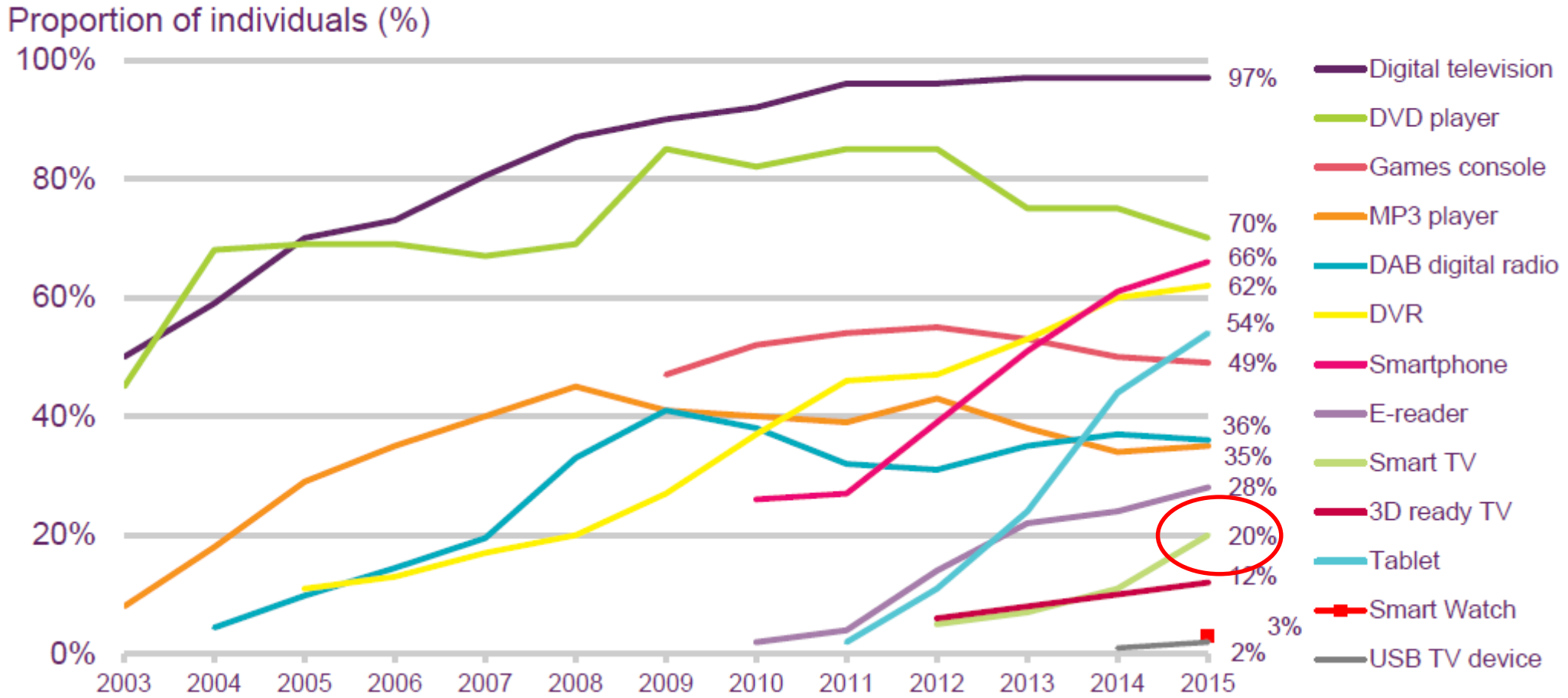
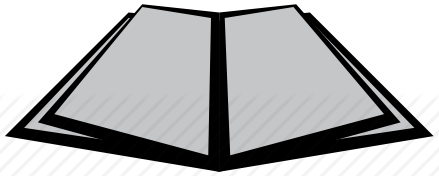
PRJ 53079 - RG 3940304 - RP 21730917 - ID 408260757

Figure 1.5 Household take-up of digital communications/ AV devices: 2003-2015



(Source: Ofcom UK CMR 2015)

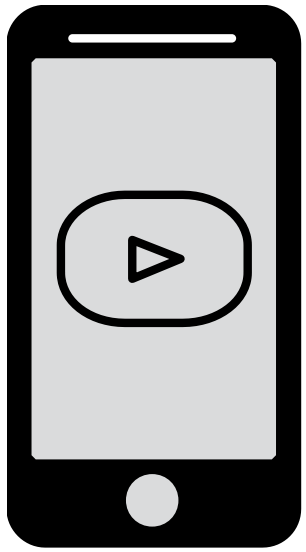
Independent industry association for UK Digital TV



Publish and maintain the technical specification for digital terrestrial TV : **The D-Book**

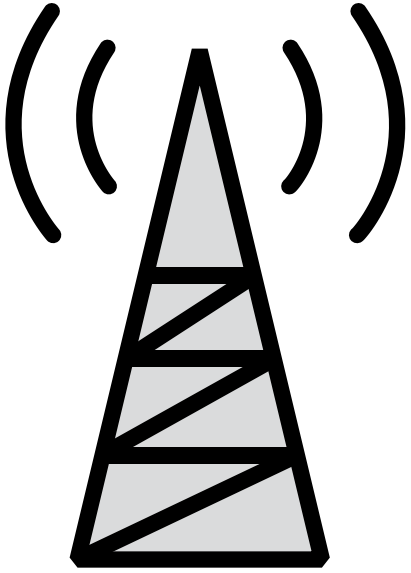
Over **125 members**: consumer electronics, manufacturers, broadcasters, platform operators, technology providers and more.

UK UHD Forum



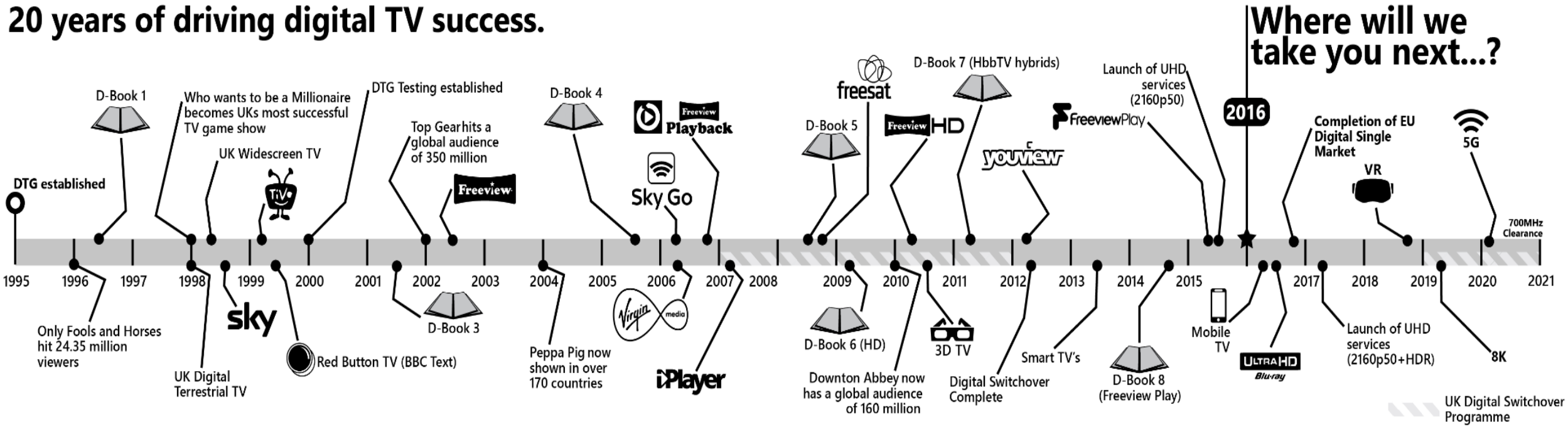
Mobile Video Alliance

Home Networking Group



Dynamic Spectrum Access Forum

20 years of driving digital TV success.



Country Review Europe

Régis SAINT GIRONS
HTTV CEO
HbbTV Marketing Co-Chairman

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HbbTV deployments in Europe

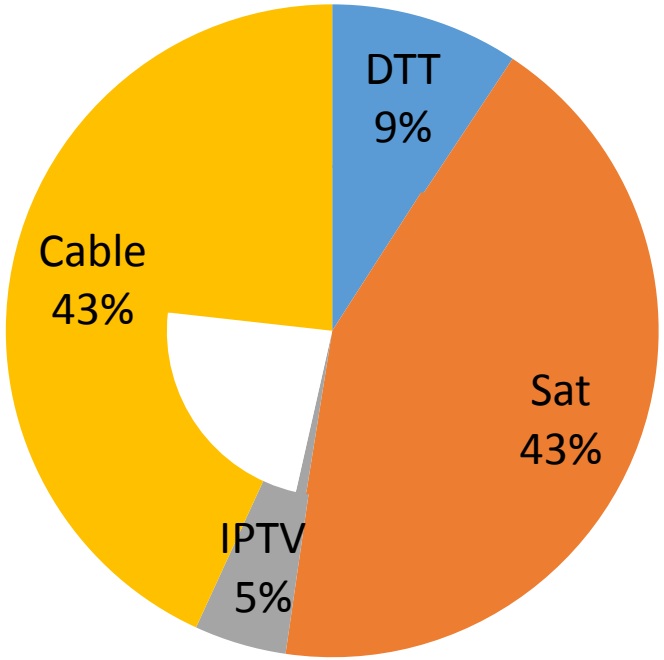
in regular operation

announced / trials

under consideration

Germany

38.5M Households



HbbTV Market Reach
Over 70%

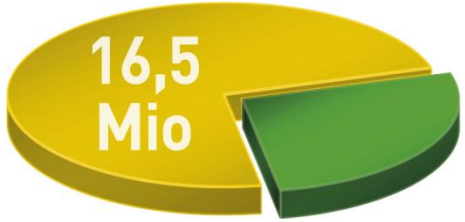
- HbbTV 1.0
  - 20% HbbTV 1.5 devices
  - no HbbTV 1.5 services
  - HD+ Replay extensions (HLS, DRM)
- No certification regime
  - Good industry collaboration
  - Active interop Workshop
- No Trademark
  - Auf ROT geht`s los!
- 75 HbbTV channels
  - 100s' of services of all kinds
- DVB-T2 HEVC switch over in 2016
  - HbbTV 2.0 opportunity

ON RED
LETS GO!
MY BUTTON FOR SMART TV.

Germany

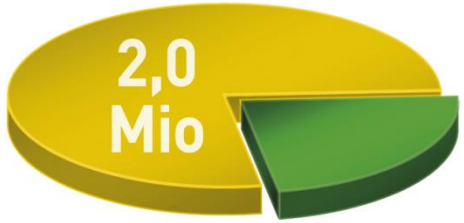
Smart-TV share
2015 Q1/Q2

Total HbbTV devices
vs all connected devices



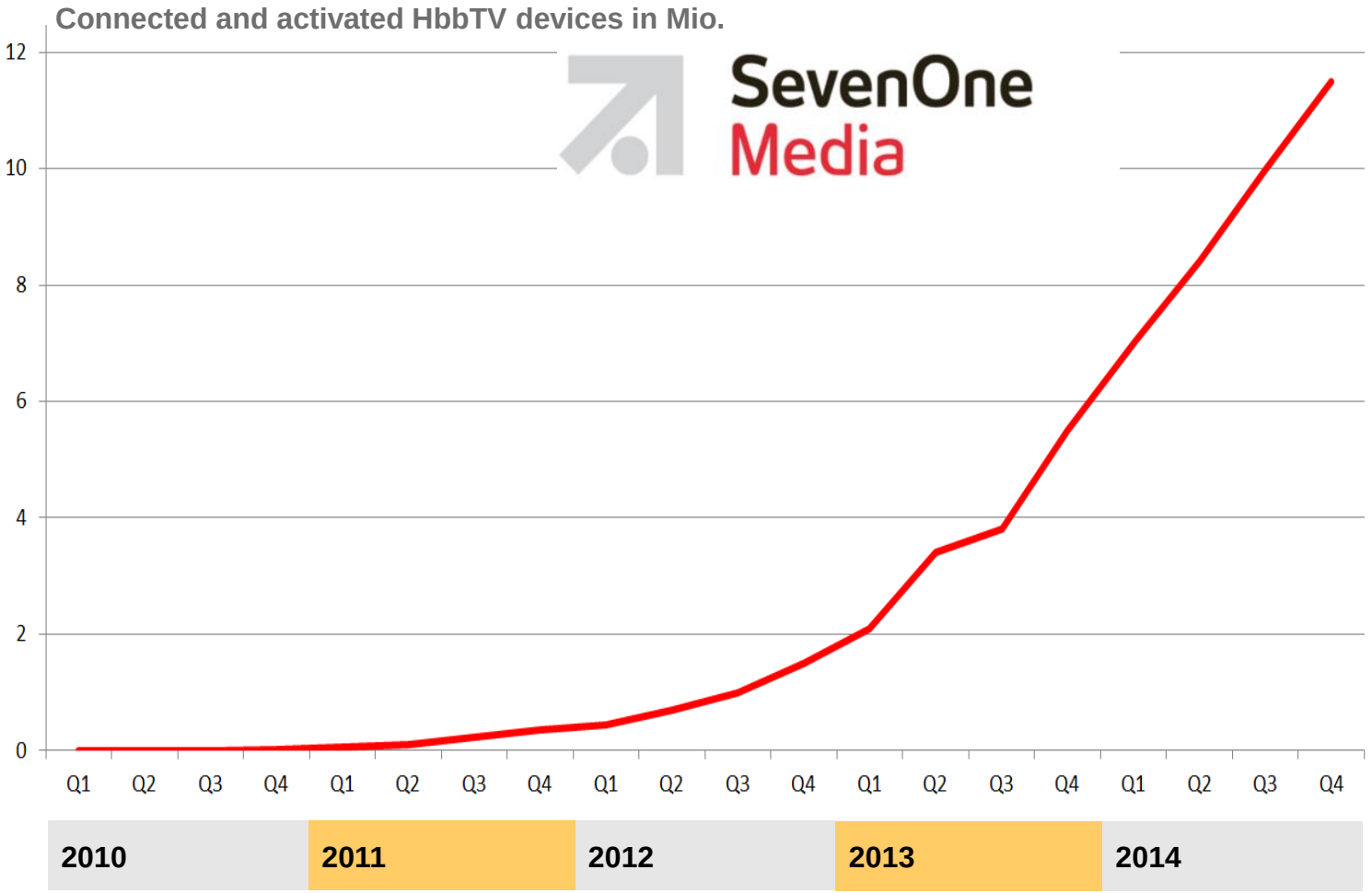
HbbTV share
2015 Q1/Q2

New HbbTV devices
2015 Q1/Q2



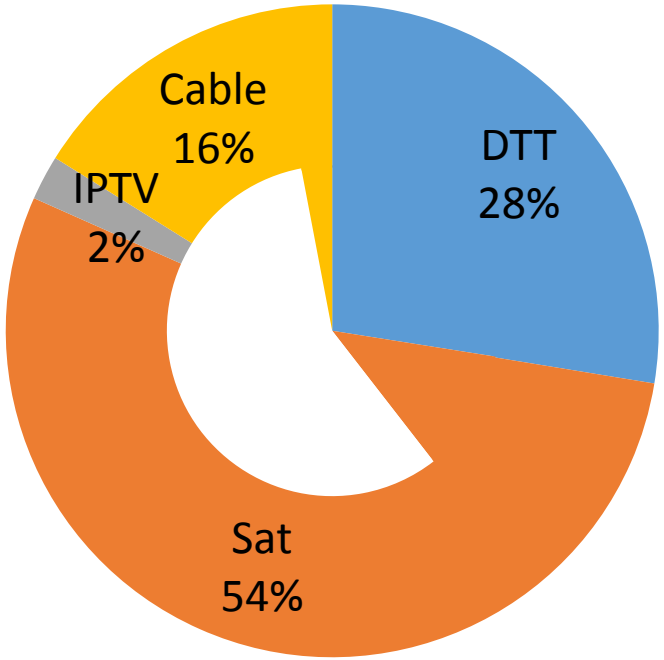
Grafiken: DEUTSCHE TV-PLATTFORM

Quelle:
GfK Retail & Technology GmbH, 08/2015



Poland

13.5M Households



HbbTV Market Reach
Over 40%

- HbbTV 1.0
  - No certification regime
    - No Consumer Trademark
- 1.5 M active devices
  - HbbTV not pre-activated on one top TV Brand
- Ten's of HbbTV services: usual ones and…
  - HbbTV apps portal
  - Virtual & Linear TV OTT channels
  - Regional Warning System (RSO)
  - E-learning
  - 4K + HEVC + MPEG-DASH
  - Interactive advertising

Poland

SATURN
TECHNOLOGIA TAK MA!

Sklepy | Pomoc | Newsletter | Zarejestruj zakup | 799 37 37 37 | Zaloguj się

Wszystkie | Szukaj w sklepie...

PRODUKTY | OUTLET | GAZETKA | SKLEPY SATURN | USŁUGI | 0 SZT. | DO KASY

DOSTAWA 0 ZŁ
DLA ZAMÓWIEŃ POWYŻEJ 100 ZŁ

TYLKO W SKLEPIE INTERNETOWYM

Oferta ważna do 18.12.2015

SPRAWDŹ

Strona główna › RTV i Telewizory › TV Satelitarna i Naziemna › Tunery TV Naziemnej › Tuner MANTA HBB01

DOSTAWA 0 ZŁ

Tuner MANTA HBB01

MANTA

nr kat.: 1228977
Tunery TV Naziemnej › MANTA

★★★★★ (2 ocen)

raty online dostępne od 300,- do 20 000,-

Dostępny!
Szacunkowy czas doręczenia: 24h
Dostawa od 0,- ›
Gdzie kupić ›

Za każde wydane 1000 zł otrzymasz 100 zł na zakupy w Piotr i Paweł >>

119,-

28€ !!!

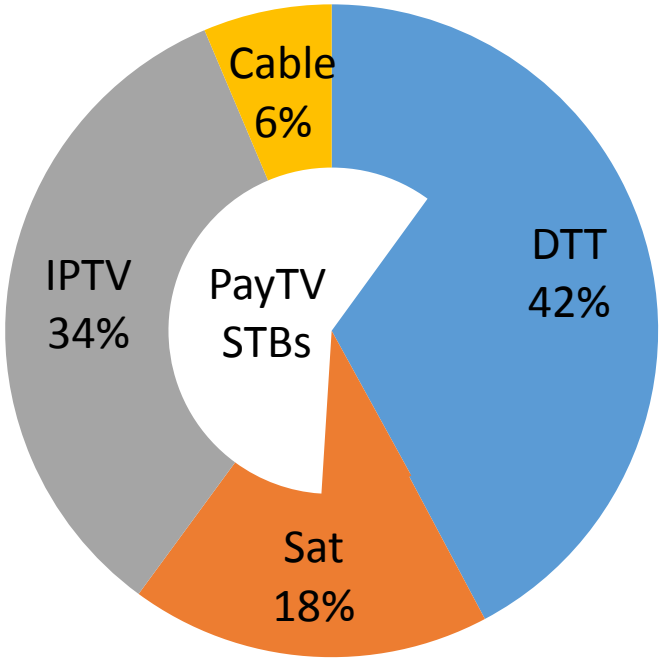
Zabezpiecz swoje zakupy od awarii, uszkodzenia mechanicznego oraz kradzieży:

- Gwarancja Plus Professional - 109,-
- Komfort i ochrona - 90,-
- Komfort - 60,-
- Minimax - 29,-

Kup teraz

France

27M Households

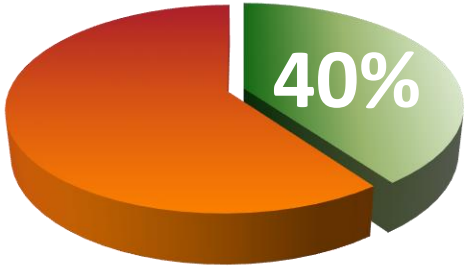


HbbTV Market Reach
40%

- TNT 2.0 spec
  - HbbTV 1.5
  - DRM PlayReady or Marlin
- Significant HbbTV 1.0 legacy
  - Few HbbTV 1.5 services
- No certification regime
  - HD Forum organization
  - Some interoperability issues

France

Smart-TV share
2015 Q1/Q2



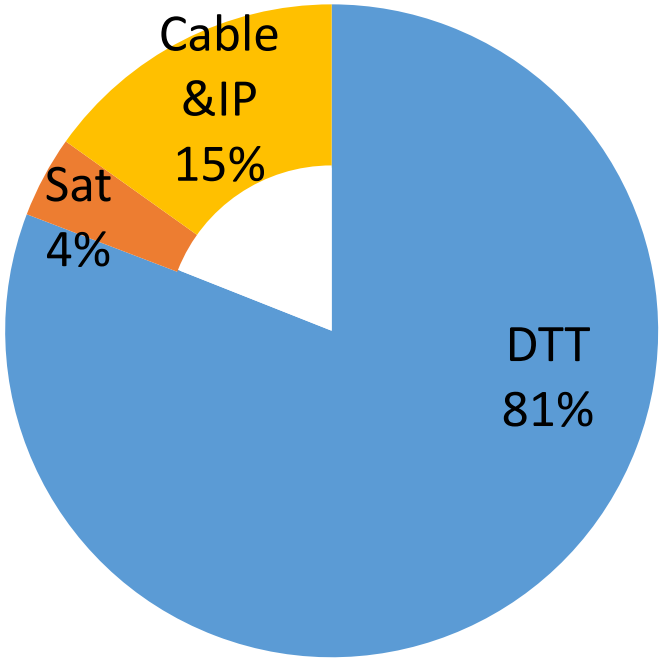
Total HbbTV devices

New HbbTV devices
2015

- 15 HbbTV channels
  - Innovative Services: Pay VOD, Start-over
  - Lack Catch-up from main Broadcasters
- Operator Services with Fransat
- Low Consumer Awareness
  - Lack of Trademark
- Around 1 Mio HbbTV active users
- MPEG 2 switch off in 2016
  - 6 Mio MPEG 2 devices to replace

Spain

19M Households



HbbTV Market Reach
80%

- TDT Hibrida specification
  - HbbTV 1.5
  - DRM PlayReady or Marlin
- HbbTV 1.0 legacy
- Certification regime
  - Logo use in consumer communication
- Local interoperability workshops

Spain

Total TV Devices

Total HbbTV devices

Connected HbbTV devices

- 15 HbbTV channels
  - Catch up video
  - synchronized content
  - special events apps
- Commercial Broadcasters launching their first HbbTV Services

National services

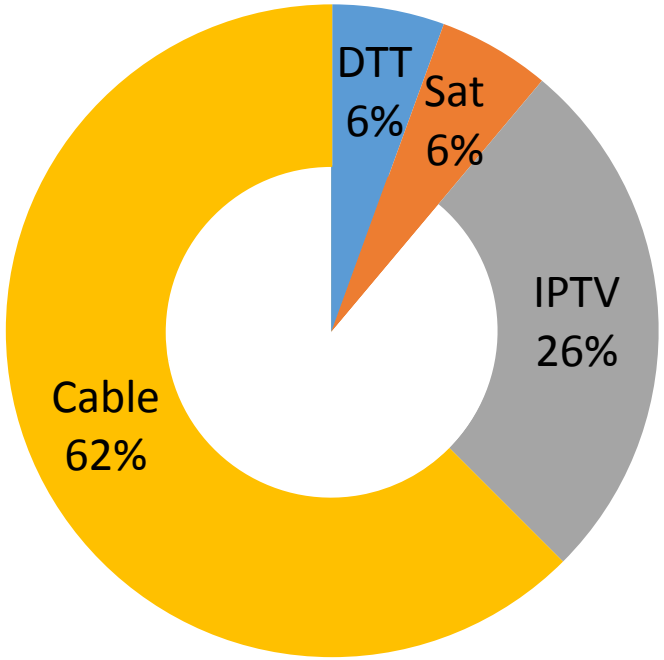
Regional services

Local services

Radio services

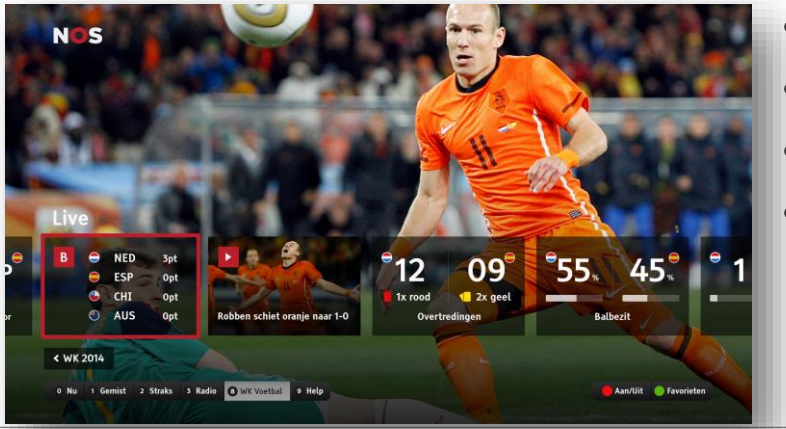
The Netherlands

17M Households



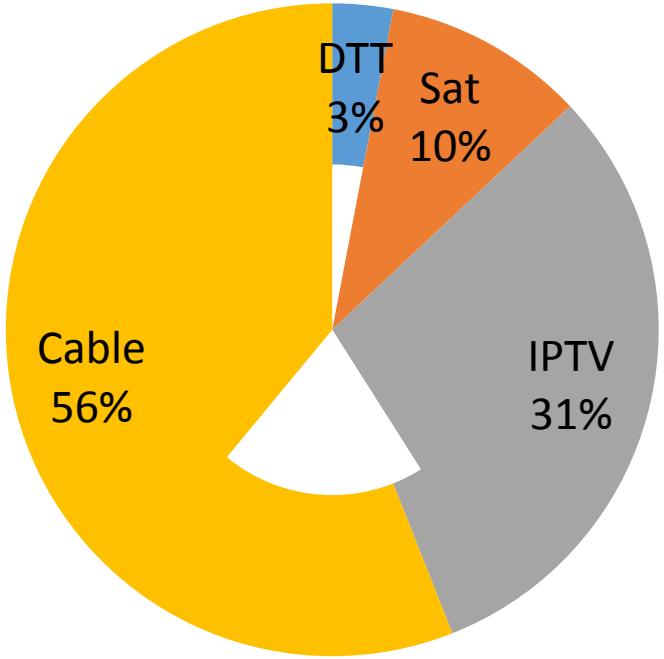
HbbTV Market Reach
40%

- HbbTV 1.5
  - DRM Marlin or Playready
  - No certification regime
- Must-carry rejected by regulator
  - Looking for alternative service access solutions
  - Some support from cable operator
- HbbTV services from NPO & SBS
  - Catch-up (NPO)
  - Enhanced TV
    - News and Soccer
    - Lifestyle and Interactive commercials
    - Eurovision Song Festival (soon)
    - Very positive about consumer response



Switzerland

3.3M Households

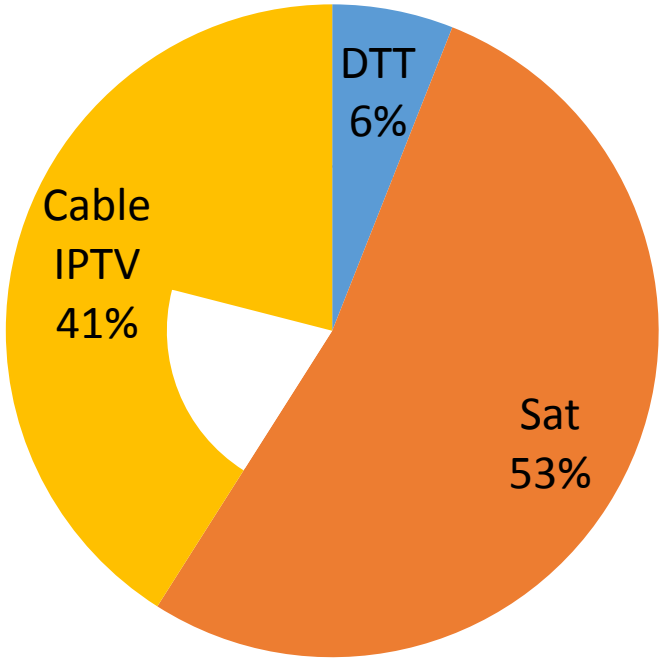


HbbTV Market Reach
Around 80%

- HbbTV 1.0
  - No certification
  - HbbTV 1.5/2.0 on going tests
- HbbTV over IPTV with Swisscom
  - HbbTV built-in Android STB
- Several cable operators provide their own HbbTV services
- Services
  - Public Broadcaster SRG
    - 6 Channels (German, French, Italian)
  - German & French broadcasters
- 2M HbbTV devices

Austria

3.6M Households

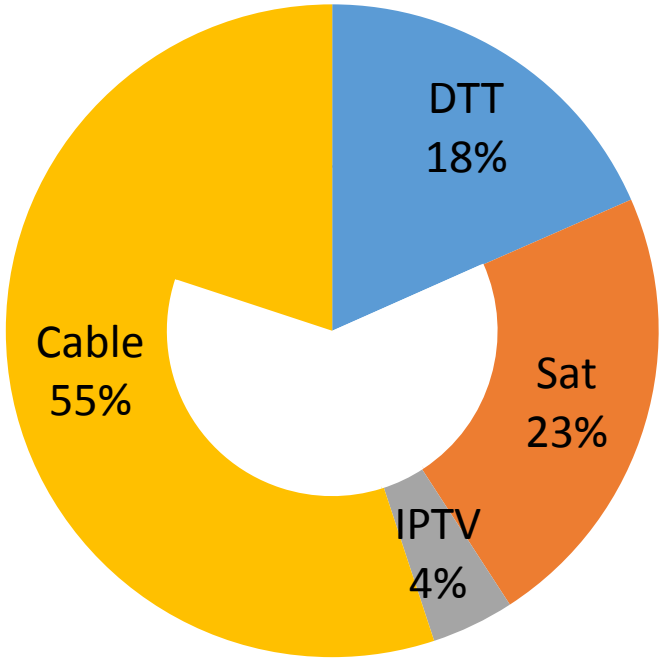


HbbTV Market Reach
80%

- HbbTV 1.0
  - No certification
- Services
  - ORF1, ORF2, ORF III, Sport+
  - Puls4, Servus TV
  - German broadcasters
- 1M HbbTV devices

Hungary

4.2M Households

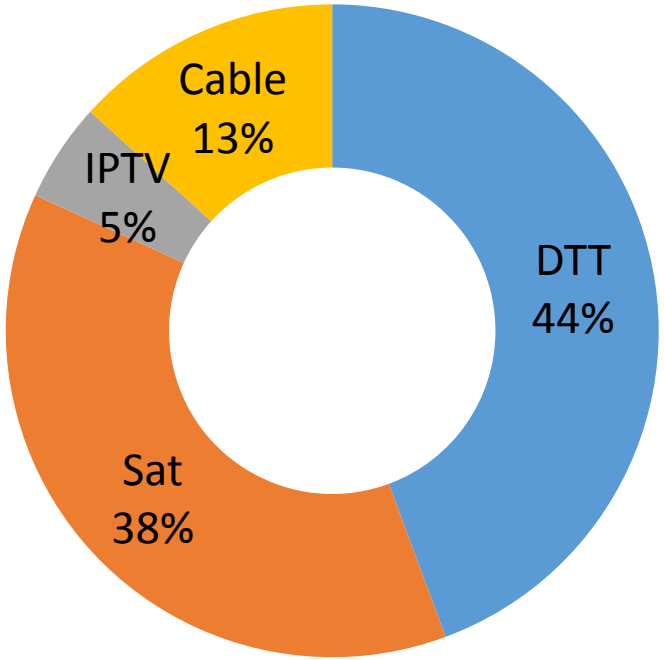


HbbTV Market Reach
40%

- HbbTV 1.0
- Antenna Hungaria "approval"
  - Good industry collaboration
    PHILIPS Panasonic LG HYUNDAI GoGEN TOSHIBA SONY Technika
    - but one major brand will activate HbbTV only in 2016!
- Consumer Trademark
  - MinDigTV with HbbTV reference
- Market deployment
  - 500K HbbTV receivers (30% of new TVs)
  - 200K active devices

Czech Republik

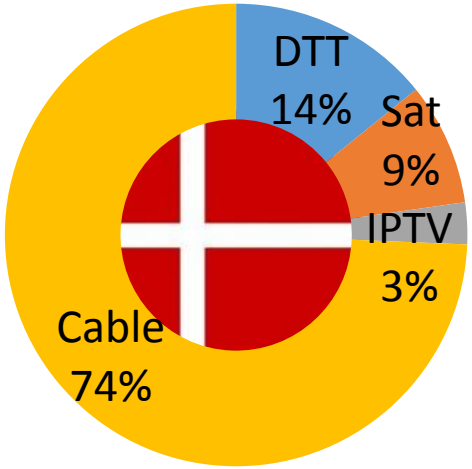
4.5M Households



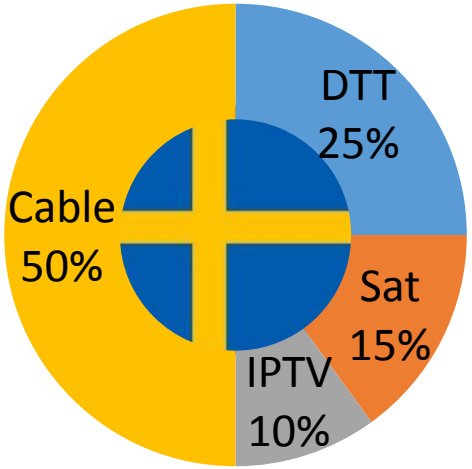
- HbbTV 1.0
  - No certification
- 740K Connected HbbTV devices in Q3 2015
  - Already 17% market share
  - Projection of 2.2 M by 2020
- Deployed by Ceska Televize (CT), Prima and Ocko
- 2M page view per day
- Access to 8 years of TV archives

Nordic Region

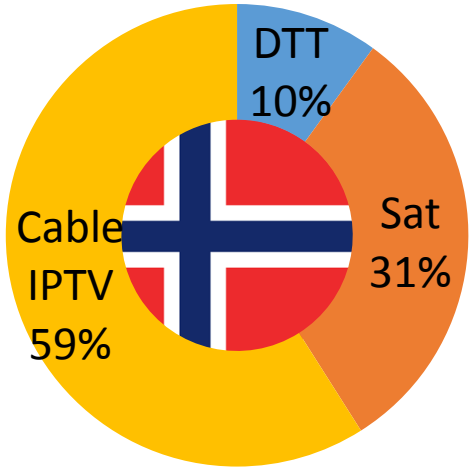
5.6M HH



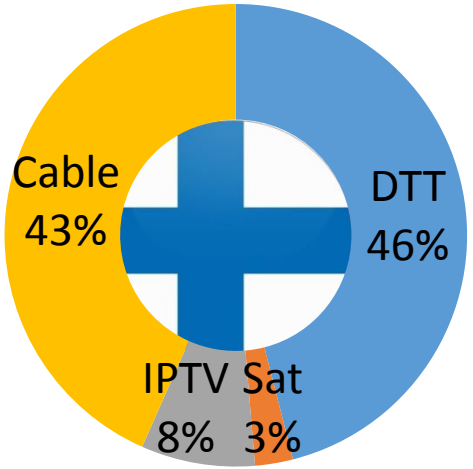
4.5M HH



2.2M HH



2.4M HH



- Nordig Specification
  - HbbTV 1.5
- Deployed in Finland & Denmark
  - HbbTV 1.0 legacy
- Norway & Sweden will deploy services in 2016

HbbTV Symposium

London, 8th & 9th December 2015

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Fraunhofer FOKUS TVRING HBBTV TESTBEDS

Country Review Africa

Régis SAINT GIRONS
HTTV CEO
HbbTV Marketing Co-Chairman

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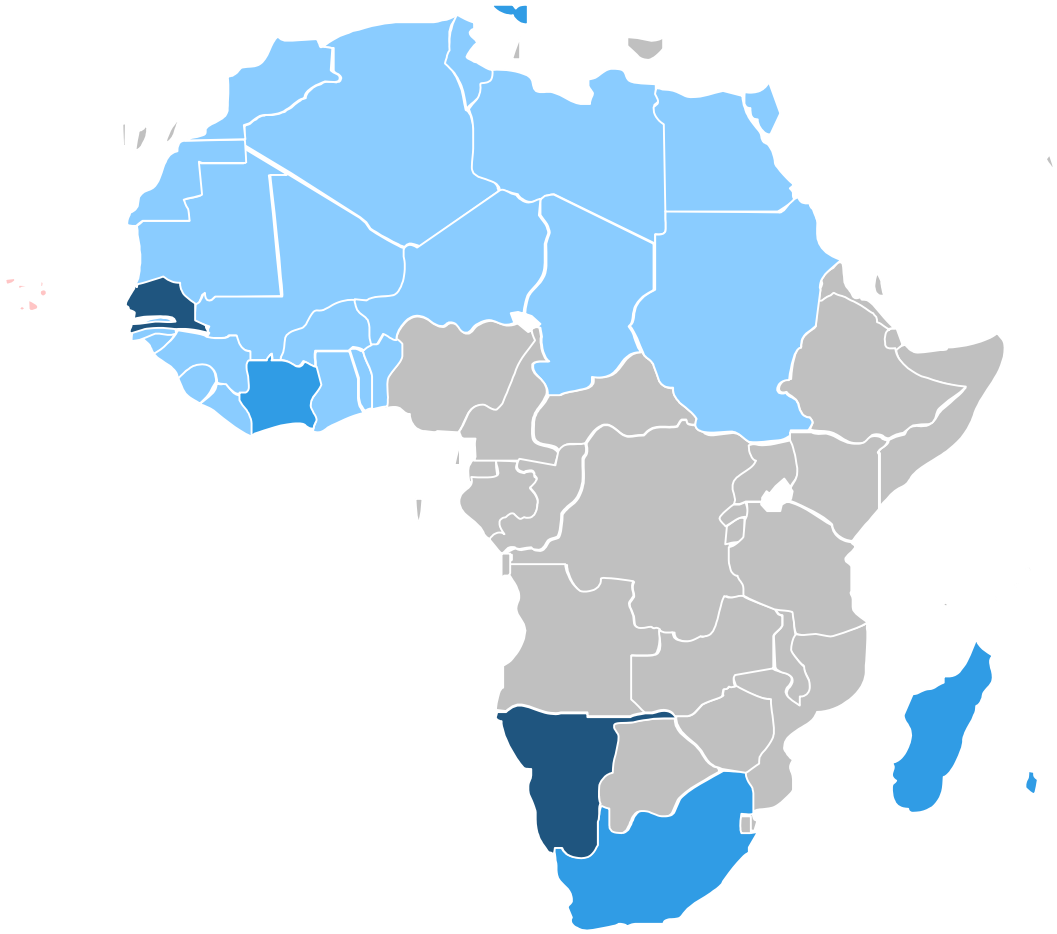
HbbTV deployments in Africa



in regular operation

announced / trials

under consideration

A Large Emerging Market

100 Million TV households

80% Analog TV today

TV households expected to increase to

over 150 million by 2020

Analog Switch Off (ASO) Transition Periods

Africa

Completed

- Mauritius
- Namibia
- Tanzania
- Rwanda

2015 ?

- Algeria
- Eritrea
- Ghana
- Malawi
- Uganda

2015 - 2020

- Angola
- Benin
- Botswana
- Bissau
- Burundi
- Burkina-Faso
- Cameroon
- Cape Verde
- Ivory Coast
- Gambia
- Guinea
- Kenya
- Lesotho
- Libya
- Mali
- Mauritania
- Morocco
- Mozambique
- Niger
- Nigeria
- Senegal
- Seychelles
- Sierra Leone
- South Africa
- Swaziland
- Tunisia
- Togo
- Zambia
- Zimbabwe

Why HbbTV in Africa?

- Digital Switch Over (DSO) is very expensive
- Transform the DSO obligation in a Value proposition
  - Value for the government:
    - Improve the “Digital Divide”
    - T-Government, Education and Health services
    - Early Warning System
  - Value for the consumer:
    - Easy access to more content and services
  - Value for the broadcasters:
    - Enhanced TV programs
    - Measure the Audience
  - Value for the business:

HbbTV Values for DSO

- Open International Standard
  - No gatekeeper (Multisource)
  - STB and TV
  - Interoperable
- Future Proof
  - Short and Long term Roadmap
  - Internet ready
- Flexible
  - Any combination of Broadcast and Broadband
  - PushVOD
- Cost effective
  - Easy to deploy services
  - Web development expertise available in all countries
  - Low cost STBs (30$)

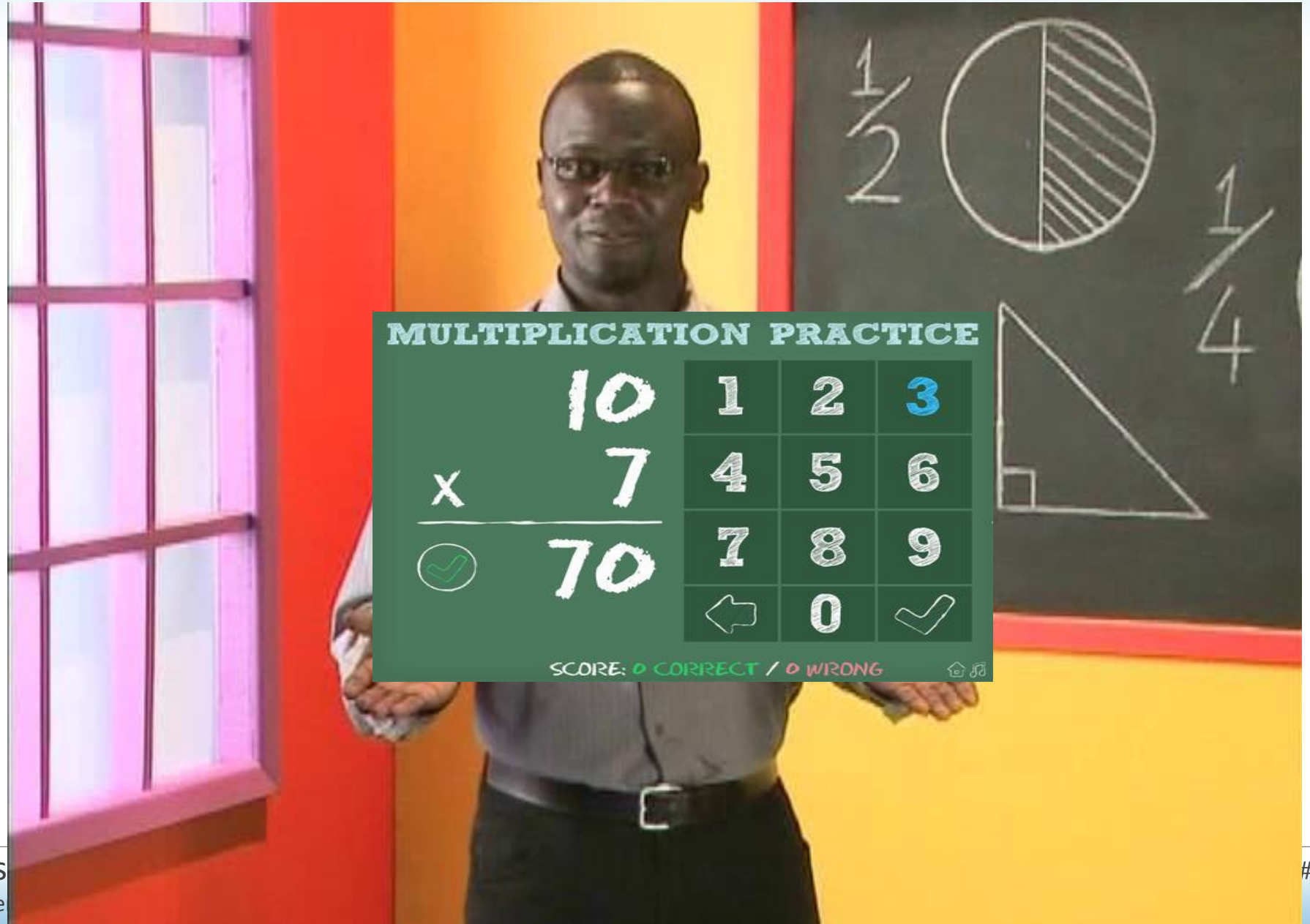
Pure Broadcast Interactivity

- Program guide
- News, Sport, Weather
- Enhanced TV
- Interactive Ads
- T-government
- Early Warning
- Education, Health
- Games
- Pay Per View
- PayTV (CAS)

News, Sport, Weather Information

T-Government

Education


MULTIPLICATION PRACTICE
10
X 7
70
1 2 3
4 5 6
7 8 9
0
SCORE: 0 CORRECT / 0 WRONG
1/2
1/4

Early Warning System

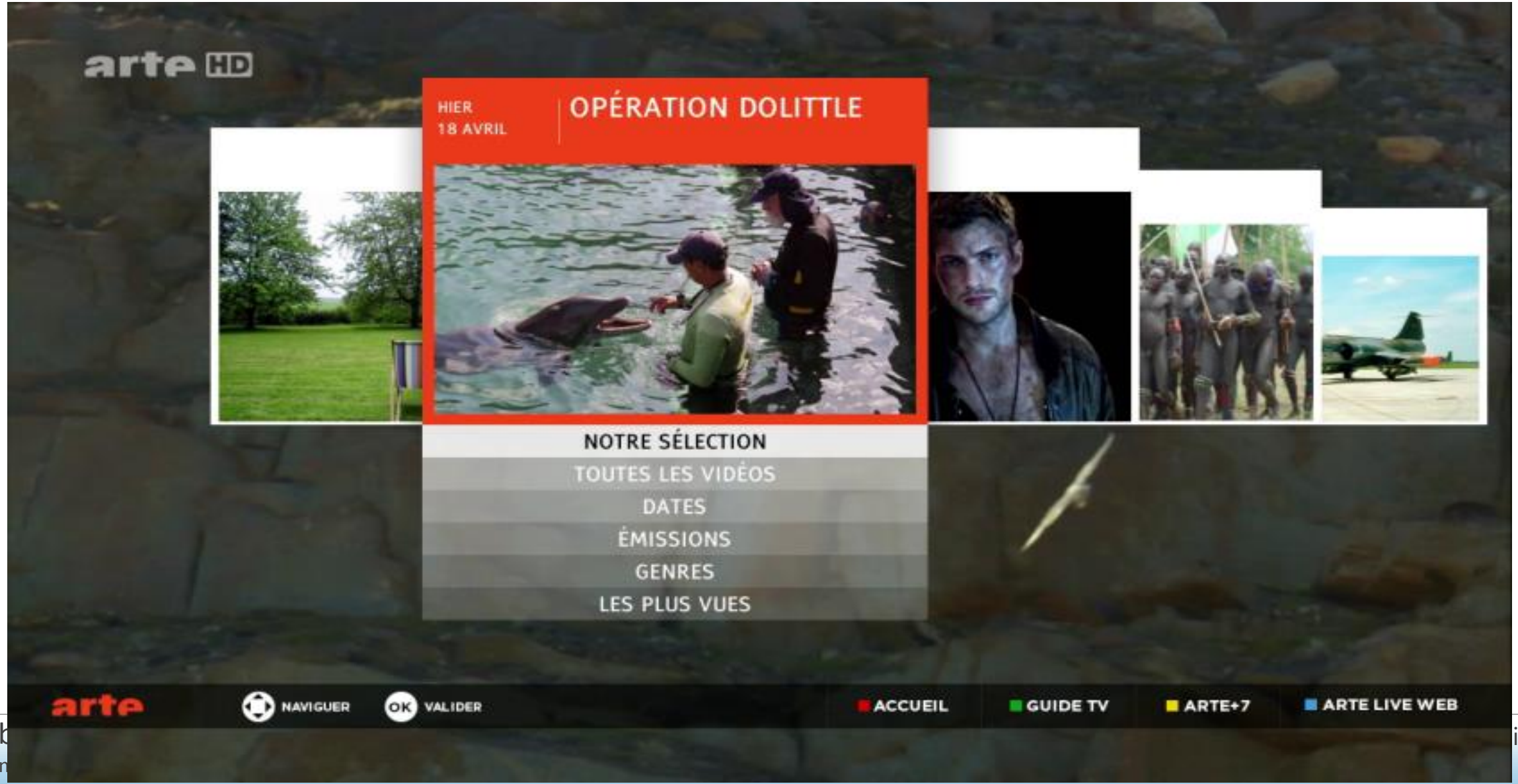
เกิดสึนามิ-วิ่งไปที่สูงด่วน

Broadcast Service & Return Channel

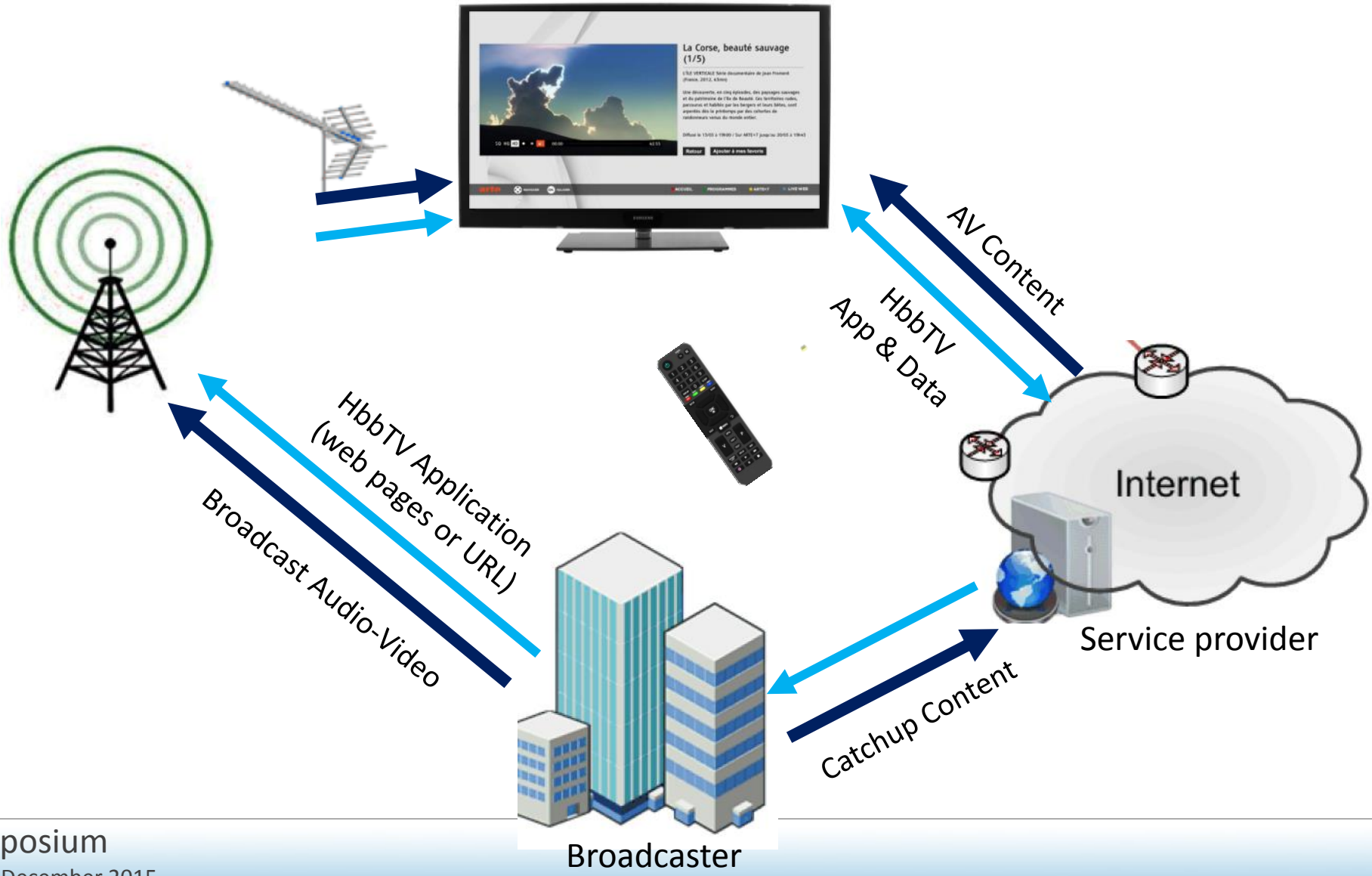
- Some broadcast services like E-Shopping require a simple return channel

- This Return Channel can be implemented with low speed internet or with even basic Mobile phone SMS

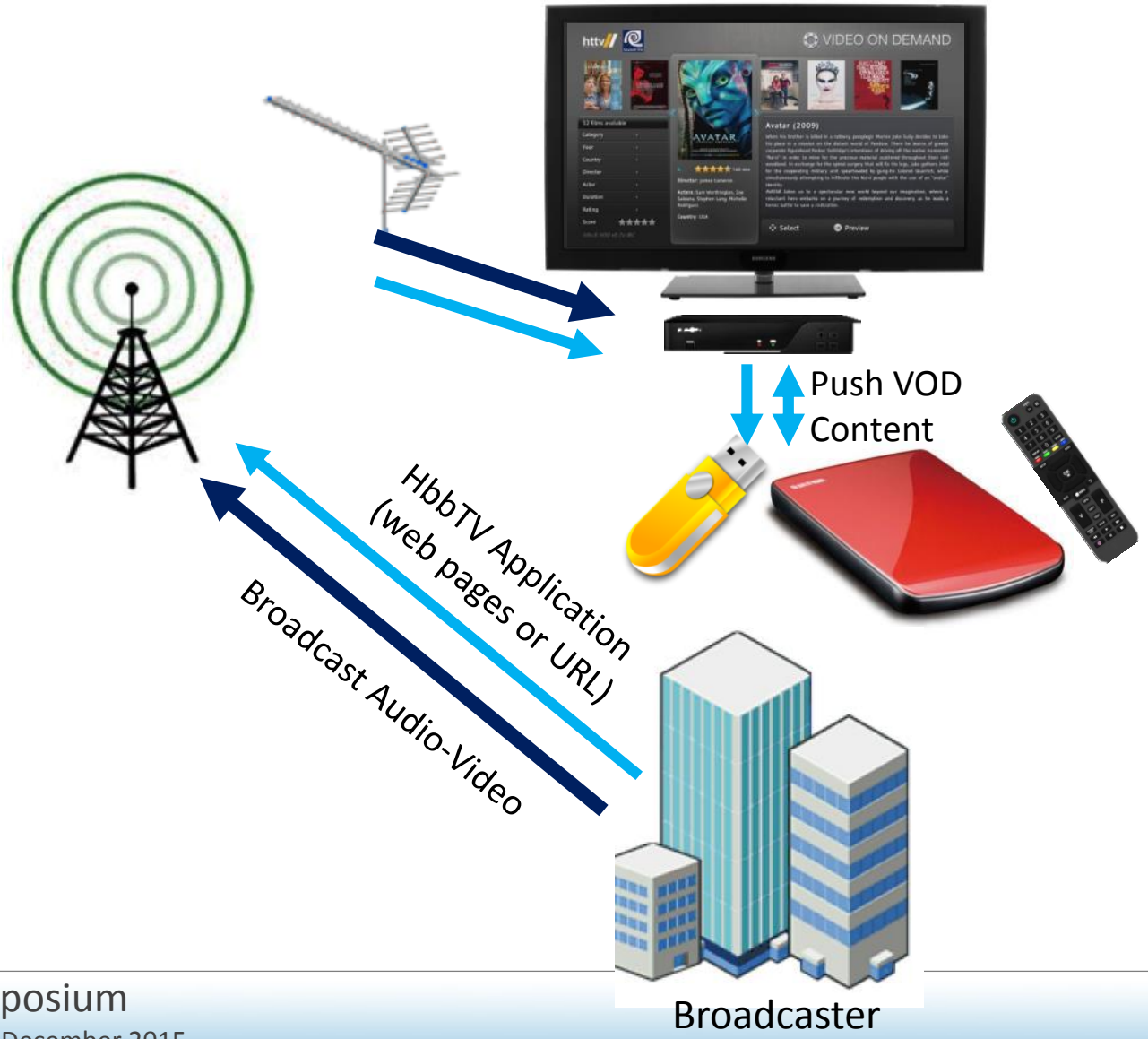
Catch-up and VOD



Broadband


La Corse, beauté sauvage (1/5)
AV Content
HbbTV App & Data
HbbTV Application (web pages or URL)
Broadcast Audio-Video
Catchup Content
Internet
Service provider
Broadcaster

Push VOD


VIDEO ON DEMAND
Push VOD
Content
HbbTV Application
(web pages or URL)
Broadcast Audio-Video
Broadcaster

On going HbbTV Deployments

- ECOWAS the West African countries organization is referring HbbTV in their DSO document
- South Africa has selected HbbTV for their DSO Satellite coverage
  - But MHEG5 for DTT
- ASBU (Arabic States Broadcast Union) has specified HbbTV in their DSO document
- Senegal has mandated DVB-T2 HbbTV for their digital Switchover
  - Deployed since June 2015
- HbbTV is deploying in Ivory Coast, Gambia, Namibia,
- Parabole, a PayTV Satellite operator, is using HbbTV STBs to serve Reunion, Madagascar & Mauritius

Thank you

regis.saintgirons@httv.fr

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Freeview + HbbTV in Estonia

Digilevi TASUTA TV

Mart Einpalu
CEO, Levira

08.12.2015

tasutatv.ee

etv etv2 etv+ 3 DELFI TV TallinnaTV FRANCE 24

Freeview + HbbTV in Estonia

Digilevi TASUTA TV

Mart Einpalu
CEO, Levira

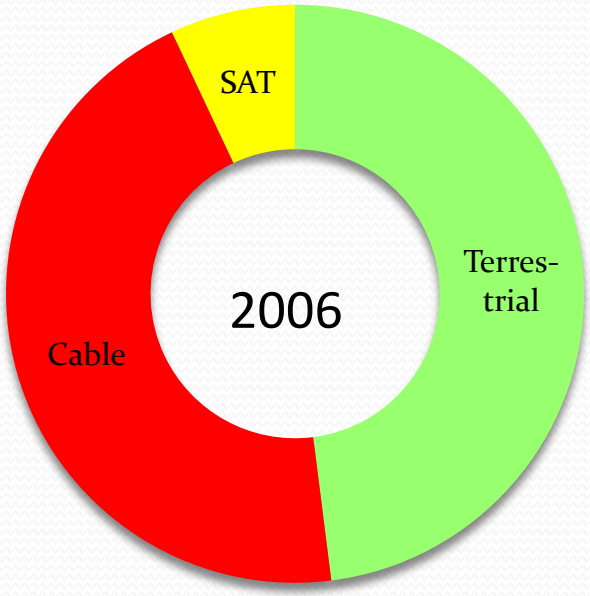
08.12.2015

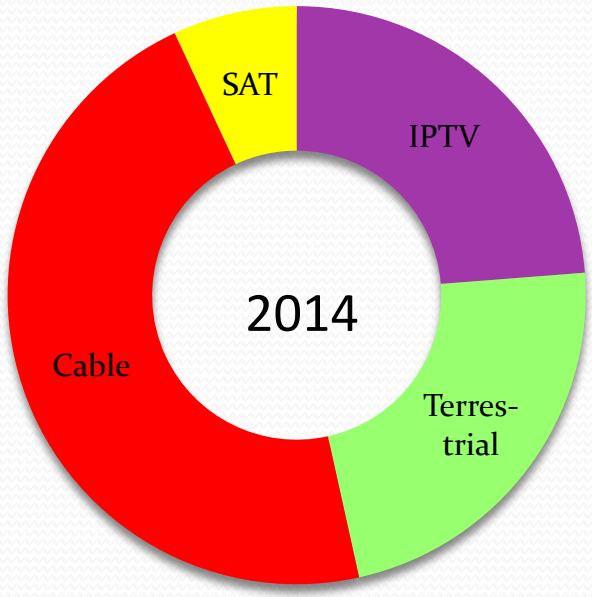
tasutatv.ee

etv etv2 etv+ 3 DELFI TV TallinnaTV FRANCE 24

Terrestrial TV Landscape - Estonia

- Network coverage 99% of population @ 64QAM, DVB-T, MPEG4
- **7** Freeview and **30** payTV channels in DVB-T and **2** in DVB-T2 HD combined with HbbTV-based catchup and other services
- Freeview market share up from 22% in 2011 to 25% in 2014 (payTV 10%)





HbbTV today

- HbbTV launched in January 2015 by Levira on terrestrial Freeview.
- Available anywhere with HbbTV-compatible smart TV.
- Services: catch-up of 6 FTA channels, 5 IP channels 17 radios; news; weather; smart EPG
- Penetration 8% of all terrestrial Freeview HHs.
- Ranking of TV-sets: LG, Philips, Sony and Samsung smartTVs.
- Services have been developed together with Sofia Digital, local TV stations and on-line media portals.

Freeview + HbbTV promise

Matching the new lifestyle:

- THE BEST LOCAL CONTENT
  - Top-of mind content from the most popular linear channels (60%+ viewing time)
  - Deepest library of catch-up and on-demand local TV-content (series, kids, docu, movies etc)
  - Access to most popular live web-video, news and niche content (cross-media)
- THE BEST CUSTOMER JOURNEY
  - All channels and media on the same platform, easy to browse
  - Superior user experience across all screens, including many new features unmatched by other platforms
  - Support online, on-screen, street-level, call-centre.

levira

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www.levira.ee

Television
Network
Media
Cloud

Country Review New Zealand

SAM IRVINE

Freeview New Zealand

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ALSO FEATURING

Fraunhofer FOKUS TVRING HBBTV TESTBEDS

freeview™
more free tv

3

Who we are and what we do….

Freeview New Zealand enables the future of free TV entertainment and our aspirational goal is to provide the most compelling value proposition for New Zealand TV viewers(v Pay TV)

Who are we and what we do….

SHAREHOLDERS

Television New Zealand | MediaWorks | Māori Television Service | Radio New Zealand

CONTENT PROVIDERS

Broadcaster "Service Agreements":

- TVNZ – TV ONE, TV2, ONE plus 1, 2 plus 1
- MediaWorks – TV3, FOUR, TV3 plus 1, FOUR plus 1, TheEdge TV
- Māori Television, Te Reo
- Radio New Zealand National, Concert
- Other free to air broadcasters

DAY-TO-DAY MANAGEMENT

Management contract for day-to-day operations

- Marketing Communications
- Electronic Programme Guide
- Product testing, development & approval
- Managing & maintaining technical standards

SUPPLY CHAIN PARTNERSHIPS

- Retailers
- Distributors
- Installers of Consumer Electronics

NZ Broadcasting Environment …

a) Market size and shape

- Long thin , multi cultural not very populous country

b) Industry Structure

- FTA - "small" industry and no actual Public Service broadcaster
- Paytv - 1 provider "monopoly" – also owns 4th FTA Network(Prime)
- Transmission - Kordia (State owned enterprise)

c) Regulation

- Unlike other OECD countries **no** regulation for content or distribution

Development of Freeview

Business Case – agreed Jun ’06

a) Government – National Benefit Study (CBA)
   - Net economic benefit

b) FTA Industry Business Case
   - No stand-alone commercial business case
   - Public / Private Partnership stacked up

Development of Freeview

Business Plan

a) Free to Air only
b) Ubiquitous - reach all NZ Homes (DTH & DTT)
c) Affordable
   - CPE cost had to be within reach of all NZers inside 3 years
d) Attractive
   - Multi-channel (existing broadcasters and new entrants)
   - High Definition, Widescreen, Surround Sound
e) Target – 35 to 50% of primary sets tuned to Freeview at DSO

Supply Chain Model …

Brand Licensing

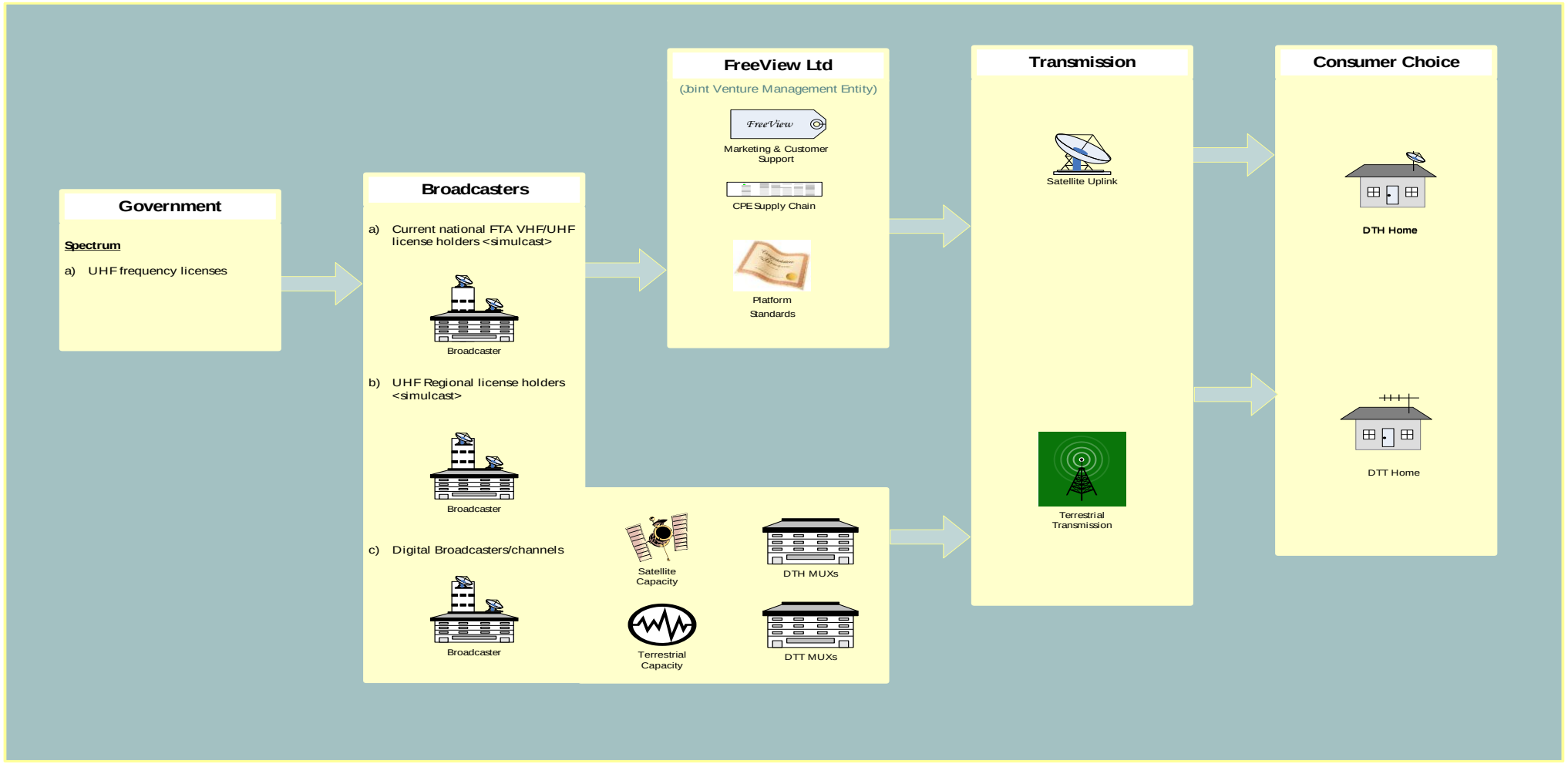
WHY: Build consumer confidence & common broadcaster standards

- Brand awareness
- No government set technical standards or import controls so brand license provides ‘standards’ control

HOW: Independent testing & sale of approved products through accredited retailers

- Certify receivers – DTG and DTV labs/Finlabs Testing
- Accredit retailers – to only stock certified products
- Partnering with an install service for nationwide installation coverage.

Freeview Structure… open access… horizontal market



We have two Broadcast Platforms

Freeview | HD® coverage:

Regions with HD coverage:

1. Whangarei
2. Auckland
3. Waikato
4. Tauranga
5. Rotorua
6. Taupo
7. Gisborne
8. Hawkes Bay
9. Taranaki
10. Whanganui
11. Manawatu
12. Wairarapa
13. Wellington
14. Nelson
15. Christchurch
16. Timaru
17. Dunedin
18. Invercargill

Freeview | HD covers 86% of New Zealand

UHF aerial required

Technical Standards – Follow … and lead

a) DTH Satellite (Freeview satellite) – launched May ‘07
   - MPEG2 (existing standard)
   - MHEG-5

b) DTT Terrestrial (Freeview | HD) – Launched April ‘08
   - MPEG4, HD only receivers
   - MHEG-5

c) HbbTV 1.5 – Launched July ‘15
   - DTT only
   - DTH launching 2016

Digital Receivers

freeview satellite

- Three approved receivers from $69

freeview|plus

- 1 approved set top box from $79
- TV's from $579
- Freeview Plus

myfreeview|HD freeview|plus

- Four approved DTR from $249

freeview|HD

- Nine approved receivers from $69

freeview|HD built in

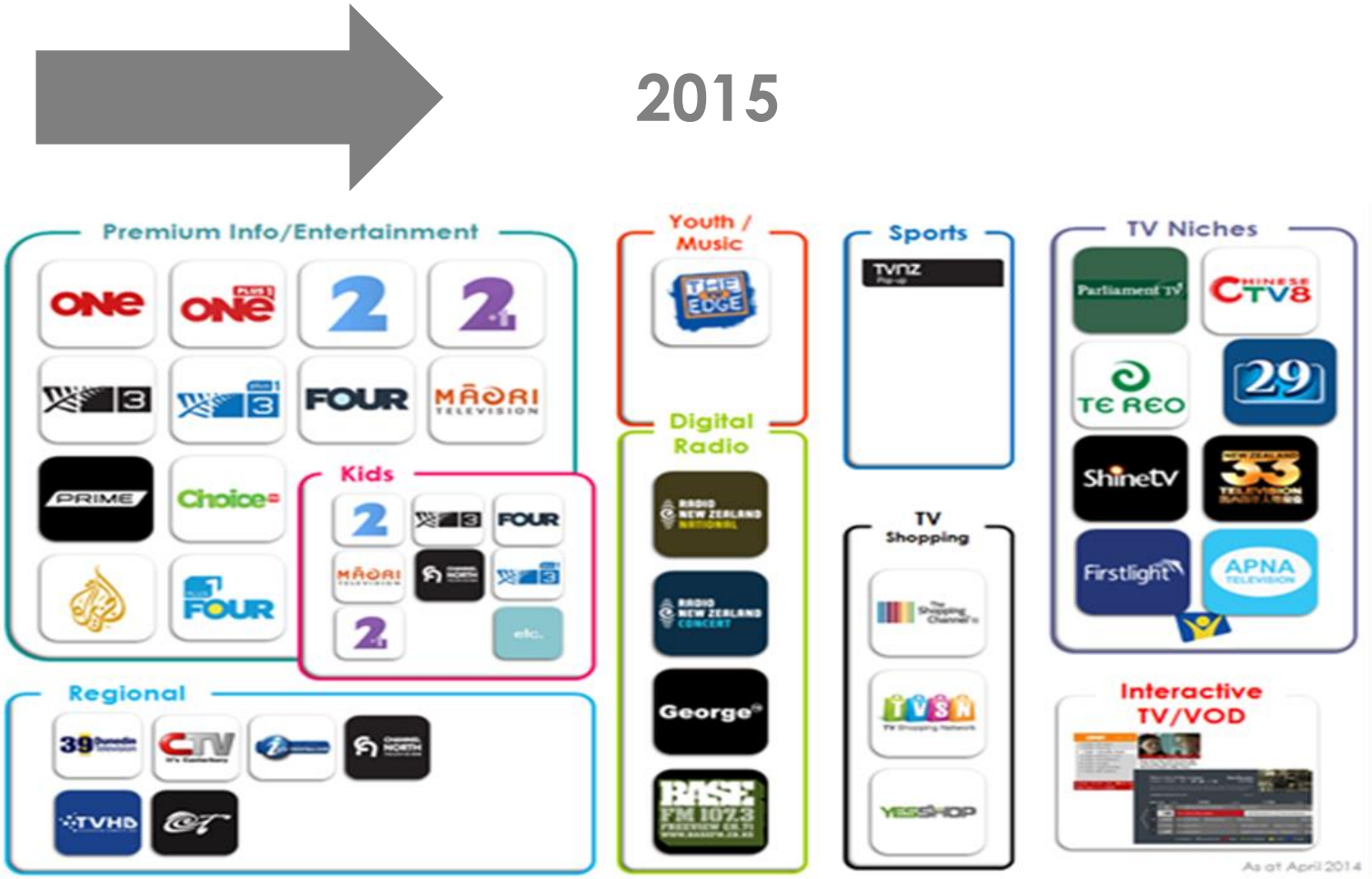
- Five approved brands from $299

Success = Launched with 6 services and now 35

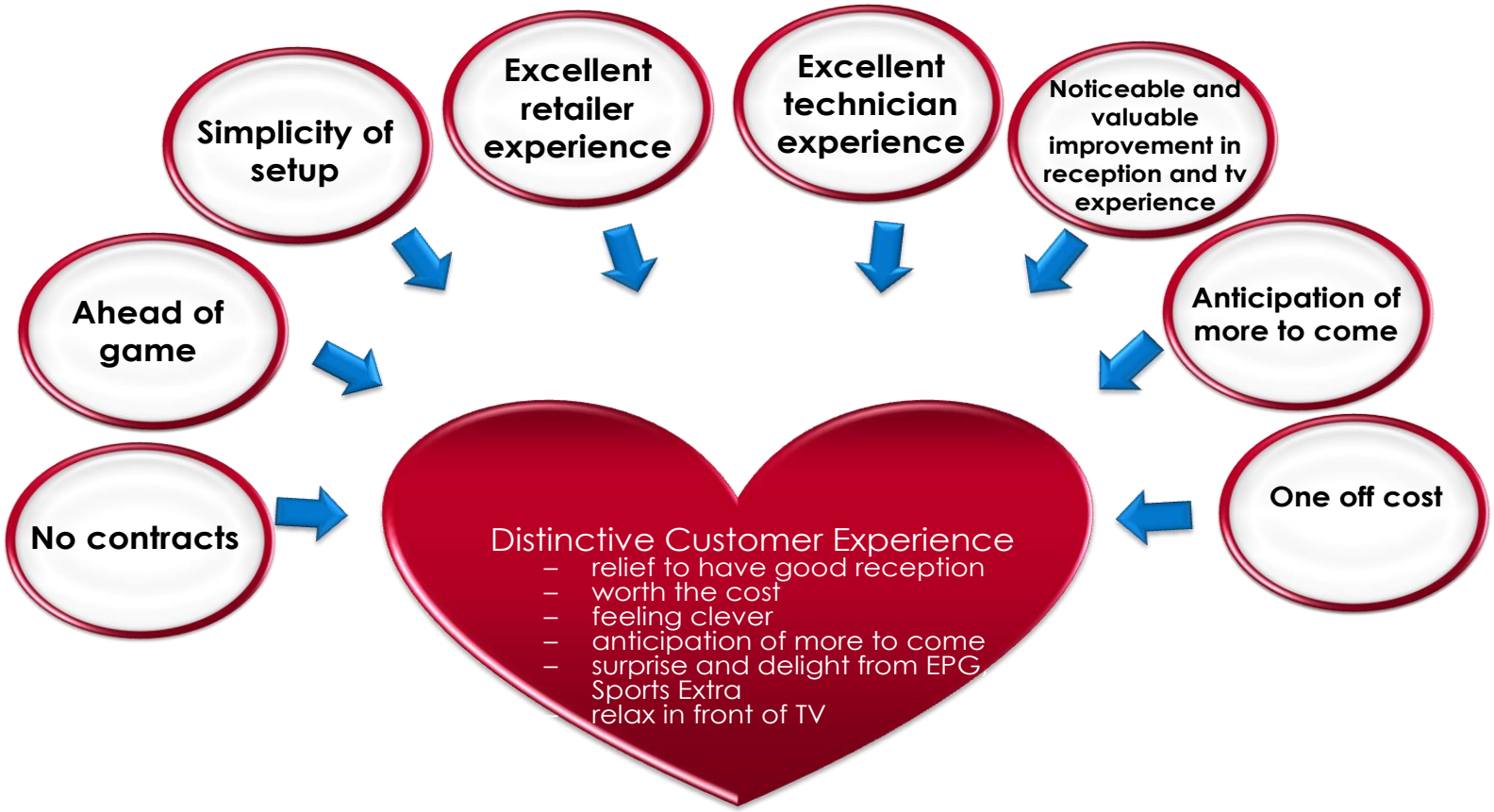
freeview

2007

2015



Success = improved customer viewing experience and value proposition…



Myfreeview (PVR) viewers like Freeview more

How favourable are you towards FREEVIEW / MYFREEVIEW / SKY?

1 (very unfavourable) > 10 (very favourable)

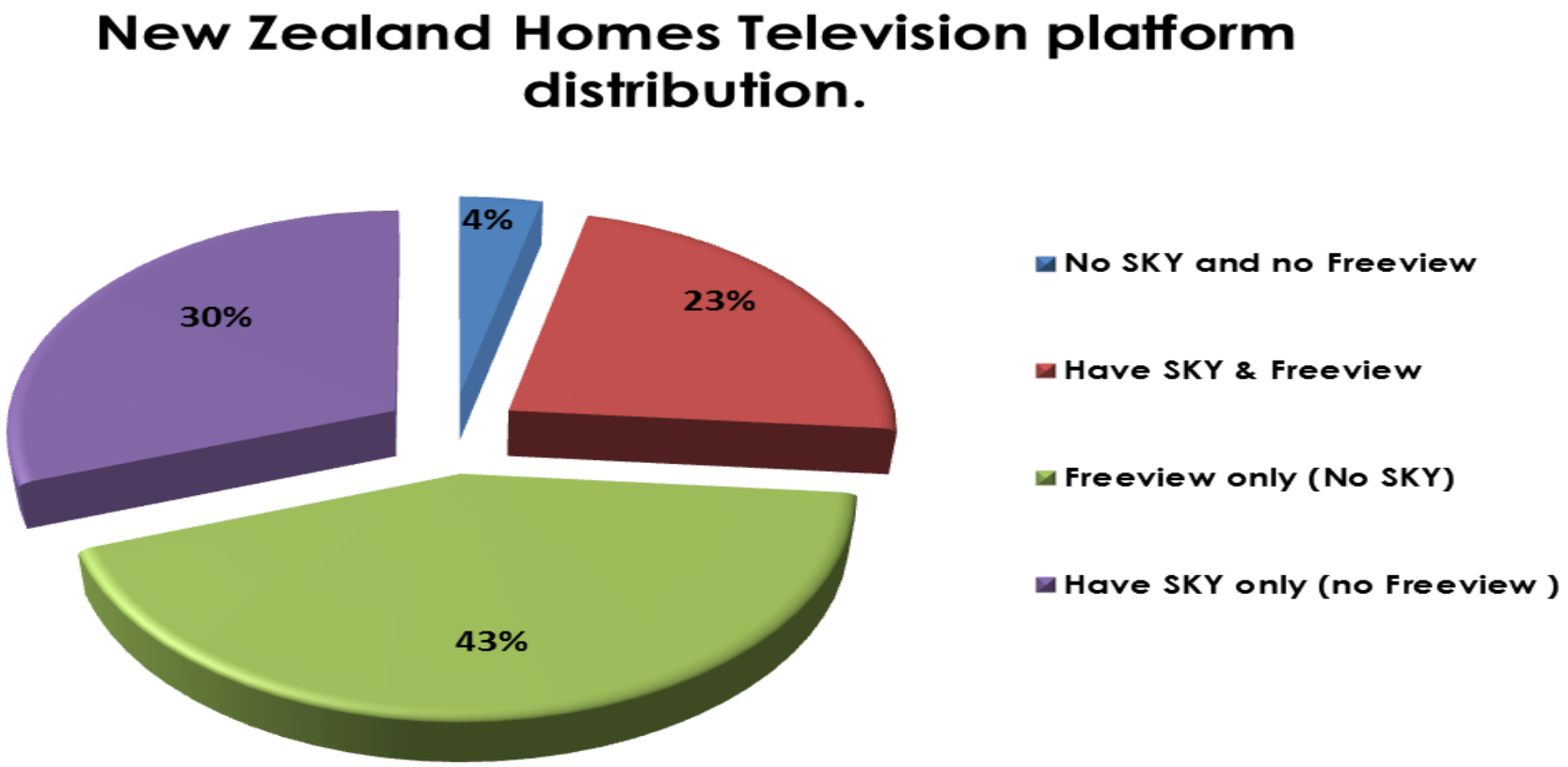
	Unsure	Freeview Satellite	Freeview HD	MyFreeview *
	9%	37%	54%	17%
AVG Favourability to FREEVIEW	6.2	6.6	7.1	7.2
	n = 30	n = 132	n = 189	n=67
AVG Favourability to MYFREEVIEW	5.9	6.2	6.5	7.5
	n = 26	n = 124	n = 171	n=65
AVG Favourability to SKY	5.9	5.6	4.8	4.6
	n = 30	n = 132	n = 190	n=67

THE MOST VALUABLE VIEWERS

MOST FAVOURABLE towards FREEVIEW / MYFREEVIEW are viewers accessing Freeview | HD and MyFreeview. These viewers are also more unfavourable towards SKY.

x% = significantly higher than other group / **x%** = significantly lower than other group

Result = 67% of New Zealand homes are using at least one Freeview device

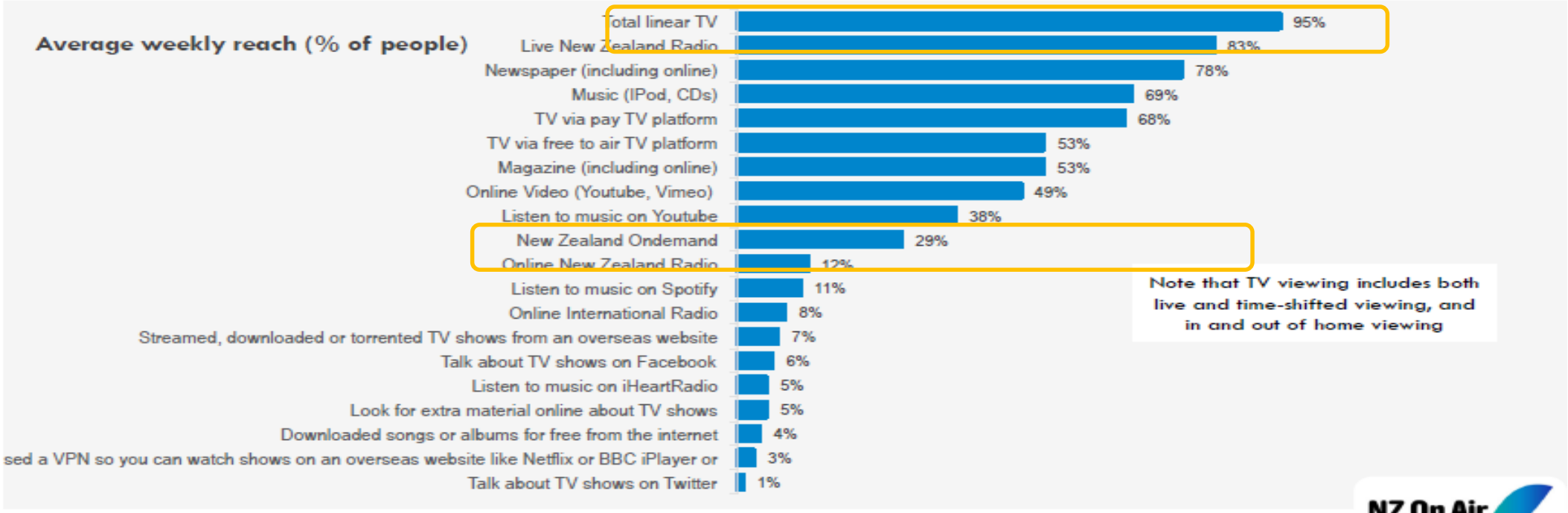


But the viewers are changing

Traditional broadcast platforms (TV, radio) still deliver the biggest audiences in New Zealand,

Linear viewing is still very strong & VOD is growing.
FREEVIEW launched FREEVIEW | PLUS in July to bring the two seamlessly together.

provides the best single point of comparison of nearly all the media included in this study.



BASE: All New Zealanders 15 and over (N=1,400)

So we launched HbbTV 1.5 service in June 2015

Enjoy TV & ondemand together – quick, easy, free – on your TV.

Freeview | Plus enhanced TV guide features:

1. Easy (one-click) access to ondemand (most appealing, Colmar Brunton 2014)
2. Global search, by title & genre, of live & ondemand content libraries (runner up)
3. Browse featured programmes, set reminders & favourites
4. Advanced grid-view 8 day programme guide
5. Catch-up guide
6. Mini guide
7. Menu

VOD portal & application to be built by each broadcaster

1. Launches from broadcaster's channel using a universal dedicated colour remote key
2. Standardised player navigation

Success factors for HbbTV Project

1. **Stable relationships from FTA linear world**
2. **Existing EPG business provided structure for resolving :-**
    1. Design choices
    2. Technical requirements and integration
    3. Investment funding decisions
3. **Will be possible to develop “2 speed” model for:-**
    1. FTA linear business
    2. Linear and on demand business including SVOD partnering

eurofins | Digital Testing

Asia HbbTV Review

Keith Potter: VP Strategic Marketing

eurofins | Digital Testing

Malaysia

- MyTV DTT Operator –planned launch 2016 on DVB-T2
- RTM public broadcaster porting OTT Myclik to HbbTV
- Media Prima (TV3) ported Tonton OTT Player
  - Live trial on air
  - VOD-DASH
  - Red-button
  - Supertext
- MCMC Spec MTSFB-004 HbbTV 1.5 profile +DRM
- SIRIM government QA

MYTV broadcasting

rtm

media prima

SIRIM

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Vietnam

GOVERNMENT DRIVEN AND OWNED

- **Vietnam Television**, or **VTV**, is the national television broadcaster and operates a network of 9 channels with several regional broadcasting centers
- VTV is deploying DTT platform with HbbTV to compete with VTC, a Pay-TV network
- Premium (HbbTV) services include
  - Red-button portal
  - Platform EPG
  - Catch-up
  - Teletext
  - News and other information services
  - Football World Cup
  - Games
  - Facebook
  - User login

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Singapore

- MediaCorp DVB-T2 network
- Expected pilot 2016
- HbbTV 1.5 profile +DRM (as NZ and Australia)

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Others

In Active Consideration

- **Thailand**
- **Indonesia**
- **Myanmar**

USA Update

Dave Siegler

Cox Media Group

Television Today

ATSC

- Constrained
- Maxed-Out
- Inefficient
- Fixed
- It Feels Old

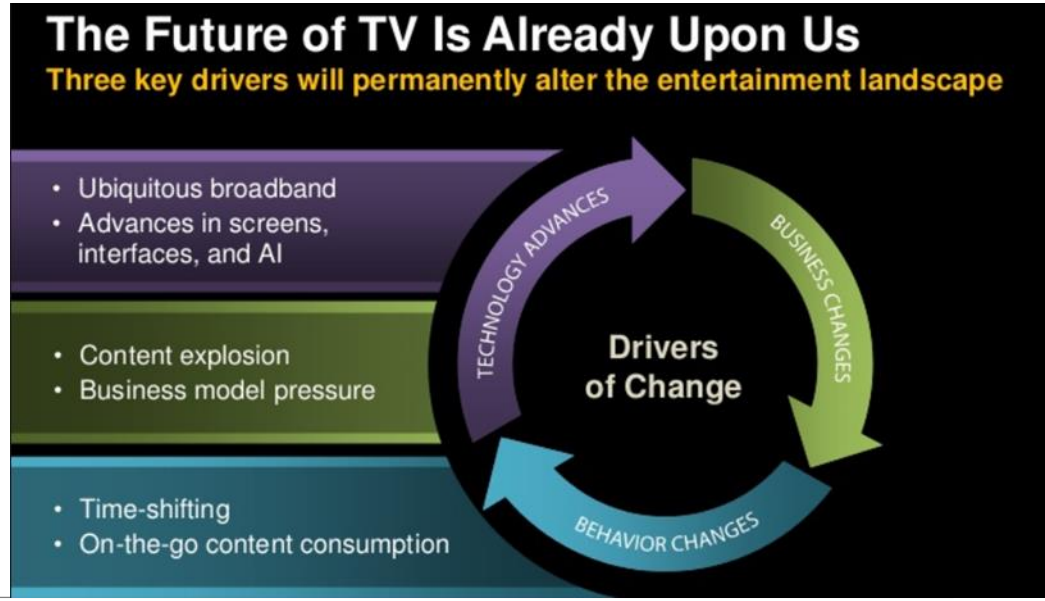
What if? ...*what might be possible?*

ATSC 3.0

- Configurable
- Scalable
- Efficient
- Interoperable
- Adaptable

Why do we need change in the U.S.?

- Spectrum is becoming increasingly scarce
- Major improvements have been made in video compression efficiency
- Interactivity has become expected on the part of consumers
- Delivery paths other than broadcast have become commonplace
- Better audience measurement accuracy is needed and expected
- A strong desire exists for higher-resolution images
- Audio has become more efficient and immersive
- Mobile devices have proliferated
- Tablets are in widespread use
- Today's TV seems 'old'



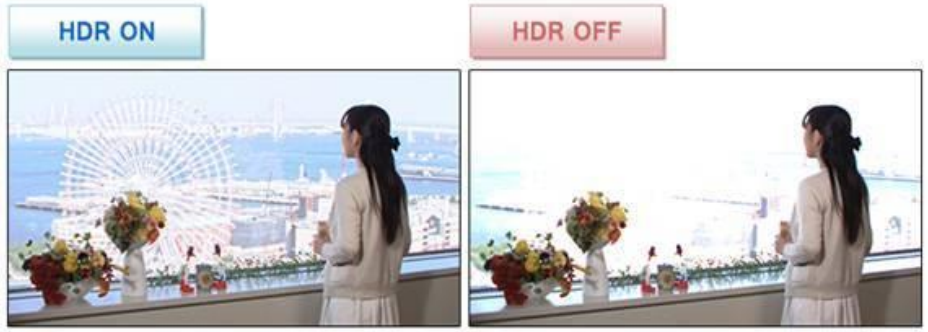
Video And Audio - UltraHD Change is Underway

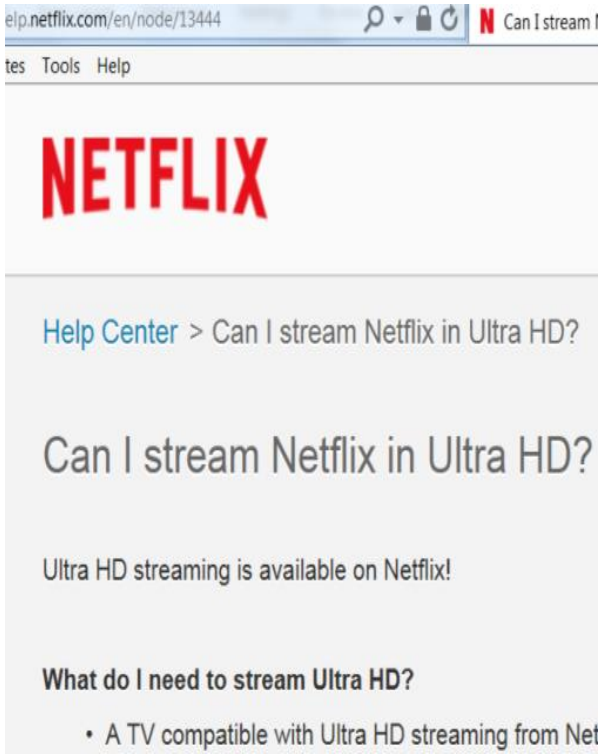
Higher Resolution, High Dynamic Range, Wide Color Gamut, Immersive Audio

4K ULTRA HD CONNECTED

DOLBY ATMOS

DOLBY VISION





Blu-ray Disc

Sony Video Unlimited 4K

September 2014 FMP-X10 upgrade to work with other 4K UHD brands

amazon Prime instant video

ATSC 1.0 in retrospect

Computer
DOS … Windows 3.1

Cell Phone
Analog 2G

Dial-up
Modem
19.2 kbps

VCR - analog

- ***The HDTV Grand Alliance was a Revolution in 1993***

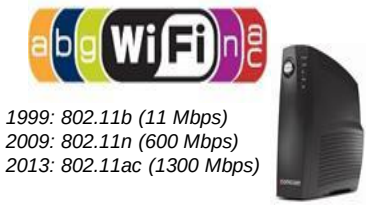
The "modern" Digital World

Cable & DSL Modem
Up to 100 Mbps

HDTV- Digital – Smart TVs
LED / LCD displays

4G Networks
12 Mbps

WiFi 802.11ac 1300 Mbps



1999: 802.11b (11 Mbps)
2009: 802.11n (600 Mbps)
2013: 802.11ac (1300 Mbps)

SmartPhones

2007: iPhone (4Gbytes)
2014: iPhone 6 (128 Gbytes)

Computer

Tablets

2010: iPad (16 Gbytes)
2014: iPad Air 2 (128 Gbytes)

Wearables

- ***Rapid Advances and Ongoing Disruptions***

High Level Goals for ATSC 3.0

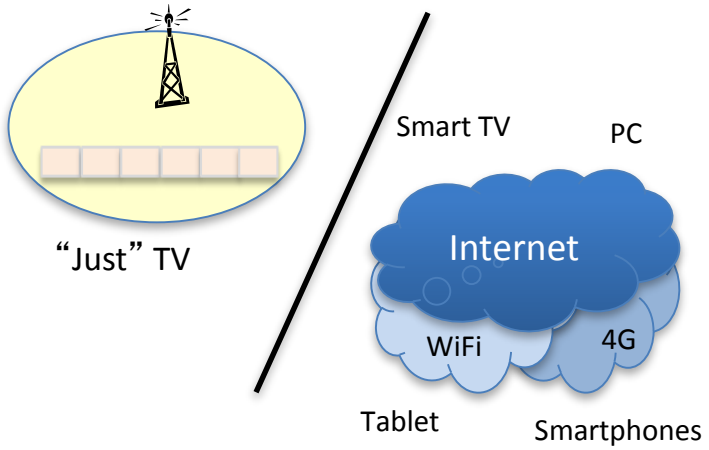
- Spectrum Efficiency
  - Enable tight spectrum repack, while preserving 6 MHz and coverage
- New Capabilities for content and services
  - Ultra High-Definition TV with Immersive Audio
  - Integrated Mobile/Handheld Capabilities
  - Mobile IP - data and VOD delivery
  - Hybrid Broadcast-Broadband services
  - Flexible transmission platform operates over a wide range of bit rate, coverage area and robustness
- New monetization opportunities
  - Personalization, Interactivity, Audience/Ad measurement
  - Dynamic Ad Insertion
  - Conditional Access / DRM
- Future capabilities – Flexible, Extensible & Scalable

Usage Scenarios for ATSC 3.0

- Flexible Use of Spectrum
- Robustness
- Mobile Services
- Ultra HD/HDR
- Hybrid Services
- Multi-view/Multi-screen
- 3D Content (Video)
- Enhanced and Immersive Audio
- Advanced Accessibility
- Advanced Emergency Alerting
- Personalization and Interactivity
- Advanced Advertising Monetization
- Common World Standard

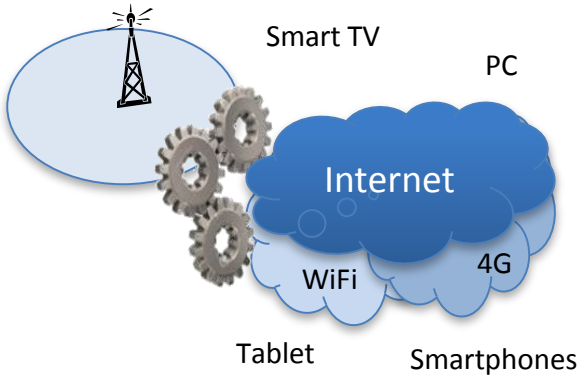
Combining Broadcast & Internet

ATSC 1.0



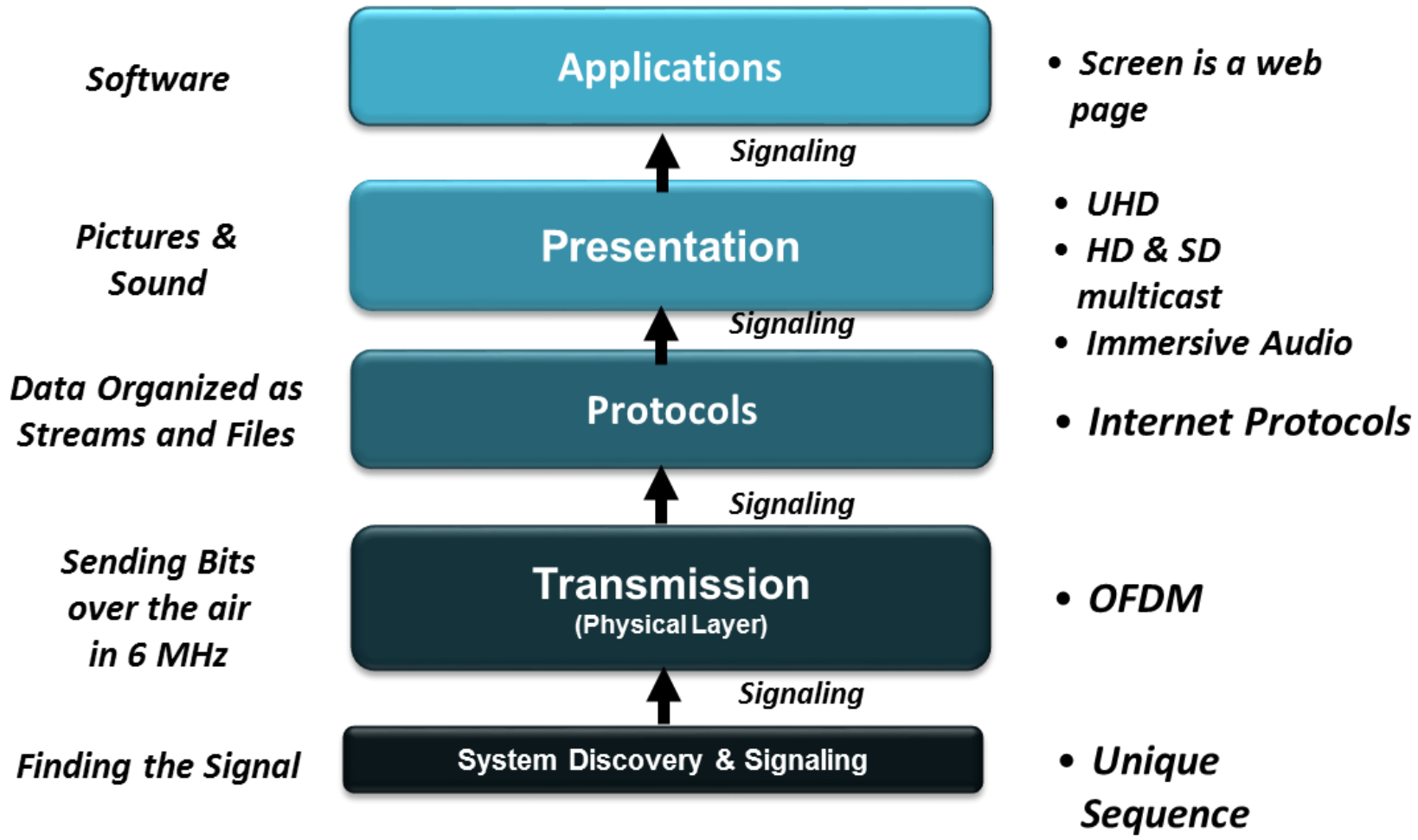
- MPEG-2 Transport Stream provides service flexibility for multicasting
- But Broadcasting isn't part of the internet … and its massive global investment

ATSC 3.0



- Internet Protocol based - enable broadcasting to become PART OF the wireless internet
- Encryption, Conditional Access / DRM enables monetization
- File delivery enables VOD and Dynamic Ad Insertion

A Peek Under the Hood

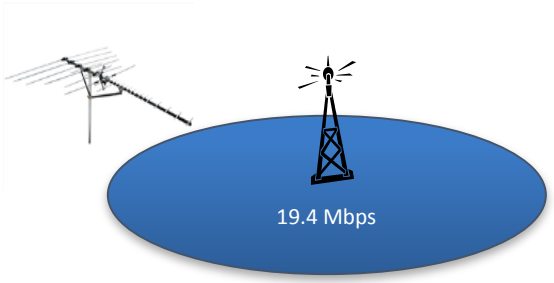


ATSC 3.0 Runtime Environment

- Based on Web Technology
- Enables new business opportunities
- Supports enhanced public alerting services
- Fosters broadcast service portability across multiple device platforms
- Enables seamless service integration with broadcast and broadband
- Increases the reach of broadcast services beyond the television

Transmission

ATSC 1.0

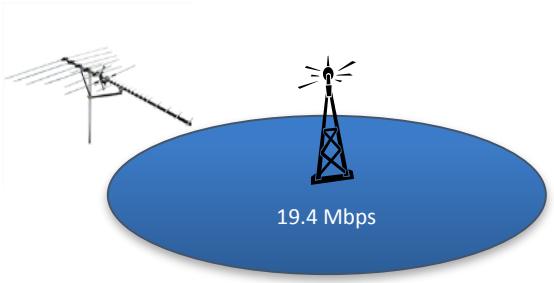


8-VSB

- One bit rate – 19.39 Mbps
- One coverage area
- Service flexibility – HDTV, multicast, data
  (see next slide)

Transmission

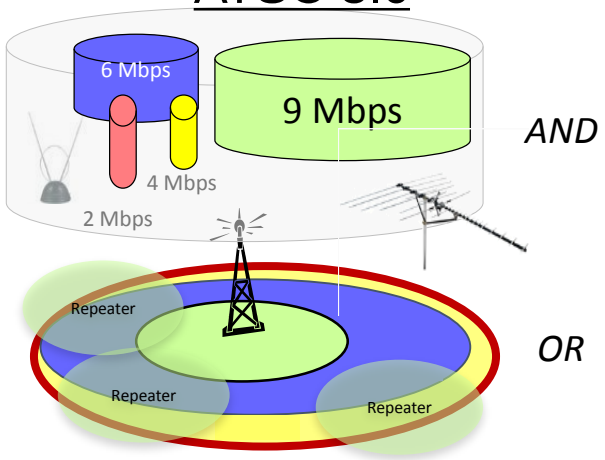
ATSC 1.0



8-VSB

- One bit rate – 19.39 Mbps
- One coverage area
- Service flexibility – HDTV, multicast, data *(see next slide)*

ATSC 3.0

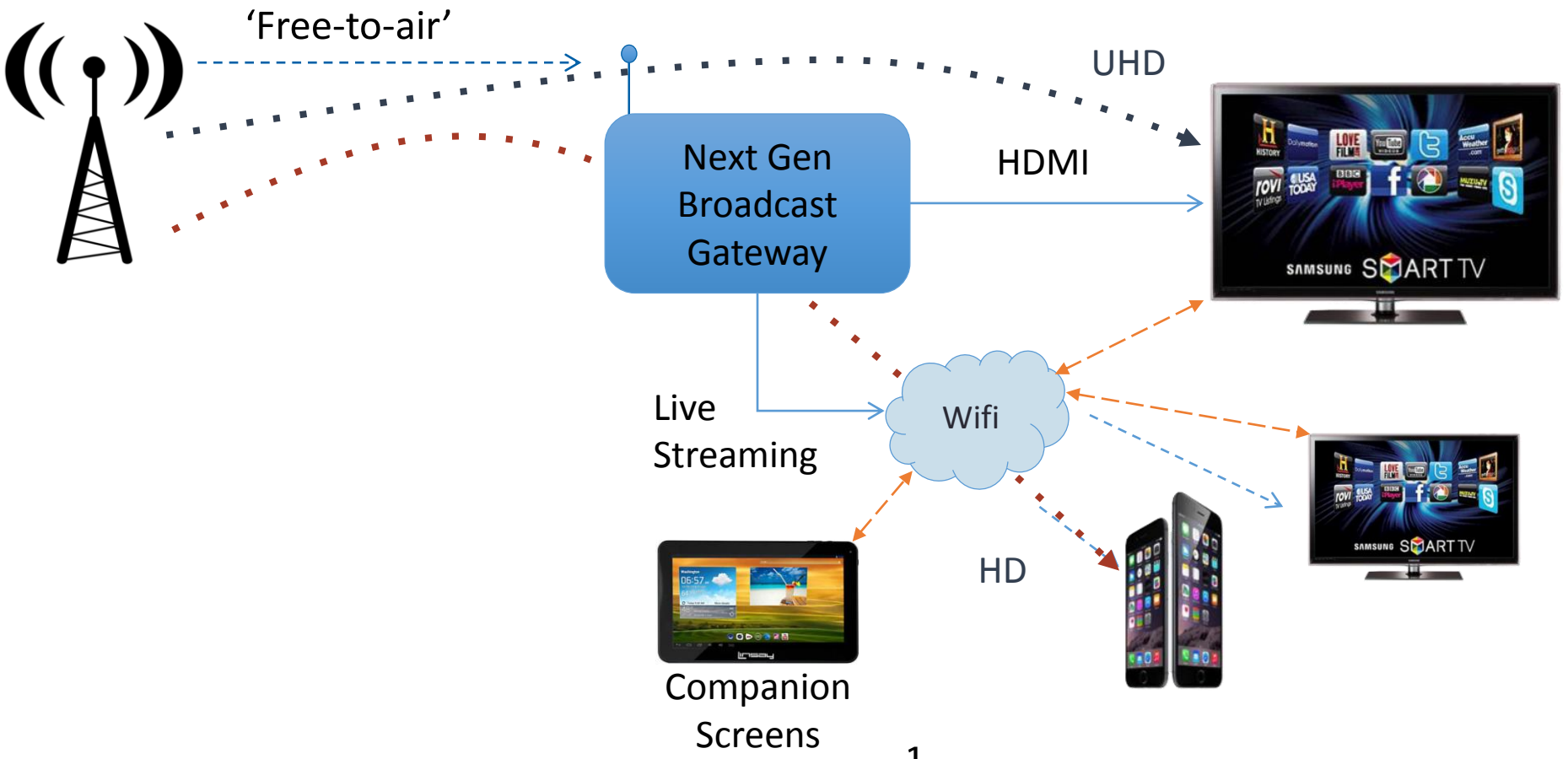


AND

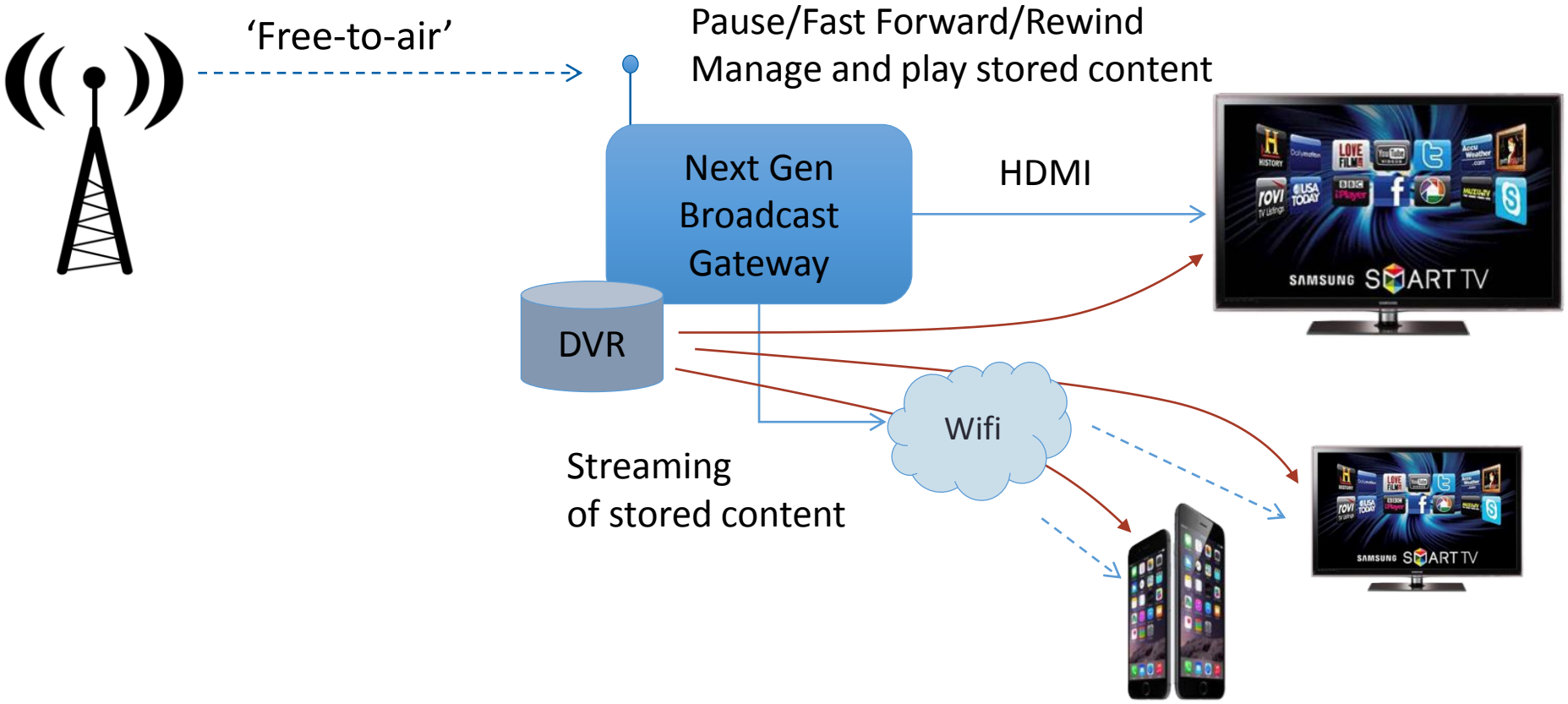
OR

- Flexible bit rate & coverage area choices
- Optional on-channel repeaters for robust indoor & mobile reception over entire DMA
- Multiple simultaneous “bit pipes” – different choices for different broadcast services
  - Physical Layer Pipes (time)
  - Layer Division Multiplexing (power)
  - Channel Bonding

Multiple Channels and Formats



Store and Forward



Presentation

ATSC 1.0

Standard Dynamic Range and Color
100-nit color grading, Rec. 709 color, 8 bits/pixel

- Allows HDTV & SD multicast
  - HDTV – MPEG-2 (12 – 18 Mbps)
  - SDTV – MPEG-2 (3 – 5 Mbps)
  - 5.1 Dolby Digital surround sound

ATSC 3.0

High Dynamic Range, Faster Framerates and Wide Color Gamut
1000-nit color grading, Rec. 2020 color, 10 bits/pixel

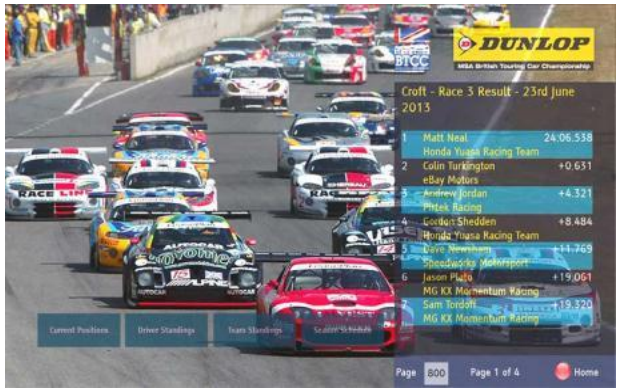
- Allows UHD and/or HD multicast
  - Super-4k – HEVC (18 – 30 Mbps)
  - Super-HD – HEVC (8 – 12 Mbps)
  - HD – HEVC (3 – 8 Mbps)
  - SD – HEVC (1 – 2 Mbps)
  - Immersive Audio

Application

ATSC 1.0

- Pictures, Graphics and Sound are “burned in”
- Same experience for entire audience

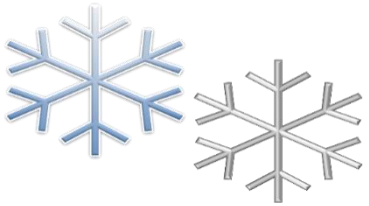
ATSC 3.0



- HTML5/Internet overlay graphics
- Hybrid delivery - merge broadcast & internet
- Dynamic Ad Insertion
- Personalized Graphics
- Interactivity
- Synchronized second-screen applications
- Immersive Audio - user control of tracks and mix
- Audience Measurement capabilities

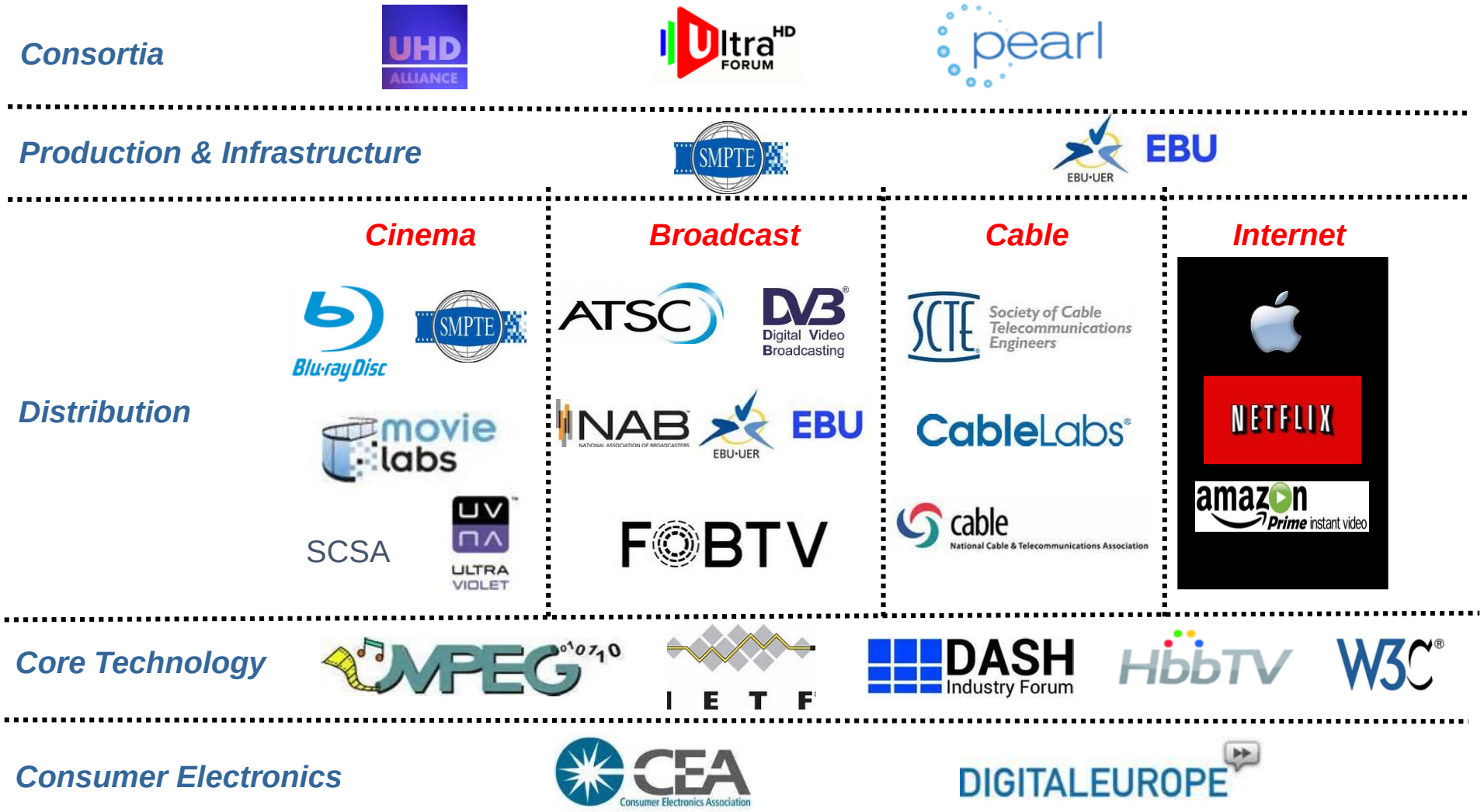
New Public Service Capabilities

- Emergency Alerting
  - Extremely robust EAS “wake up” signaling
  - Advanced EAS messaging capabilities
  - Ability to reach indoor, battery-powered receivers



- Robust Audio and Closed-Caption delivery even when picture fails
- Improved audio intelligibility for the hearing impaired
  - New capabilities for improved dialog/narrative intelligibility (track – specific volume control)
  - Continued support for Video Description Services

Industry Efforts- Next-Gen Standards Landscape



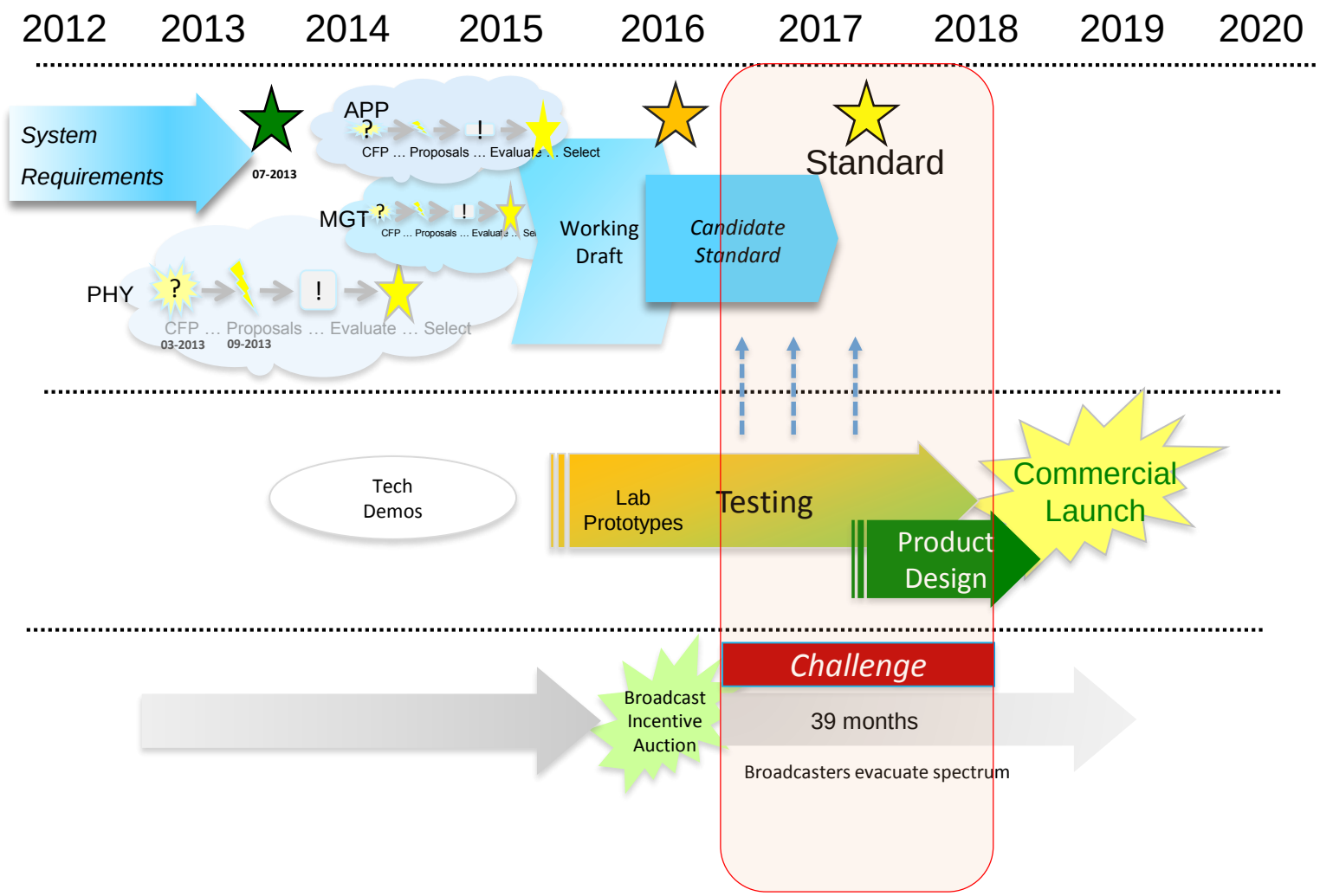
Schedule

ATSC 3.0 is a suite of standards

- Multiple standards per layer
- Each Standard moves through the process independently
- Most will move to Candidate Standard in 2015
- Final approval of each document expected in 2016 with completion of all in the first or second quarter of 2017

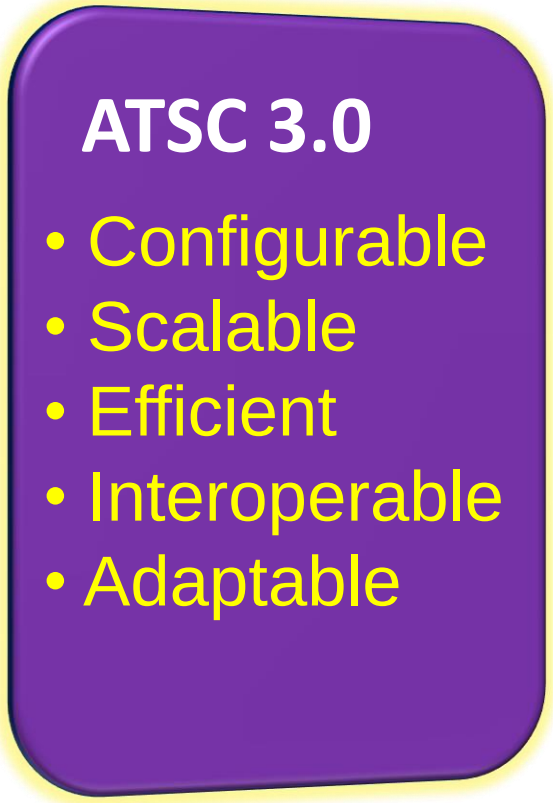
Testing and Regulatory Activities Are Outside the Scope of ATSC

Possible Schedule…the big picture



Industry

Why U.S. Broadcasters need ATSC 3.0



Next generation broadcast television

- Significantly higher data capacity
- Flexible spectrum use
- Higher physical layer robustness
- Future extensibility
- Mobile handheld support
- Hybrid broadcast + broadband delivery
- Advanced A/V compression
  - Greater efficiency, use of spectrum
  - Immersive audio
  - UHD support

Thank You!

For more information
atsc.org

Dave Siegler
dave.siegler@coxinc.com

Competition in the Livingroom using HbbTV

Joost Negenman, NPO
Senior policy advisor research & development

(joost.negenman@npo.nl)

(source: "Why we watch TV, 2015", Dr William Cooper, informitv)

Question: Why we watch TV

“TV Shows still bring families together, providing pretext for spending time together for generations. It’s a reason to be in the same room at the same time, or simply to sit next to someone.Television can engage us like no other medium, typically sport and some entertainment shows, It allows us to express our emotions”

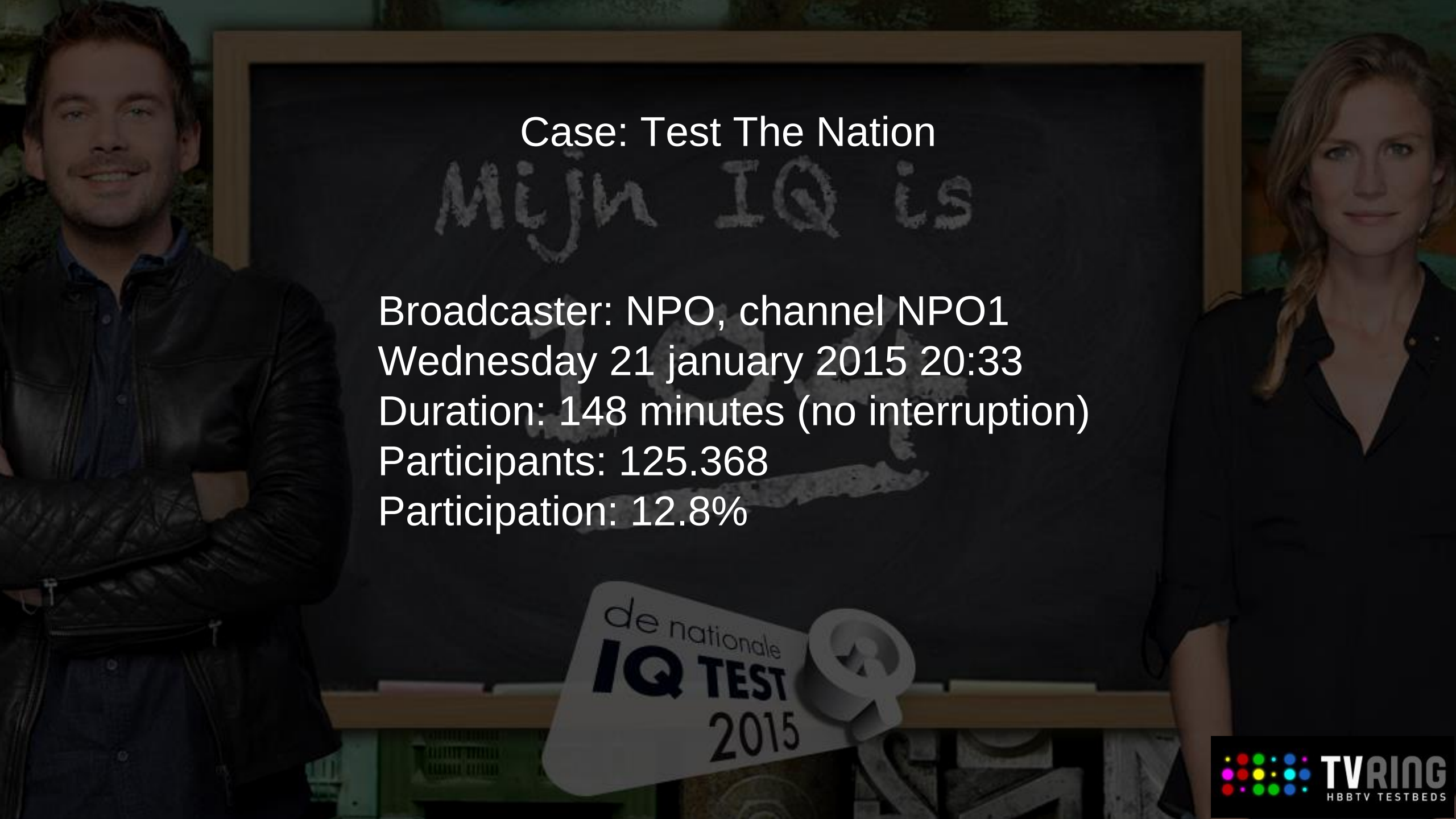
So.. Television is still very much a social event

Smart Social Emmersive Engaging Interactive Personalized Television

TVRING
HBBTV TESTBEDS

Fun Television!

TVRING
HBBTV TESTBEDS



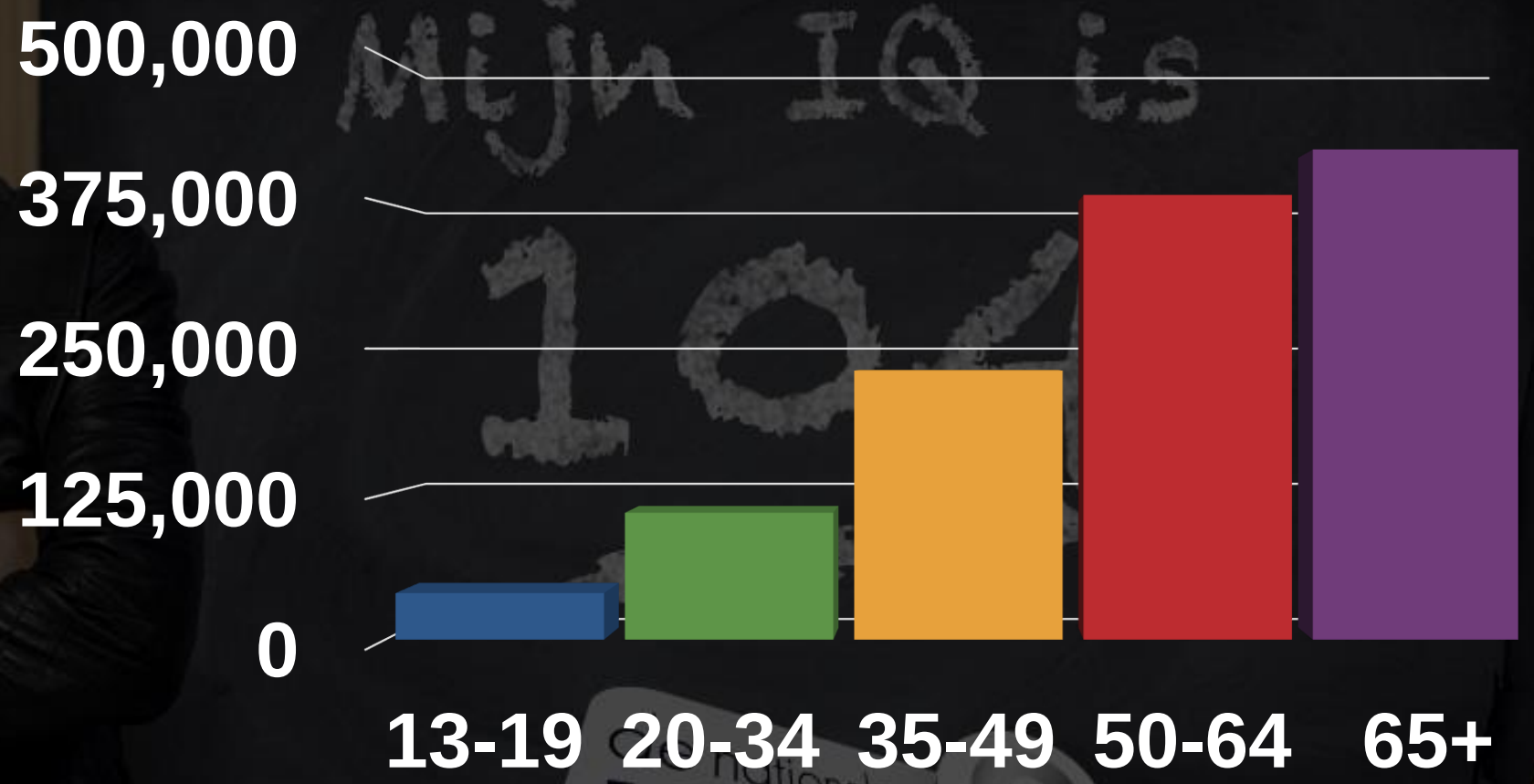
Case: Test The Nation

Broadcaster: NPO, channel NPO1
Wednesday 21 january 2015 20:33
Duration: 148 minutes (no interruption)
Participants: 125.368
Participation: 12.8%

TVRING
HBBTV TESTBEDS

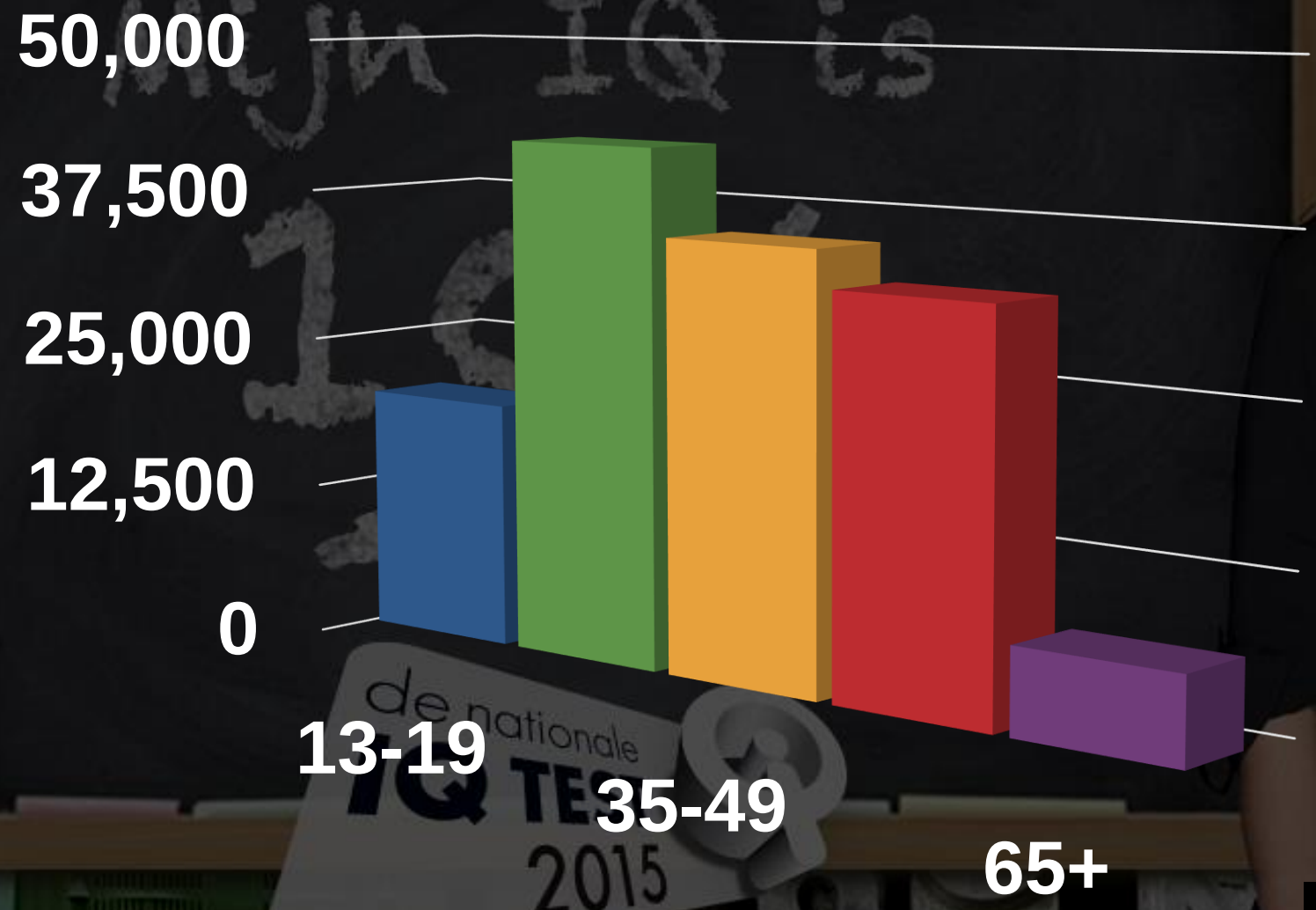
TWO SCREEN 16:24
BNN
IQ TEST
de nationale IQ TEST 2015
Hallo!
Om mee te kunnen doen met De Nationale IQ Test hebben we een paar gegevens van je nodig. Daarna kun je, als je wilt, inloggen om na de test je score te delen.
Ik doe mee!
TWO SCREEN 16:24
BNN
IQ TEST
PERSOONLIJKE GEGEVENS
Wat is je leeftijd?
54
Ben je een man of een vrouw?
MAN
Verder
TWO SCREEN 16:24
BNN
IQ TEST
12
ruimtelijk inzicht
A
B
C
D

Viewers



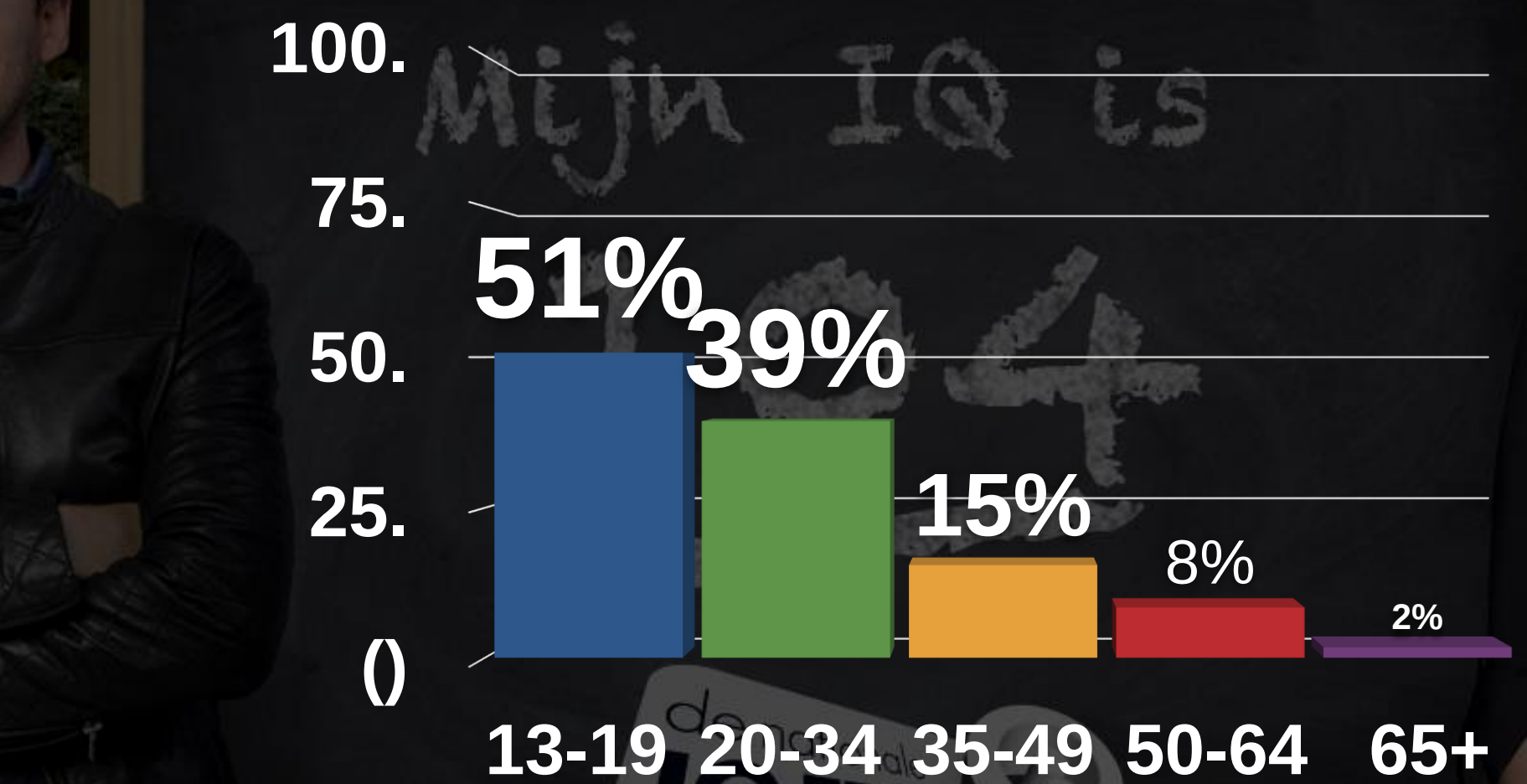
Source: BNN-VARA

Participants



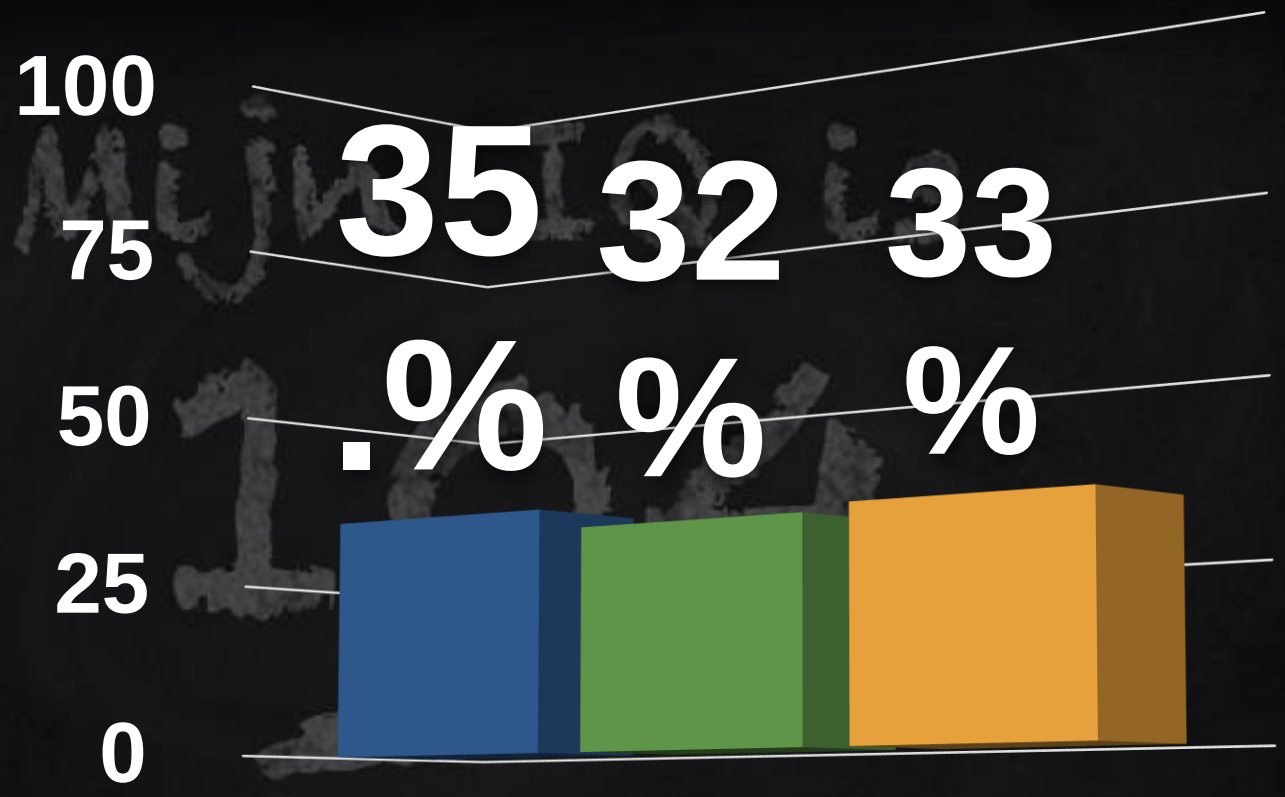
Source: BNN-VARA/Angry Bytes

Participants/Viewers



Source: BNN-VARA/Angry Bytes

3 viewers in 1 household



Source: BNN-VARA/Angry Bytes

So.. Television is still very much a social event

Problems

- 2nd screen engages, but can be distractive and frustrating for TV program makers AND viewers
- Login and profile creation are cumbersome
- Too much eyes on the 2nd Screen, that should’ve been on the first screen, what now? ..

objective

Develop and test applications and infrastructures that will shape the future internet-based television

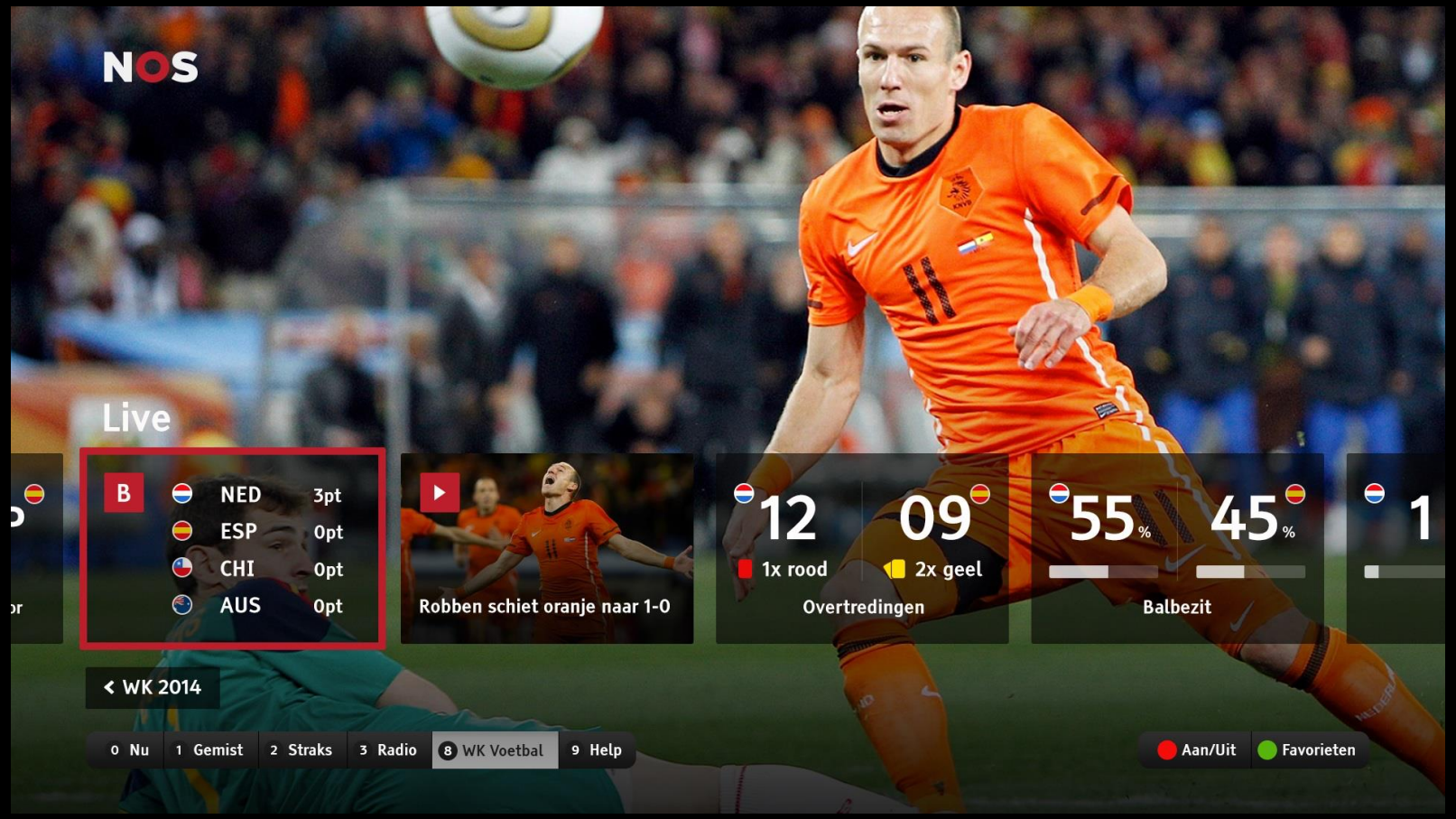
TVRING
HBBTV TESTBEDS

TVRING
HBBTV TESTBEDS

Consortium

HbbTV

Can look like this ..



npo
TVRING
HBBTV TESTBEDS

Or like this ..

TV RING CASE:
EUROVISION SONGCONTEST

2015 see2gather pilot:
Connect 2nd screen to the TV

Technical basics

TVRING
HBBTV TESTBEDS

Technical basics

TVRING
HBBTV TESTBEDS

Pilot: 3 countries

Simple interface, voting device!

play-a-long, play each other (families)

Or group vs group play-a-long (groups of friends / bars / events etc..)

2015 actual footage

Group vs group play-a-long between countries!

Interactive learnings

- Add competition in the living room, adds emotion
- Simplicity: make features optional, like login or social media
- 2nd screen application schold be no more than en zou een voting box like being in a TV studio
- All information on TV Screen: scores, when to vote, call 2 actions etc..
- All eyes are on TV Screen and each other!

Innovation learnings

- Strive for lean development, do not impose heavy centralized app’s
- Make use of open (EBU) standard like: html5, wifi, cloud, hbbtv, or set-top-box.

Marketing stuff ..

Please visit our booth for a live demo

joost.negenman@npo.nl

HbbTV and User Interaction

An example from Germany

Nico Patz, rbb Innovation Projects

How can we make TV interesting for a younger audience?

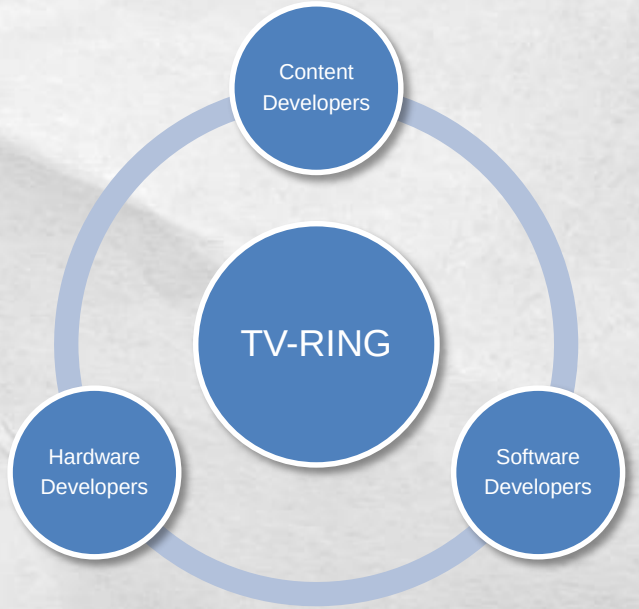
- What did we do to find out?
- What did we find out?
- What are we going to do with this knowledge?
- First: Who are WE?

Who are WE?

Nico Patz

rbb Innovationsprojekte

The TV-RING Project



TVRING

rbb

The TV-RING Project

Objectives of National Pilots

- Deployment
- User Evaluation

Objectives of TV-RING

- Experience
- Knowledge Sharing
- hbbtv-developer.com

rbb
ARD | 11:11 Uhr
rbb
DIE BERLINER
MAUER
Serie zum Thema "Erste Liebe"
Hier findet Ihr den LiveBlog, Episoden, Interviews, Steckbriefe, Votings und vieles mehr.
verknallt & abgedreht
ARD
EPG
rbb
MEDIATHEK
Startleiste Extras
Ausblenden
EPG
Mediathek
Videotext

What does the young audience want/like/expect?

What does the young audience want/like/expect?

- Information
- Entertainment
- Involvement
- (Social) Interaction

Our assumptions!

Name: Mina

Alter: 16

Wohnort: Berlin

Sternzeichen: Steinbock

Wie würdest Du Dich in fünf Worten beschreiben:
Paris, London, Tokio, New York und Madrid - sprich: vielfältig, ambivalent, lustig, offen und stressing/ hyperaktiv

Hobbies:
Schlagzeug, Heavy Metal, Schauspielerei und England-Fan

Lieblingsschauspieler:
Gary Oldman, Ron Perlman, Roger Moore, Tony Curtis, Helena Bonham Carter und Cate Blanchett

Bester Anmachspruch:
Nichts sagen und das Mädchen einfach auf die Stirn küssen.

Liebe ist ...
etwas sehr interessantes und abstraktes. Ich mag es, Gedichte zu schreiben, die im weitesten Sinne Liebe behandeln. Denn oft scheint es nicht offensichtlich zu sein, was Liebe alles umfassen kann.

Steckbrief: Mina

← Zurück

Mina

Als uns Sofia den Titel der Reihe genannt hat, 'verknallt und abgedreht', dachte ich: Oje. Eigentlich ist das nicht mein Thema. Also gar nicht. Ich war dann erst mal so: 'Oh . . . Okay . . .'. Aber dann habe ich es auch auf mich zukommen lassen.

INFORMATION

verknallt & abgedreht

ENTERTAINMENT

Orte

Die drei Kurzfilme

Unnützes Liebes-Wissen

Best of

Anti-Liebes-Rap

Pärchen-Interviews

verknallt & abgedreht

INVOLVEMENT

Neues | Episoden | Personen | Specials | Über Uns

20. Die Premiere!

Video: Best of

Umfrage & Verlosung

Wir möchten gerne herausfinden, was Dich begeistert. Deshalb wäre es toll, wenn Du mitmachst.

Meinung sagen, Tablet gewinnen

Voting

Hast Du schon mal Schluss gemacht?

- ☒ Ja
- ☐ Vielleicht
- ☐ Nein

Gib jetzt deine Stimme ab!

Ausblenden | 0 Startleiste | 1 Datenschutz | 2 Impressum | 3 LiveBlog an

verknallt & abgedreht

SOCIAL INTERACTION

#verknallt15

knalldreh
vor 18 Stunden

Kika Serien
vor 18 Stunden

Maria Ehrich
Fanpage

Ausblenden 0 Startleiste 1 Datenschutz 2 Impressum 3 LiveBlog aus

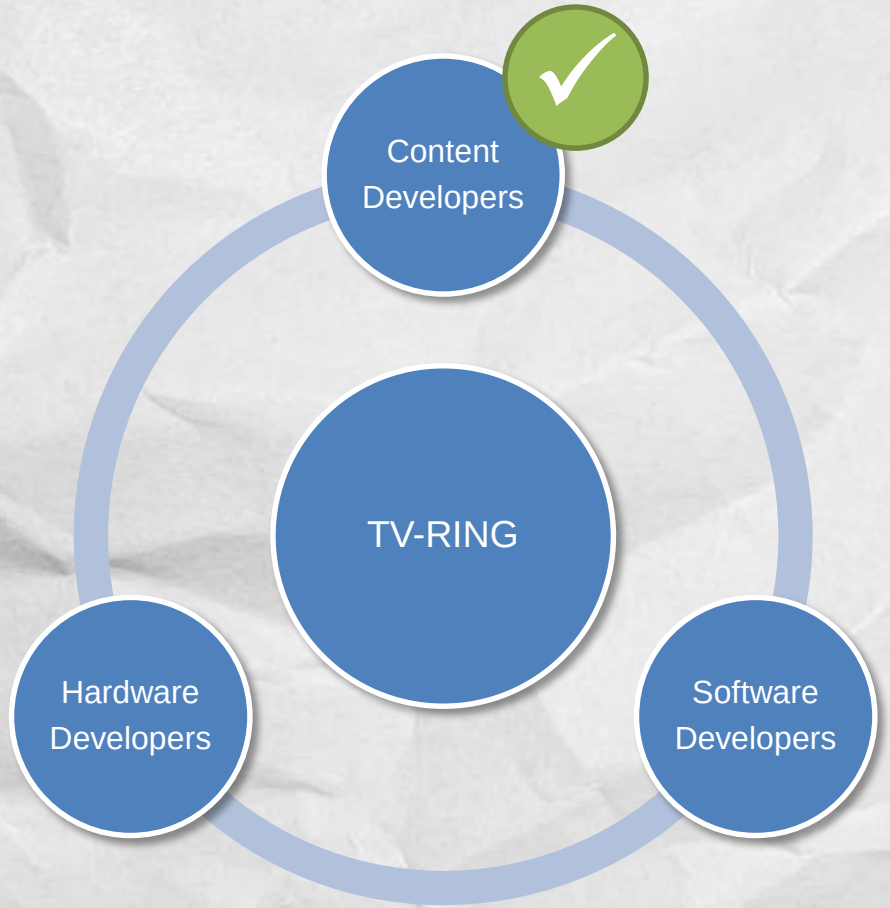
What does the young audience REALLY want/like/expect?

What does the young audience REALLY want/like/expect?

Test User Feedback!

- Information Yes, BUT „less text, more video!“
- Entertainment „Video is KING!“
- Involvement Yes, BUT rather on social network (preferrably smartphone) than on TV
- (Social) Interaction More and longer visits

What about technology?



DASH and UHD Video Player

20. Die Premiere!

Endlich ist es so weit. Die Premiere der Kurzfilmreihe steht vor der Tür. Mina, Tim, Hannes, Alina, Lili und Yusuf treffen sich nach gut sechs Wochen an einem prominenten Ort mitten in Berlin - dem Potsdamer Platz.

‹

20. Die Premiere!

›

← Zurück

www.hbbtv-developer.com
The HbbTV Developer Forum is addressing beginners and experts alike. The objective is to foster the exchange of knowledge in HbbTV application development and to create best practices for the future of Connected TV.
The HbbTV Developers Forum consists of Wiki, Forum and Blog including numerous program code snippets and application examples. Users are explicitly invited to actively contribute.
The developer forum was established in the framework of the EU project TV-Ring: www.tvring.eu
Kontakt: info@tvring.eu
TV RING
HBBTV TESTBEDS
www.hbbtv-developer.com
Your website for HbbTV app development
BLOG
WIKI
FORUM
WRITE WITH US
Guideline
HbbTV
Code
Cutomisation
Recommendation
Remote Control
User Experience
Social Interaction
Video content
Advertisement
Known issues
Navigation
Streaming
Testing
Usability
Personalisation
User Engagement

TVRING

Find out more at www.TVRING.eu,

at our booth here

… or contact me later

Nico Patz

nicolas.patz@rbb-online.de
innovationsprojekte@rbb-online.de

+49 (331) 97 993 500 42

CCMA HbbTV
Towards an interactive and innovative TV

Corporació Catalana de Mitjans Audiovisuals, SA

3 CATALUNYA RÀDIO

About the CCMA

- **Corporació Catalana de Mitjans Audiovisuals (CCMA) is the Catalan public Broadcaster.**

- **Its audiovisual offer includes:**
  - TV: TV3, 33, Super3, 3/24, Esport3 and TV3Cat.

  - Radio: Catalunya Ràdio, Catalunya Informació, CatMusica & iCat.cat

  - Digital Media: website, mobile apps, Connected and Hybrid TV, social networks, etc…

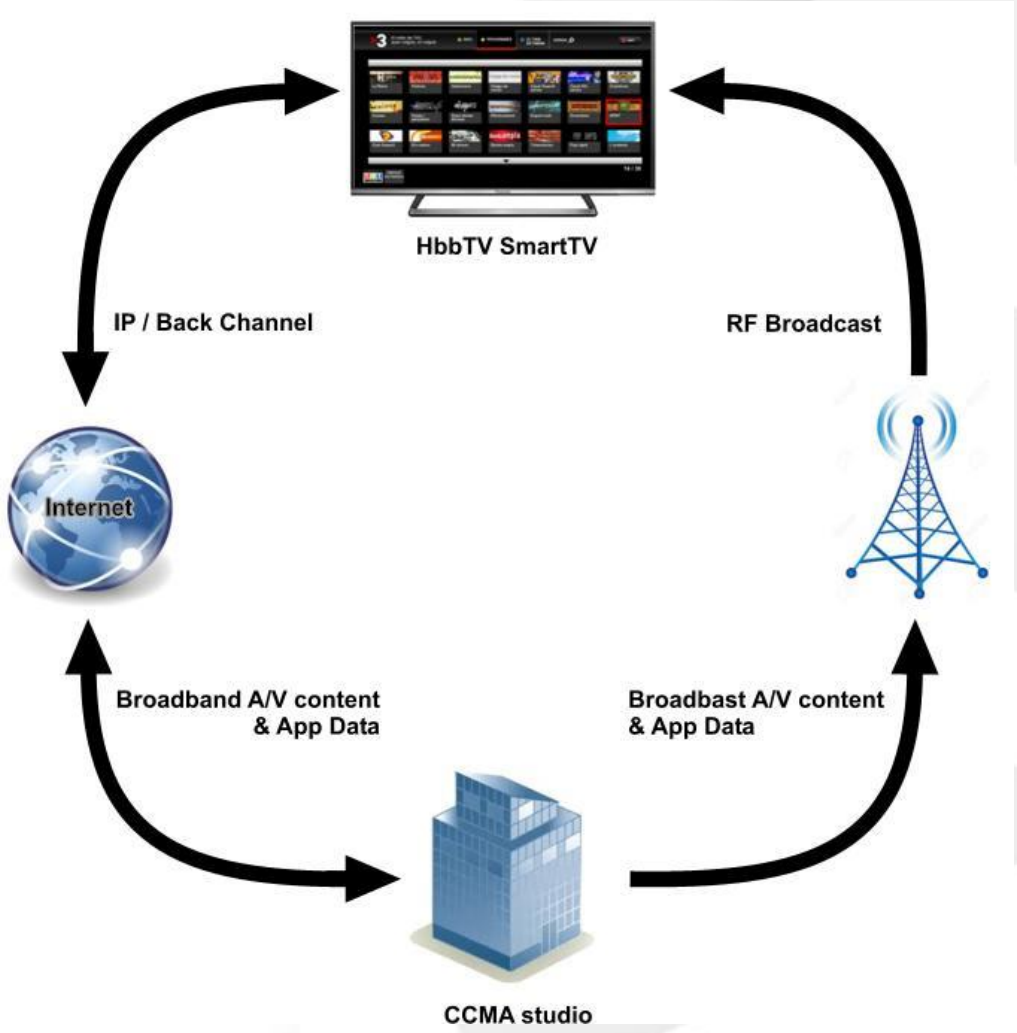
The CCMA and Interactive Services

- **Since the beginning of DTT broadcasting, the CCMA has been very aware to latest technologies to offer interactive services.**

- **CCMA has developed and progressively deployed interactive services, since firsts mhp TV applications to nowadays "TV3alacarta" service on proprietary platforms such as PS4 or proprietary SmartTV markets.**

- **Thanks to the introduction of HbbTV, CCMA has deployed new innovative services including VOD and accessibility services to the TV audience. Nowadays CCMA is working in a new multicamera service project.**

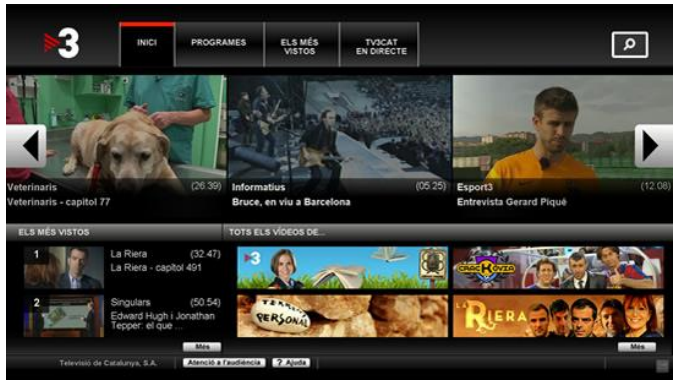
HbbTV opportunities on CCMA services



HbbTV opportunities on CCMA services

- **HbbTV is an industry standard, an open platform, non proprietary**
  - HbbTV allows broadcasters direct access to their audience to offer new and enhanced services
- **Flexibility and Dynamism**
  - Time to publish new apps and updates dramatically reduced
- **Broadcast/Broadband Synchronization**
  - Allows the activation of interactive services scheduled and synchronised with broadcast events.
- **Innovation**
  - Allows deployment of improved services like VOD, EPG, voting, interactive advertising , etc.
- **Accessibility**
  - Allows too development of accessibility services (captions, AD…)

CCMA’s deployments since HbbTV 1.0



- **2011 - Catchup service “TV3alacarta”**
- **2014 – Access Services**
- **2015 – Multicamera Project**

CCMA “TV3alacarta” Catchup service

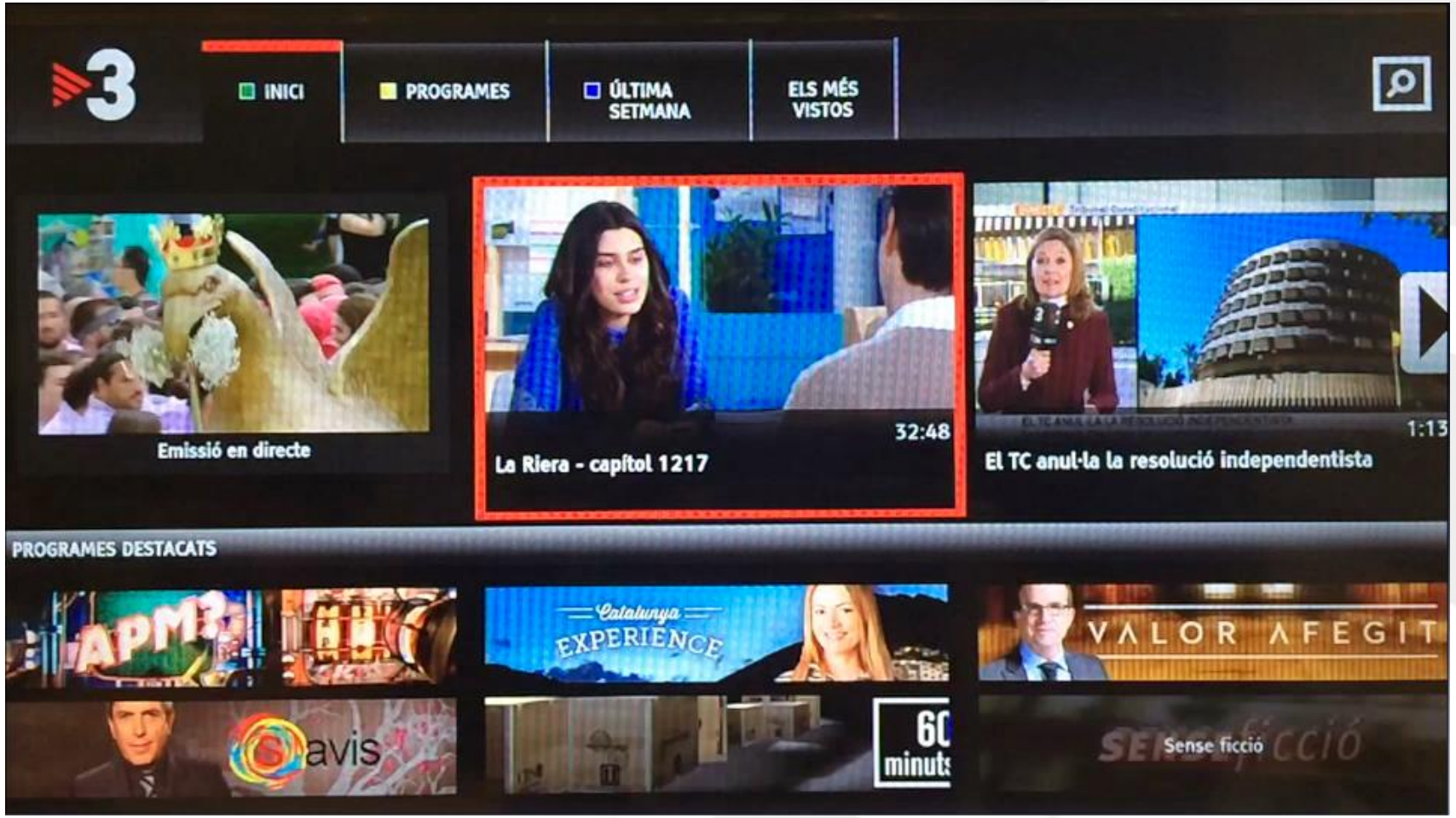
- **2011 - “TV3alacarta”**
  - VOD service with alphabetical content searcher and direct access to “most seen” & “last week” programs and special contents.
  - Accessible from channels TV3, 33, 324, Esports3 and Super3

CCMA “TV3alacarta” Access services

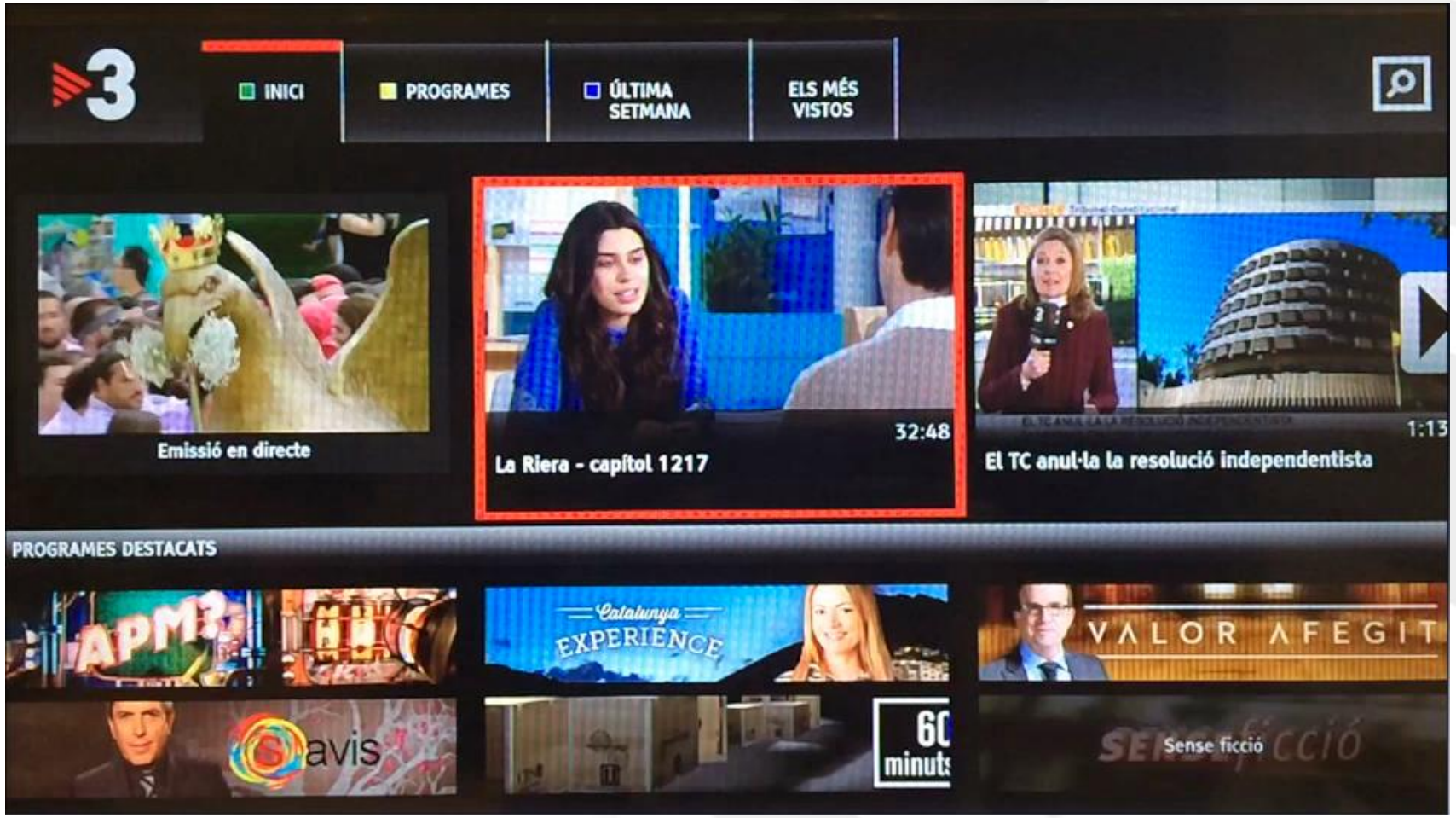
- **2014 – Improved service with Access Services**
  - EBU-TT-D Subtitling and Audiodescription

  - CCMA participates in the European project Hbb4All that addresses media accessibility possibilities in the new hybrid broadcast-broadband TV(HbbTV) environment.

CCMA “TV3alacarta”

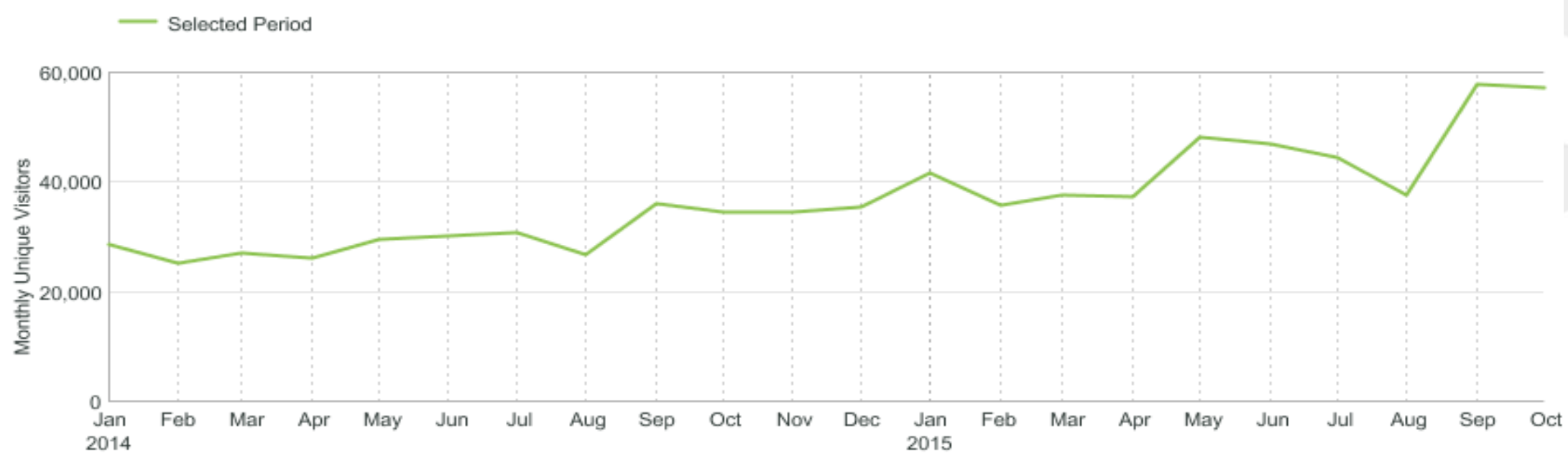


CCMA “TV3alacarta”



CCMA “TV3alacarta” Catchup service

- **Growing Audience due to**
  - Increase number of Connected HbbTV SmartTV’s
  - Changes in the behaviour of the audience watching TV
  - TV3 leadership in the catalan audiovisual market



Monthly Unique Visitors Report | HbbTV No Hook | Wed. 1 Jan. 2014 - Sat. 31 Oct. 2015 | Graph generated by Adobe Analytics at 12:14 PM FWT, 21 Nov 2015

CCMA “TV3alacarta” Catchup service

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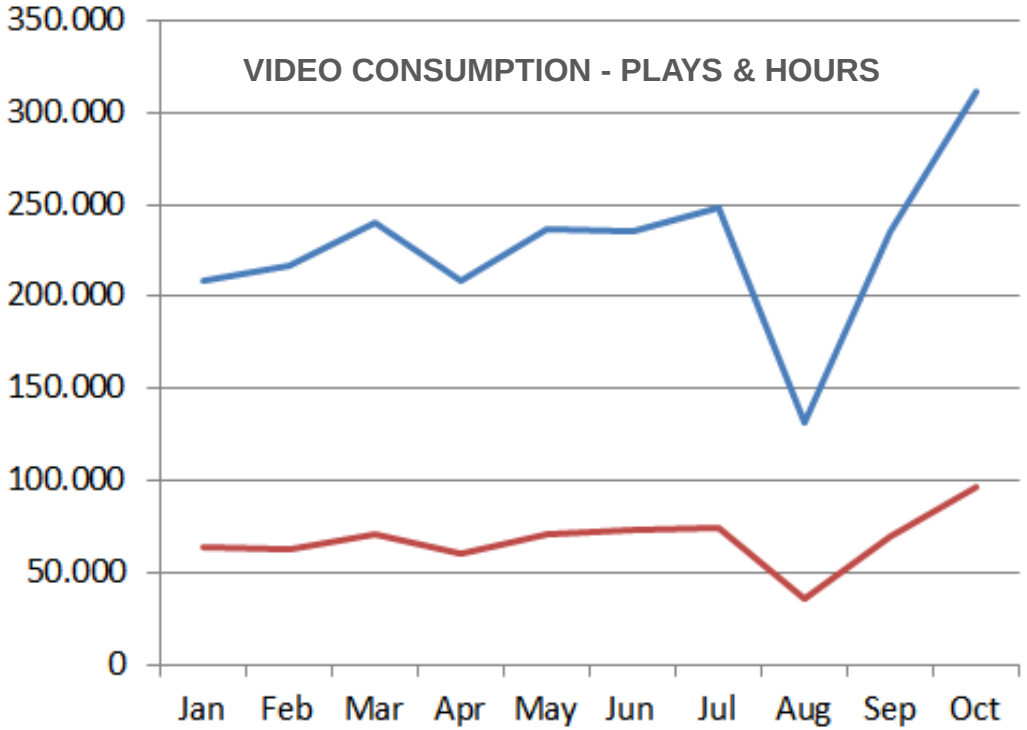
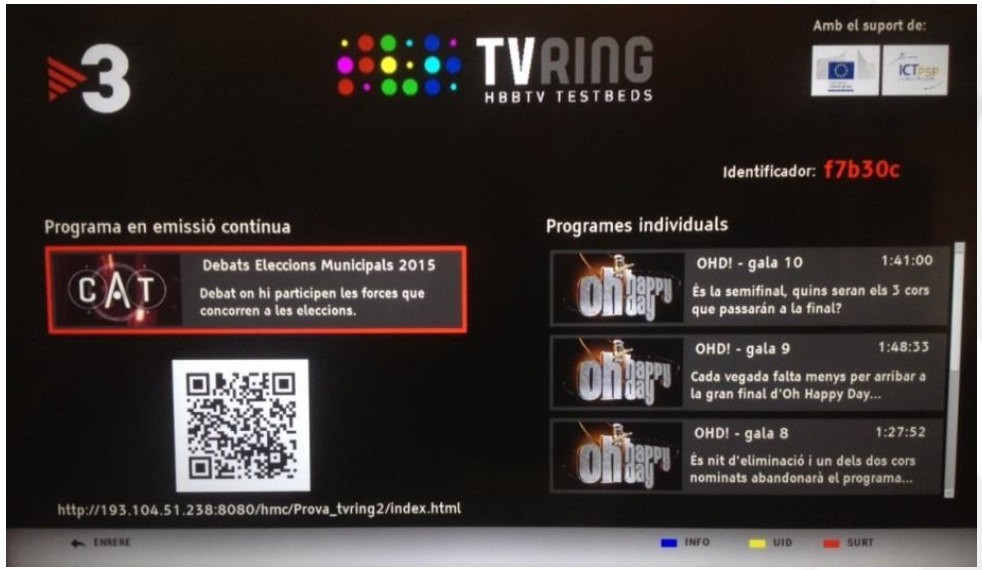


Achieved 100.000 hours
of HbbTV video consumption

CCMA Multicamera Project

- **2015 – Live and VOD Multicamera Service**
  - Objective: deployment of multicamera TV programs for SmartTV's based on HbbTV V1.5.
  - Developed within the scope of European TV-Ring Project that involves 3 different pilots in three countries: Germany, the Netherlands and Spain.



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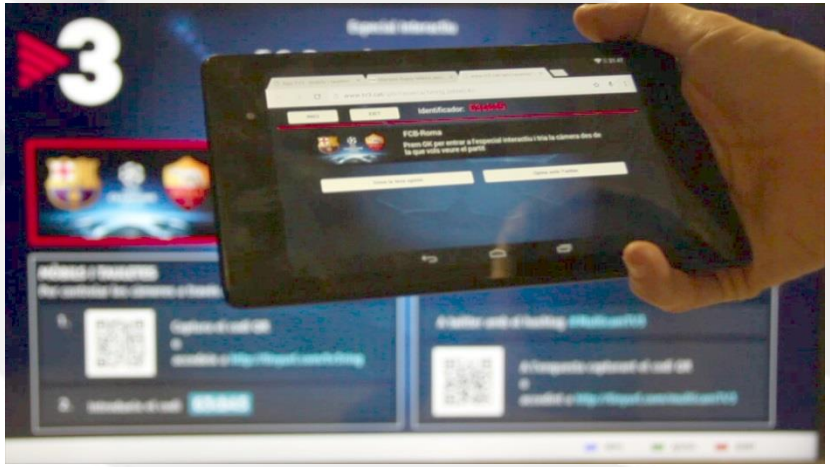
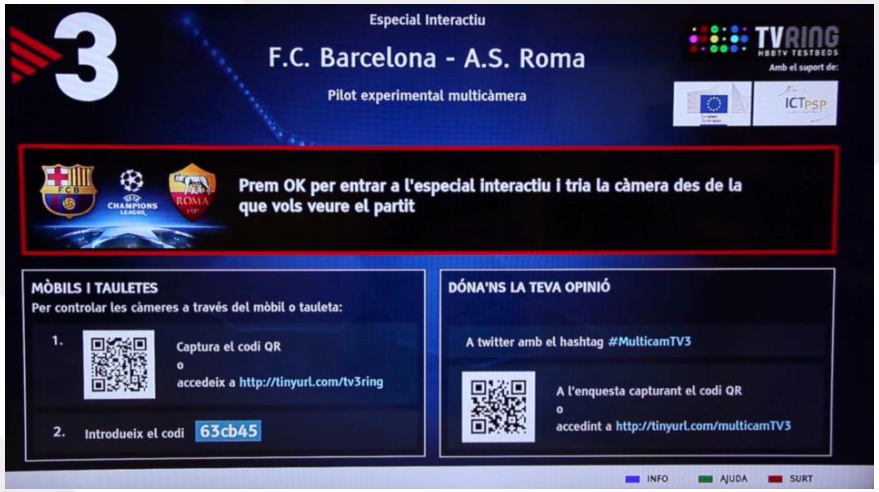


- **Improved Multicamera Service**
  - Multicamera monitoring and control through 2nd Screen

CCMA Multicamera Project

- **Deployed pilots:**
  - Cultural events (Castellers, folklore music concerts)
  - Entertainment programs (Oh! Happy Day)
  - Sports programs (Champions League)
  - Parliamentary Elections
  - Debates



CCMA Multicamera Project

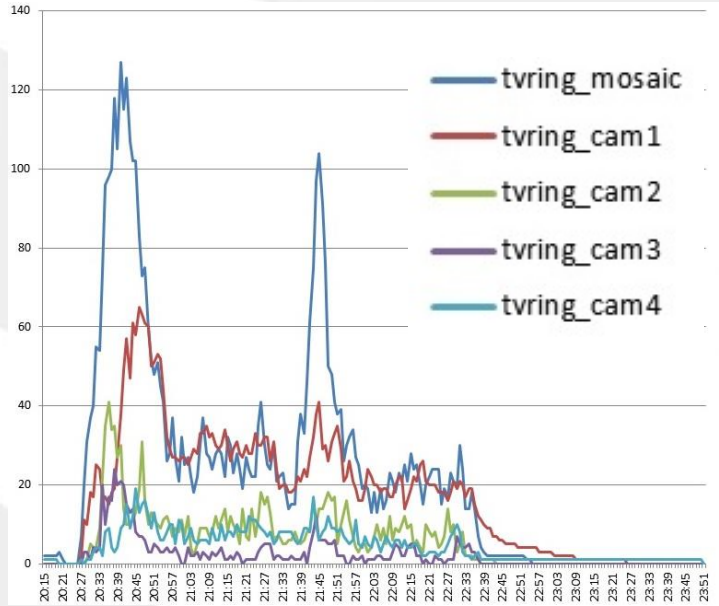
- **24N Champions League – FC Barcelona vs AS Roma football match**

- CAM 1 – Live program
- CAM 2 – Messi, Neymar, Suárez camera
- CAM 3 – Luís Enrique
- CAM 4 – Attack camera

CCMA Multicamera Project

- **24N Champions League – FC Barcelona vs AS Roma football match**

Fabricant TV	Unique Visitors	
LG	2.341	37,7%
Sony	1.428	23,0%
Panasonic	1.298	20,9%
Samsung	922	14,9%
Philips	69	1,1%
Toshiba	55	0,9%
Altres	37	0,6%
Total	**6.203**	



CCMA Multicamera Project

CCMA Multicamera Project

CCMA Multicamera Project

- **Analisys Multicamera Pilot - FC Barcelona vs AS Roma**
  - Positive feedback from users through social networks

CCMA Multicamera Project

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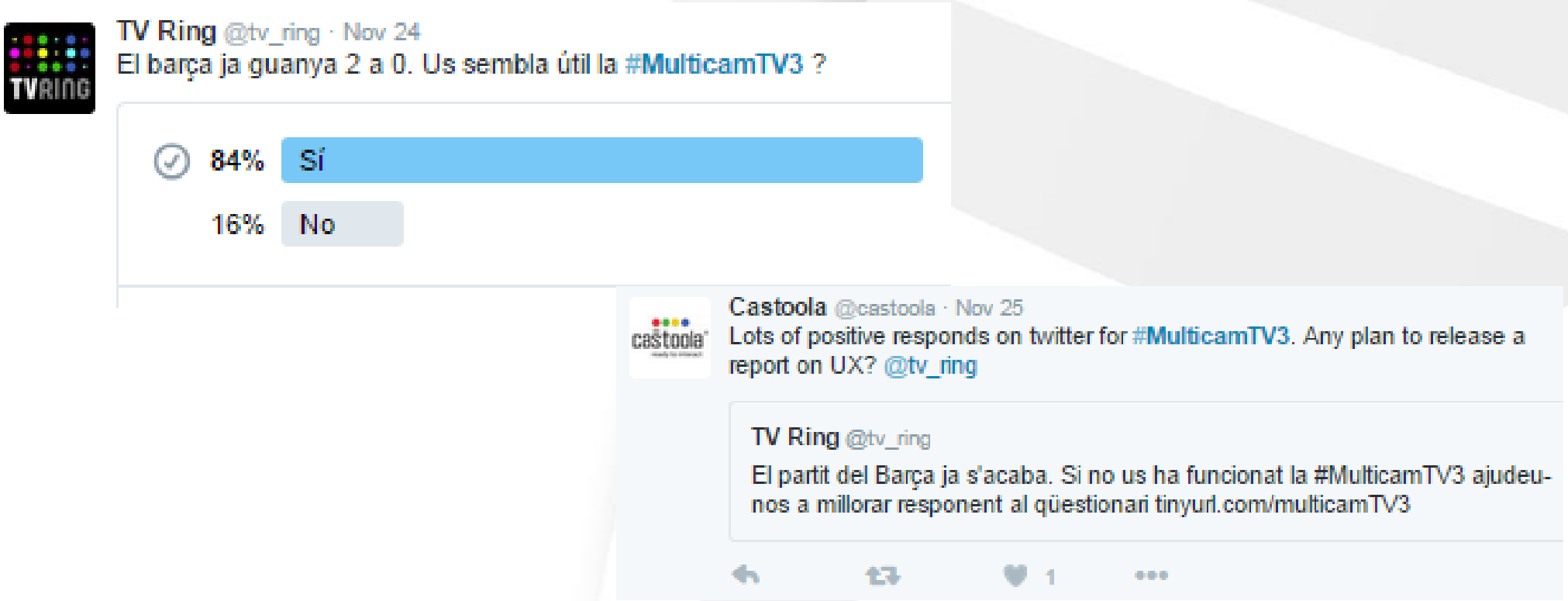


CCMA Multicamera Project

- **Analisys Multicamera Pilot - FC Barcelona vs AS Roma**
  - Positive feedback from users through social networks
  - Some negative feedback from users with SmartTV problems
    - Camera switching was too slow
      - Nowadays developing a new solution with better switching time.
    - Blackscreen on some SmartTV's

CCMA Multicamera Project

- **Conclusions**
  - TV-RING Multicam project has been a success:
    - Great audience acceptance.
    - CCMA has seen the project as an opportunity to offer new innovative services.

  - But nowadays multicam based on HbbTV 1.5
    - is not 100% working on all HbbTV SmartTV's. Interoperability issues.
    - usability is still an issue that needs improvement
      - Camera switching is too slow
      - 2nd screen video synchronization is not possible

Corporació Catalana de Mitjans Audiovisuals, SA

CCMA Multicamera Project

- **Conclusions**
  - Next steps
    - Better camera time-to-switch
      - Testing a new streaming format
    - Better compatibility
      - Achieve more HbbTV SmartTV's models. Improve interoperability.
    - Capture user feedback
      - Social Networks real-time feedback, Living lab, Workshops...
      - Improvements based on user preferences & experience
  - HbbTV 2.0 will allow great improvements
    - HbbTV and 2nd screen video syncronization
    - Improved synchronisation broadcast & broadband contents
    - Better video quality at low bitrates with HEVC

Corporació Catalana de Mitjans Audiovisuals, SA

CCMA HbbTV

Thank you very much

Feedbacks, questions and comments are welcomed.

Francesc Mas – CCMA S.A.

fmas.z@ccma.cat

Corporació Catalana de Mitjans Audiovisuals, SA

sofiadigital
Powering Smart Screens

HbbTV

Value Creation with HbbTV

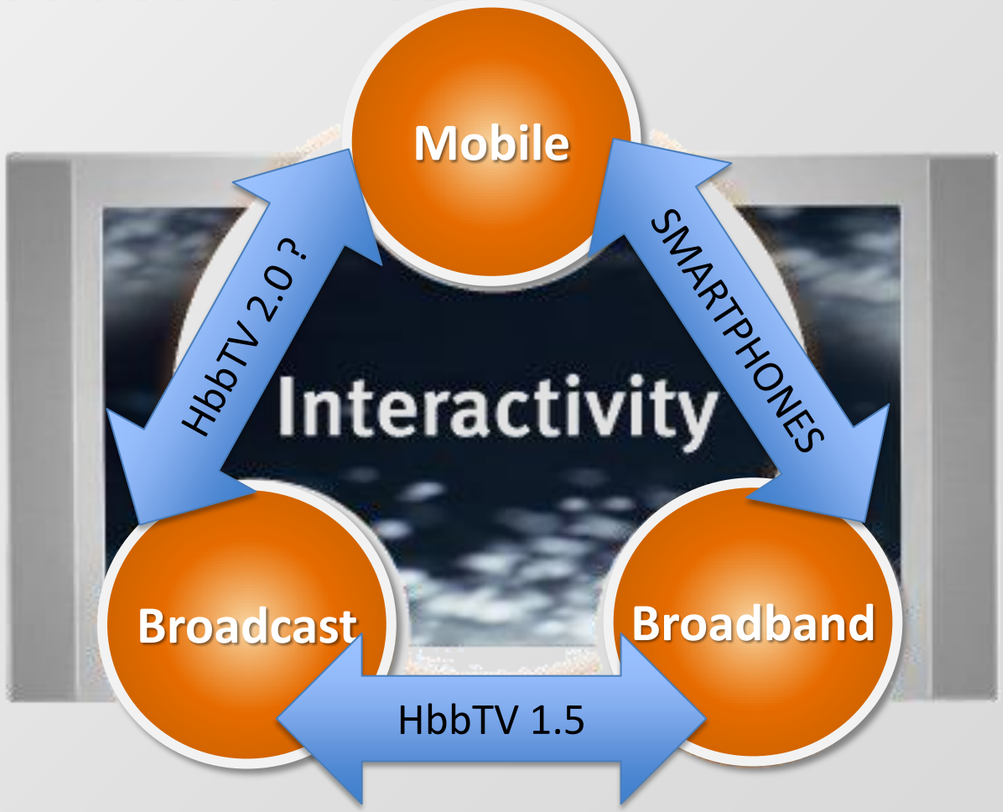
Real Life Case Examples

Mika Kanerva, Sofia Digital Ltd.

About Sofia Digital Ltd.

- Sofia Digital - 15 years history of value-added services for TV
  - DVB-MHP (in the past)
  - Mobile TV (in the past)
  - Current: DVB-Products:
    EPG systems, PSI-SI, HbbTV Inserter
  - **And HbbTV and Smart Screens Apps**

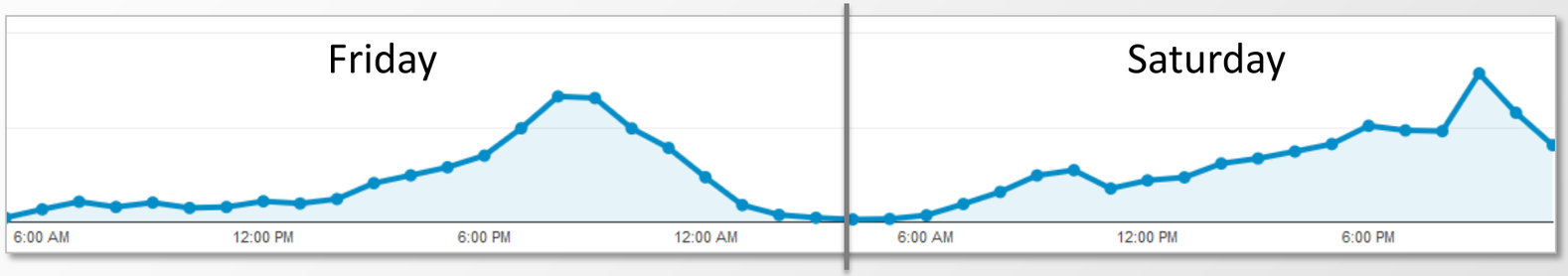
HbbTV Market activity: Finland (and Nordic), Estonia, Hungary, Turkey, Netherlands, Spain, Malaysia …

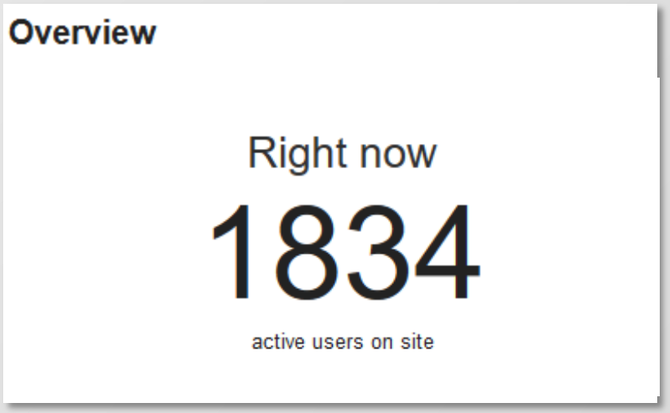


What is The Value in TV business?

- Numbers are always needed to measure it
  - How to measure…. How to get the numbers? Must make TVs to be connected !

Simple Formula: More receivers out means more potential, more business!





i.e. Google Analytics

- Do not look only number of device reach
- Most valuable are viewers who are spend more time with the services

Smart Devices viewing times: TV(HbbTV)=3 hours, PC=30 min, mobiles=6 min

Source: Australian Multi-Screen Report Q4 2014, daily average for 2014

HbbTV Core services

”Must have” services must be included with The Red Button

- **Rich TV-Guide (EPG)**
  - All Linear content in one UI
- **VOD & Catch-up (or network PVR for operator)**
  - All online video content
- **All other apps**
  - News, Weather, Sports, Social Media, etc.

Result : 100% of linear TV content + **100%** of VOD content

➢ **TV + EPG + VOD = HbbTV experience !**

Broadcasters view

HbbTV brigns OTT video models with Broadcasted TV

- Playback starts with pre-roll **- Forced ads can shown in brodcast also !**
- Every user/usage is measured **- Let's do this now also in the broadcast !**
- Personalized OSD and pop-up **- offer people more selections (to participate)**
- Personal communication **- But this is not very good for broadcast TV!**

How to do personal transactions?

- Must recognize the user !
- Use of companion devices !
- Linking online accounts with TV
- TV is NOT very personal device

IMAGE: Sofia Backstage HbbTV Starter Kit
Easy way to develop and showcase HbbTV services in real TV

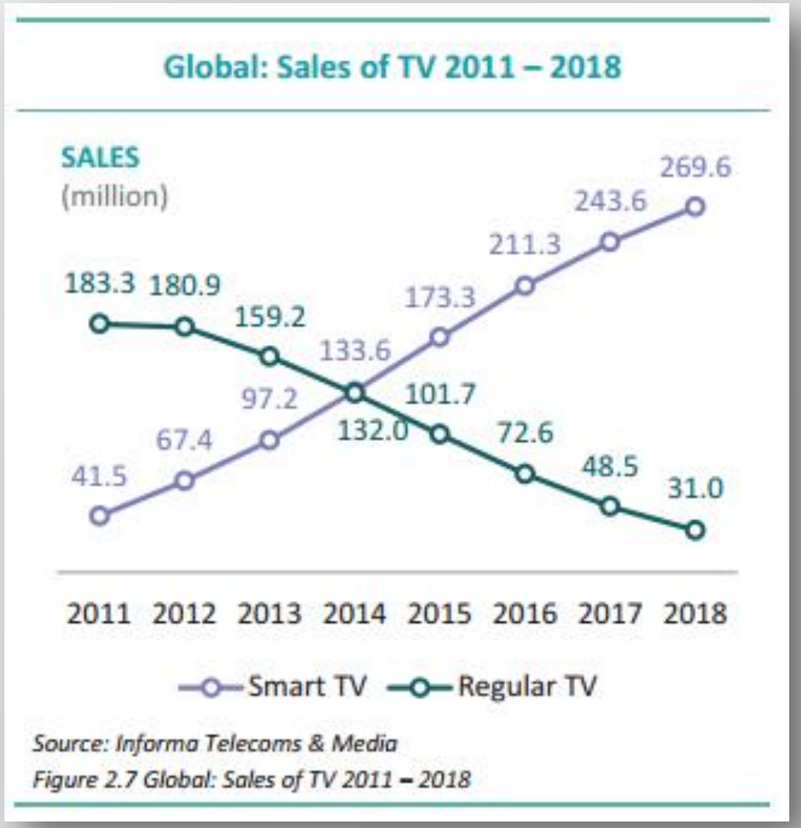
Markets are still developing

One Scenario for launching HbbTV technology

1. Just monitor the audience (i.e. hidden app)
   - How many ”lost opportunities”
2. Waith while receiver base growing organically
   - New SmartTVs are purchased every day
3. **Critical mass for HbbTV comes sooner or later!**

For 2015 some estimates (how many units delivered):

- 10 Mil Connected-TV devices (Chromecast, etc.)
- 140 Mil Connectable STB
- 170 Mil SmartTVs (> 50% of all TV) – going up
- 1500 Mil Smartphones

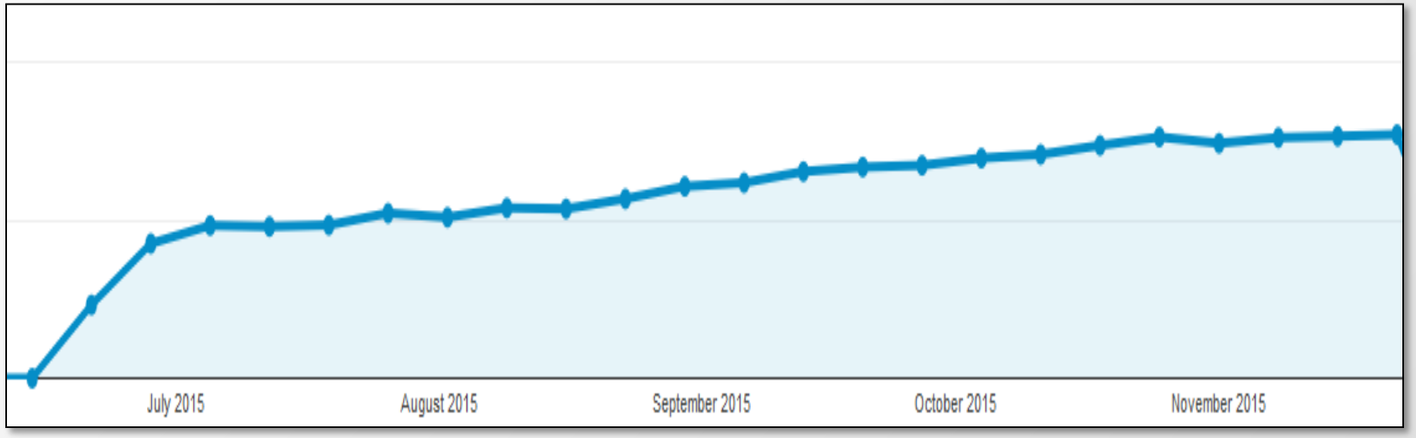


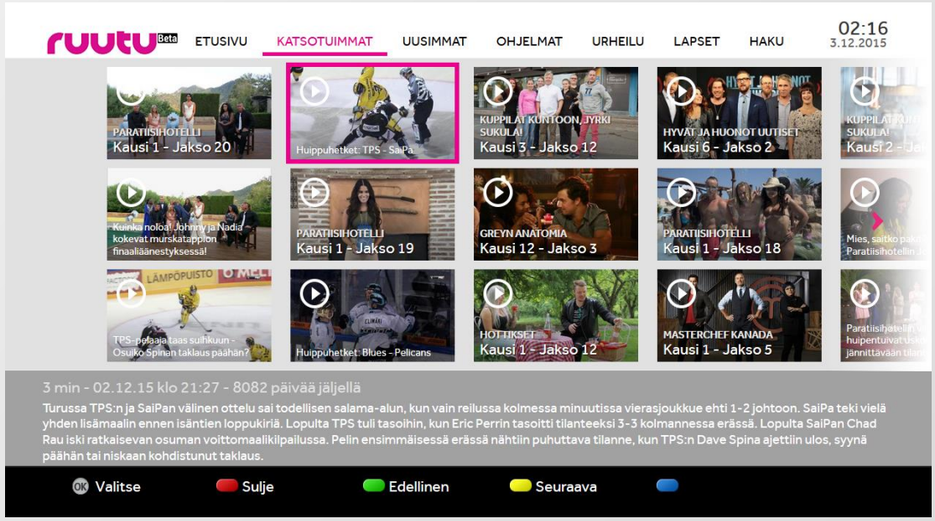
About the deployments

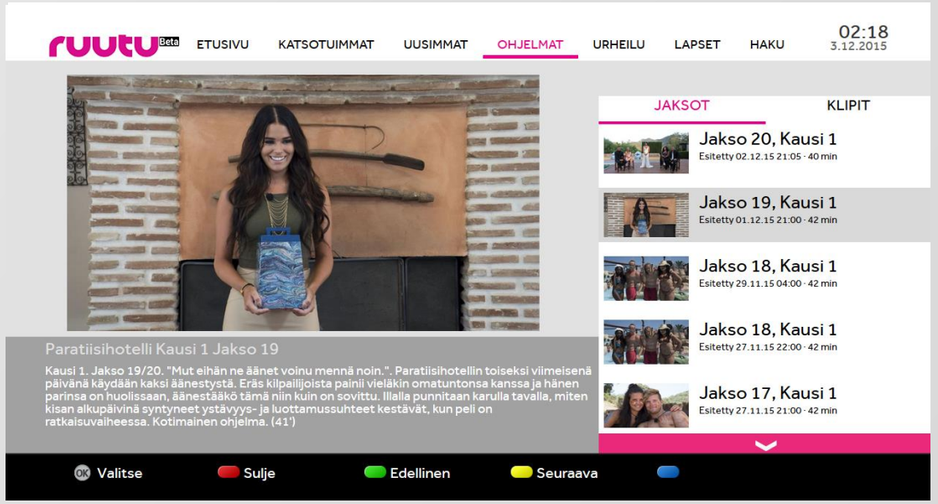
Case Ruutu: Sanoma (Nelonen Media) – Finland

Technical requirement, MPEG-DASH support working fluently in HbbTV 1.5 receivers (and in back-end)

- Ruutu HbbTV service reach all major smart TVs (except one)
- About 40.000 HbbTV viewers in 6 month
- Most important to see how fast the user base grow at launch almost instantly 30.000 users after launch
- Red-Button as “restart this program” using OTT content



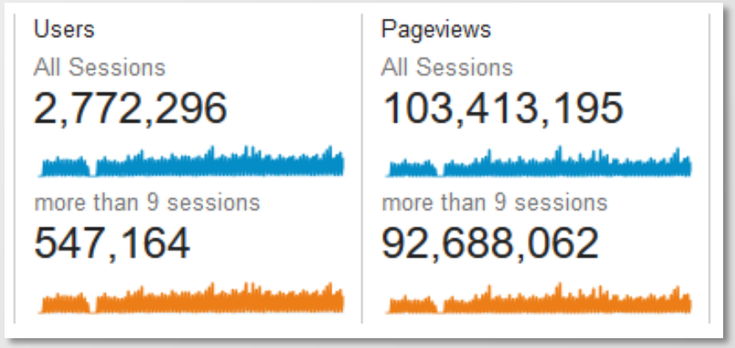




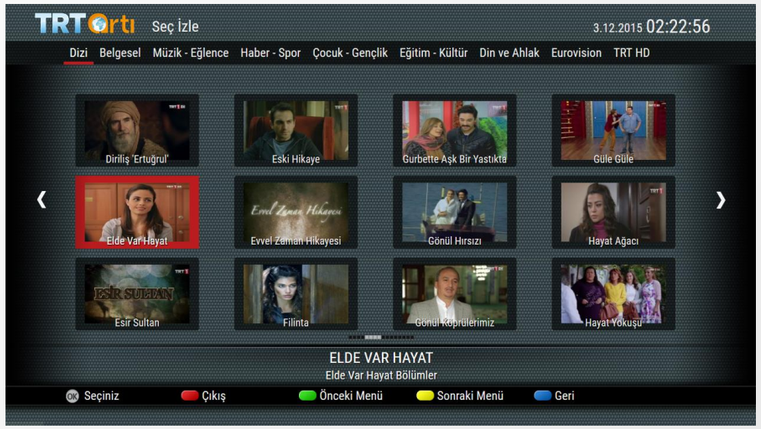
About the deployments

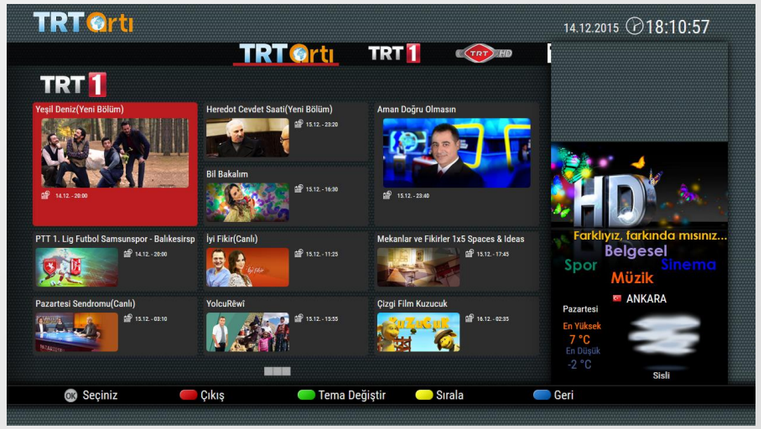
Just launch it:The Red Button does marketing itself

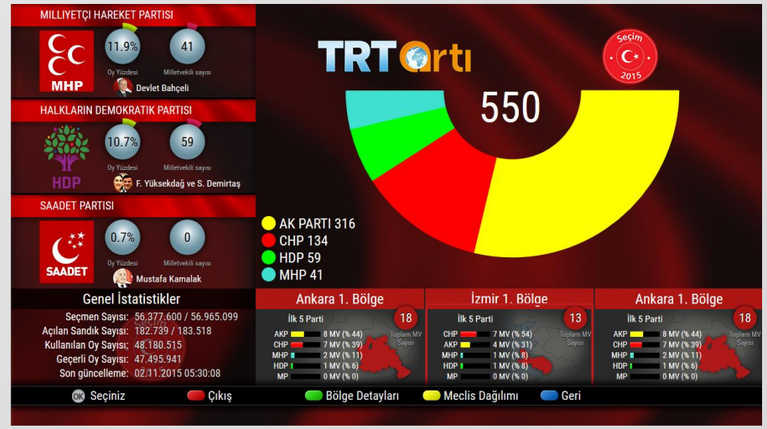
CASE TRT-Turkey, TRT ARTI : >500.000 HbbTV viewers without marketing or terminal investment!



- Usage numbers in period of 3 months on right
  - * 100 Million sessions = 100 Million opportunities to monetize
  1. Most popular is Seç İzle, catch-up application, linked with Rich EPG
  2. Featured programs, with trailers of coming shows, linked with Rich EPG
  3. In parliament elections app 14.000 simultaneous viewers in HbbTV



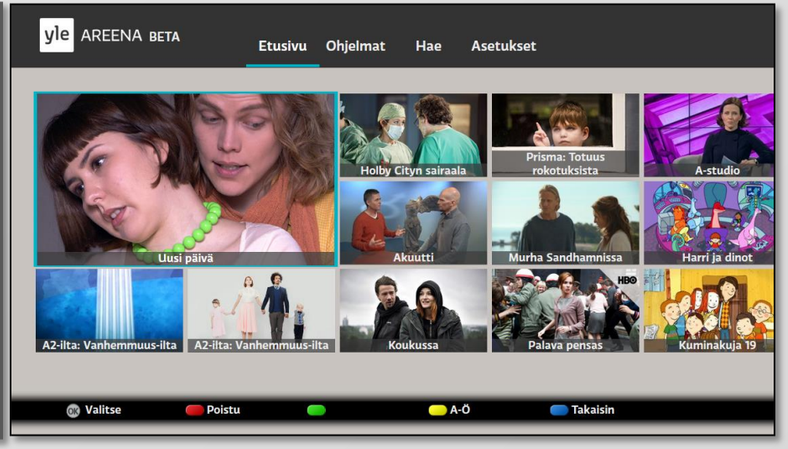




For Operators?

- DTTV Network operators are using HbbTV already in many countries
  - HbbTV is ideal for Free-to-Air terrestrial network
  - HbbTV brings DTTV operators portfolio **unlimited number of TV services**
    - Niche channels and Pay-TV thru OTT with MPEG-DASH live streaming
  - Network competitiveness against Cable, Satellite or IPTV
  - Operator's HbbTV portal could be their own "AppStore" what local markets can control

Examples below: Levira (Estonia) & Digita (Finland) offer local catch-up TV to DTTV houses



Consumers angle

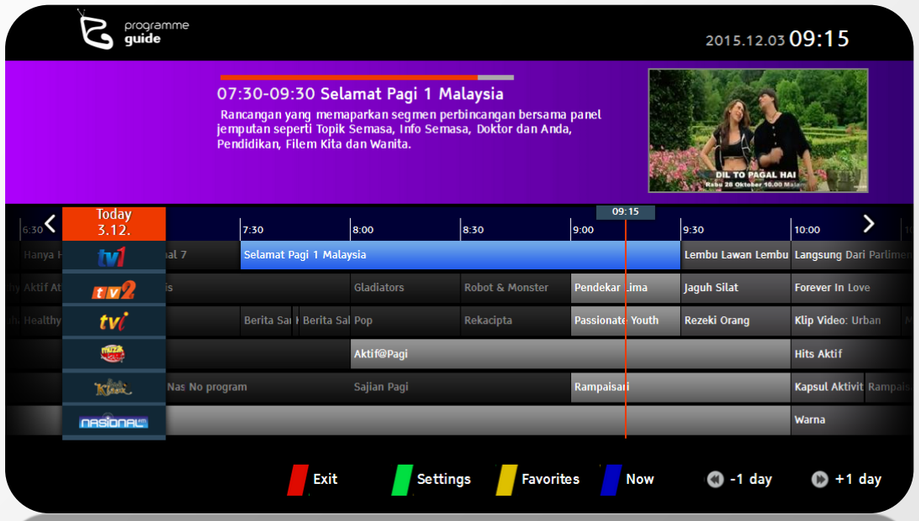
- More TV content easily available in big screen
- No need to connect various external boxes to the TV
  …But sometimes need to update the TV set…
  - Then how to know what models are compatible with services?
    - Confusion of technologies must be avoided: DRM, HbbTV 1.5, 2.0, Live DASH, PlayReady, Marlin, HTML5, etc.
  - **One solution - In Finland “Smart HD” logo launched in 2015**.

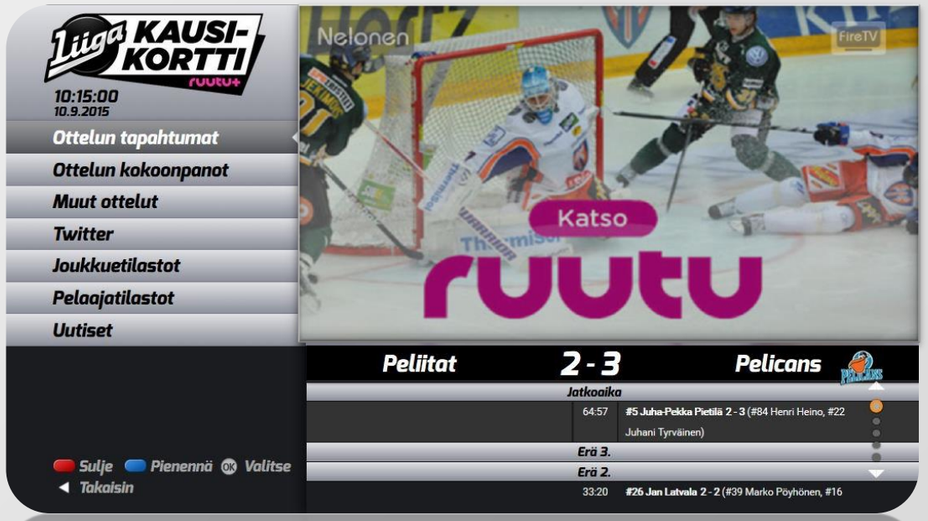
    Target to collect all FTA catch-up services for all certified DVB-T2 HbbTV 1.5 receivers. Compatible with LIVE DASH with DRM.

HbbTV the only platform where consumer have easy access to premium online video without install any new applications into device?

Thank you !

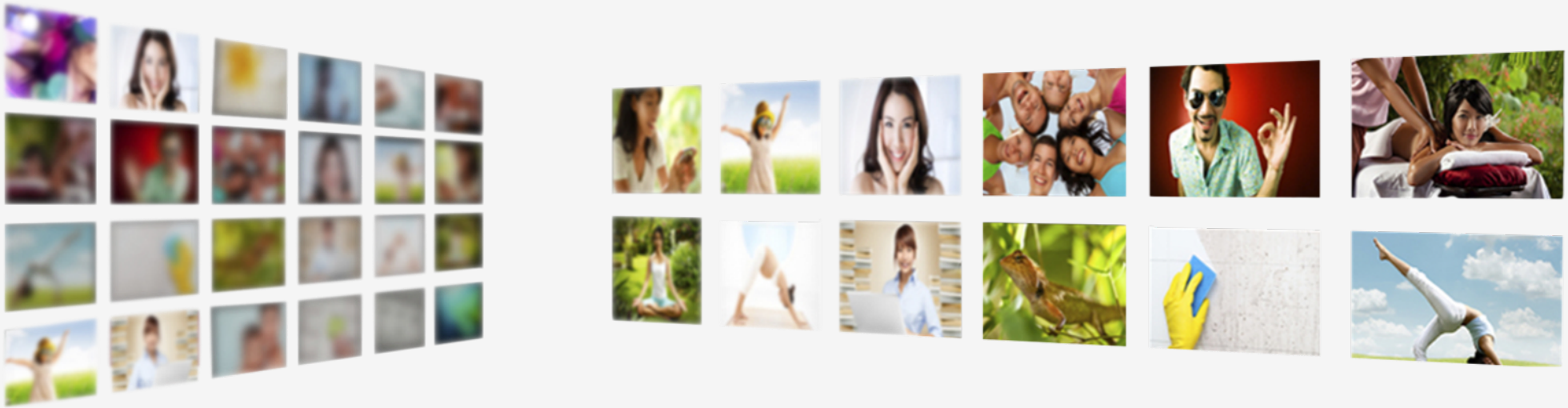
Mika Kanerva
COO, Sofia Digital Ltd.
mika.kanerva@sofiadigital.com
www.sofiadigital.com





Sofia Digital latest apps in 2015: New style EPG and Sports app with real-time data and twitter integration

SMARTCLIP ADDRESSABLE TV



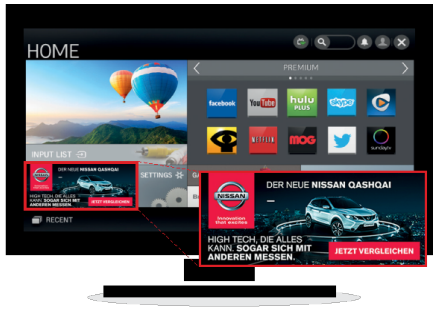
HBBTV IN THE CONTEXT OF TV ADVERTISING
LONDON, 8th of DEC

smartclip

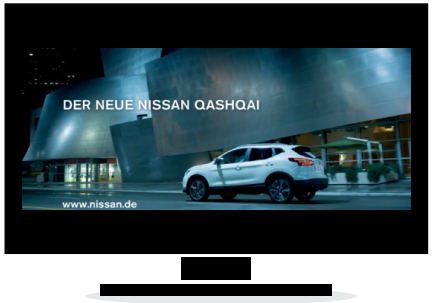
smartclip

SMARTCLIP IS ADDRESSING THE „BIG SCREEN" SINCE ITS EARLY DAYS. ADDRESSABLE TV INTO BROADCAST IS CLOSING THE LAST GAP

ON SMART TV
PORTALS



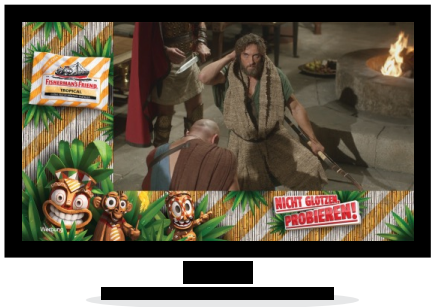
APPS ON
SMART TV'S, SET-TOB BOXES, GAMING CONSOLES



APPS IN BROADCAST VIA
RED BUTTON

HbbTV

SERVING IP DELIVERED ADS INTO
LINEAR BROADCAST



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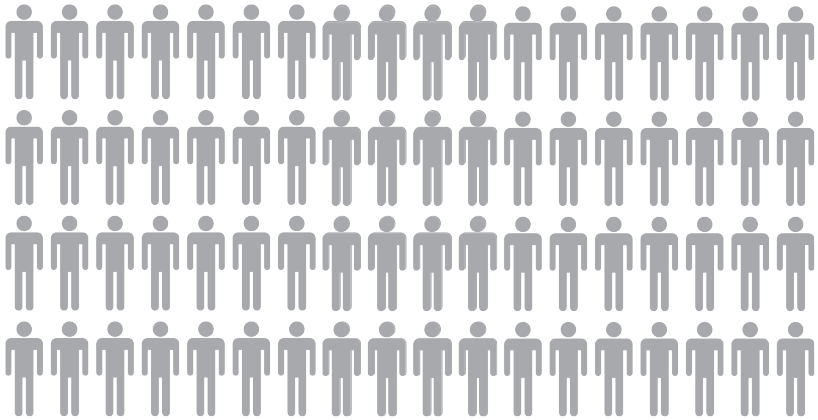
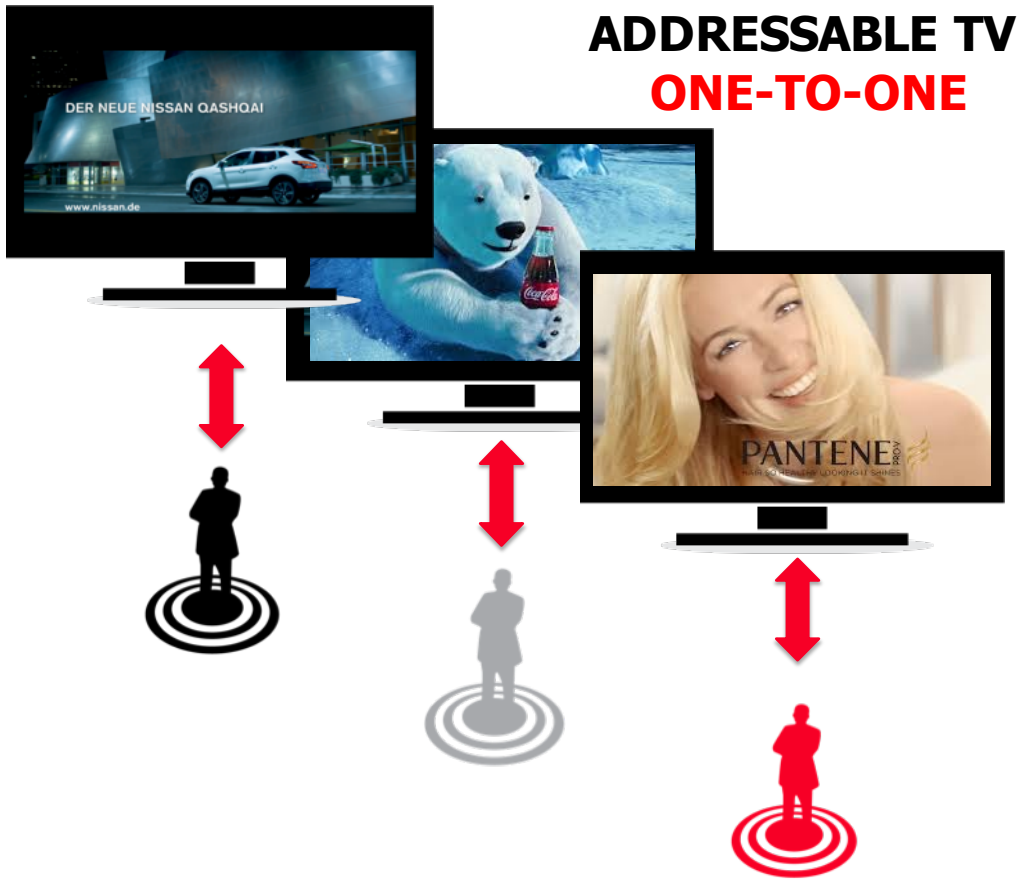
HBBTV AS ENABLER FOR ADDRESSABLE TV - DELIVER A SPECIFIC TV COMMERCIAL TO AN INDIVIDUAL DEVICE

TRADITIONAL TV
ONE-TO-MANY

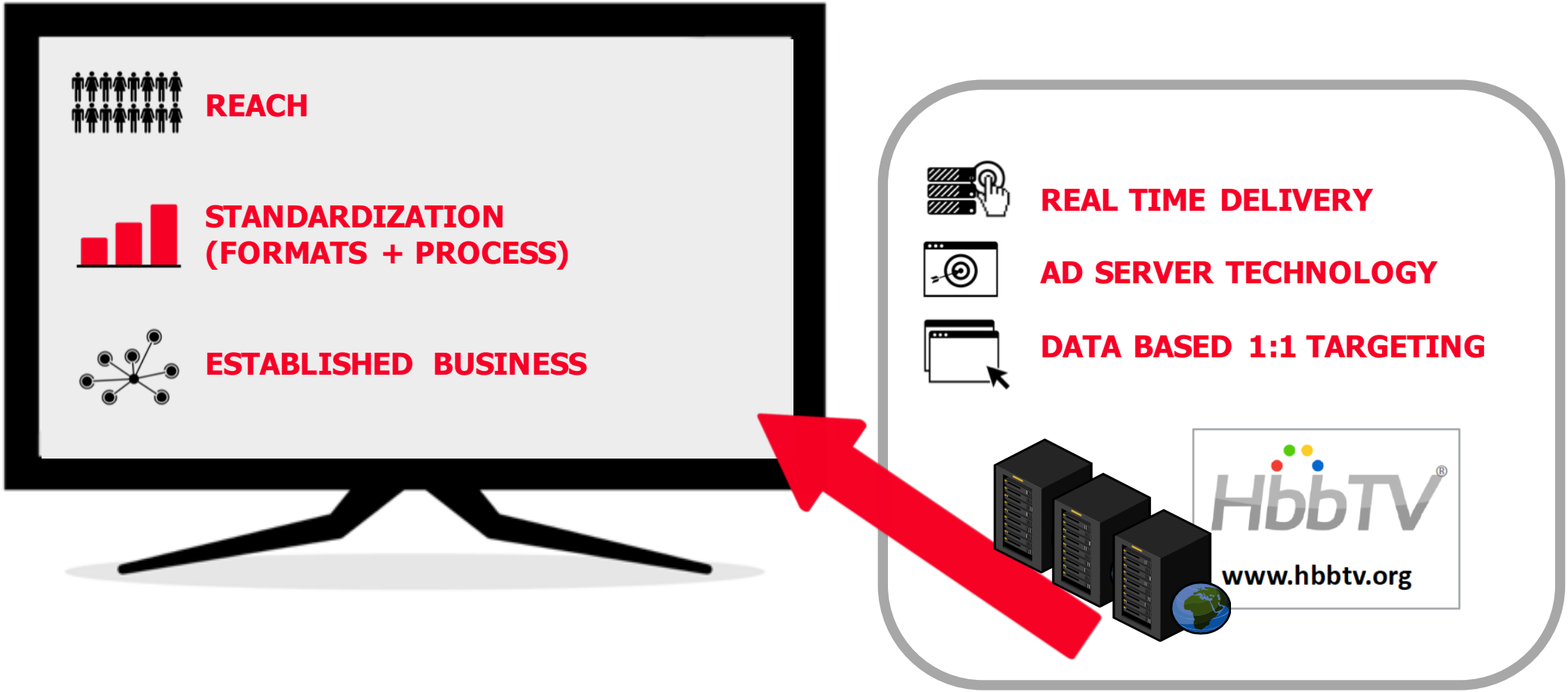


ADDRESSABLE TV
ONE-TO-ONE



smartclip

ADDRESSABLE TV ENABLES REAL TIME AD DELIVERY AND BY THIS „CONNECTING THE DOTS" BETWEEN TV AND DIGITA



smartclip

ADDRESSABLE TV – A COMPETETIVE GAME ABOUT AD BUDGETS WITH BROADCASTERS GETTING PRESSURE FROM DIFFERENT AREAS

OPERATING SYSTEM

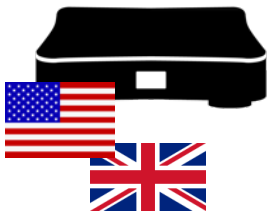
- STILL LACKING RELEVANT FOOTPRINT
- DO NOT HAVE ACCESS TO BROADCASTER AIR TIME

OEMs

ACR (AUTOMATIC CONTENT RECOGNITION)

- FRAGMENTED MARKET

OPERATORS



- PROPR. TECHNOLOGY
- OWN STB ECOYSYSTEM

BROADCASTER

- STANDARD TECHNOLOGY
- BROADCASTER DRIVEN

ADVERTISING TV + DIGITAL

smartclip

HBBTV AS EUROPEAN WIDE AND COMPREHENSIVE STANDARD ALLOWS SCLABLE ADDRESSABLE TV ADVERTISING

BROADCAST

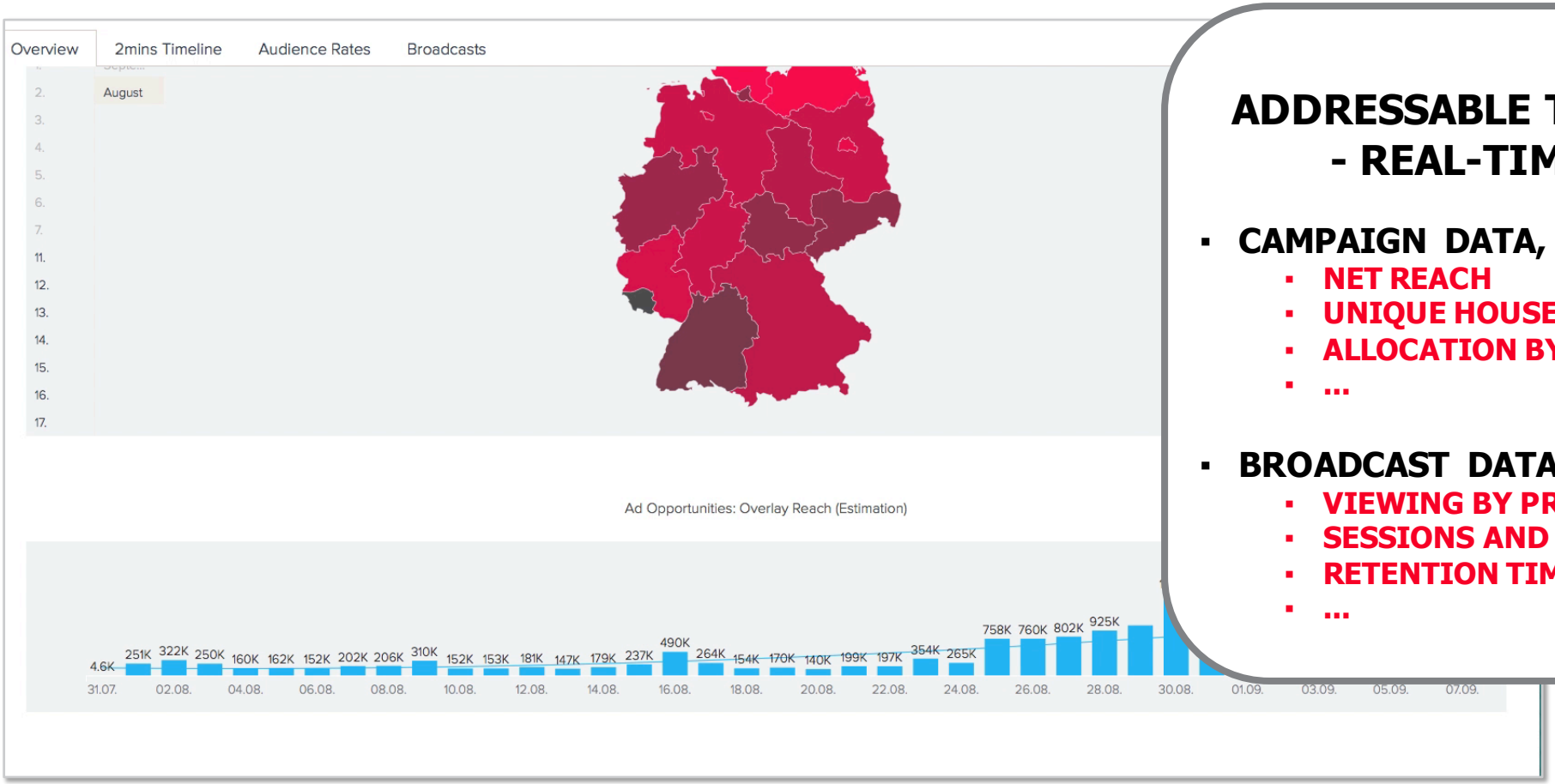
DVB-S
DVB-T
DVB-C

smartclip
Application hosting
Ad serving + Tracking

Mercedes-Benz
PORSCHE
EVOSPEED
PUMA
TOTAL
22/09/15

smartclip

ANALYTICS FOR BROADCASTERS AND ADVERTISERS

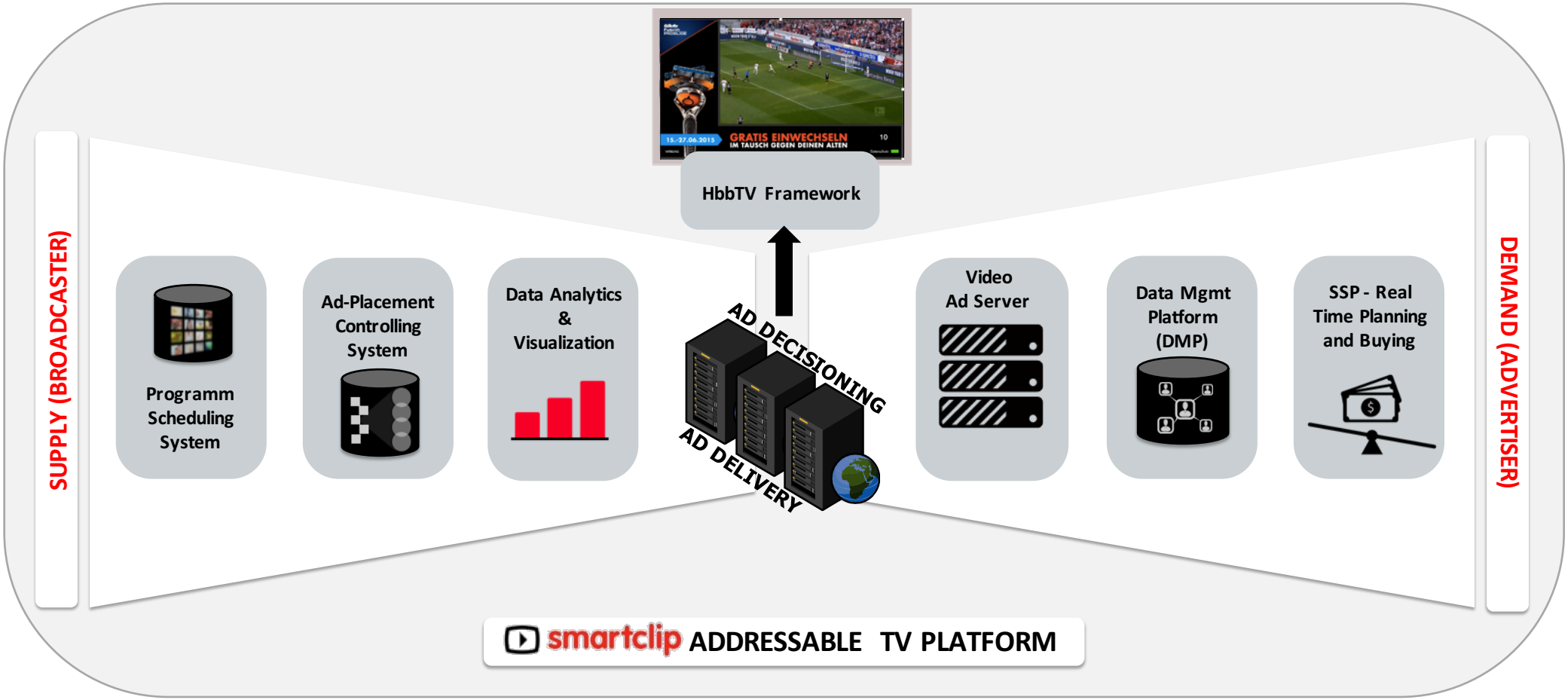


ADDRESSABLE TV DATA
- REAL-TIME -

- **CAMPAIGN DATA, e.g.**
  - **NET REACH**
  - **UNIQUE HOUSEHOLDS**
  - **ALLOCATION BY REGION**
  - **...**
- **BROADCAST DATA, e.g.**
  - **VIEWING BY PROGRAMME**
  - **SESSIONS AND UNIQUES**
  - **RETENTION TIME**
  - **...**

smartclip

ADDR. TV ADVERTISING REQUIRES A RESILIENT AND SCALABLE PLATFORM FOR THE WHOLE ADVERTISING VALUE CHAIN



smartclip

NUMEROUS CAMPAIGNS OF GLOBAL BRANDS HAVE BEEN REALIZED VIA THE SMARTCLIP ADDRESSABLE TV PLATFORM IN 2015

TARGETING ON TV

Procter launches first campaign via Addressable TV

Procter & Gamble is serious: The world's largest advertiser, who wants to boot its digital content significantly, starts in Germany a first campaign via Addressable TV. The Group advertises on Sport 1 for the brand Gillette...

HORIZONT 16/06/2015

P&G

ŠKODA

CFP BRANDS

gsk GlaxoSmithKline

smartclip

THANK YOU, AND STAY TUNED!

SEBASTIAN BUSSE
DIRECTOR ADDRESSABLE TV
BUSSE@SMARTCLIP.COM

HbbTV Value Creation

Pawel Tutka
HbbTV expert, hybra.tv

twitter: @tutka

hybra.tv

HbbTV in Poland

HbbTV apps available on TV channels:

TVP

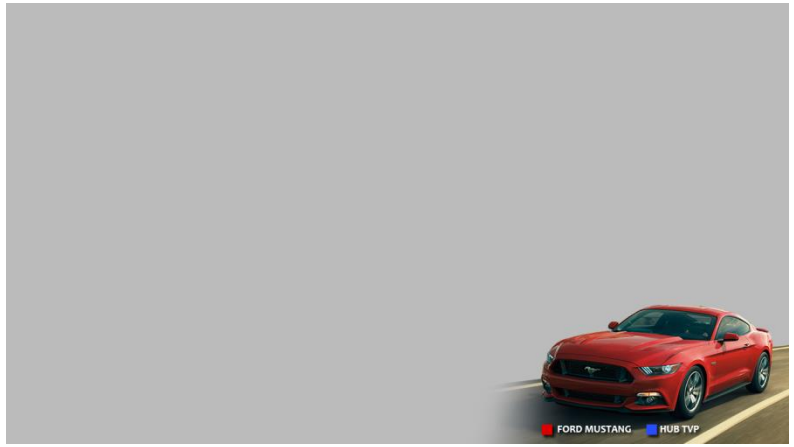
ZPR Media Group:

stopklatka tv

HbbTV tests / HbbTV signaling available on TV channels in DVB-T:

HbbTV interactive advertising

Ford Mustang



HbbTV teaser

Branded video player with countdown time to start ordering via website for new Ford Mustang in Poland

Product photo gallery

QR code used in this HbbTV app

Product photo gallery

Video player in Full screen mode

HbbTV app developed by hybra.tv

HbbTV interactive advertising

Saturn

HbbTV teaser

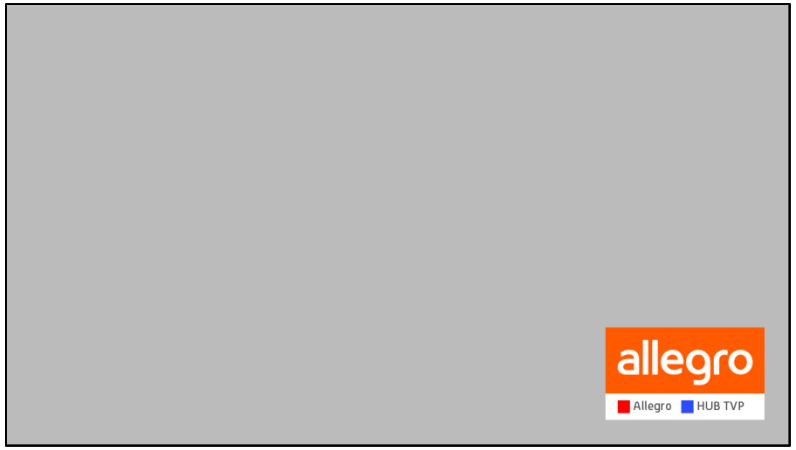
Branded video player with 30 sec. commercial TV spot

Video player in full Screen mode

HbbTV interactive advertising

Allegro

HbbTV teaser (first scene)



HbbTV teaser (second scene)

Allegro – Interactive advertising menu

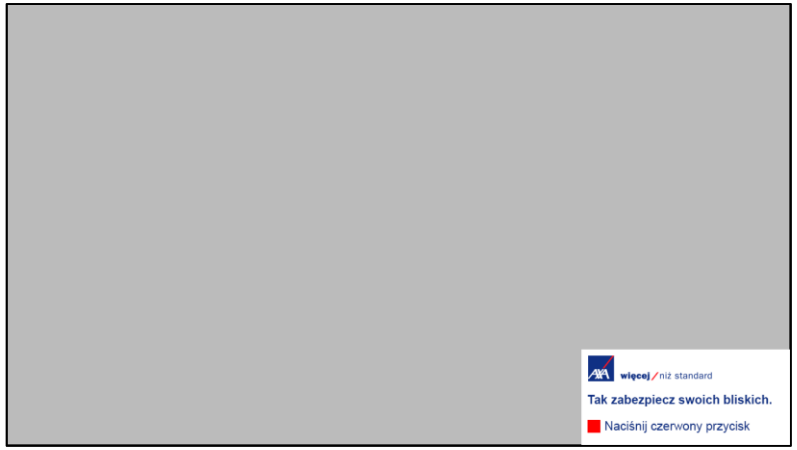
Allegro – Interactive advertising menu

Allegro – Product details

Allegro – Product details

HbbTV interactive advertising

AXA



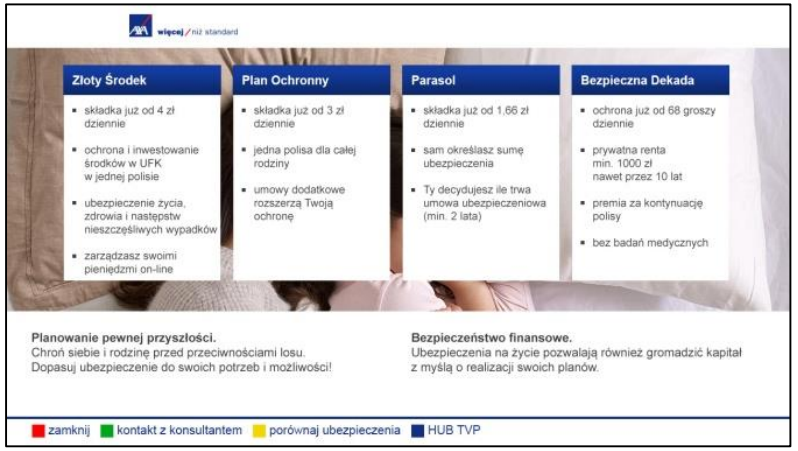
HbbTV teaser

Interactive advertising menu

Interactive advertising menu with additional information about using green button in this app.

Contact form to leave a mobile phone number

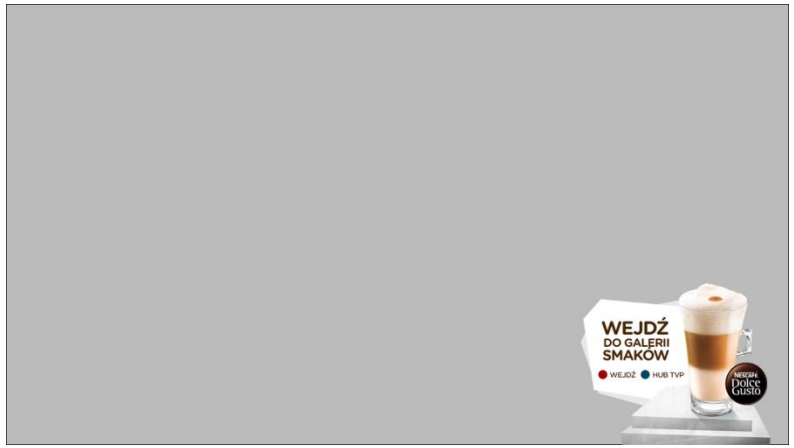
Contact form to leave a mobile phone number



Comparison of insurance offers

HbbTV interactive advertising

Nescafe Dolce Gusto (1)



HbbTV teaser

Interactive advertising menu

Interactive advertising menu

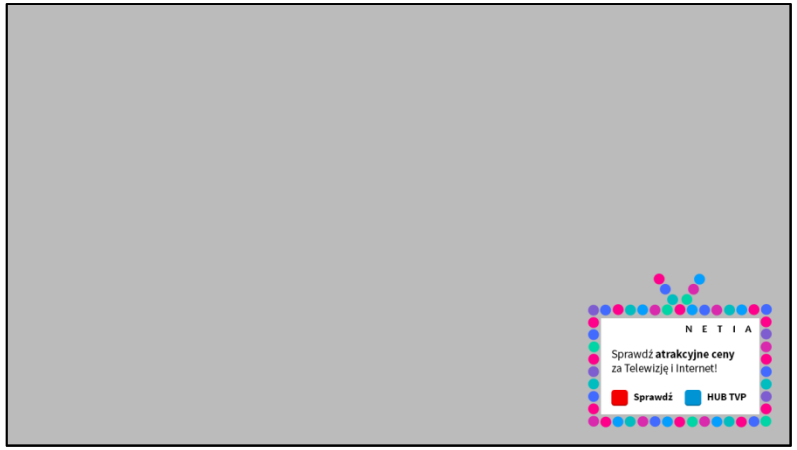
Interactive advertising menu (select cafe)

Product details with a movie

Product details with a movie

HbbTV interactive advertising

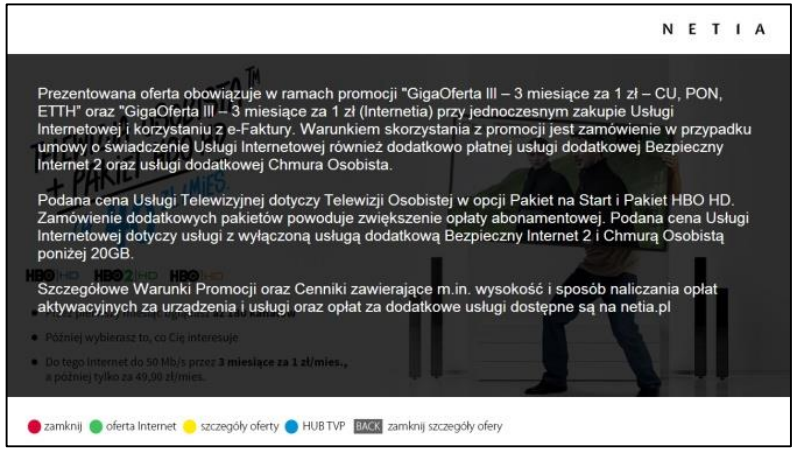
Netia



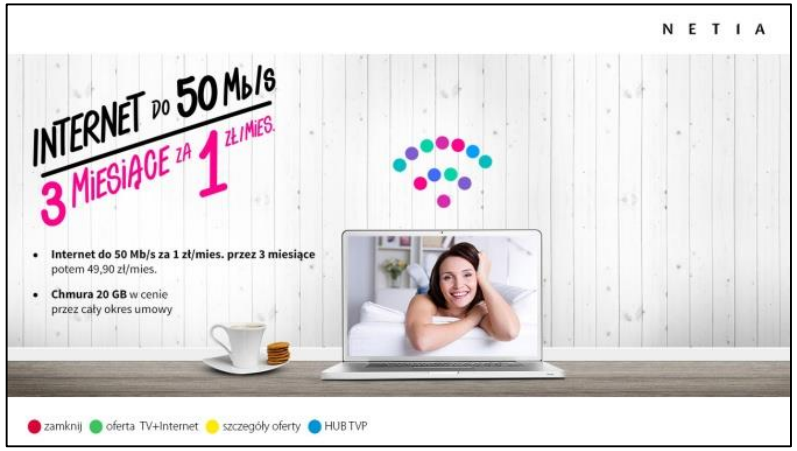
HbbTV teaser

Interactive advertising menu

Interactive advertising menu



Advertising promotion regulations

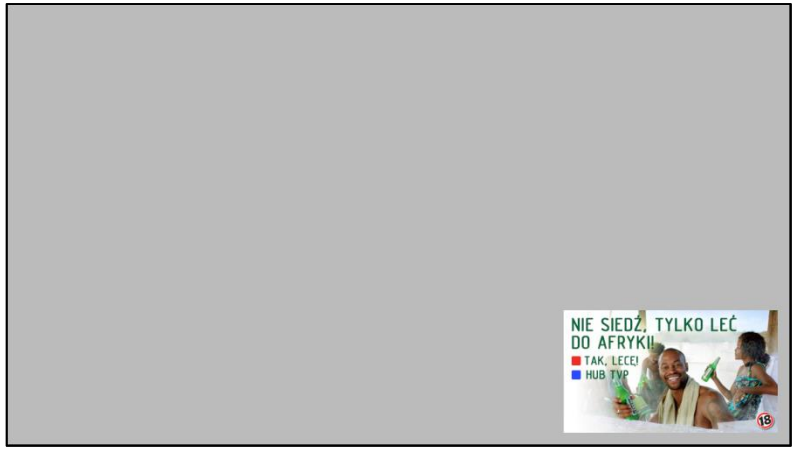


Interactive advertising menu

Contact form to leave a mobile phone number

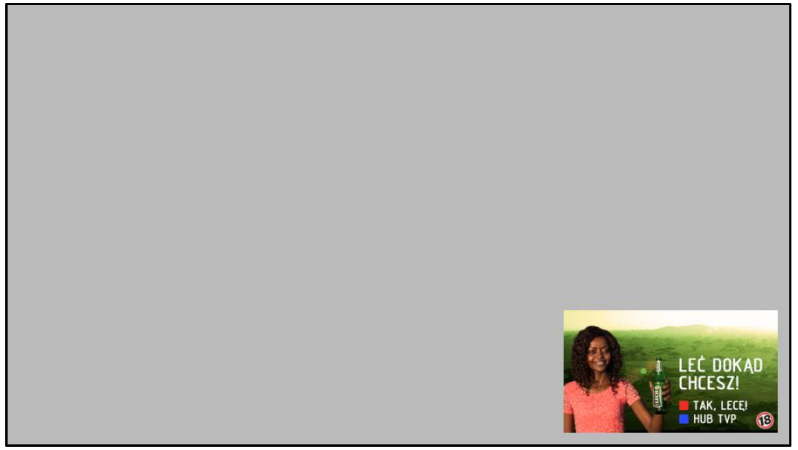
HbbTV interactive advertising

Lech Premium



HbbTV teaser 1 / 6

HbbTV teaser 2 / 6



HbbTV teaser 3 / 6

Interactive advertising video player

Interactive advertising video player

Interactive advertising video player

HbbTV interactive advertising

3M Command

HbbTV teaser

Interactive menu

Dedicated video player

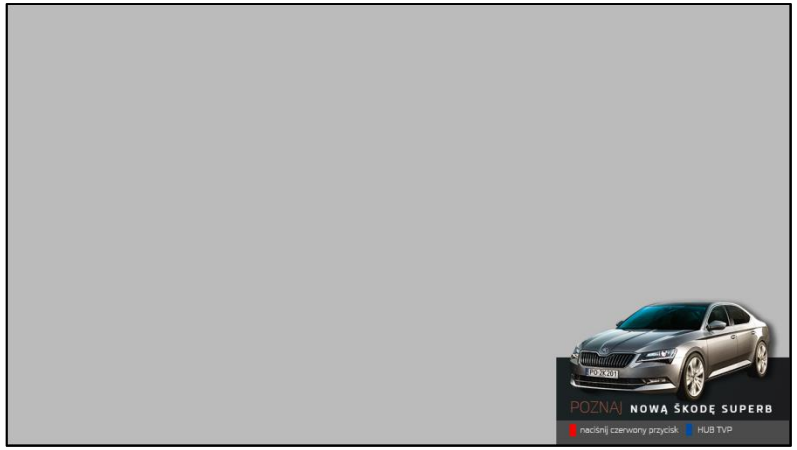
Tips for using 3M Command strips

Information about in stores promotion

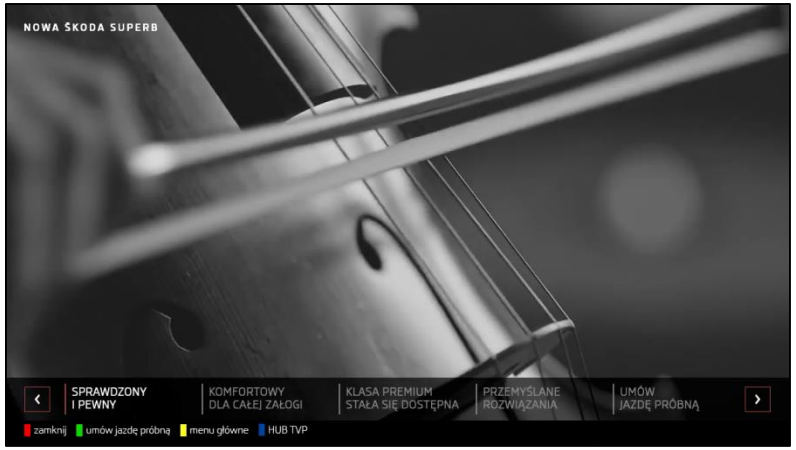
Tips for using 3M Command strips

HbbTV interactive advertising

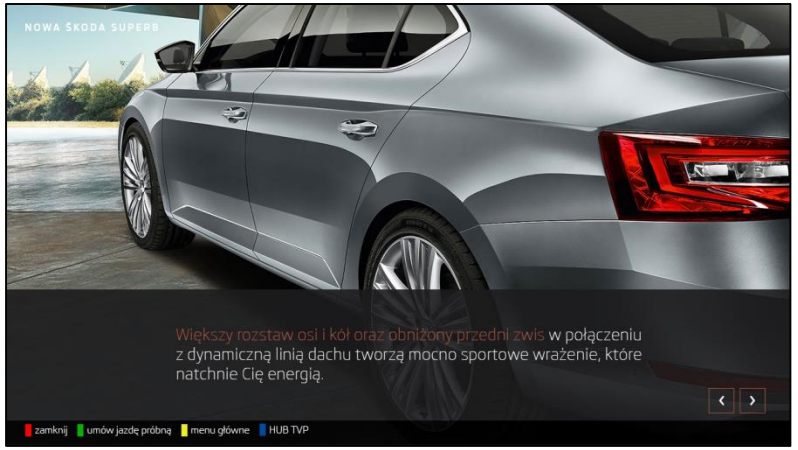
Skoda Superb



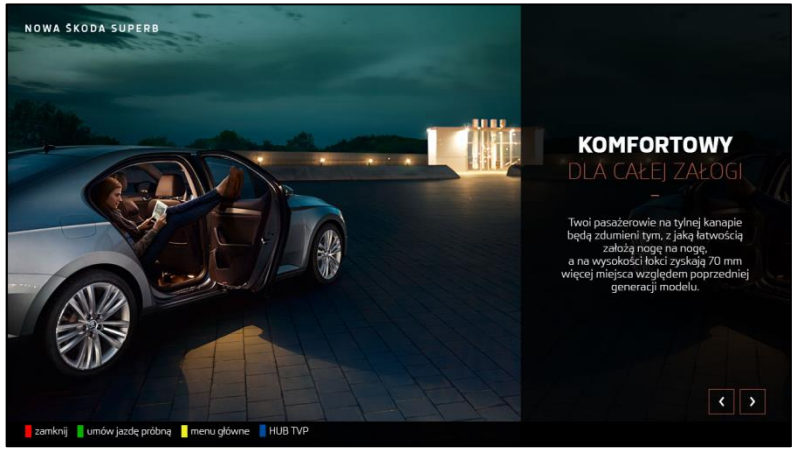
HbbTV teaser



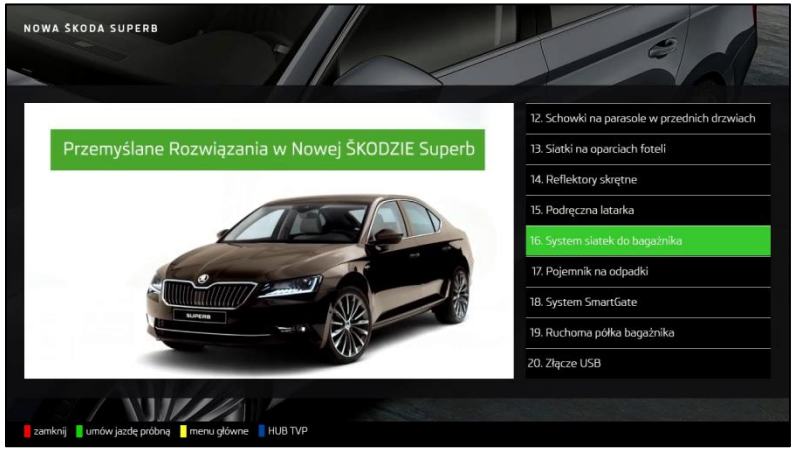
Interactive menu with video background



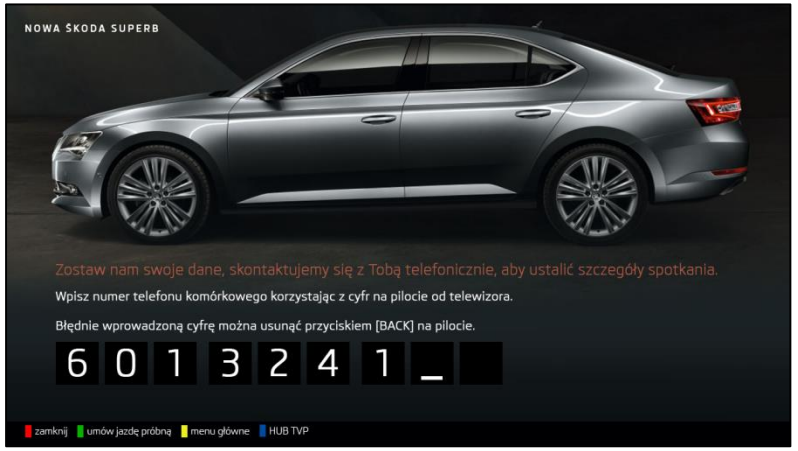
More details about car



More details about car



Interactive video player with short movies



Contact form for mobile phone number

HbbTV interactive advertising

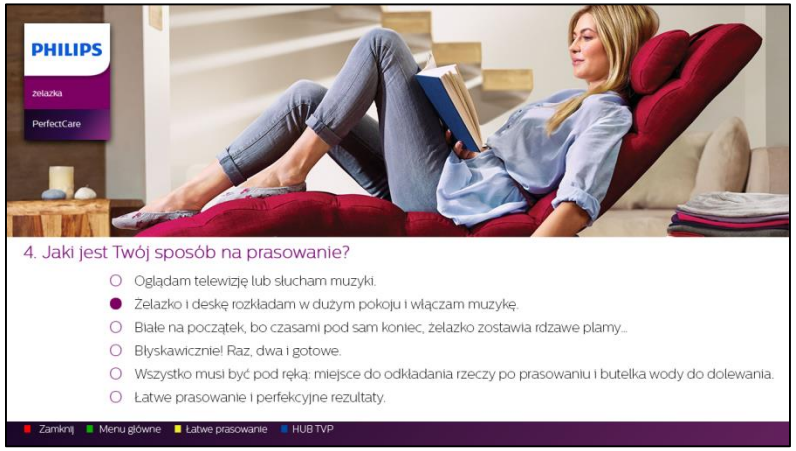
Philips PerfectCare

Philips PerfectCare – HbbTV teaser

Philips PerfectCare – Interactive menu

Philips PerfectCare – Tips for ironing

Philips PerfectCare – Second menu to select Philips product



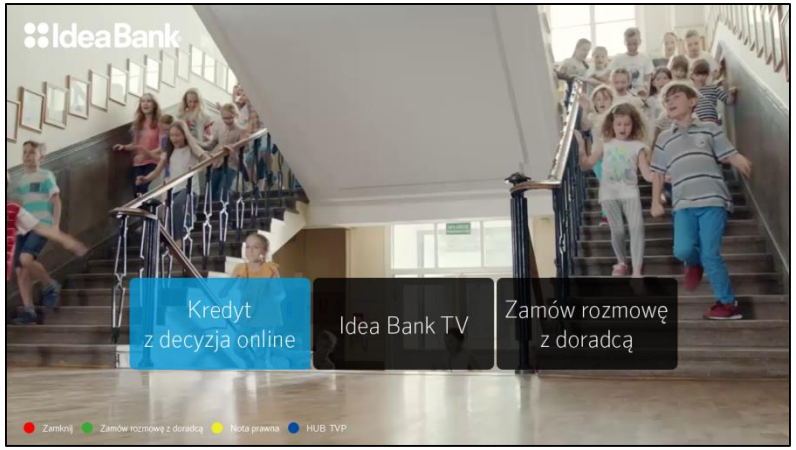
Philips PerfectCare – Interactive Quiz do select best iron

Philips PerfectCare – Information about in stores promotion

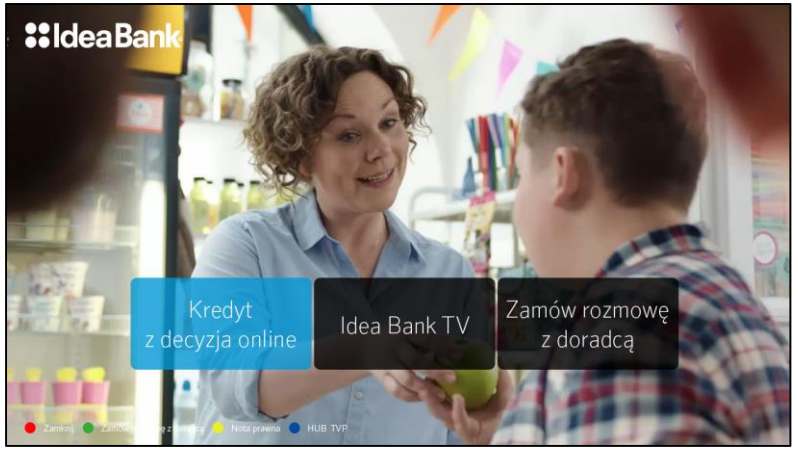
HbbTV interactive advertising

Idea Bank

HbbTV teaser

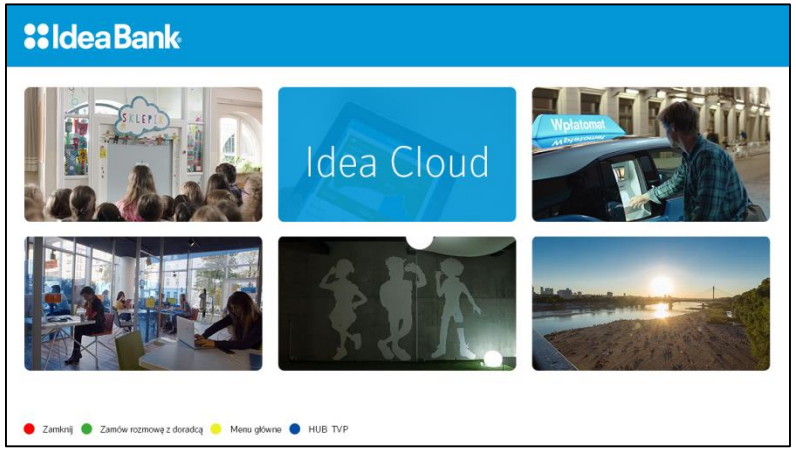


Interactive menu with video background



Interactive menu with video background

More information about the promoted credit for companies



Idea Bank TV – micro VOD zone

Contact form for mobile phone number

HbbTV interactive advertising

Orange

HbbTV teaser

Introduction with countdown of days until Christmas

Interactive menu with products carousel

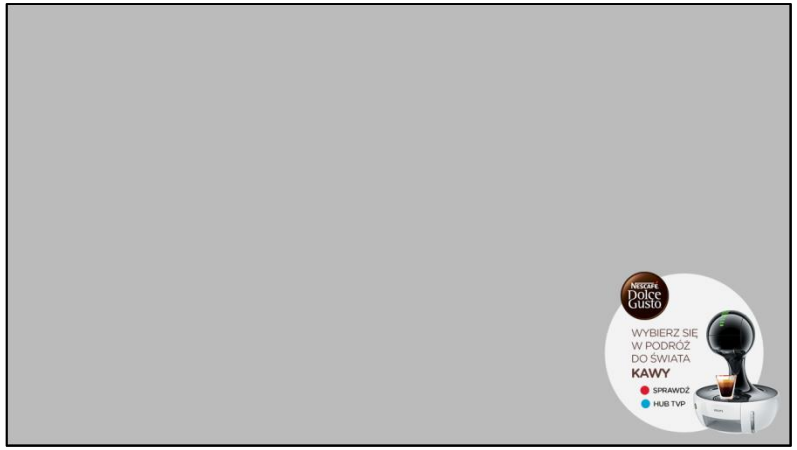
More information about the selected product

Branded video player

Disclaimer

HbbTV interactive advertising

Nescafe Dolce Gusto (2)



HbbTV teaser

Interactive main menu

More information about the coffee and promotion video on demand

Second interactive menu

Additional information about the coffee machine and promotion video on demand

Information about in-store promotions

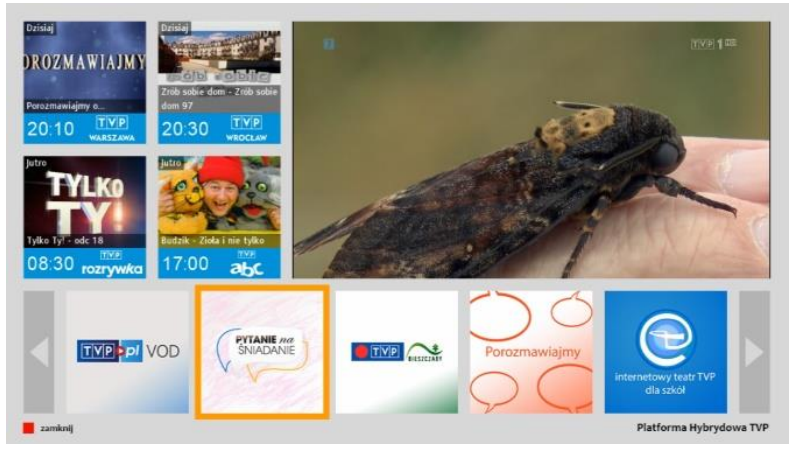
TV portal

Platforma hybrydowa TVP

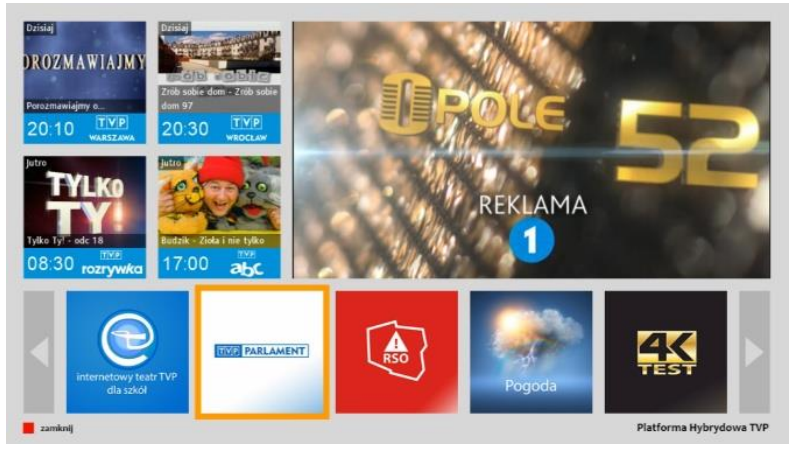
HbbTV app teaser

HUB TVP 2015

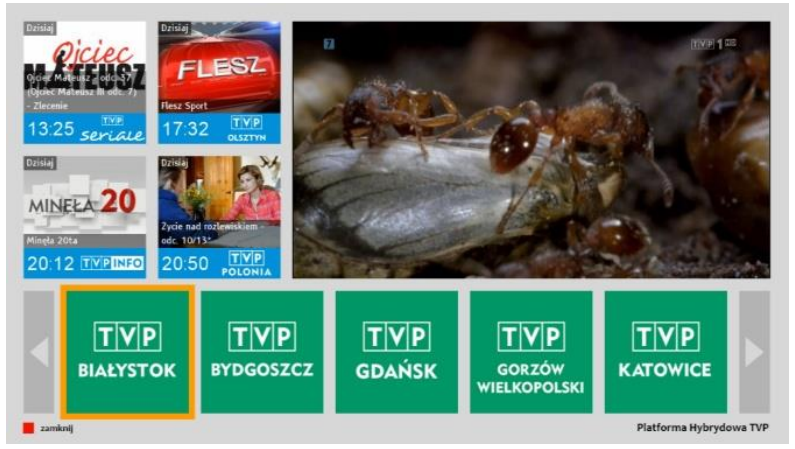
HUB TVP 2015



HUB TVP 2015



HUB TVP 2015



HUB TVP 2015

Recommendation system

TVP

TV recommendations

TV recommendations

TV recommendations

TV recommendations

TV recommendations

TV recommendations

HbbTV app for sport events

Brasil 2014

Brasil 2014 – HbbTV teaser

Brasil 2014 – video menu

Brasil 2014

Brasil 2014 – live statistics

Brasil 2014

Brasil 2014

Virtual TV channels in HbbTV

Live TV streaming via HbTV in TV

Virtual TV channel: 25 Years of Freedom

Regional TVP – Following the footprints of John Paul II

Regional TVP – Following the footprints of John Paul II

Online TVP Theatre for Schools – HbbTV teaser

Online TVP Theatre for Schools – menu + live streaming

Online TVP Theatre for Schools – micro VOD

Virtual TV channel in HbbTV

Chopin competition 2015

HbbTV teaser

Virtual TV channel (streaming + micro EPG)

Video on demand from this event

Video on demand from this event

Video on demand from this event

Played video in full screen mode

HbbTV app developed by hybra.tv

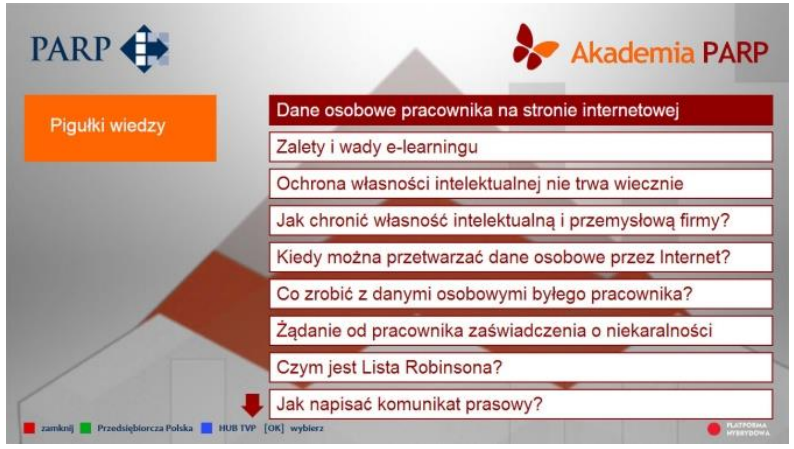
Micro VOD app

PARP

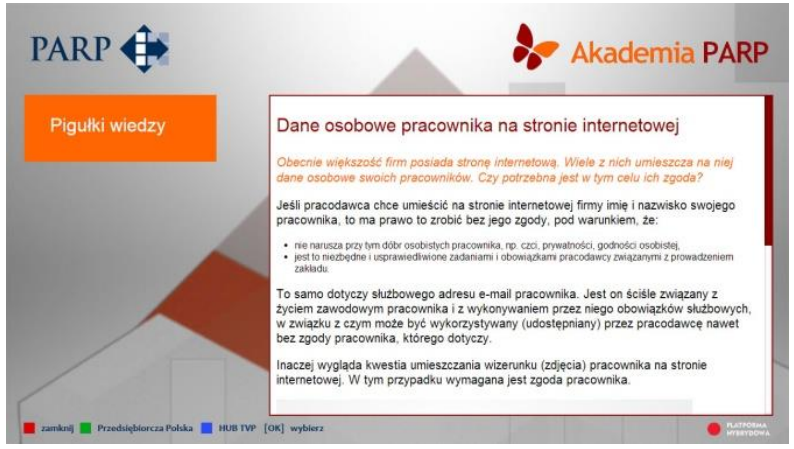
HbbTV teaser

Micro VOD

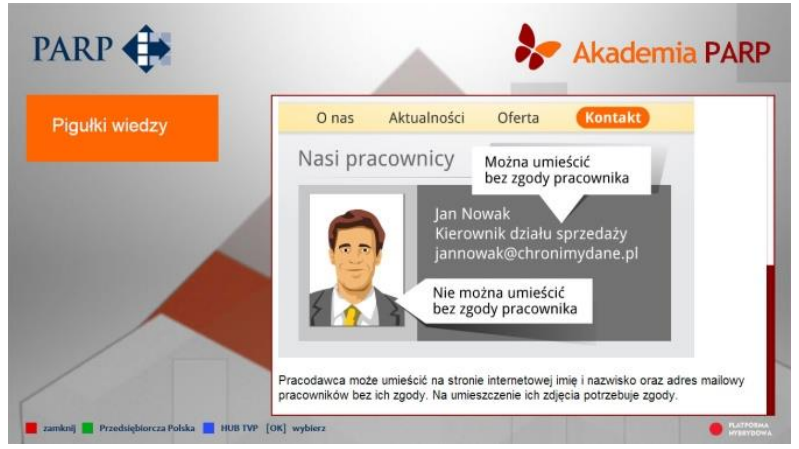
Micro VOD



pills of knowledge



pills of knowledge



pills of knowledge

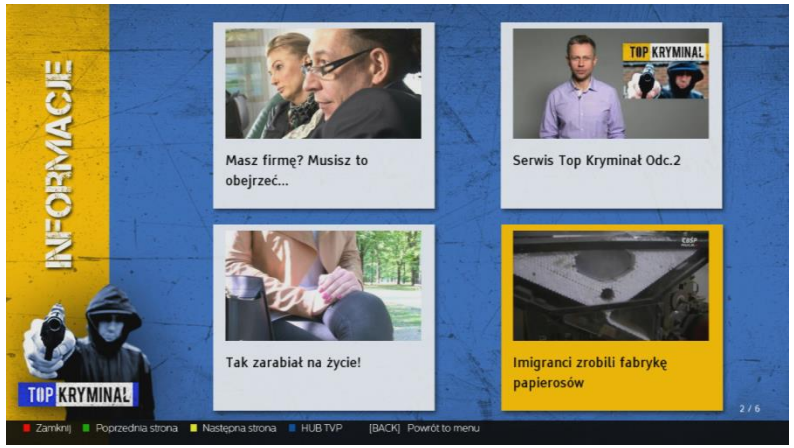
Micro VOD app

Top Crime

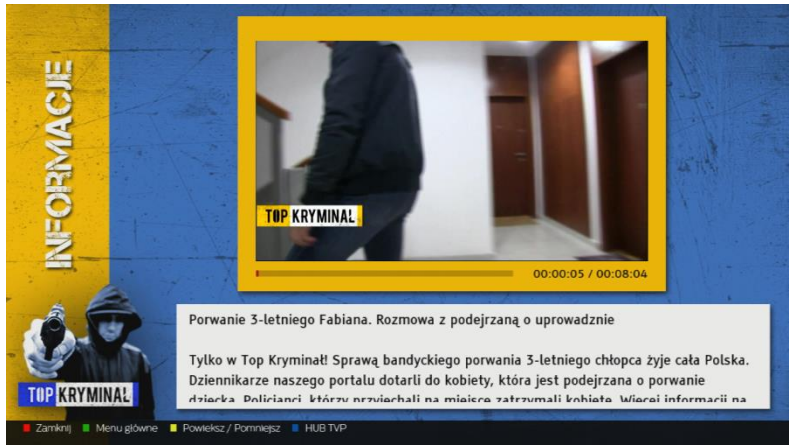
HbbTV teaser

Interactive menu

Interactive menu



Video on demand



Video on demand

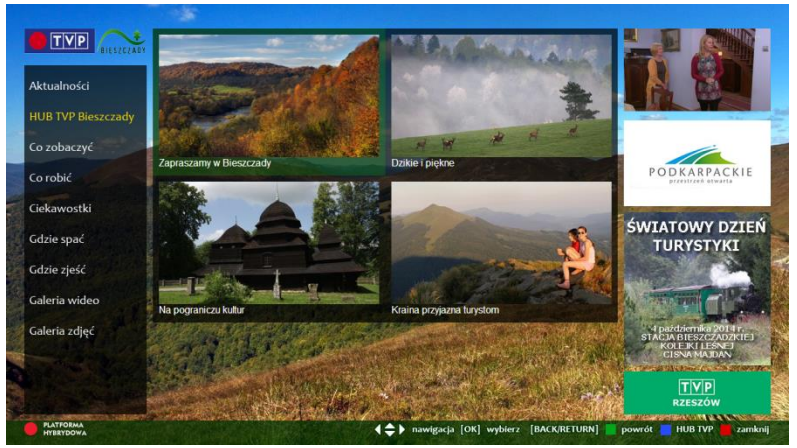
Video on demand

Tourist HbbTV app

TVP Bieszczady

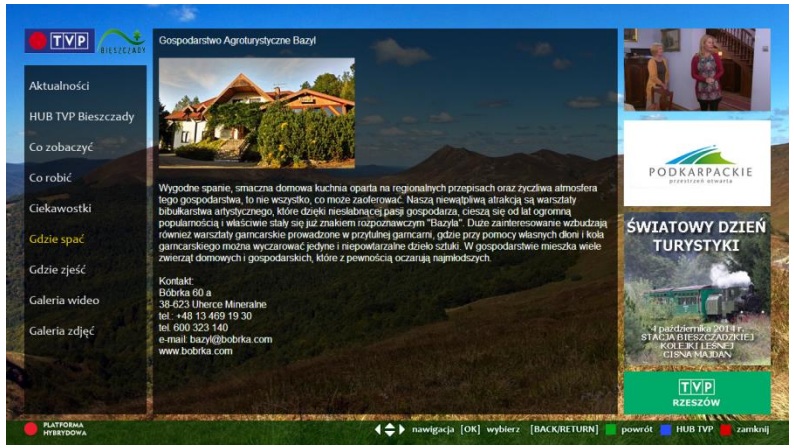
HbbTV teaser

Interactive menu



Tourist attraction in Bieszczady mountain

Accommodation in Bieszczady



Accommodation – contact details

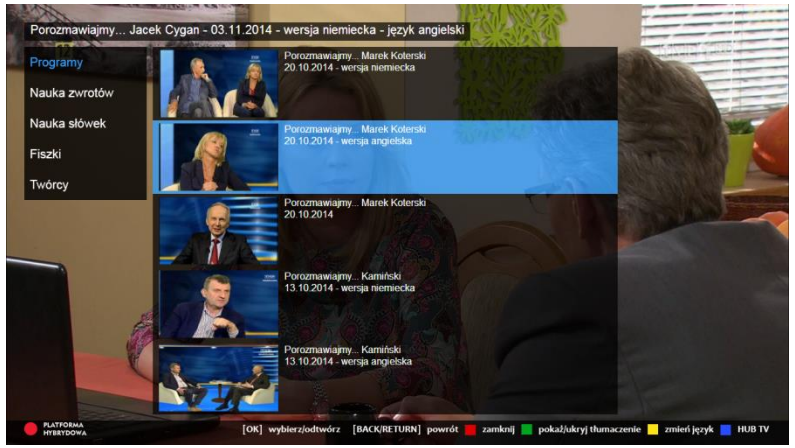
Photo gallery with HD quality pictures

E-learning HbbTV app

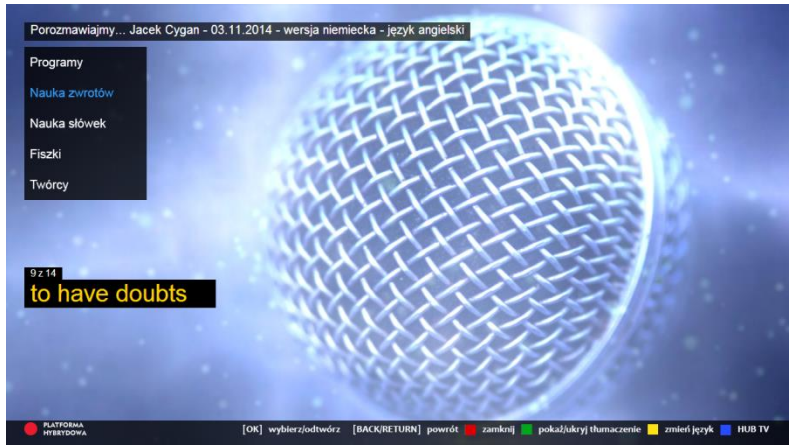
Let's talk...

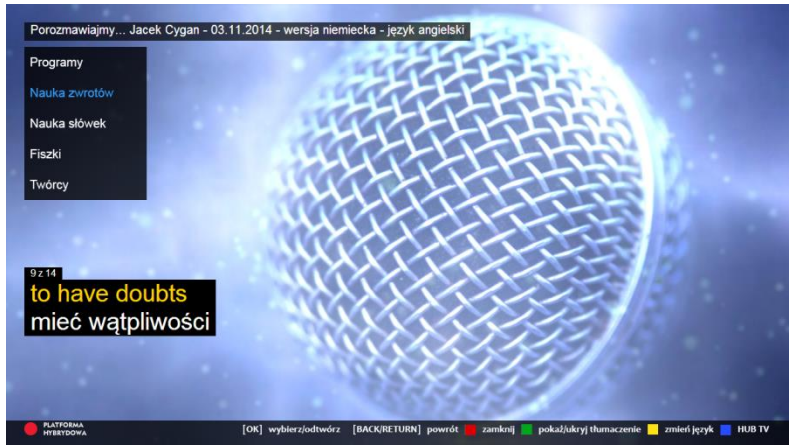
HbbTV teaser

Interactive menu



Select TV show from VOD menu



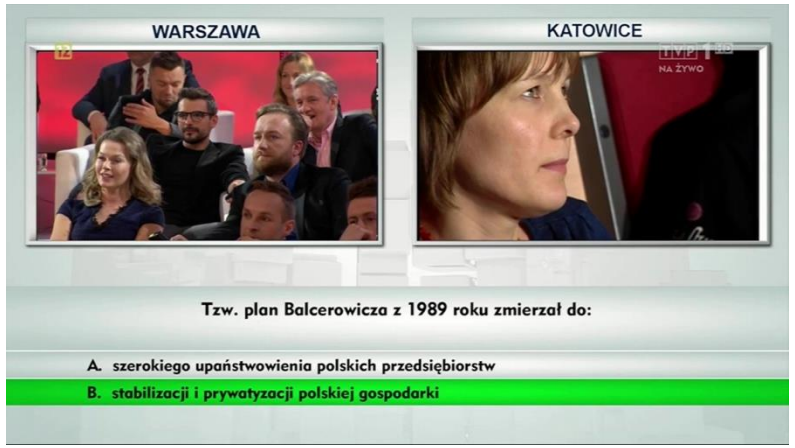


App for Quizes on live TV

Big Test in TVP

Live TV on TV devices without HbbTV

Live TV on TV devices without HbbTV - first question



Live TV on TV devices without HbbTV – answer for question

Live TV on TV with HbbTV. Overlay graphics with info about using colour keys in HbbTV app.

Live TV on TV with HbbTV. Overlay graphics with first question.

Live TV on TV with HbbTV. Overlay graphics with information about bad answer for this question.

Pawel Tutka
HbbTV expert, hybra.tv

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twitter: @hybratv

facebook.com/hybratv
vimeo.com/hybratv

hybra.tv

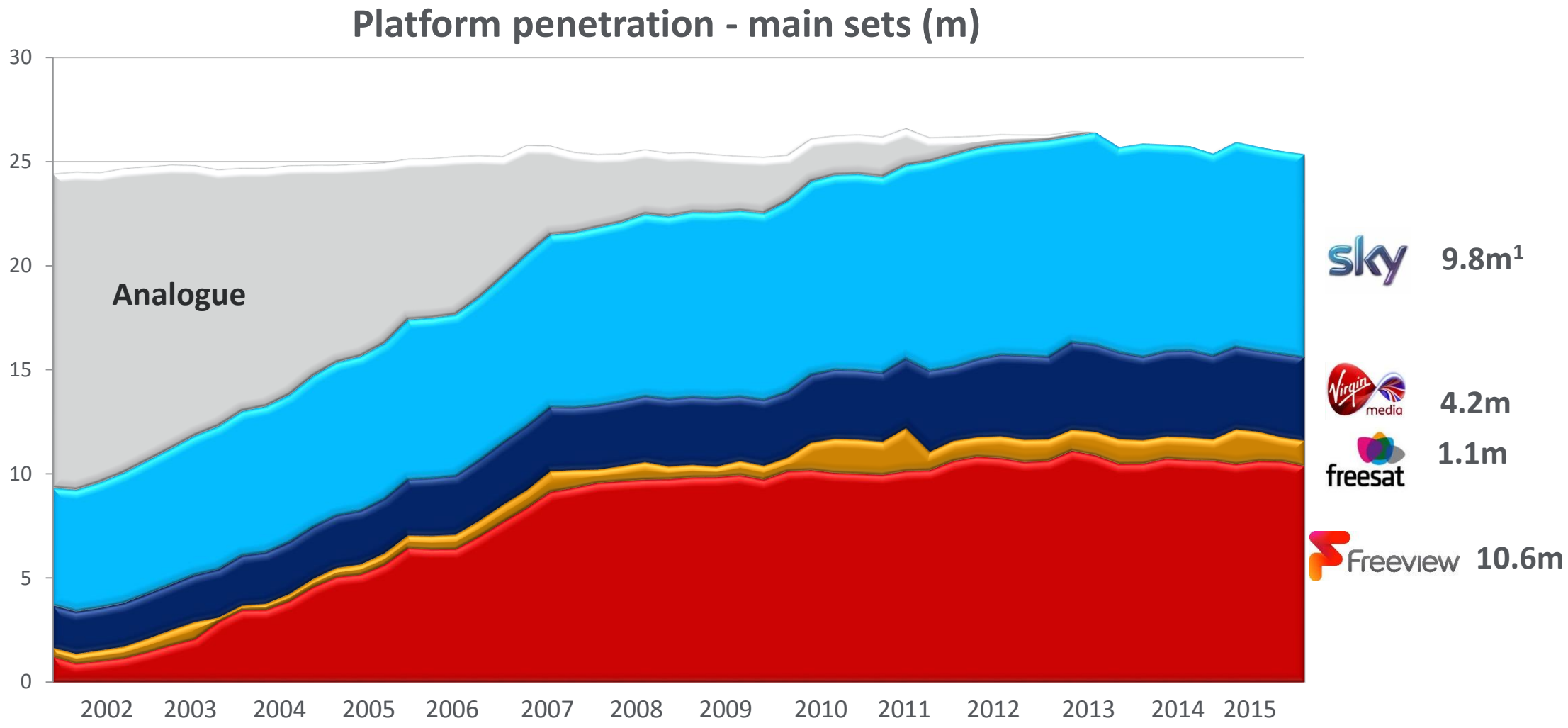
The natural next step in TV

Ilse Howling, Managing Director, Connected TV, Digital UK

James Jackson, Technical Director (acting), Digital UK

8 December 2015

Freeview is the number 1 TV platform in the UK



Freeview is in 18.8m homes, 73% of all UK homes with a TV

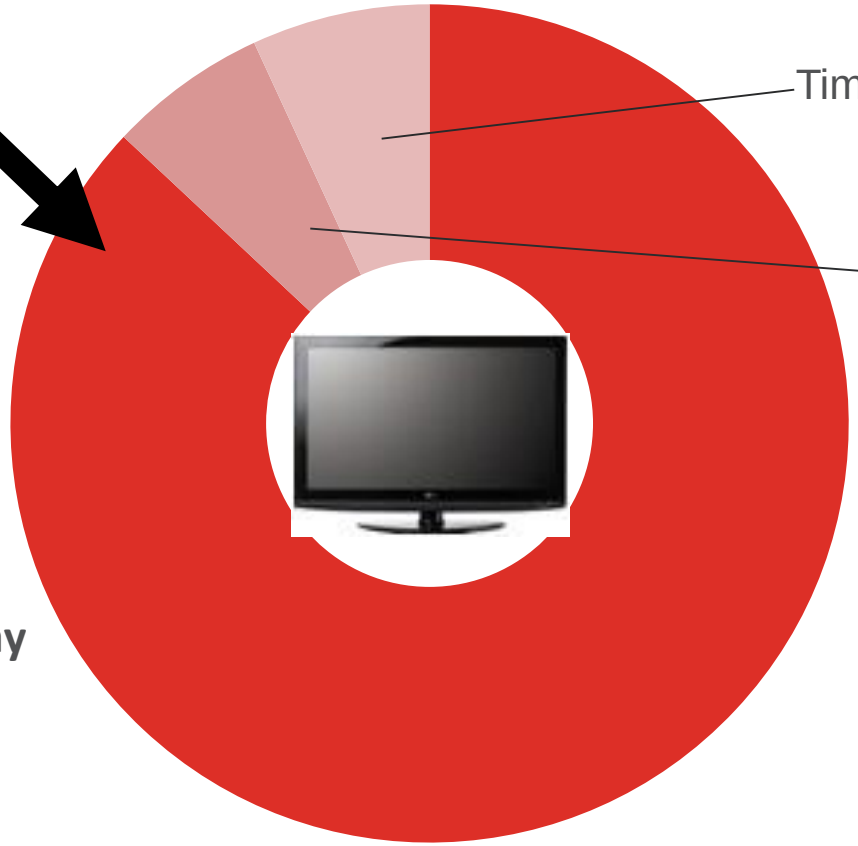
digitaluk

Source: Ofcom Digital TV Update to Q1 2011 then BARB Establishment Survey to Q2 2014.
Sky's published figure of 10.7m includes Europe and Republic of Ireland and Now TV.

Freeview

Live TV is hugely popular in the UK

Live 87%



Average TV viewing per day

All Individuals: 4hrs, 20 mins

16-24s: 3hrs, 30 mins

Source: Thinkbox / BARB, Jan – June 2015

digitaluk

Freeview

TV market complexity is growing, Freeview Play is about simplifying

2002

Freeview

sky

ntl: Telewest

Analogue

2015

Linear platforms

Connected propositions

OTT aggregators

OTT channel Players

Individual manufacturer offers

Freeview Play = new normal TV

- Best of broadcast and on demand
- Built-in to TVs and STBs
- Leading catch-up services
- Free-to-view, subscription-free

Principles underpinning our approach to Freeview Play

- Consumer focused: easy access to broadcast and catch up
- Trusted Freeview brand helps to drive take up
- Free and unbundled service (no obligation to subscribe)
- Open and collaborative
- Based on open international standards

Freeview Play Partners

Panasonic

VESTEL

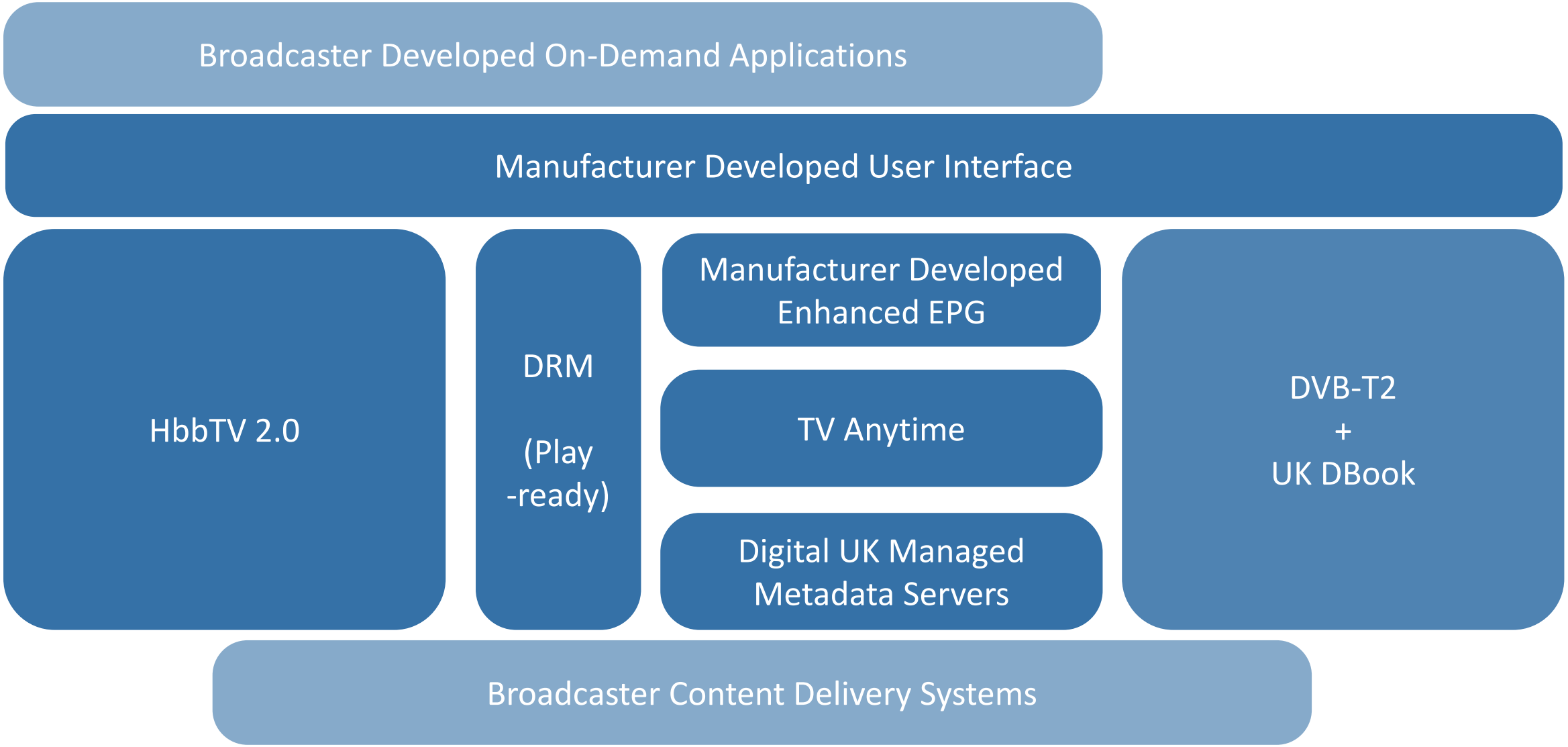
HUMAX

Manhattan

FreeviewPlay

Our engagement approach

Components of Freeview Play

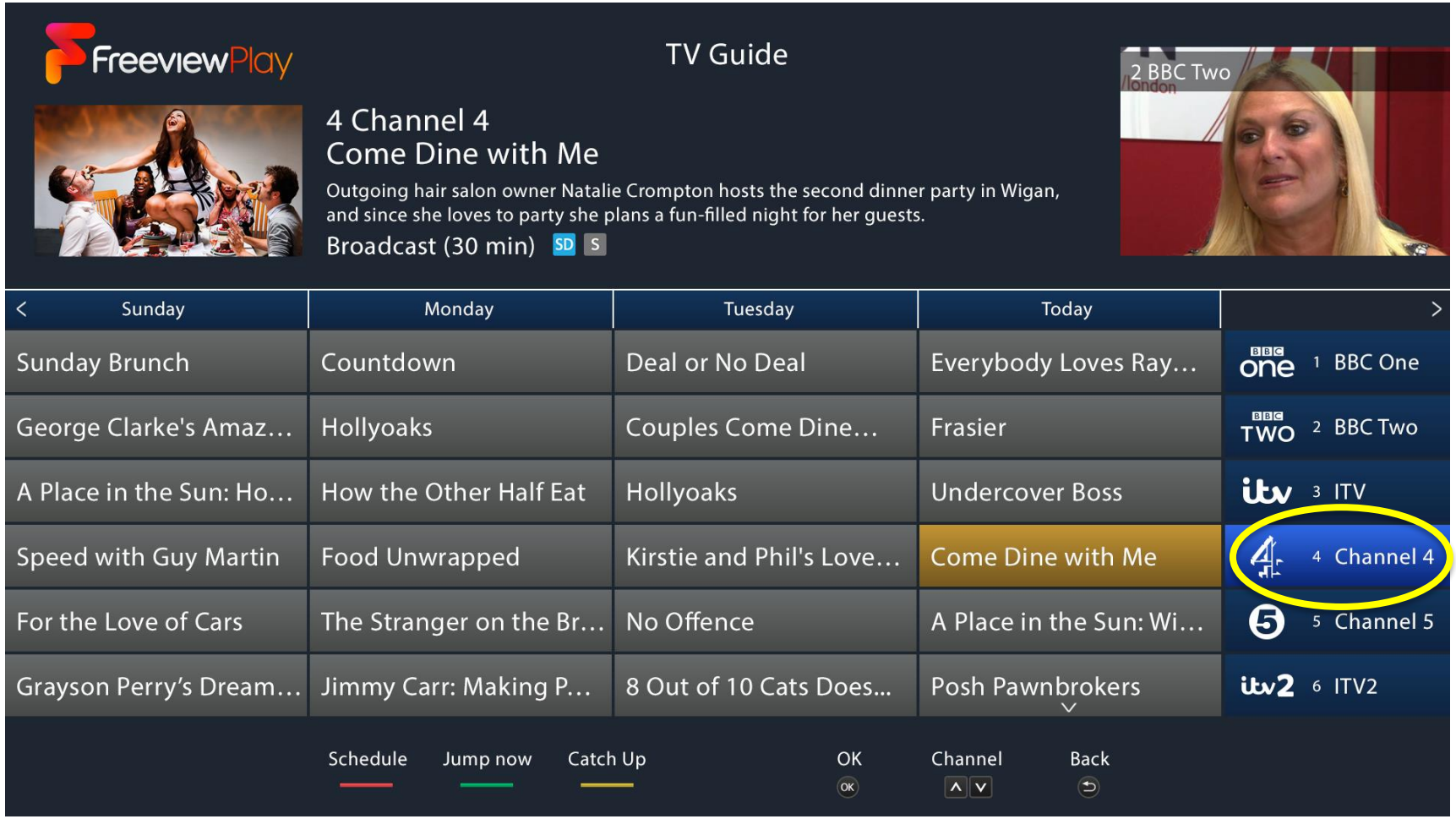


Thank you

Freeview Play EPG on Panasonic TV

Freeview Play catch-up players on Panasonic TV

Freeview Play scroll back TV guide on Panasonic TV



TV apps area: another way in to Freeview Play alongside Netflix, Amazon Prime and Youtube

HbbTV Symposium

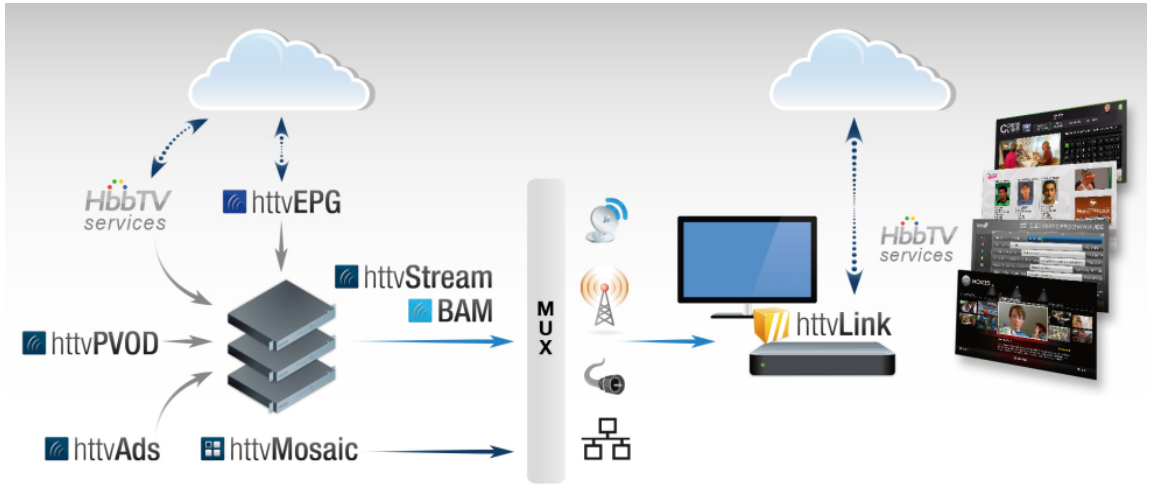
Non-realtime Content Delivery Via Broadcast

Régis SAINT GIRONS
CEO HTTV

London December 8, 2015

Company Background

- **Technology and solution provider for Connected TV**
- **End to End Digital TV Product Line**
  - Head End Play Out Servers
  - STB turnkey Software product
    - Based on **HTML5** and **HbbTV**



- **HbbTV Expert**
  - 2014 CSI-IBC award for best HbbTV technology and products

CSI 2014 AWARDS WINNER

Best HbbTV Technology

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Non-realtime Content Delivery via Broadcast

- **HbbTV 2.0 integrates a File Delivery Protocol (FDP):**
  - Files are delivered in packets over broadcast
  - Files are stored in Receiver's local storage
- **This protocol brings Non Linear Content delivery via Broadcast to HbbTV 2.0 applications**
  - Referred as **Push VOD** for the non real time delivery of video content
- **The workflow is :**
  - Broadcast schedules for the video (or other files) are provided through an HbbTV application
  - Metadata are managed through an HbbTV application in the receiver
  - Patch Up mechanism to obtain loss packets (over broadcast or broadband)
  - Possibility of additional Forward Error Correction (FEC)
  - Compatible with DRM

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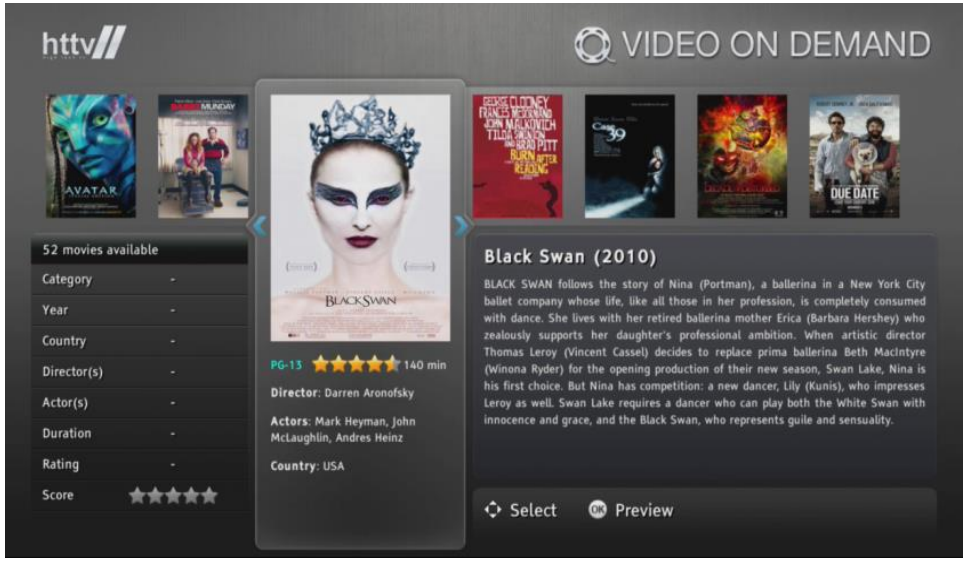
Push VOD

- **All VOD types**
  - Transactional VOD
  - S-VOD services
  - Advertisement financed VOD
  - Catch-up services



- **Markets with limited Broadband access**
  - Africa…

- **Optimizes Broadband Cost/Quality**

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Enhanced Content

- Ultra HD contents are pushed and stored on receiver
- Red Button Application allows user to swap from Broadcast content to same content in UHD
  - Swap can be done automatically

Roland Garros – France Télévisions

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Targeted Advertising

- **Requires real-time switch between the main broadcast feed and alternative video source**
  - Easier to implement with FDP than Broadband

Household: Mature Couple

Household: Single

Household Couple w/ Kids

Household: Young couple

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Broadcast Delivery as Broadband extension

- **Push Technology is not only about Pushing video content.**
- **It is about providing on demand services using a limited bandwidth return channel (3G/4G or satellite return) by caching locally the most viewed content (« edge CDN »).**
- **The same HbbTV broadband OTT applications can therefore be made available to viewers with limited bandwidth.**
- **Example: Offering a Replay service on tablets in areas with limited bandwidth**

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FDP Operational choices

- **Tuner**
  - Single versus Multiple versus Dedicated
- **Broadcast bandwidth**
  - Blast versus Drop Feed
  - Single mux versus Multiple muxes
  - Repeat cycles
- **Storage**
  - Capacity
- **Services**
  - Operator versus Broadcasters

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FDP: Bandwidth requirements

- **A 500GB hard disk connected to a single tuner HbbTV STB with a bandwidth of 4 Mbs can offer :**
  - 100 Movies (1/3 HD)
  - 160 Series Episodes (1/5 HD)
  - 320 education programs of 15mn (SD)
  - 14 hours of replay services (SD)
  - 25% renewal per week
- **A 32GB USB key (8€) can offer 12 HD movies with 4 new per week on a bandwidth of only 0.4 Mbs**

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Implementing the Standard

- **HTTV has deployed Push VOD solutions since 2010 in South Africa (Multichoice) enjoying impressive usage**
- **Together with our partner Quadrille we are deploying PushVOD on HbbTV 1.5 based STB in Africa**
  - Ivory Coast, Senegal and Mauritius
- **We are now working on HbbTV 2.0 Push VOD through the AdicTV French research project**

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- **French research project**
  - Partnership between: Enensys, HTTV, Quadrille, TDF, Telecom ParisTech, IETR
- **Improve DTT offer by the Addition of Dynamics Content TV (AdicTV) via Broadcast**
  - Before the transmitter using the DVB-T2 SFN (Single Frequency Network) Multi-PLP (Physical Layer Pipe)feature
  - In the receiver using HbbTV 2.0 Push VOD
- **Content could specific to user location or profile**
- **Implementation on DVB-T2, HEVC, UltraHD receiver**
  - 2015-2016

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Use Cases

- **Regional or local advertising**
- **Switch from a National service to a Regional one**
- **Insertion of a national, regional or local alert message**
- **Enrichment of a linear service**
  - HD to UltraHD
- **Targeted advertising**

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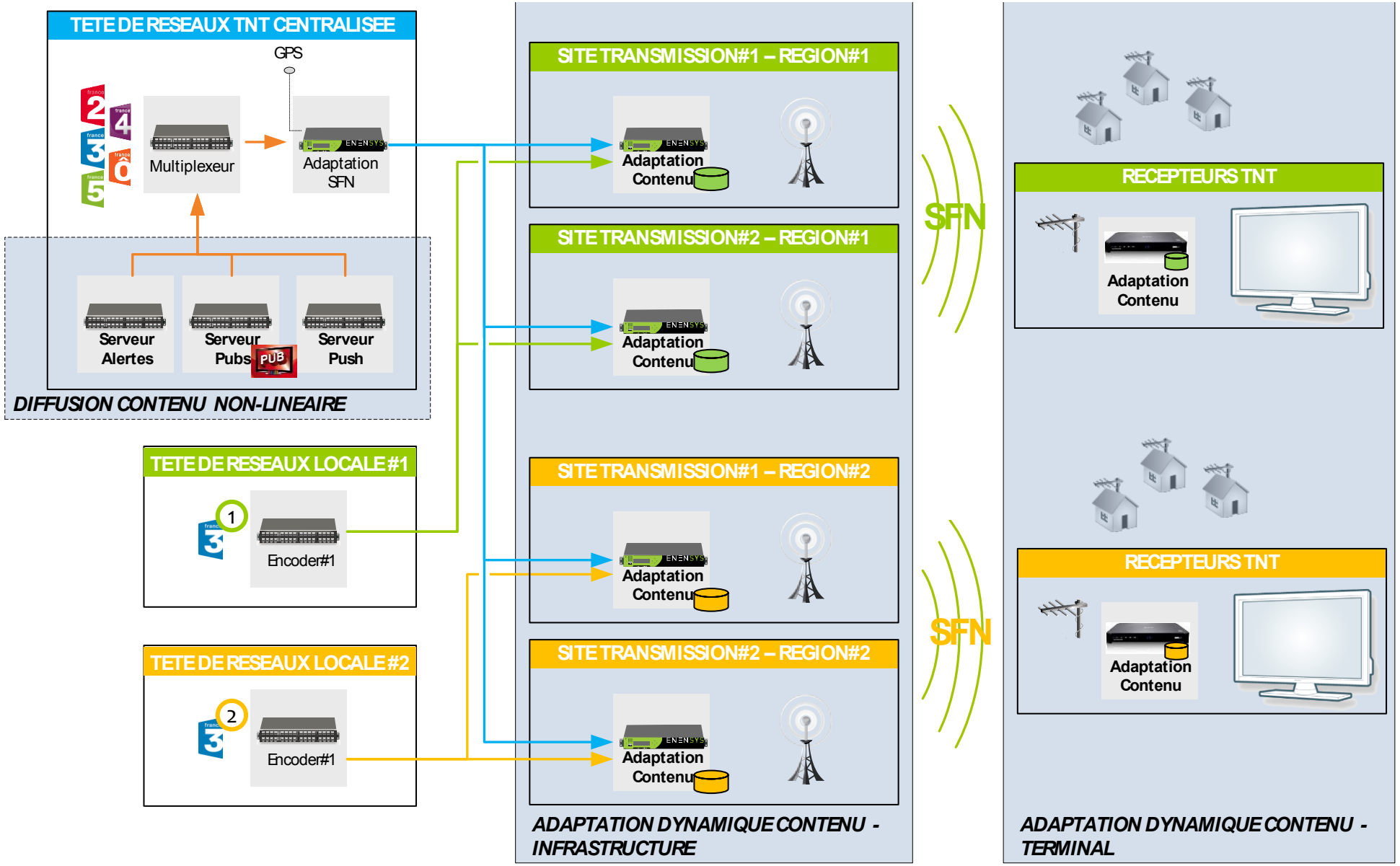
Architecture



Thank you !

regis.saintgirons@httv.fr

Companion screens

Features and opportunities provided by HbbTV 2.0

December 2015

Matt Hammond, BBC R&D

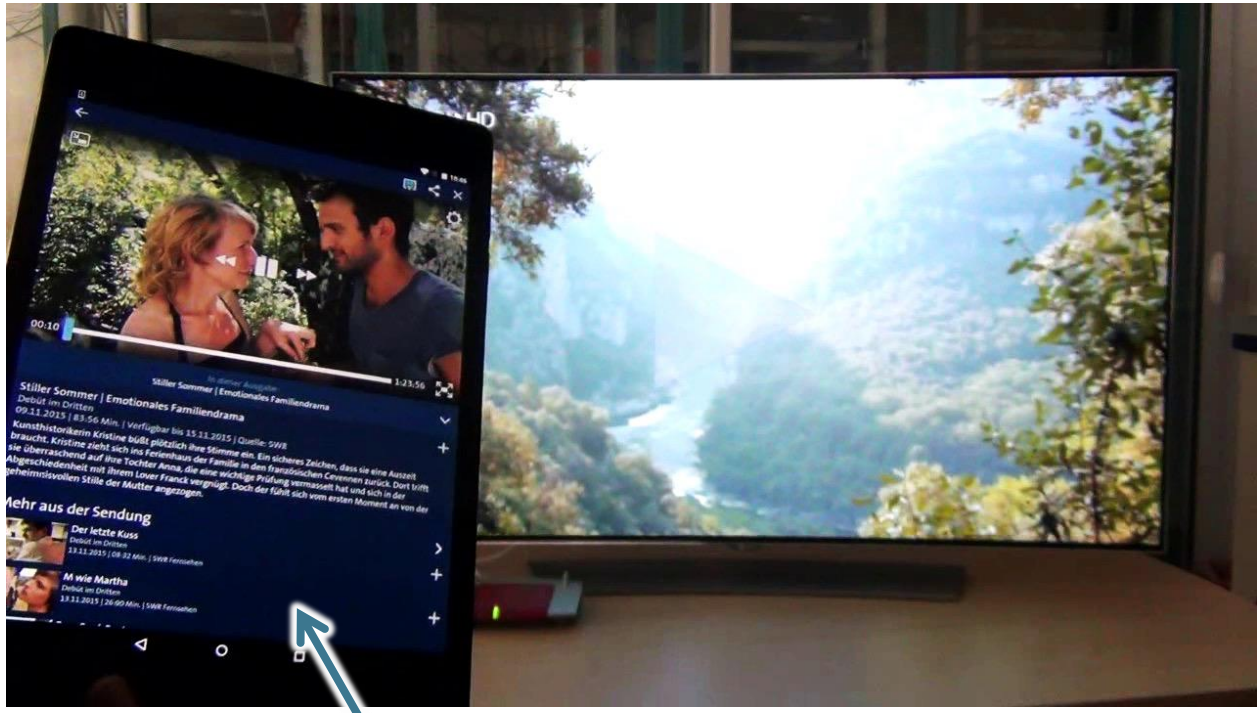
BBC | Research & Development

Playing to the strengths of the mobile UX and social networks

"Cast"

Use mobile phone app to browse available content. Then choose to watch it on the TV.

Control play/pause/seek using the phone.



IRT/ARD "Mediathek" demonstrator

Richer content discovery and navigation experience possible in mobile apps.

Possibilities to join up user journeys…

Enable users to journey from social sharing back to TV viewing via your mobile app.

Social connection?

Linked Data!

BBC | Research & Development

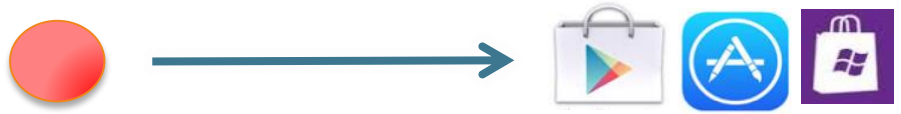
Bootstrapping the mobile app installation

"Launch and Play-along"

HbbTV app installs and/or launches a quiz companion app.

User plays along, answering the same questions as the contestant in the studio.

Use calls-to-action to encourage installation of mobile apps and provide enhanced experiences.



Press RED

Trigger mobile app install / launch

New kinds of value-added experience

BBC Companion Sync demonstrator (IBC 2015)

"Personal Synchronised content"

Audio description or alternative commentary streamed to an app on the phone and listen on headphones.

Avoid annoying everyone else in the room!

"Additional information"

Programme guides and additional programme information is brought up on the tablet automatically depending on what programme you are watching.

A toolkit of features based on *standardised* technologies

- TV discovers companion
- TV launches companion app

- Companion discovers TV
- Companion launches HbbTV app

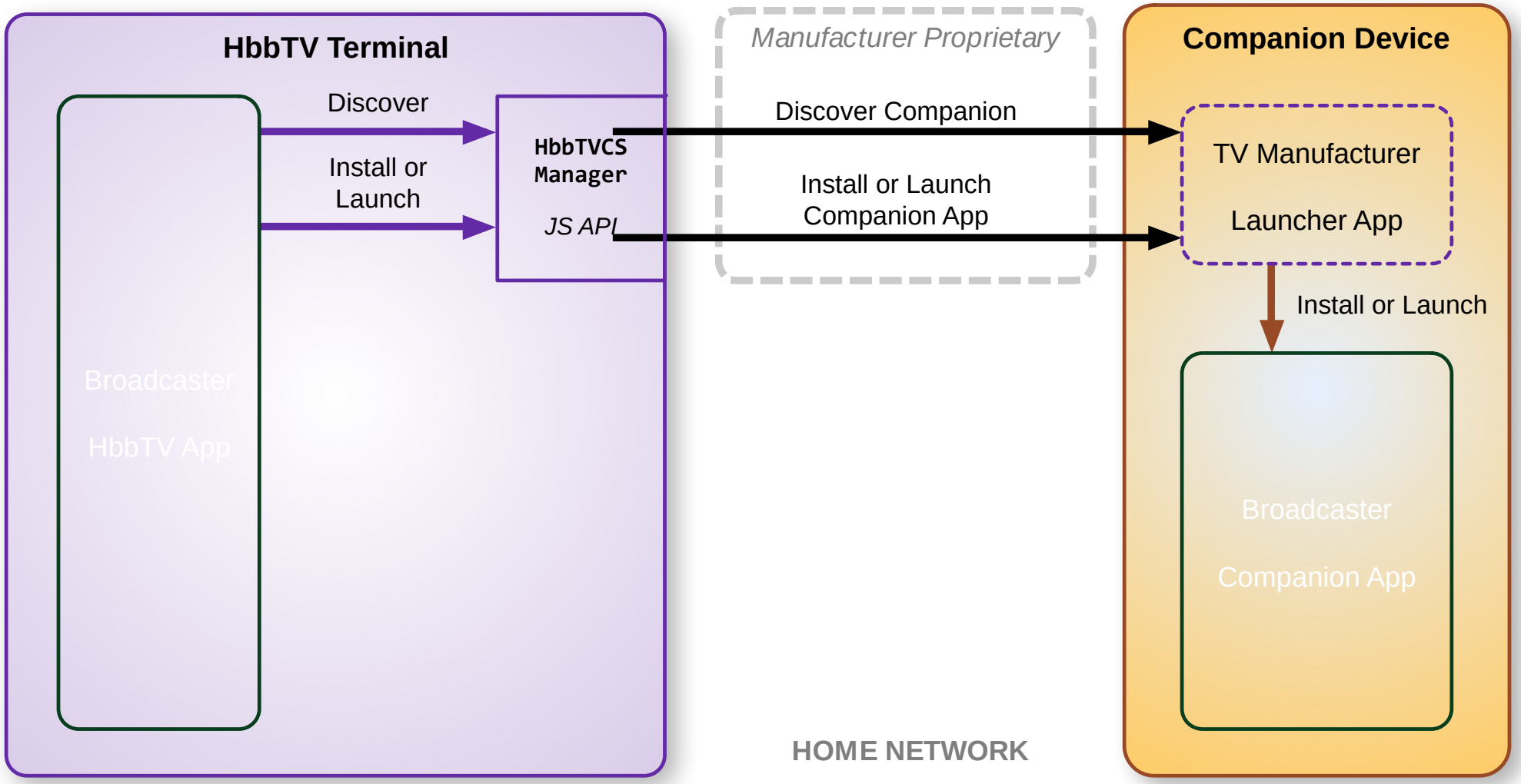
- "App to App" communication

- Frame-accurate media sync between TV and companions

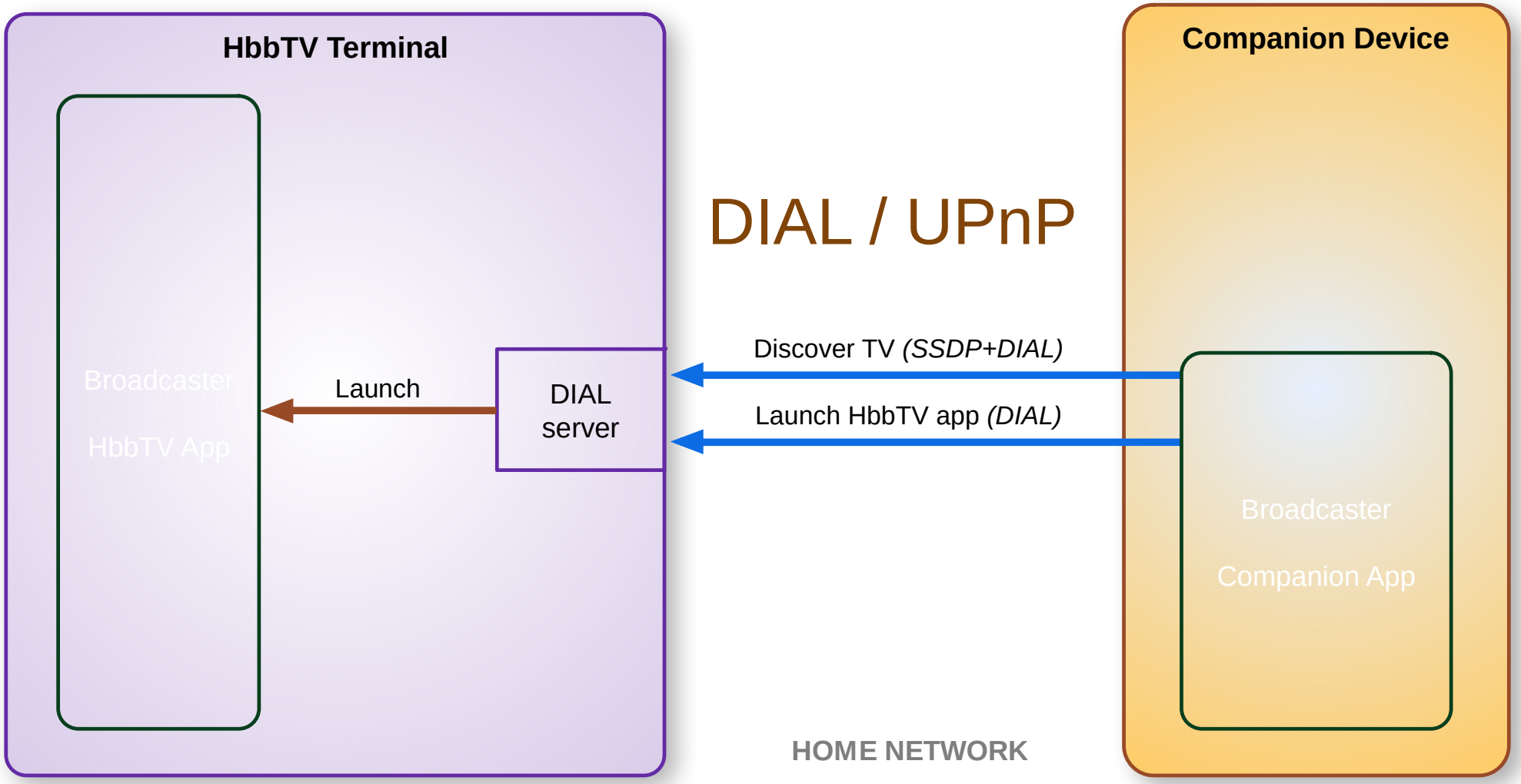
A toolkit that enables a wide range of use cases.

Broadcaster has the flexibility to choose what to use and how to use it.

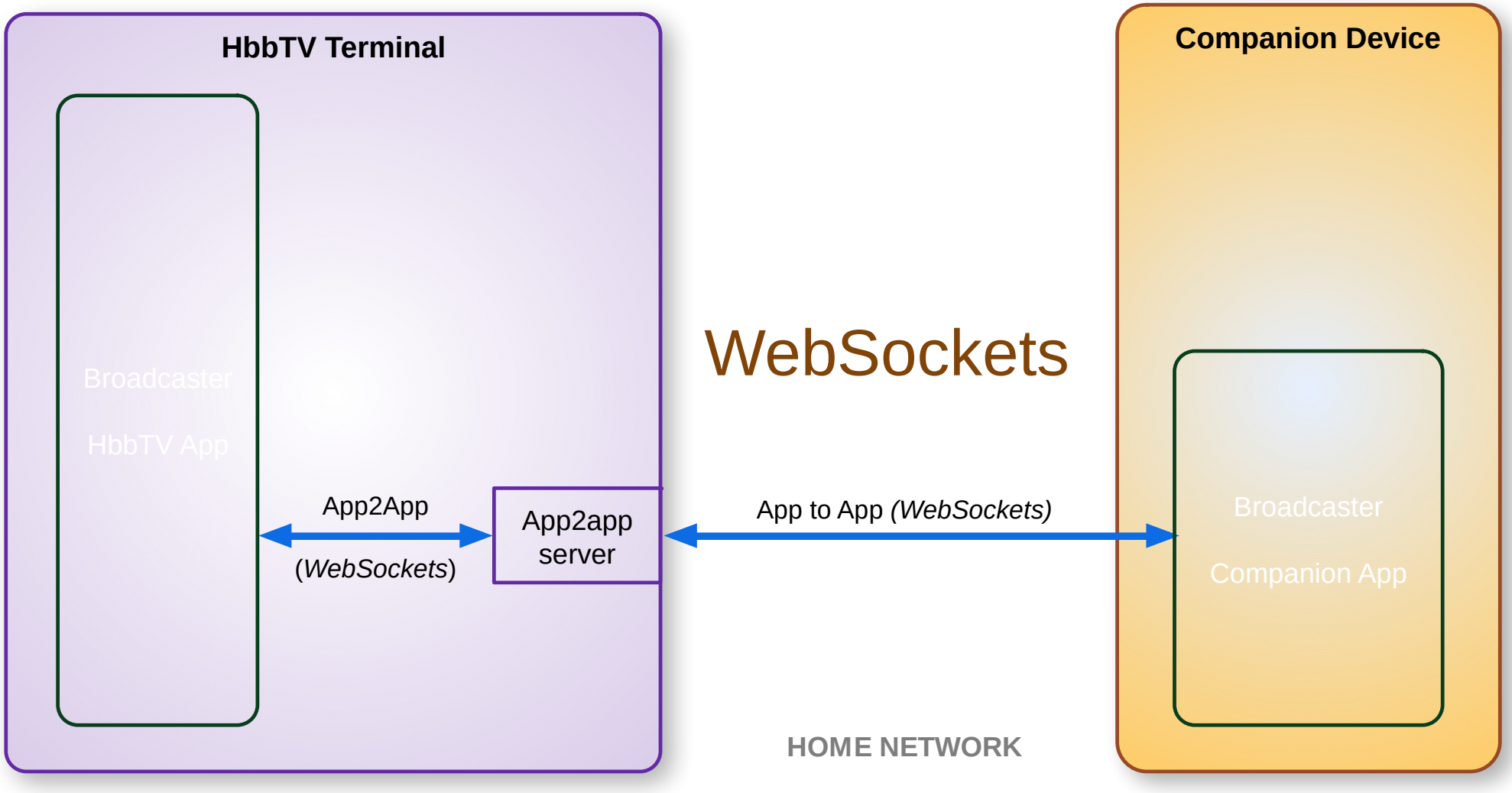
Technologies: launching apps onto companions



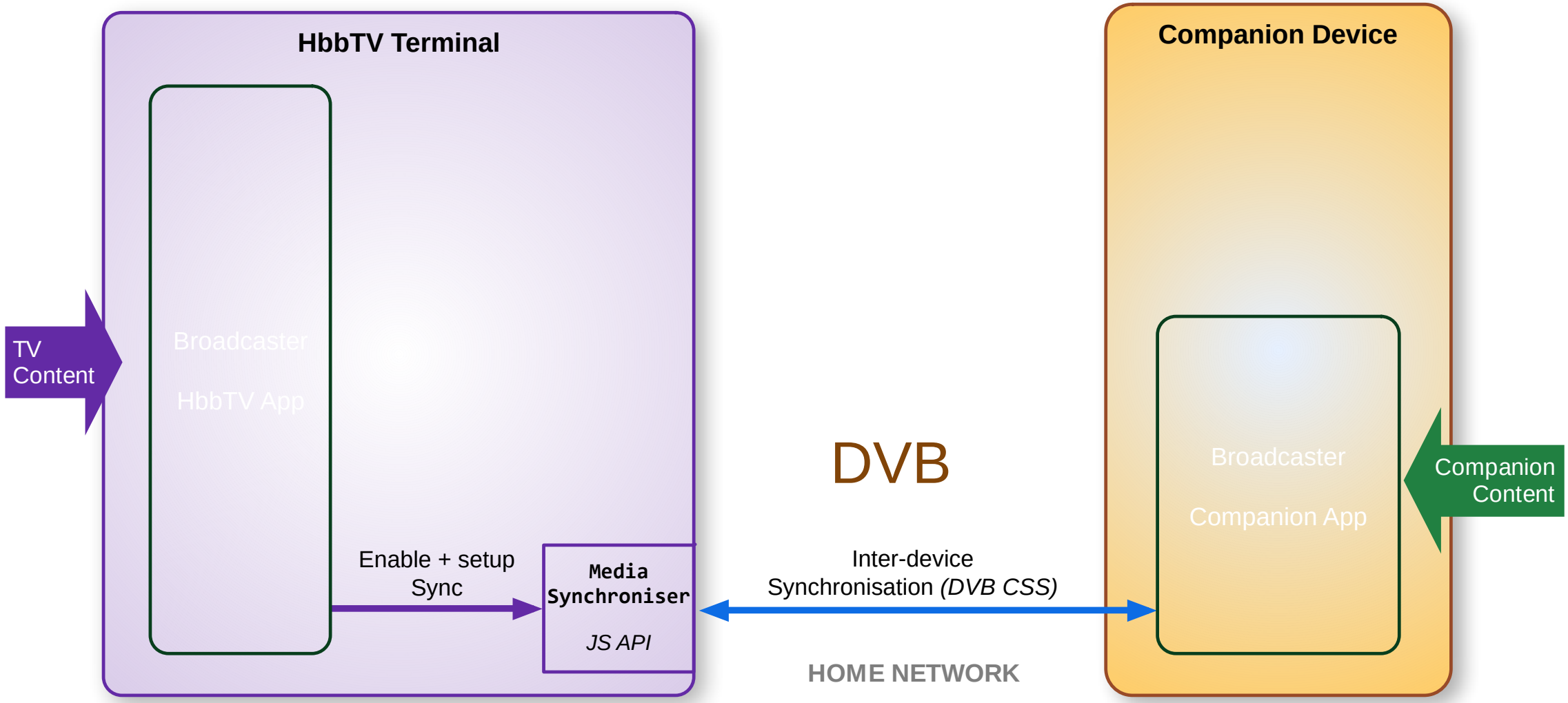
Technologies: launching HbbTV apps



Technologies: HbbTV apps communicating with companion apps



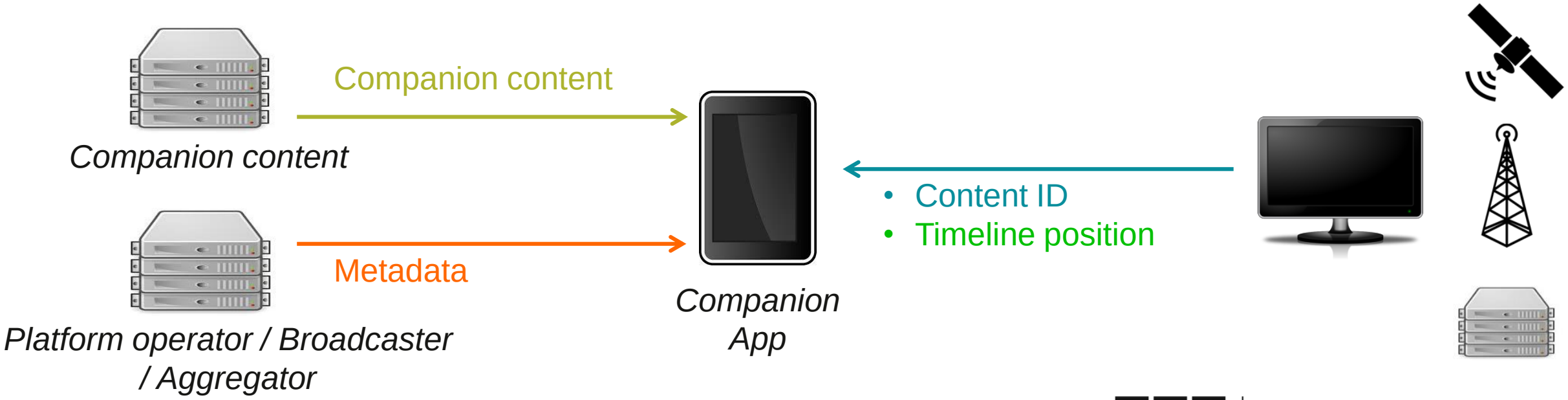
Technologies: frame-accurate synchronisation



Metadata to drive the synchronised experience

Companion is not controlled by the TV

- Metadata that translates the broadcast timeline to companion experiences … provided via internet/cloud services (DVB standardised)
- Opportunities for platform/mux operators and metadata aggregators to provide this as a service



In conclusion

HbbTV 2.0 adds a toolkit to enable TV and mobile to come together:

- Utilise richer mobile user interfaces for content discovery and view on the big screen
- Enable journeys between mobile social sharing and TV viewing
- New value-added and premium experiences where companion is responsive and relevant to what you are watching and can be highly synchronised

HbbTV 2.0 uses open, standardised technologies to achieve this

Opportunities for metadata aggregators and platform operators

- Metadata service to provide the connection between broadcast and companion content

Thank you

bbc.co.uk/rd

Email:

matt.hammond@bbc.co.uk

BBC | Research & Development

Freeview Play Specifications

HbbTV in the UK

8th December 2015

Nick Yeadon

BBC | Research & Development

Drivers behind Freeview Play Technical Specifications

- True hybrid device – integrated forwards and backwards EPG important as app launching area
- Provide freedom of UI design for manufacturers to integrate backwards EPG and app launching into own look-and-feel
- To ensure full content offering from PSBs content protection required
- Personalisation and use cases requiring user login implies level of device security
- Application reuse and ease of support
- Common application environment for content providers

} demands HTML5 environment

- Need for equivalent functionality for broadcast interactivity
- Head-end infrastructure complex to change hence variety of streaming formats

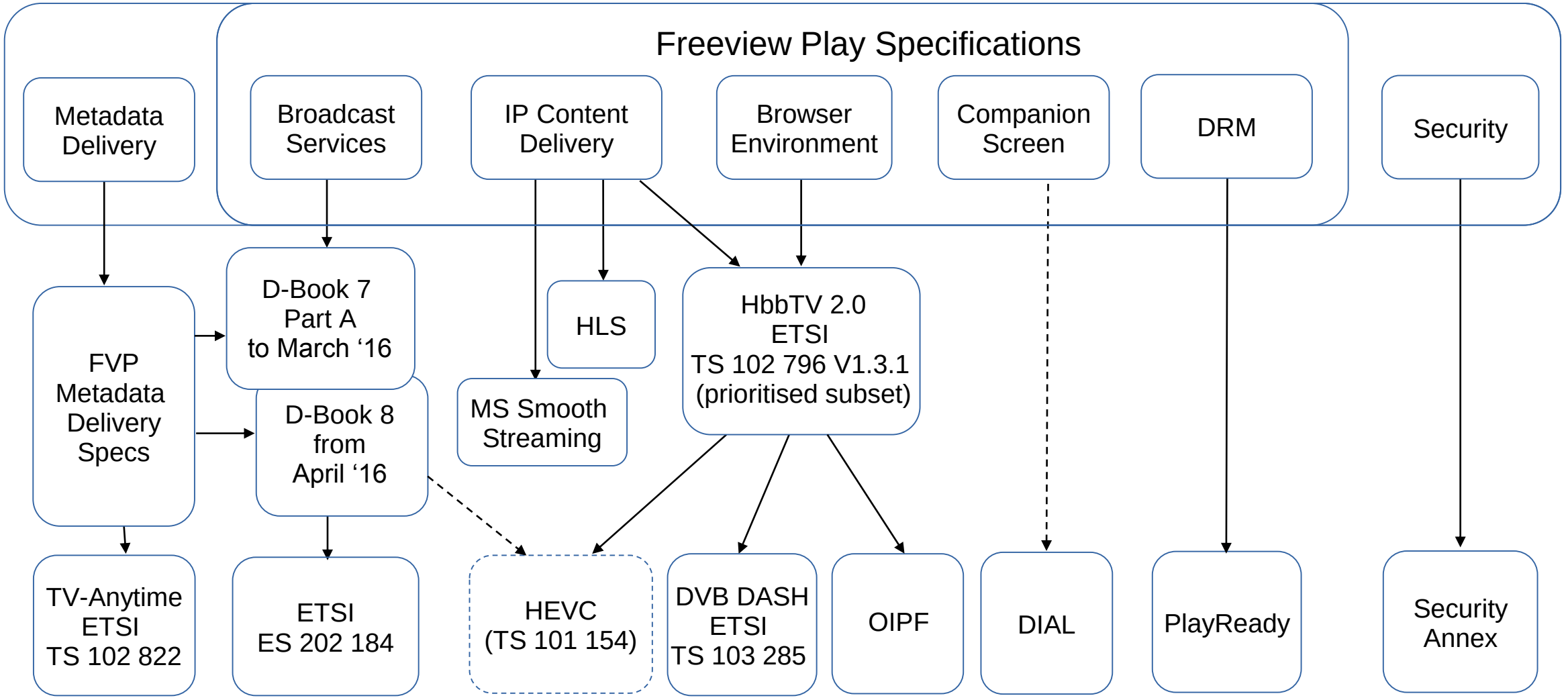
What are the Freeview Play Technical Specifications?

- Technical Specification
  - Core of HbbTV
  - Metadata discovery
  - Transition technologies
  - DRM requirements
- Security Annex
  - Device requirements
  - Authentication with metadata delivery service: certificate specification

What are the Freeview Play Technical Specifications?

- B2C Metadata Specification
  - Authentication process
  - Metadata queries
  - Response format
  - Broadcast-independent launching
- Metadata Taxonomy Vocabulary
  - Classification Schemes used with the B2C specification

Specification Map 2015-2016



Technical Specification

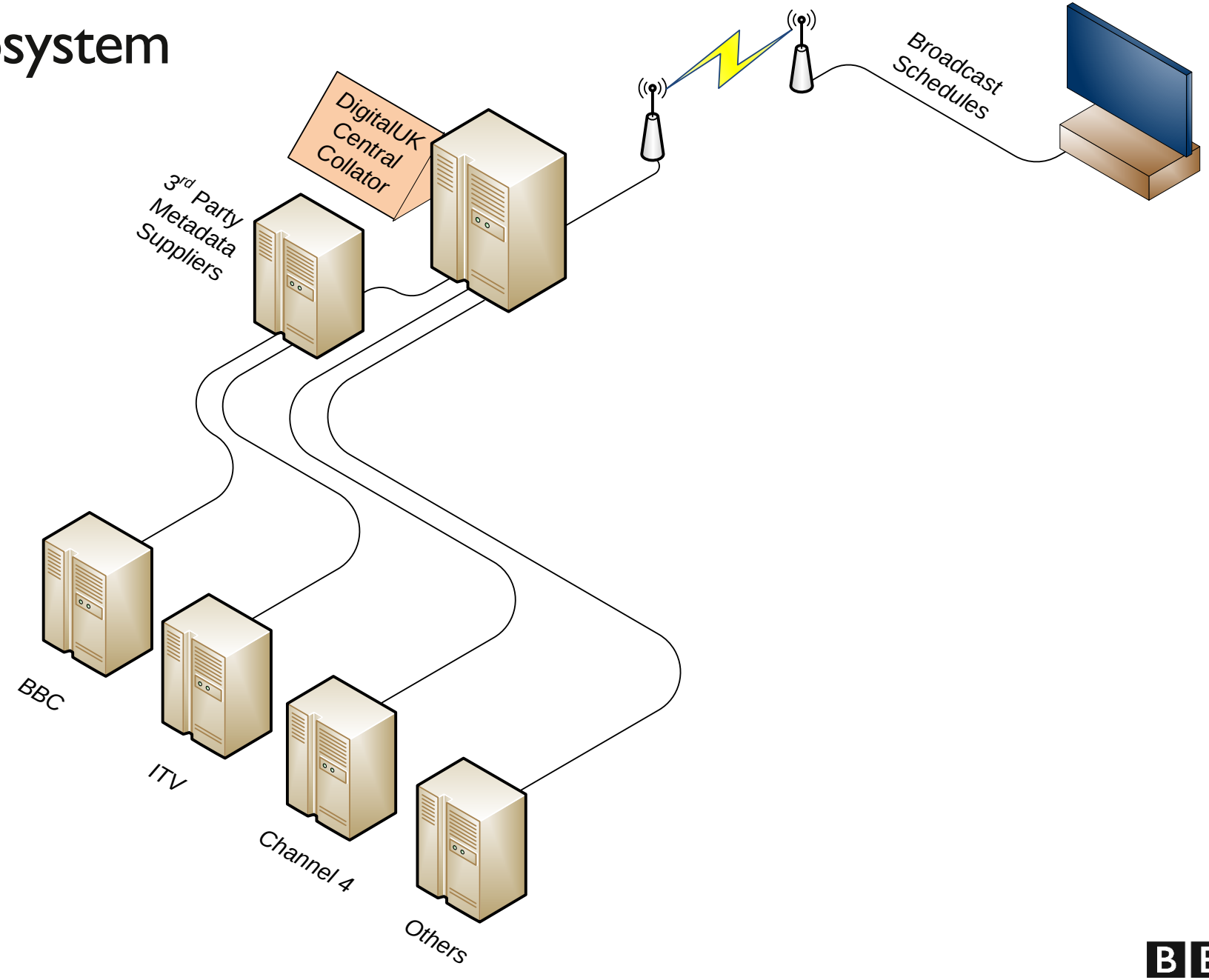
- HbbTV 2.0 plus:
  - Reference to D-Book
  - Co-existence with MHEG – now part of D-Book 8
  - Metadata discovery from broadcast – based on EN300 468
  - Reliability requirements – European profiles as the lead
  - Transition Streaming formats
  - HTTP caching, cookie and user-agent requirements
  - Guidance on HEVC
  - Requirement that content provider uses DVB profile of DASH
  - DRM & Security
  - Requirement for software update
  - Existing DIAL use-cases using DIAL Application Name/Prefix Registry

Technical Specification

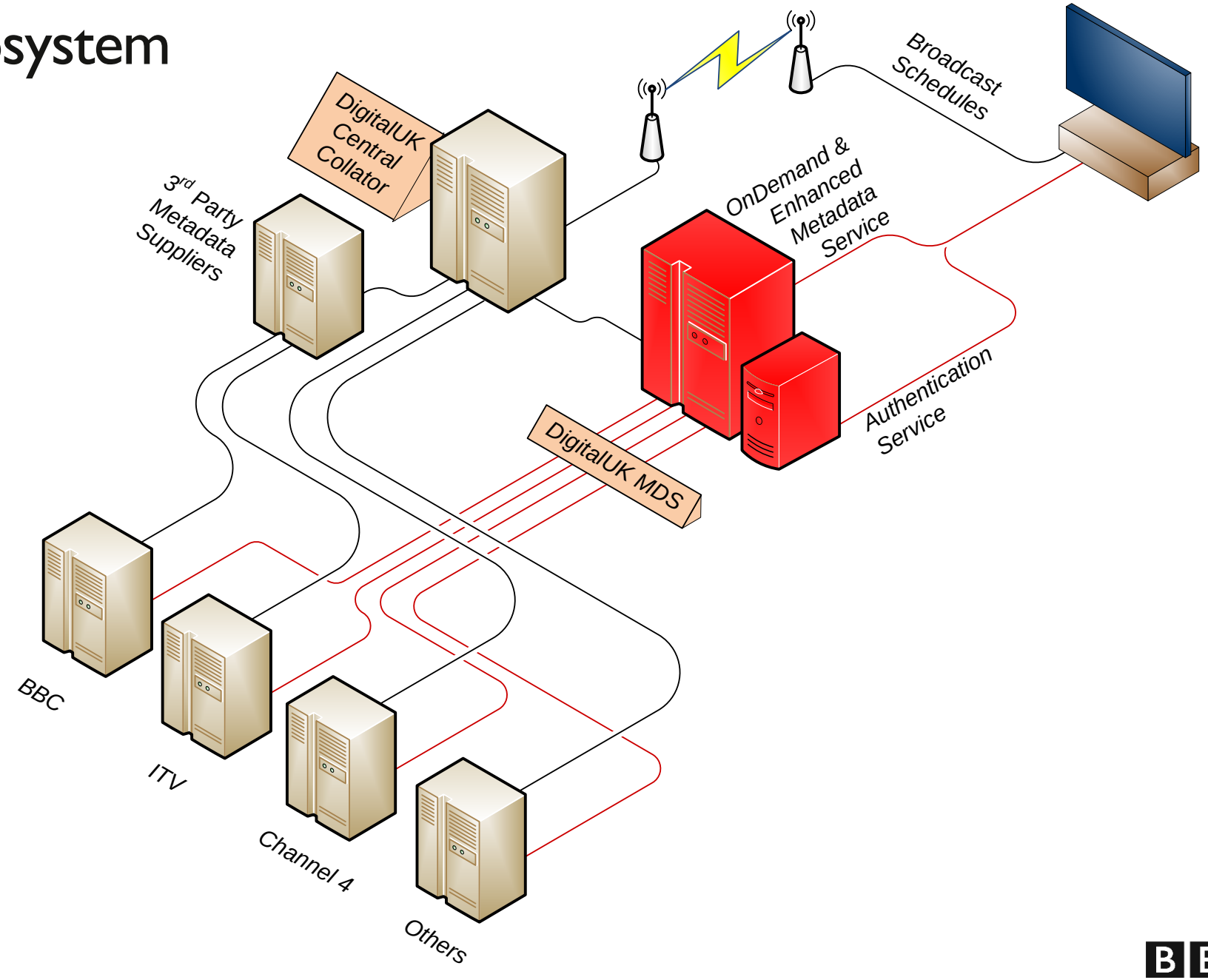
- HbbTV 2.0 de-prioritised in 2015
  - EBU-TT-D subtitles
  - Companion Screen, DIAL for HbbTV apps
  - Media Synchronisation
  - File System Acceleration
  - Downloading content via FDP

but still committed to full HbbTV2.0 implementation

Ecosystem


DigitalUK
Central
Collator
3rd Party
Metadata
Suppliers
Broadcast
Schedules
BBC
ITV
Channel 4
Others

Ecosystem


DigitalUK Central Collator
3rd Party Metadata Suppliers
Broadcast Schedules
OnDemand & Enhanced Metadata Service
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DigitalUK MDS
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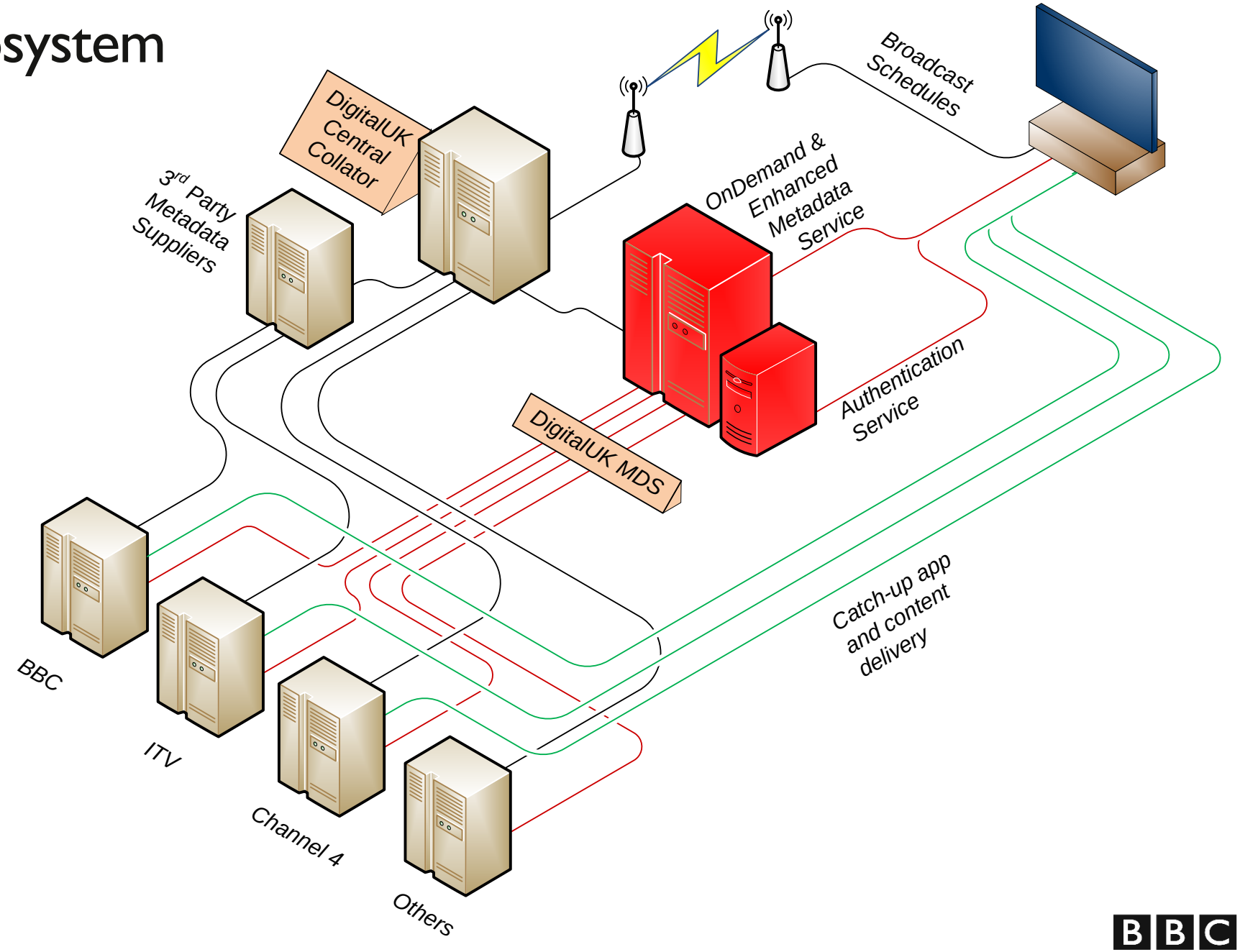
Ecosystem


DigitalUK Central Collator
3rd Party Metadata Suppliers
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Catch-up app and content delivery
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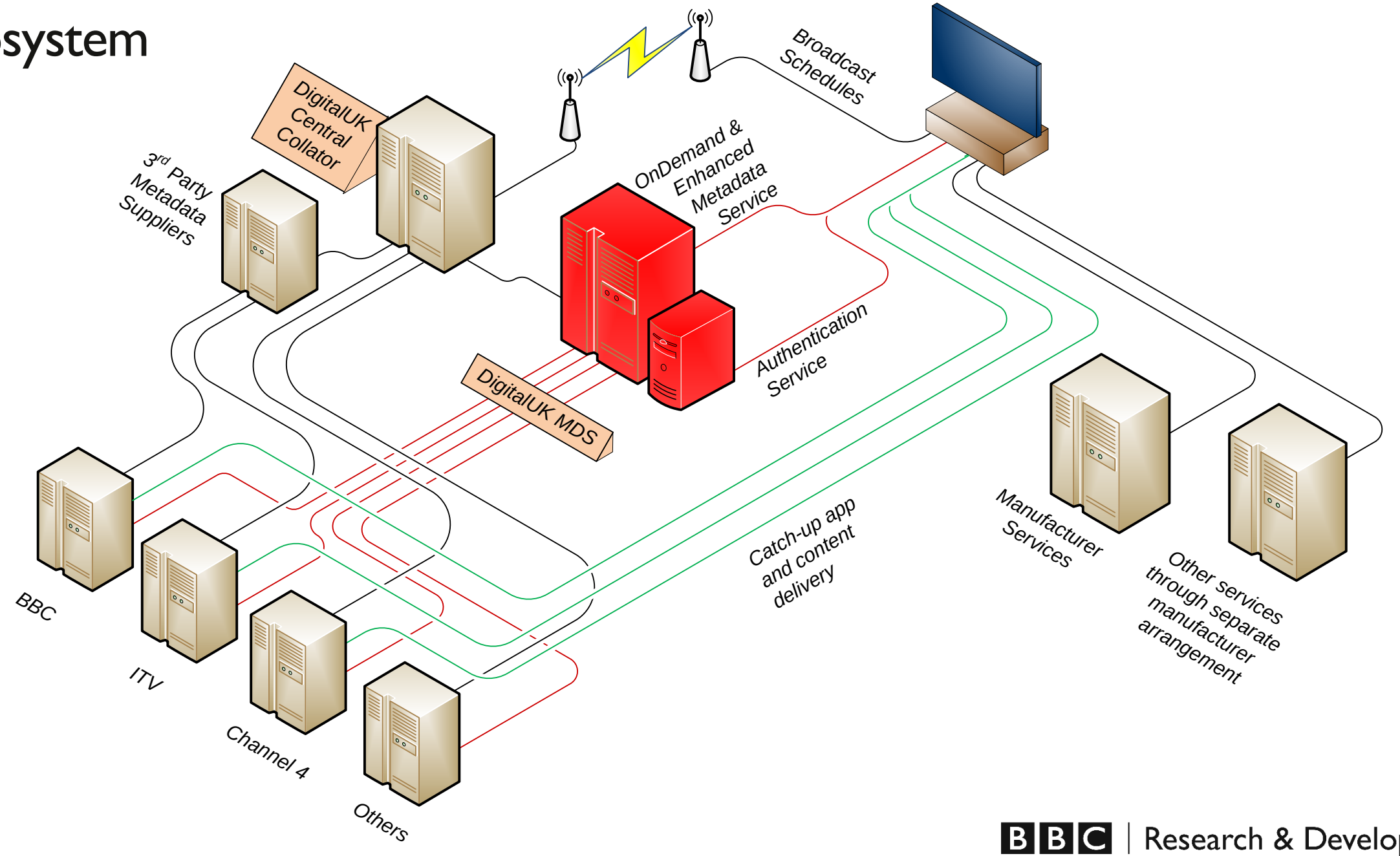


BBC | Research & Development

Launching Applications

- From Broadcast (BBC RB+)
  - Currently via MHEG then into XML AIT
  - Plan to move to Broadcast AIT
  - ‘Holding’ broadcast AIT already on-air across UK
- From MDS supplied metadata
  - Variety of launch point available to manufacturers
  - ‘Top level’ Freeview Play application list
  - Service level – associated with broadcast linear service
  - Individual events

Challenges

Timing of HbbTV specification, in between 1.5 and 2.0 cycles whilst requiring features of 2.0

Availability of test materials for 2.0 – investment in test materials

Multiple browser environments found in devices

Object Carousel in use today has mature sophistication based on years of tuning

Evolution Goals

- More metadata APIs e.g. search
- Already promoting features to HbbTV where appropriate
- Full HbbTV2.0
  - Subject to availability of suitable tests
- Remove reliance on streaming formats other than DASH
- Deprecate legacy interactive technology i.e. MHEG
  - DTG MHEG transition group is developing roadmap for UK
- Specification release to align with most appropriate point in OEM development cycle

More Information

- Manufacturers - Digital UK

  http://www.digitaluk.co.uk/industry/news/freeviewplay

- Consumers - Freeview

  http://www.freeview.co.uk/what-we-offer/freeview-play

MHEG to HbbTV

Graham Mills

Chair of DTG's MHEG Transition Task Group

HbbTV Symposium: 8th December 2015

Overview

- Background to DTT and MHEG in the UK
- Why is the DTT industry now considering HbbTV in the UK?
- Is a changeover really feasible, what issues need to be addressed?
- What would the main steps be, to transition from MHEG?
- What decisions would the industry need to make about transition?
- What happens next?

Background

- Digital terrestrial broadcasting began in the UK 17 years ago – on 15th November 1998 – the first national rollout of DTT worldwide
- DTG was founded in 1995 to facilitate the early launch of DTT
- Broadcast interactive services were identified as an important part of the service package from the outset
- DTG established a working group to select the receiver 'middleware' needed to support interactive applications
  - With a footprint small enough to run on set-top boxes or integrated TVs
  - Using open standards in a 'horizontal' market with free-to-air and pay TV
- MHEG-5 was selected as the best solution then available
  - STB memory and processor requirements were a particular constraint
- MHEG-5 has served the UK well, with feature updates along the way

Why Change to HbbTV?

- Since DTT began and MHEG-5 chosen, the changes we've seen: -
  - **Moore's Law:** transformed processing and memory in STBs and TVs
  - **Broadband:** now a mature and capable TV delivery platform
  - **Content:** authored for broadcast and Web, but repurposing is complex
  - **Middleware** standards have evolved: MHP, HTML5, HbbTV etc.
  - **TV set design**: From national to regional, then global products
- MHEG is mainly a UK feature (also used as CI+ browser across EU)
- Benefits are claimed from use of a single standard, adopted by many countries: -
  - Product development and testing **costs reduced**
  - Content **repurposing simplified** for multiple devices and different markets
  - Barriers to selling TVs into the UK reduced, encouraging **more competition**
  - UK programme makers may find **selling content easier** into other markets
  - Closer **alignment between standards** for broadcast and Internet delivery

Feasibility: What are the issues to be addressed? - I

- Can HbbTV support all of the MHEG functionality currently in use?
  - If not, would HbbTV be able to enhance the v2.0 specification?
  - Can a conformance and testing regime be delivered?
- Is HbbTV necessary in the broadcast chain? Could it and MHEG both be supported?
  - Would a simulcast period be necessary?
  - Would there be sufficient data capacity in the multiplexes to simulcast?
  - Are there technical solutions that would enable efficient simulcasting?
- Can broadcasters' interactive content be converted automatically into MHEG and HbbTV streams during the simulcast period?

Feasibility: What are the issues to be addressed? - II

- Will manufacturers offer 'dual stack' receivers with MHEG and HbbTV or will HbbTV-only receivers need to be supported from day 1?
  - Freeview Play receivers with HbbTV 2.0/MHEG dual stack are currently shipping in UK
  - For HbbTV-only, when will a minimum necessary set of services be ready?
- DTG's D-Book 8 already has an agreed MHEG / HbbTV co-existence model
  - This could support the efficient delivery of content during a simulcast period
  - One broadcaster has been testing some of the signalling (and found problems)

be, to transition from MHEG?

1. Key stakeholders work together to evaluate the case for change
   - DTG formed its MHEG Transition Task Group in May 2015
   - White Paper report to DTG Council will be produced before Christmas
2. DTG Council assesses the case for change - February 2016
3. Industry-wide decisions taken - agreed roadmap and dates
   - Decisions to be taken by Freeview and DUK
   - Aligned plans for broadcasters, manufacturers and infrastructure operators
   - Revised D-Book published, enabling HbbTV-only receivers
4. Begin MHEG / HbbTV simulcast services
   - Manufacturers can test then launch HbbTV-only products, MHEG-only or both
5. All new receivers must include HbbTV capability
6. Simulcast period ends – only HbbTV services available

What decisions are needed?

- Do the benefits of change outweigh the costs and disruption entailed?
  - For some manufacturers, it's clear; for broadcasters it may be a closer call
- What's the optimal time to begin simulcast services?
  - An earlier date may carry much higher operational risks
  - A later date will delay benefits and may miss the window of opportunity
- Governance: How will the transition programme be managed?
- When should MHEG be optional and HbbTV mandatory in receiver requirement?
  - For new receivers to meet D-Book and Trade Mark Licence requirements
- When should the simulcast period end?
  - How long will it take for the STB and TV replacement cycles to ensure most homes have HbbTV compatible receivers?

Next Steps

- MHEG Transition Task Group completes its White Paper for DTG Council
- DTG Council, DUK, Freeview and other stakeholders decide
  - Roadmap and provisional timescales agreed
- Governance arrangements for implementation and testing put in place
- HbbTV delivers an enhanced version of HbbTV 2.0 spec. and DTG produces a new version of the D-Book
- Detailed planning by manufacturers, broadcasters and operators
- Implementation phase begins
  - Applications re-authored in HbbTV
  - Infrastructure provided to deliver HbbTV broadcast interactive services
  - HbbTV-only products designed, compliant with ne version of D-Book

Questions?

From MHP To HbbTV

The Italian Case

Angelo Pettazzi

On behalf of HD Forum Italia

HbbTV Symposium
London, December 8th, 2015

Presentation Agenda

- HD Forum Italia
- The market overview:
  - Major Broadcasters and Operators
  - Connectable device penetration
  - Broadcasters and Operator OTT services
- The migration market request:
  - HbbTV – HDFI working group
    - The business requests
    - The working group outcome
  - Managing the gap

HD Forum Italia - Who We Are - www.hdforumitalia.org

- **HD Forum Italia** is an association established to promote, support and disseminate the use of audiovisual and multimedia content, High Definition, Ultra High Definition and 3D products and technologies and any other emerging audiovisual solutions
- **Established in 2006**, HD Forum Italia embraces interests from the TV industry: producers, content providers and aggregators, broadcasters, network operators, research institutes and laboratories, equipment manufacturers and distributors, representatives of institutions.
- It is organized in **Working Groups** that, periodically, defines and profiles technical specifications that are published in **HD Books** directed towards the industry.

HD Forum Italia - Who We Are

The Italian Market – Major Broadcasters and Operator

- **Rai**
  - The public service broadcaster
- **Mediaset**
  - The major commercial broadcaster offering FTA and PayTV services
- **Sky**
  - The Italian branch of the pan-european satellite broadcaster offering PayTV and FTA services
- **La7**
  - The commercial broadcaster, owned by Cairo Communication, offering FTA services

- **Tivù**
  - A joint venture founded in October 2008 by **Rai, Mediaset and Telecom Italia Media** to offer value added services to their members (e.g. EPG, platform services).
  - Tivù, through specific agreements with Manufacturers, has set up an horizontal platform - called **tivùon!** – offering to their members and third party SPs a secure and controlled environment to deliver valued OTT services to viewers.

The Italian Market – An Overview of Connectable Devices

- Various kind of connectable device with different capabilities:
  - **Smart TV** (based on Manufacturers proprietary technologies)
  - **DGTVi Gold** (based on DVB-MHP, DASH since 2013 models, no DRM, no app security)
  - **tivùon!** (DGTVi Gold features plus Marlin CENC-compliant DRM, DASH, broadband app security with Tivù certificates)
- Addressable market
  (GfK sellout data internal elaboration, cumulated to end 2014)

Tipologia	Sell out
Smart TV	4.272.000
Gold label TV & STB	3.950.000
tivuon! TV & STB	1.000.000

The Italian Market – An Overview of OTT Services - RAI

RAI offers the following free services to their viewers; namely:

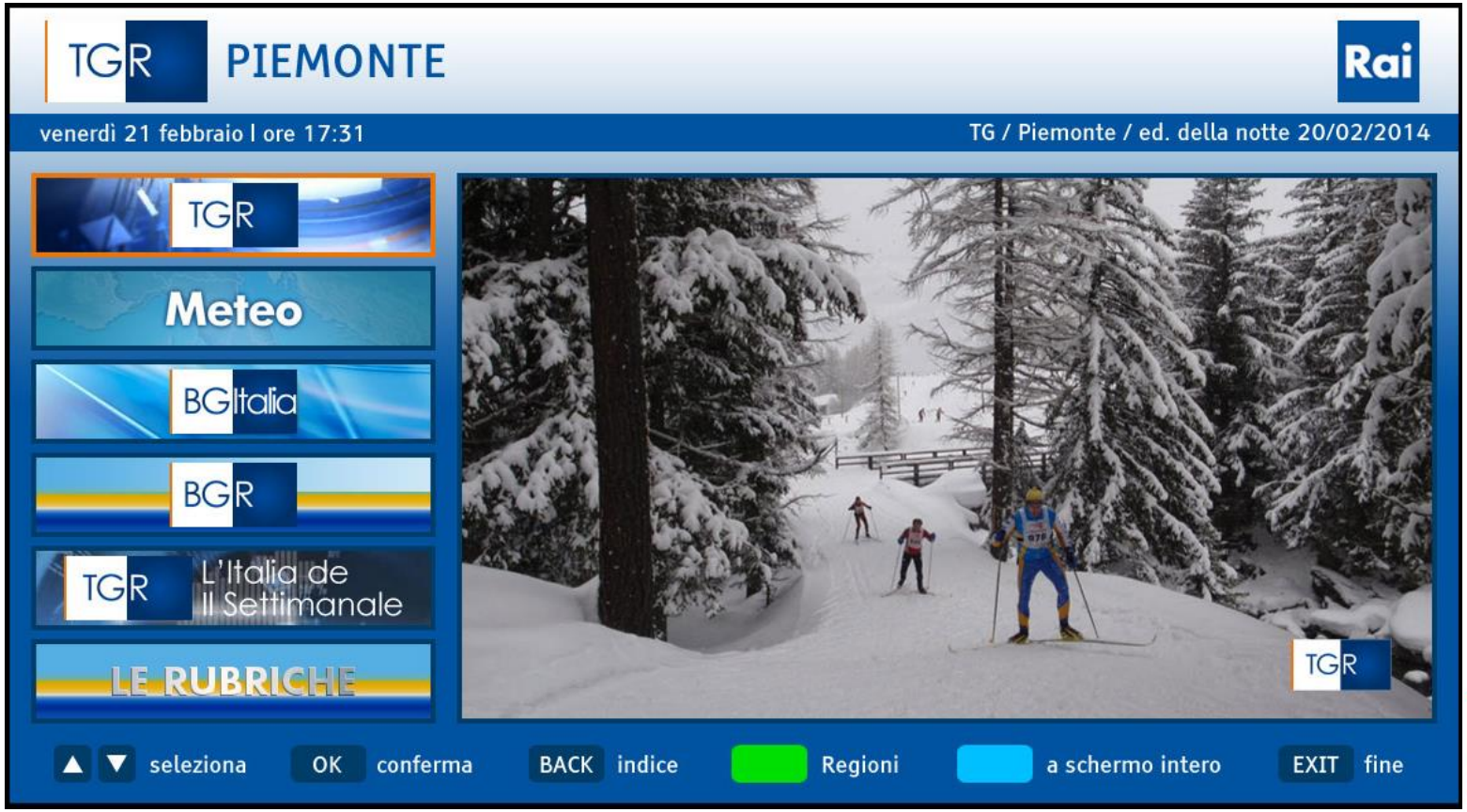
- **RAI Replay** – a free catch up of previous 7 days programming;
- **TGR**, a free catch up of regional news and regional weather report;
- **RaiSport**, a free catch up of sport news;
- **RaiNews**, an on line news magazine with a selection of news video gallery.

These services are available on DGTVi gold and tivùon! labeled receivers and “Rai Replay” even on LG and Samsung smart TVs.

RAI Replay – a free catch up of previous 7 days programming

… and LG and Samsung Smart TVs

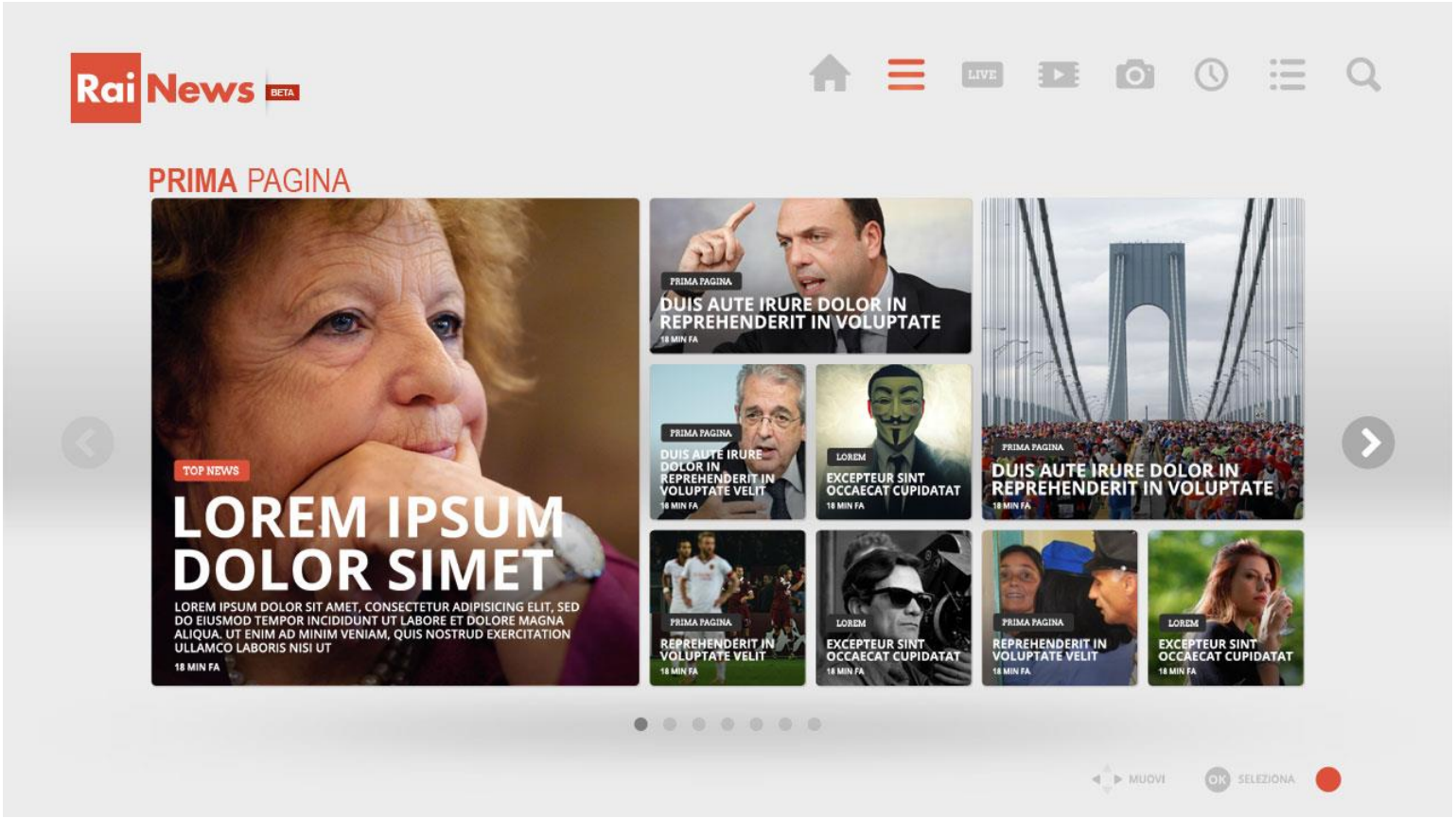
TGR, a free catch up of regional news and regional weather report



ABILITATO tivùon!
dgtv PER IL DIGITALE TERRESTRE
PREDISPOSTO PER TV DIGITALE IN CHIARO, PAY E SERVIZI INTERATTIVI*.
HD DVB-T
*CONSULTA LA LISTA SUL SITO WWW.DGTVI.TIVU.TV

RaiSport, a free catch up of sport news programs

RaiNews, on line news magazine with a selection of news video gallery



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PREDISPOSTO PER TV DIGITALE IN CHIARO, PAY E SERVIZI INTERATTIVI*. HD DVB-T
*CONSULTA LA LISTA SUL SITO WWW.DGTVI.TIVU.TV

The Italian Market - An Overview of OTT Services - Mediaset

MEDIASET Mediaset offer a combination of free and pay services to their viewers; namely:

- **Mediaset on Demand** – free catch up TV of previous 7 days programming;
- **Infinity** – a subscription VOD catalogue;
- **Premium PLAY** – a value added service always included for MP pay TV subscribers featuring linear channels/events and a VOD catalogue;
- **Premium ONLINE** – a MP pay TV lite linear and non linear offer

These services are available on …

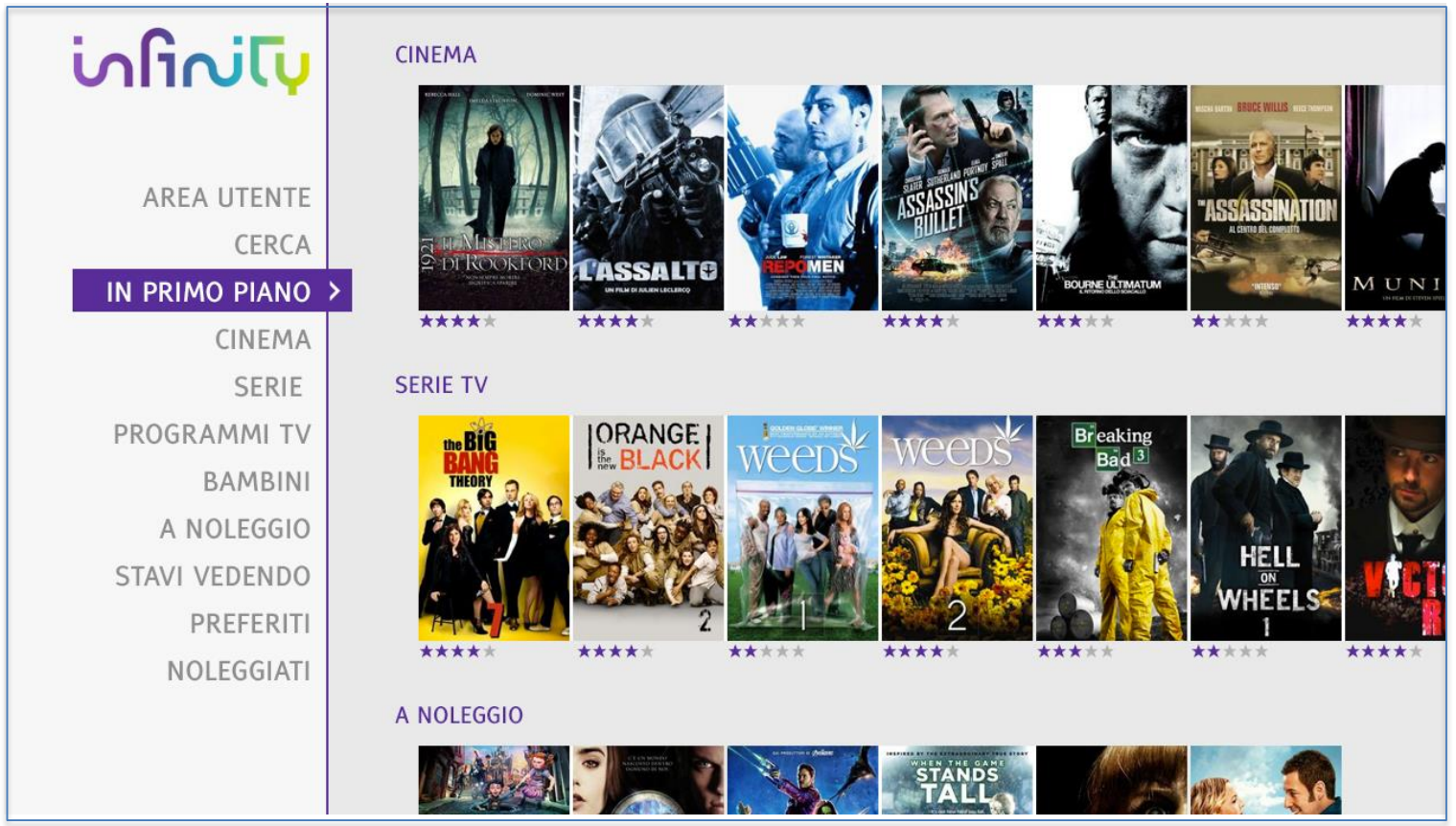
The Italian Market - An Overview of OTT Services - Mediaset

MEDIASET … available on the following devices:

	Mediaset On Demand	Infinity	Premium PLAY	Premium ONLINE
Smart TV	LG (link to native MHP app)	Samsung, LG, Sony, Panasonic	Samsung, (Sony and Panasonic soon), MP Smart CAM	Samsung (Sony and Panasonic soon)
DGTVi Gold Label	STBs Various brands (SD only, best effort, no content/app protection)	STBs Various brands (HLS, Nagra PRM)	STBs MP and other brands (HLS, Nagra PRM)	STBs MP and other brands (HLS, Nagra PRM)
tivùon!	LG (DVB-DASH, CENC, Broadband App Security)	LG (DVB-DASH, CENC, Broadband App Security)	LG (DVB-DASH, CENC, Broadband App Security)	LG (soon)

Mediaset On Demand – The TV set version of web and mobile 7 days catch up TV service

Infinity – A stand alone subscription VOD catalogue



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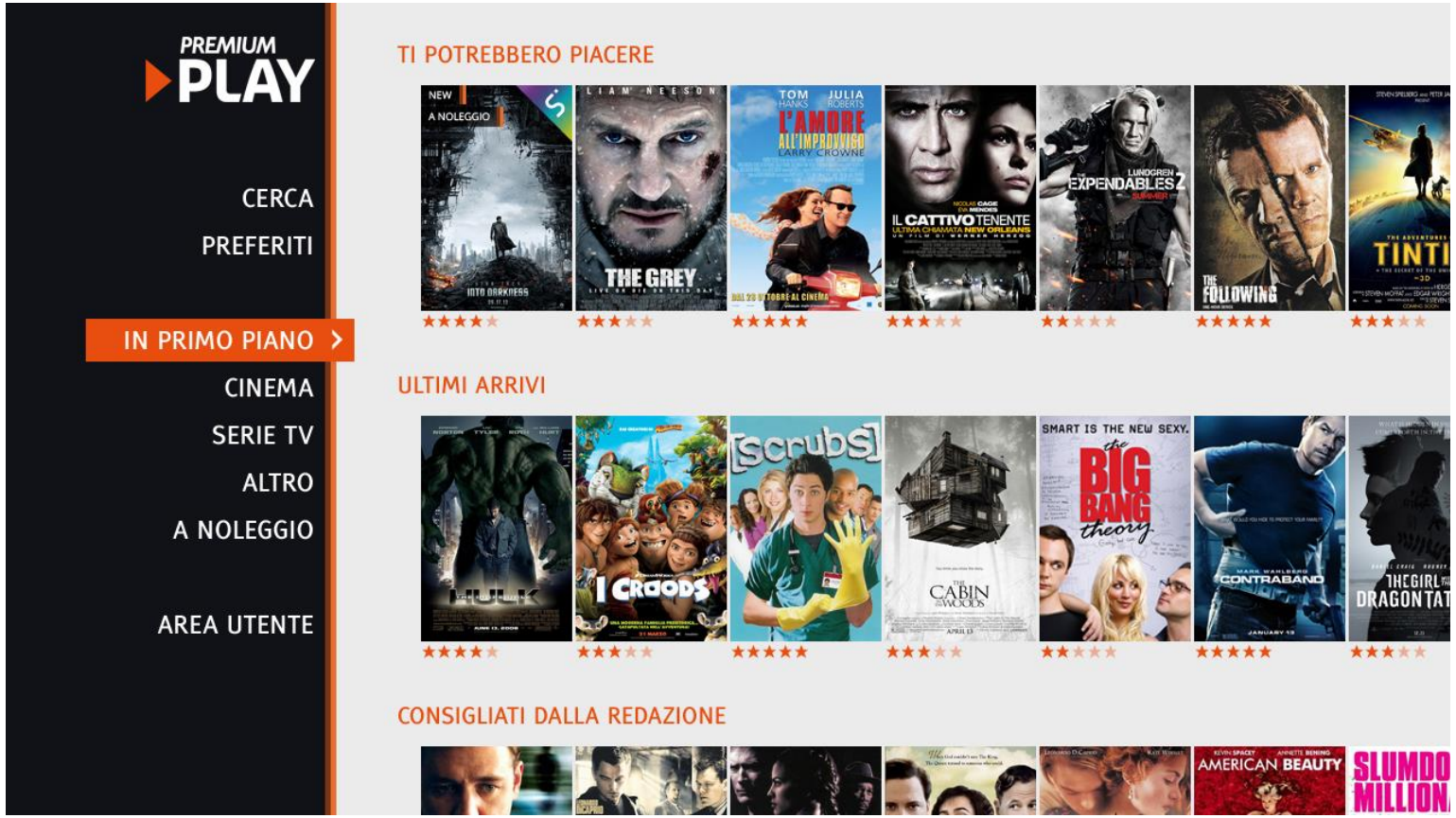
*CONSULTA LA LISTA SUL SITO WWW.DGTVI.TIVU.TV

The Italian Market – An Overview of OTT Services - Mediaset

MEDIASET **Premium PLAY** – for MP subscribers featuring linear channels/events and a VOD catalogue



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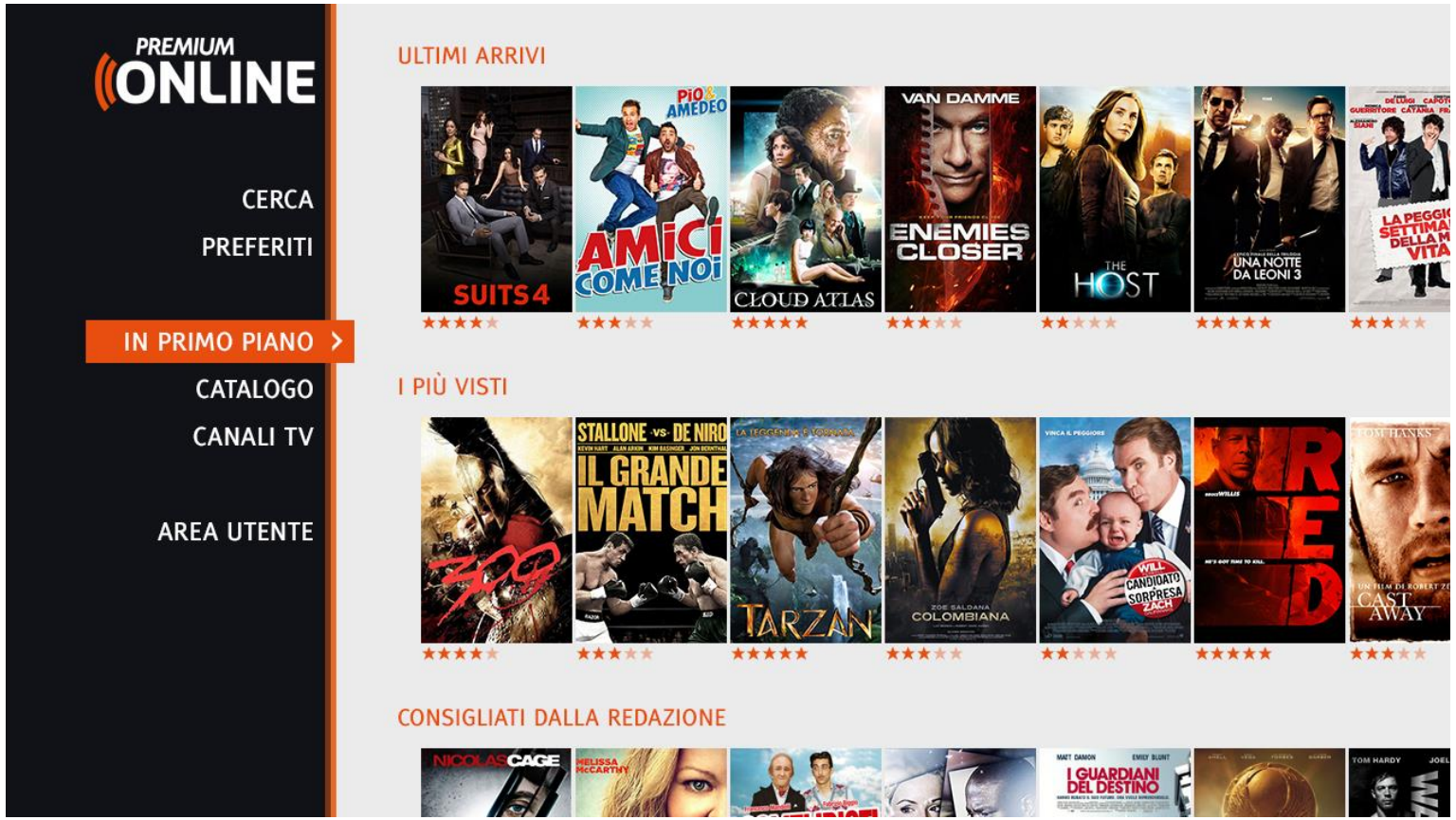
Premium ONLINE – a MP pay TV lite linear and non linear offer



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*CONSULTA LA LISTA SUL SITO WWW.DGTVI.TIVU.TV

La 7 On Demand - a free, 7 days catch up TV service

tivùon! from Tivù

- A new, soon to be launched, Tivù service agreed with Rai, Mediaset and La7;
- It is a broadcasters' coo-petitive "EPG and catch up TV" service;
- A unique interactive proposition, shared alongside Rai, Mediaset and La7 channels lineup, to offer an organized EPG and the respective broadcasters' catch up TV programs to viewers.

tivùon! from Tivù - Access to **tivùon!** service

Rai channels call-to-action

Mediaset channels call-to-action

La7 channels call-to-action

… pressing the green remote control button …

The Italian Market – An Overview of OTT Services - Tivù

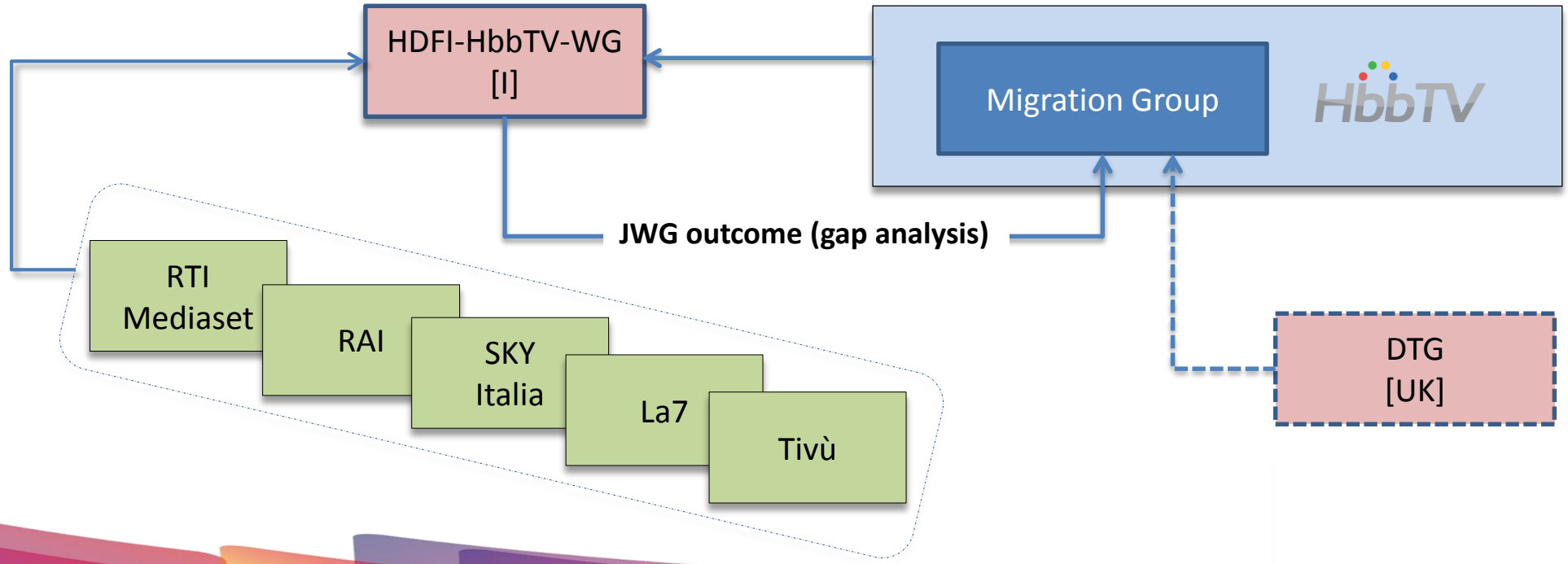
tivùon! from Tivù - Full Screen EPG Up TV programs

The Italian Market – Migration from MHP to HbbTV 2.0 – CRTV Position

- In conclusion, **today**, there are around **15 OTT services**, offered by public service and commercial broadcasters, both free-to-air and payTV services, that are exploiting the DVB-MHP middleware, mainly on TV set receivers.
- On **July 2014**, CRTV, the Association of Broadcasters and Network Operators released a statement of direction toward the adoption of HbbTV 2.0; relevant issues to face:
  - Migration of existing MHP applications to HbbTV 2.0;
  - Coexistence/simulcasting of MHP and HbbTV 2.0 applications and preservation of legacy devices;
  - Support of newly identified business needs (e.g. CICAM +1.4 and application embedding/storing)

The Italian Market - Migration from MHP to HbbTV 2.0 - Joint WG

- In light of the migration, HDFI and HbbTV Association started working in the so-called **"HbbTV Working Group"**, in order to identify **"gaps"** between broadcasters' commercial requirements and HbbTV 2.0 specifications.



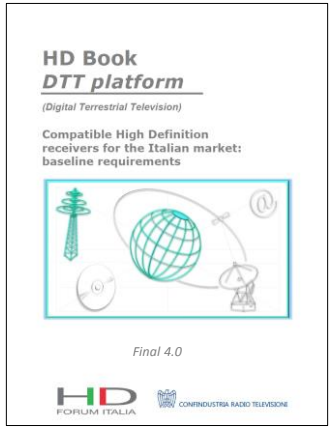
The Italian Market – Migration from MHP to HbbTV 2.0 – Joint WG

- The JWG followed an SDO like process, defining “use cases” and deriving the related “Business Requirements” to then be verified against HbbTV 2.0 requirements.
- The identified **use cases** at a glance:
  - Application launcher and context (lifecycle and signaling);
  - Application features (including secure application download and exclusive use of device resources);
  - Application features based on a CICAM (VoD and live streaming by CICAM means);
  - Companion screen (discovery, application launching, communication and synchronization) ;
  - Application embedding (i.e. application embedding/storing to overcome lifecycle).

The Italian Market - Migration from MHP to HbbTV 2.0 - Joint WG

- The gaps were identified and documented to the HbbTV Migration Group.
- Relevant identified gaps were:
  - CI+1.4 related (e.g. CICAM Player mode, CI+ virtual channel HbbTV app launch)
  - Application exclusive usage of specific device resources (e.g. DRM, memory)
  - Application embedding/storing (i.e. app delivering operator specific UX)
- Gaps management:
  - Some gaps have been discussed and identified as relevant and passed from Migration Group to the RG and will be part of an incremental version of HbbTV;
  - Others were not considered valid (e.g. app exclusive usage of resources and app embedding).

The Italian Market – Migration from MHP to HbbTV 2.0 – HD Book 4.0



- Gaps that were not considered relevant by the HbbTV Migration Group are right now under HD Forum Italia evaluation to be part of the new HD Book 4.0 (i.e. the baseline requirements for compatible HD receivers for the Italian market).
- The new HD Book 4.0 will mandate HbbTV 2.0 only, completely replacing the DVB-MHP middleware.
- HD Book 4.0 will be published on time to allow the HbbTV 2.0 (or maybe 2.x) compliant device to be on the market on 2017 (i.e. on March 2016).
- Broadcaster will start delivering HbbTV 2.0 services (in simulcast with DVB-MHP services) on the same time frame.

Thank you for your attention

angelo.pettazzi@mediaset.it

Vision for HbbTV

Dr. Klaus Illgner-Fehns

Managing Director, IRT

Chairman HbbTV Association

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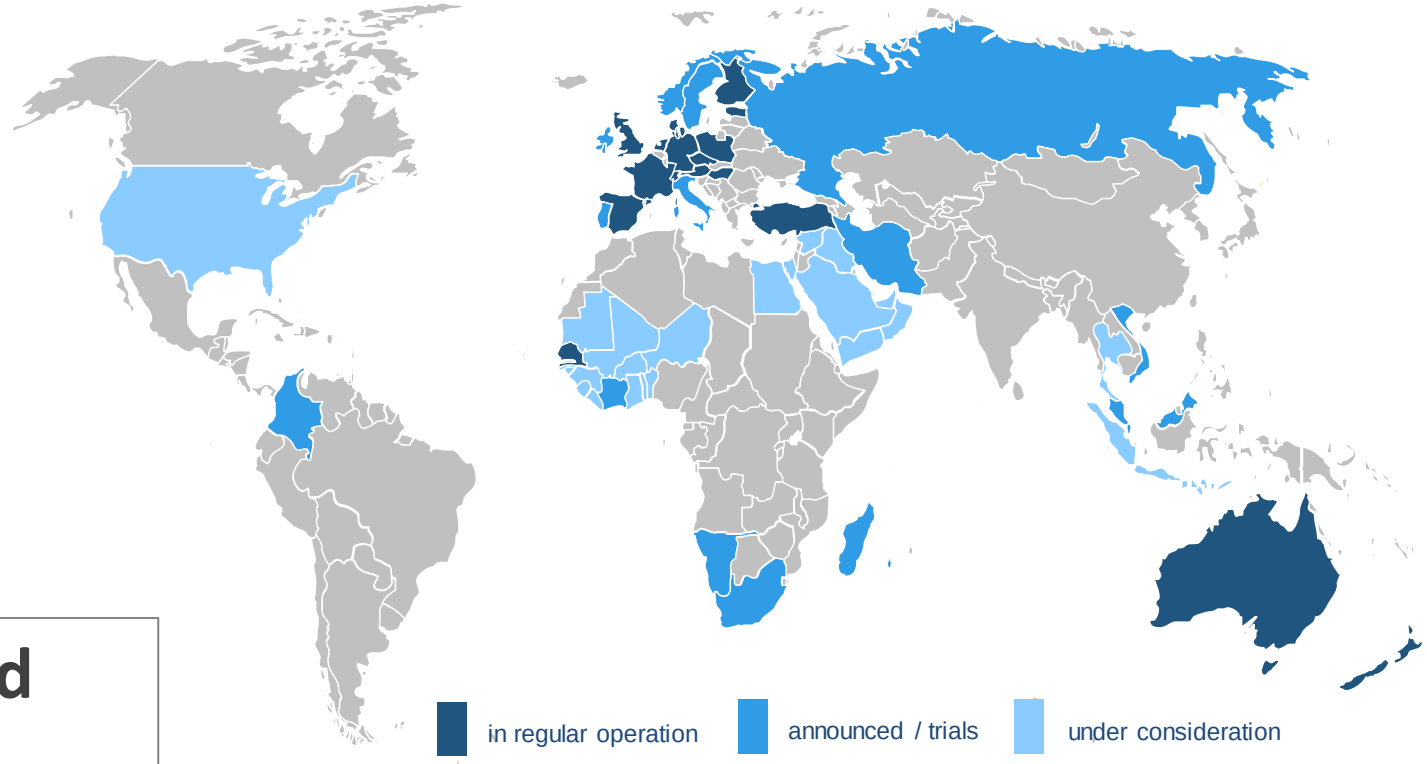
HbbTV: Paradigm for Success

- addresses current market demand
- creates win-win for stakeholders
- references mature & stable pieces of technology
- Keeps it simple
- Is a single specification
- Broadcast-minded standard bridging national peculiarities



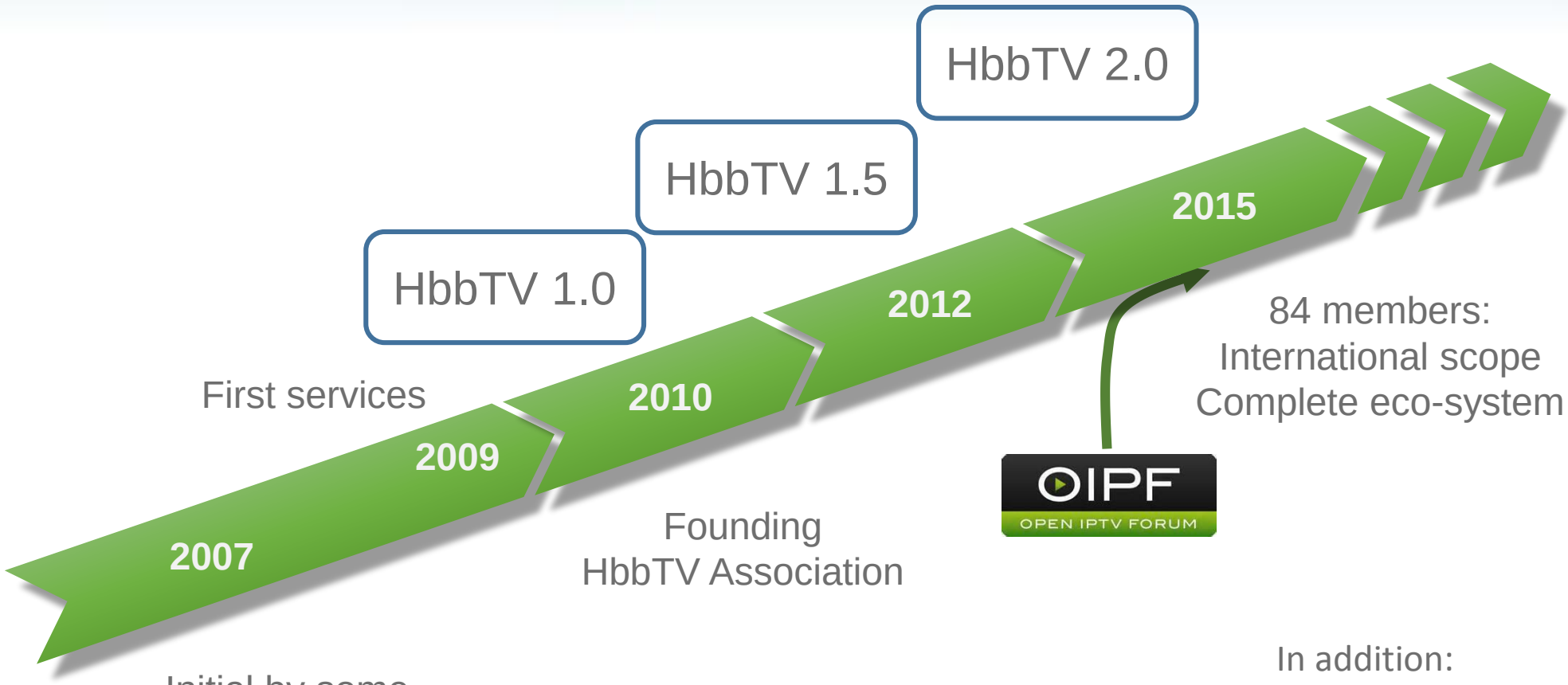
Fastest growing TV standard

100s services

20 deployed countries

30 Mio devices (TV or STB)

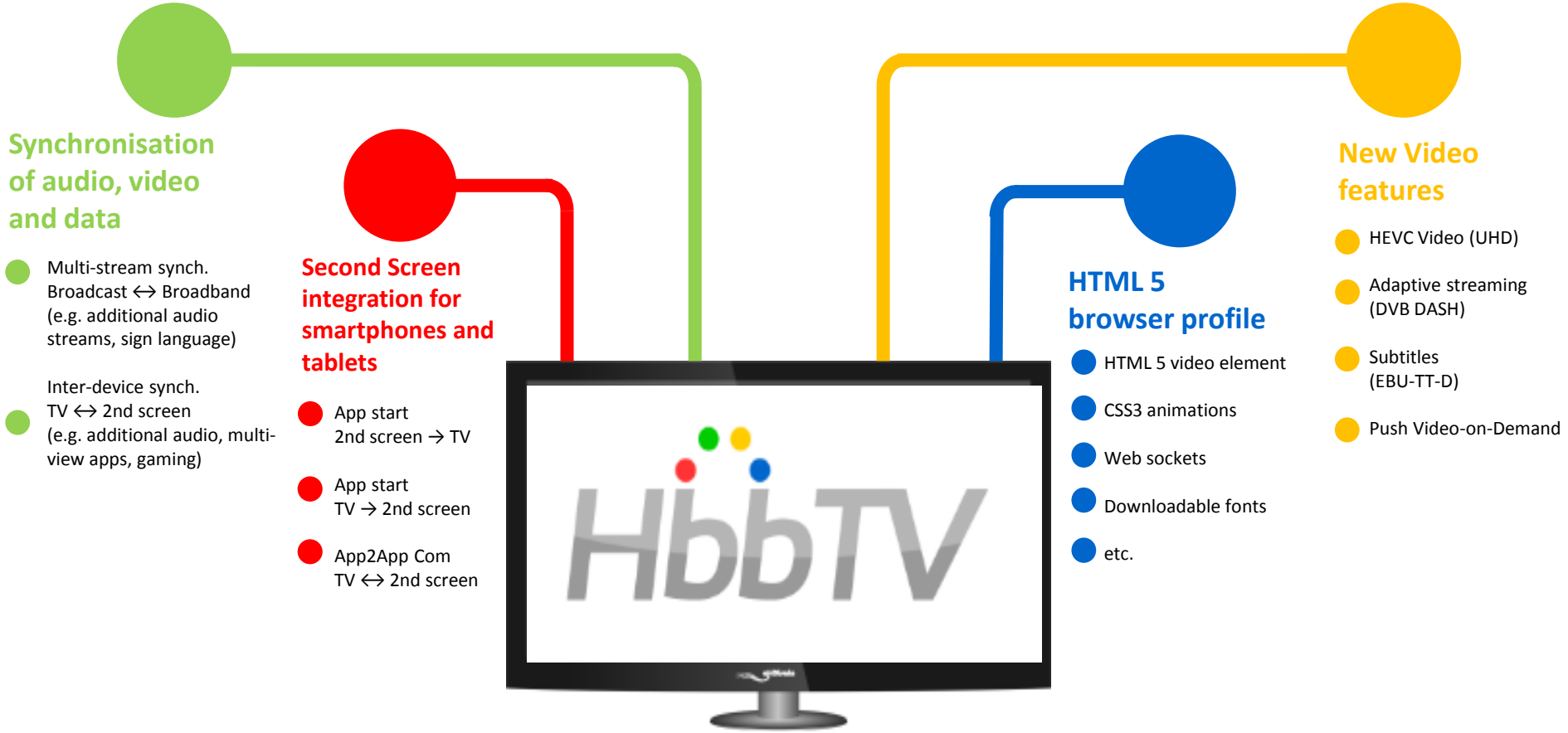
The HbbTV Association



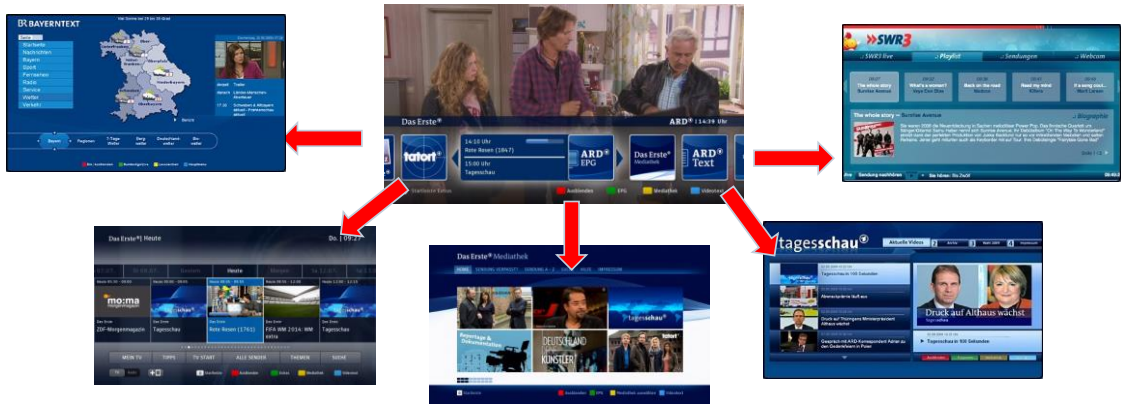
In addition:

- Test suite development
- Logo licensing regime
- Certification regime

The Key of Elements HbbTV 2.0



HbbTV provides Benefits for the Entire Ecosystem

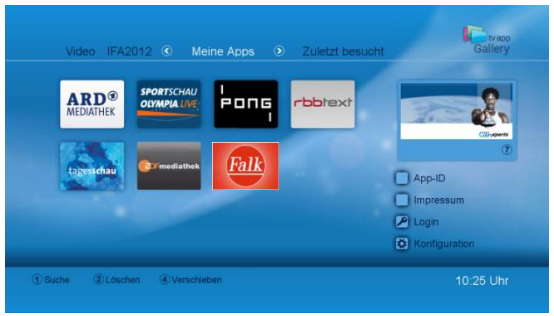


Broadcasters & Content Providers

Network operator / Service provider portals

Manufacturer Portals

Device independent Applications and …



… open HbbTV TV App Portal for all kinds of applications

Same Market Facts and Considerations

HbbTV in all networks	IPTV integration
AIT not available for receivers	New feature
Security Concerns	HbbTV 2.0; joint effort with DVB
Covering “national” flavours in broadcast-minded technology?	HbbTV considers specific requirements of common interest
Perceived as Broadcasters - only	HbbTV 2.0; broaden scope to include operators

Currently Discussed Features

IPTV

- Is operational in some networks
- Requires clarification (e.g. IPTV as broadcast, SD&S, multicast IP)

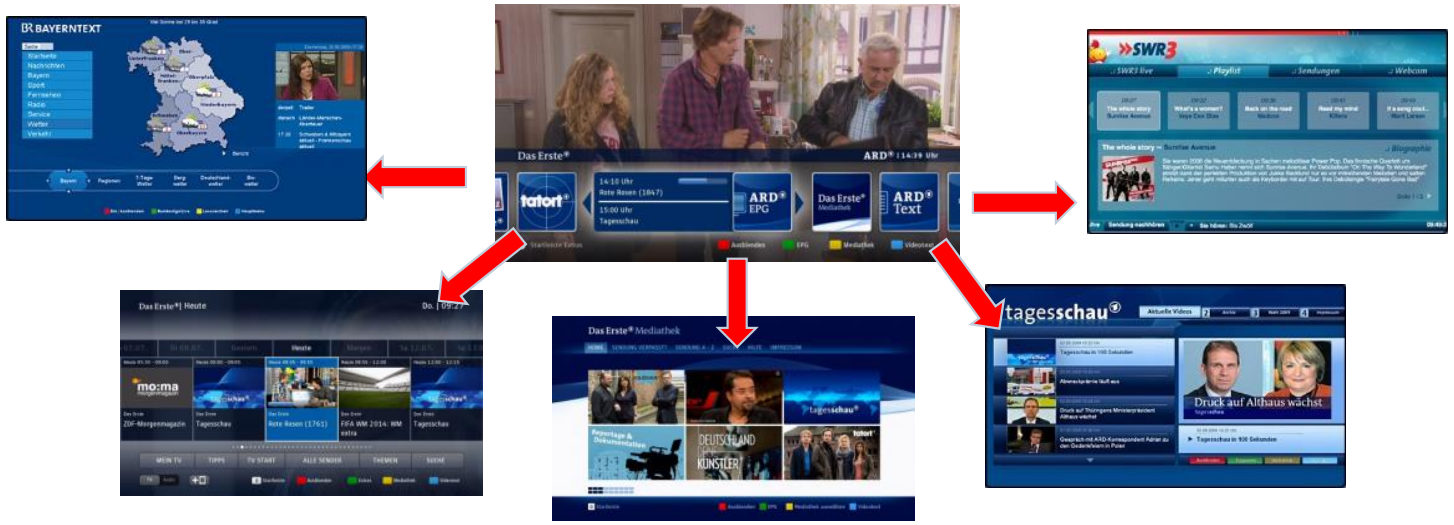
Application Discovery via Broadband

- enable launching broadcast-related apps even when signalling via broadcast does not reach the TV / STB

Operator Apps

- Interface to operator
- Co-existence of operator and broadcast apps (interoperability, defined rules)

Mismatch between Capabilities and Market Facts



Broadcasters & Content Providers

To some extend;
not the „big ones“

Network operator /
Service provider portals

marginal

Manufacturer Portals

Not supported
by portals

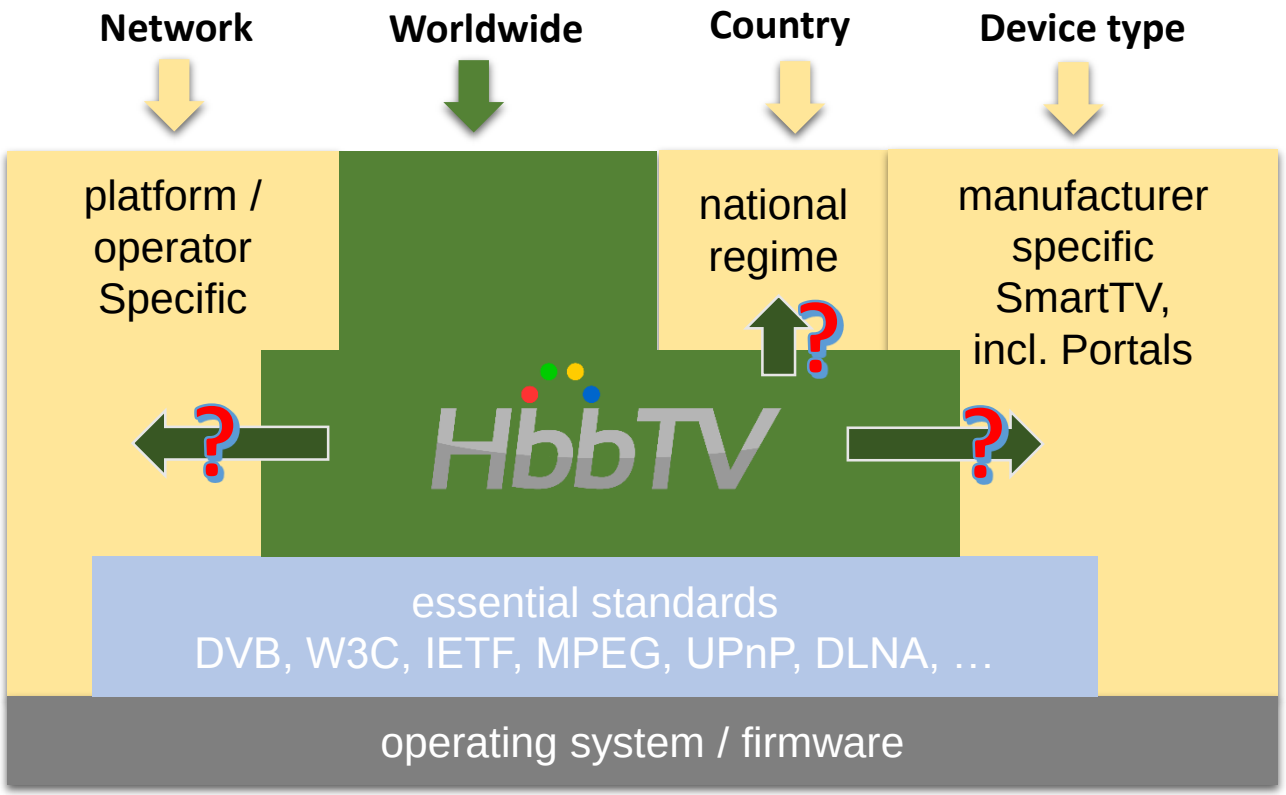
Device independent
Applications and …

Not available
in the market

… open HbbTV TV App Portal
for all kinds of applications

HbbTV in the Context of different Environments

HbbTV Common Denominator which enables
largely harmonized receiver platforms



Where is HbbTV moving to?

1. Support markets, implementation, and operational stability
   - testing of devices & applications,
   - Fostering interoperability

2. Communication and Marketing
   - Market information and best practices
   - HbbTV 2.0 is OTT

2. Technical Improvements

3. Address market requirements
   - Requirements from national markets, ideally with a common interest
   - Improving applicability for certain environments, e.g. operators
   - Feasibility for commercial services

Guiding Principles

- HbbTV Purpose
  - develop and promote open specifications and solutions for hybrid broadcast/broadband and IPTV television systems, with the ultimate public interest objective to allow harmonization of broadcast and broadband delivered entertainment services and consumer equipment
- market driven requirements
- Specification work follows
- no specification without test assertions

HbbTV is ….

the only wide-spread technology for true and seamless convergence of broadcast and broadband

Standard feature on SmartTV internationally

OTT

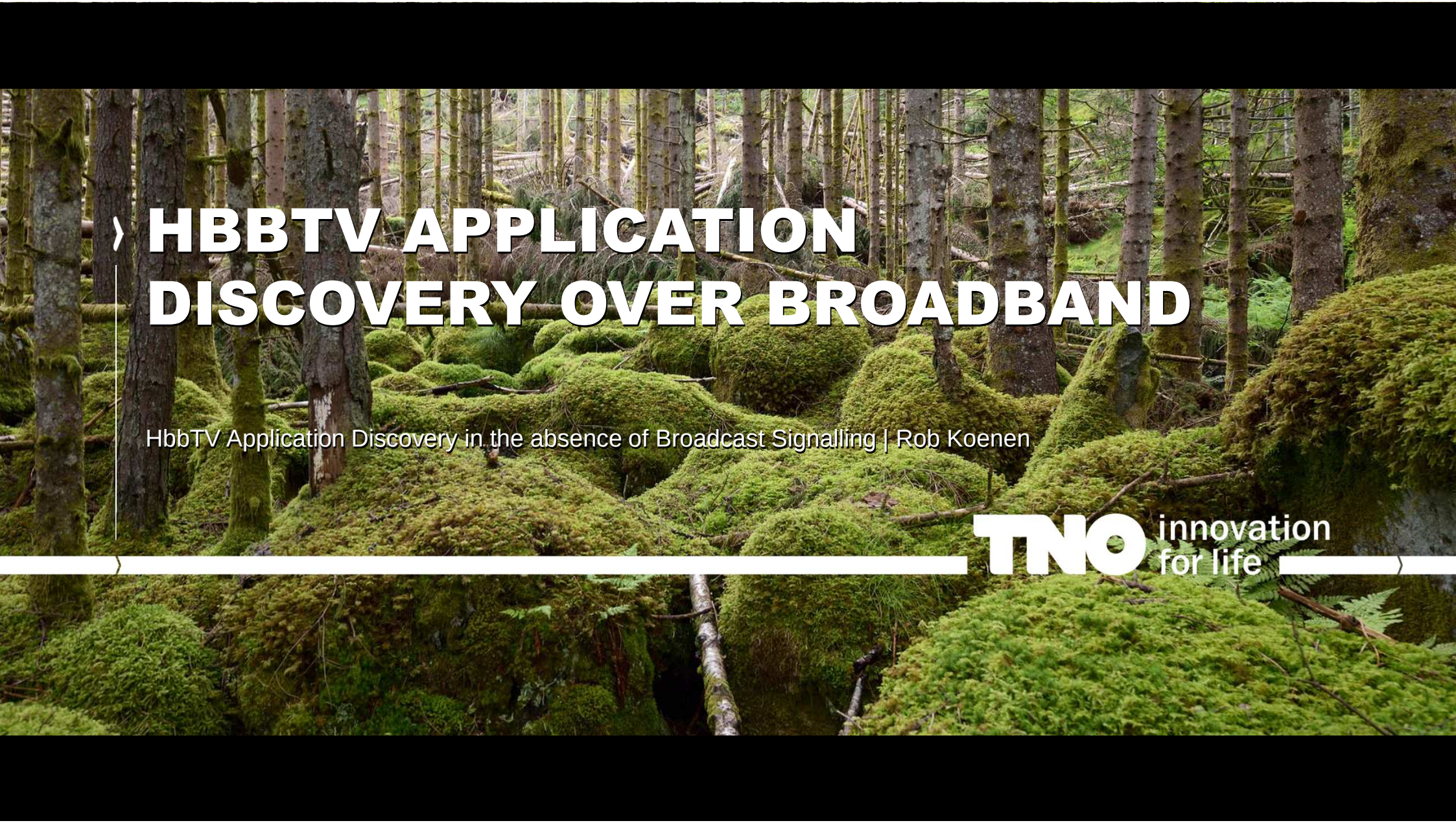
a fantastic environment for new services & formats and commercial opportunities

Thank you for your attention

illgner@irt.de

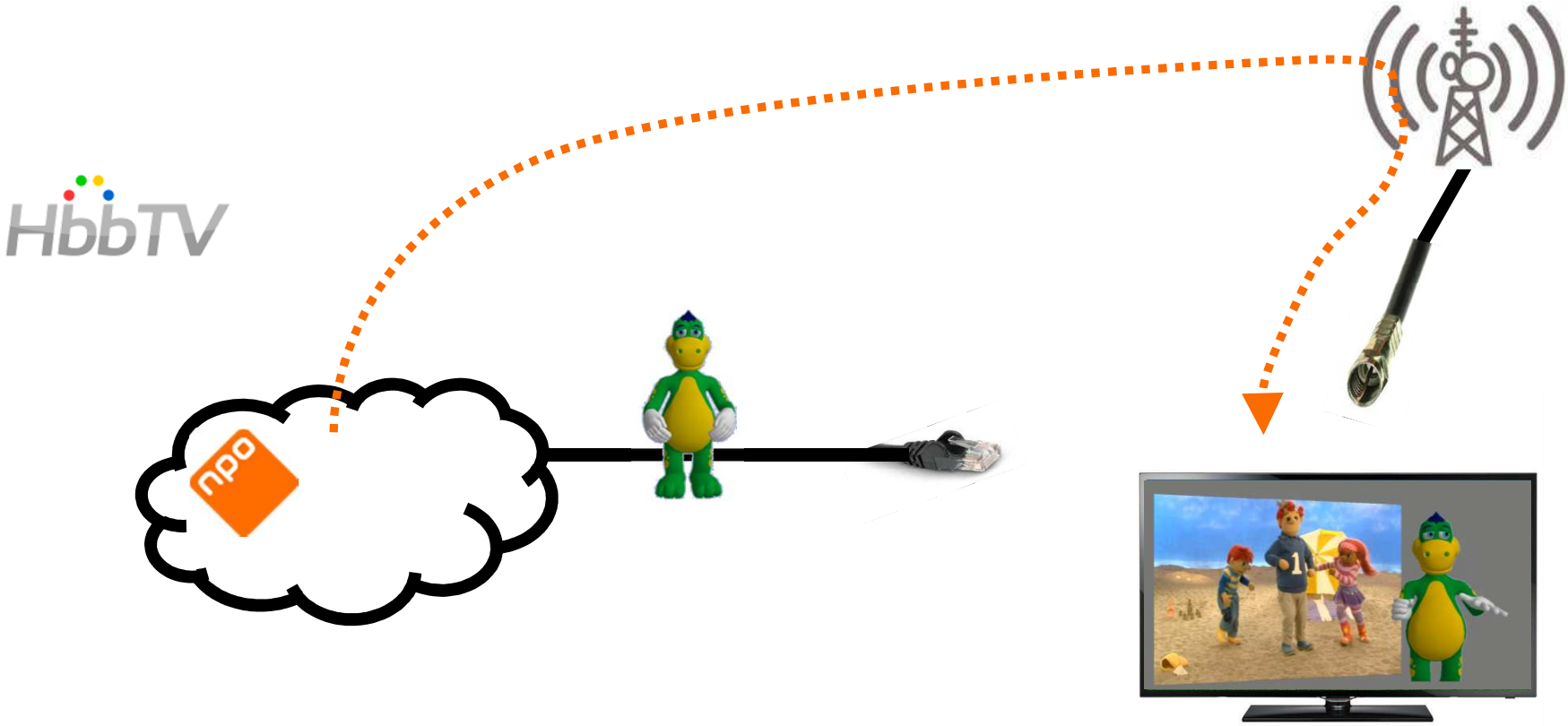
SPONSORED BY

ALSO FEATURING

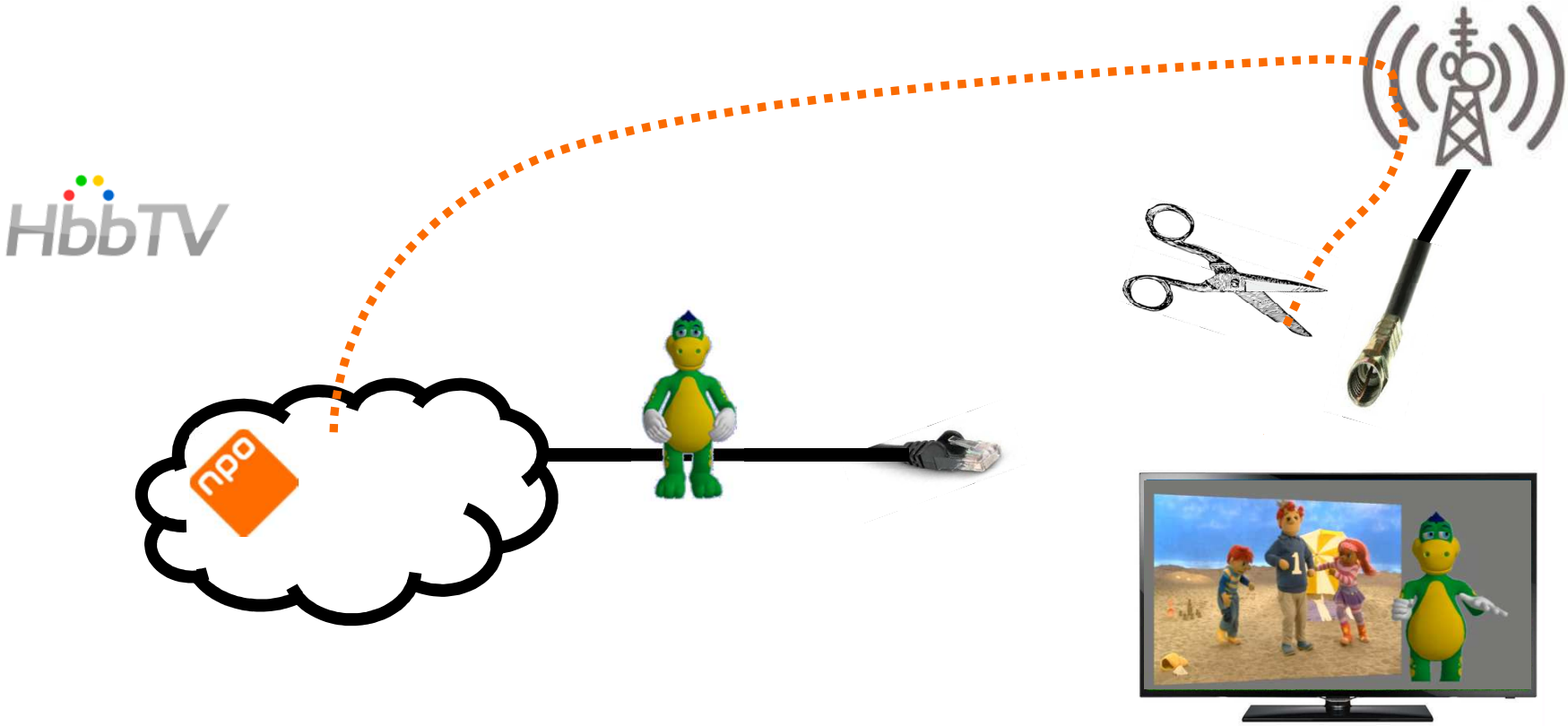

HBBTV APPLICATION DISCOVERY OVER BROADBAND
HbbTV Application Discovery in the absence of Broadcast Signalling | Rob Koenen
TNO innovation for life

TNO Project Supported by NPO, The Dutch Public Broadcasting Organisation

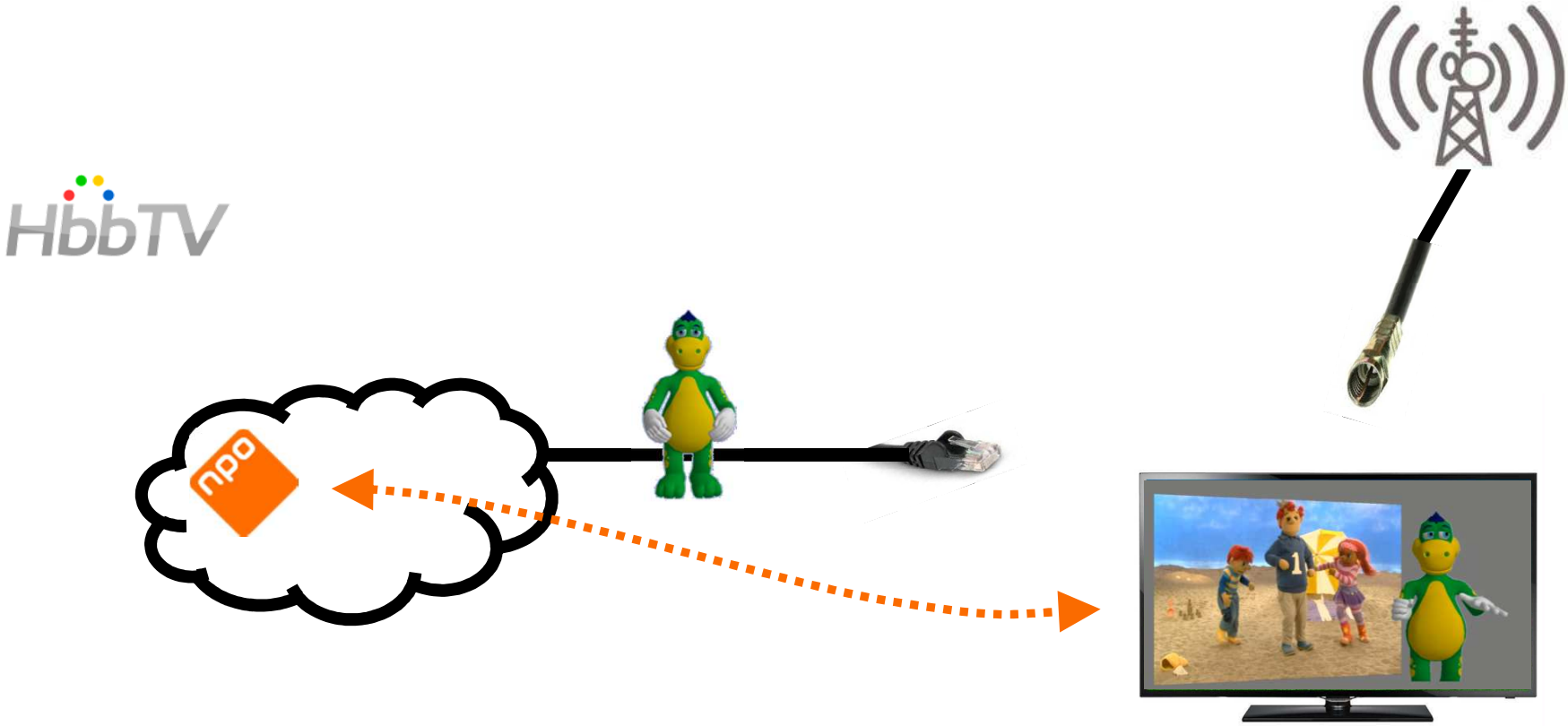
APP DISCOVERY OVER BROADBAND



APP DISCOVERY OVER BROADBAND



APP DISCOVERY OVER BROADBAND



WHY

- HbbTV applications require an AIT (Application Information Table) that is carried in the DVB broadcast

- Virtually all new connected TVs are now HbbTV compliant, but the user may still not be able to use the service, because:
  1. The trigger may not be carried by the operator, or
  2. The TV is connected to an STB using HDMI or SCART, while
     a) There is no AIT in the broadcast
     b) There *is* an AIT in the broadcast, but the STB does not support HbbTV

- Variations of this exist in several European markets, including The Netherlands, parts of the Nordics, Spain, others

WHAT

- New HbbTV Specification that specifies **Application Discovery over Broadband (“ADB”)**
- Two Cases:
  - TV receives a digital (DVB) broadcast including Service Information
  - TV connected to a video input (HDMI, SCART)
- Main Requirements:
  - Backward compatible
  - Don’t rely on regulatory regimes
    - Can rely on some sort of net neutrality though
  - Terminal must know when to invoke the new discovery method
    - and when not to
  - Secure, and respecting of privacy
  - Respect existing App Lifecycle

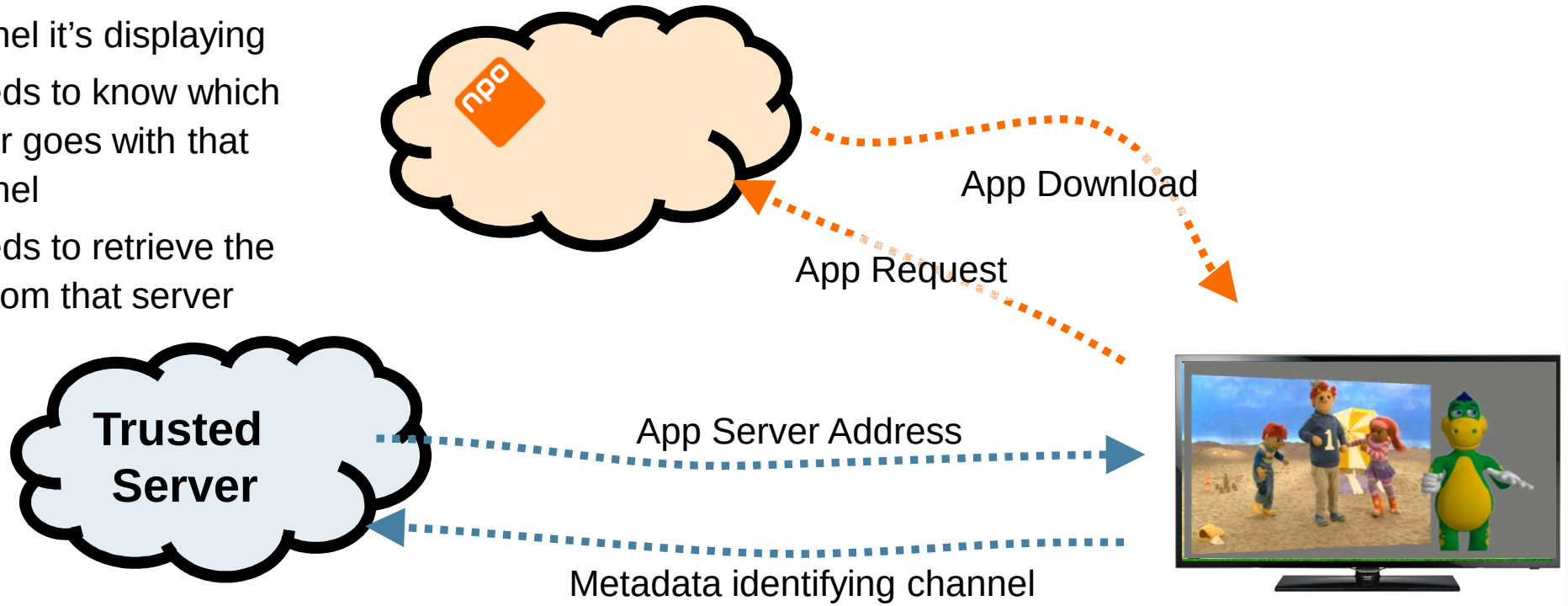
HOW

- Possible approaches:
  1. **Send the AIT** directly in the broadcast (in a way that cannot be removed)
  2. Send an **address for an AIT** server directly in the broadcast
  3. Let the (connected!) TV **discover where to retrieve the app**
     - through some form of **resolution,**
     - … based on knowing the current channel,
     - … looking at metadata that already exists,
     - … and that is always present and reliable.

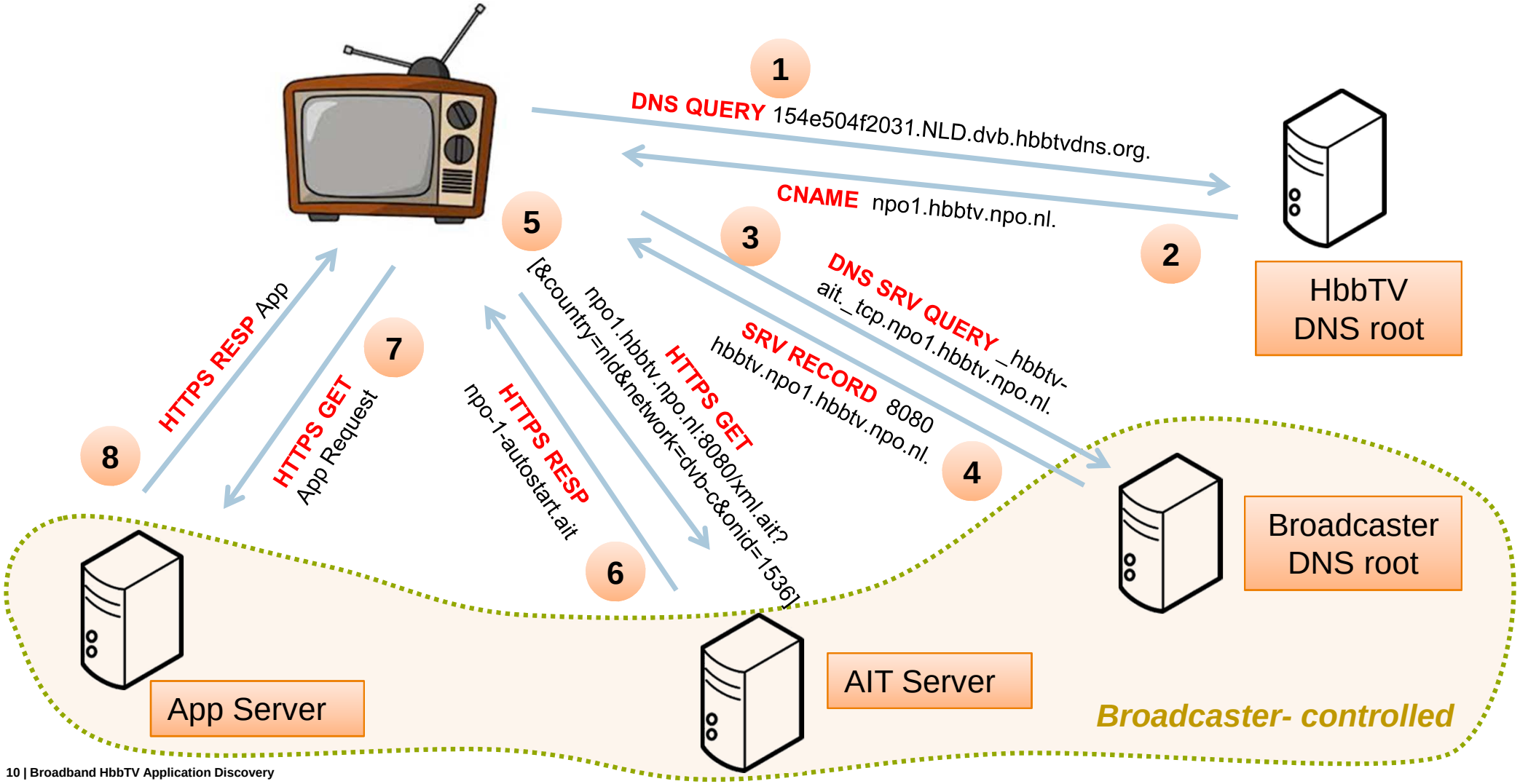
- Selected the third approach
- Modelled the solution after RadioDNS

BASIC PRINCIPLES

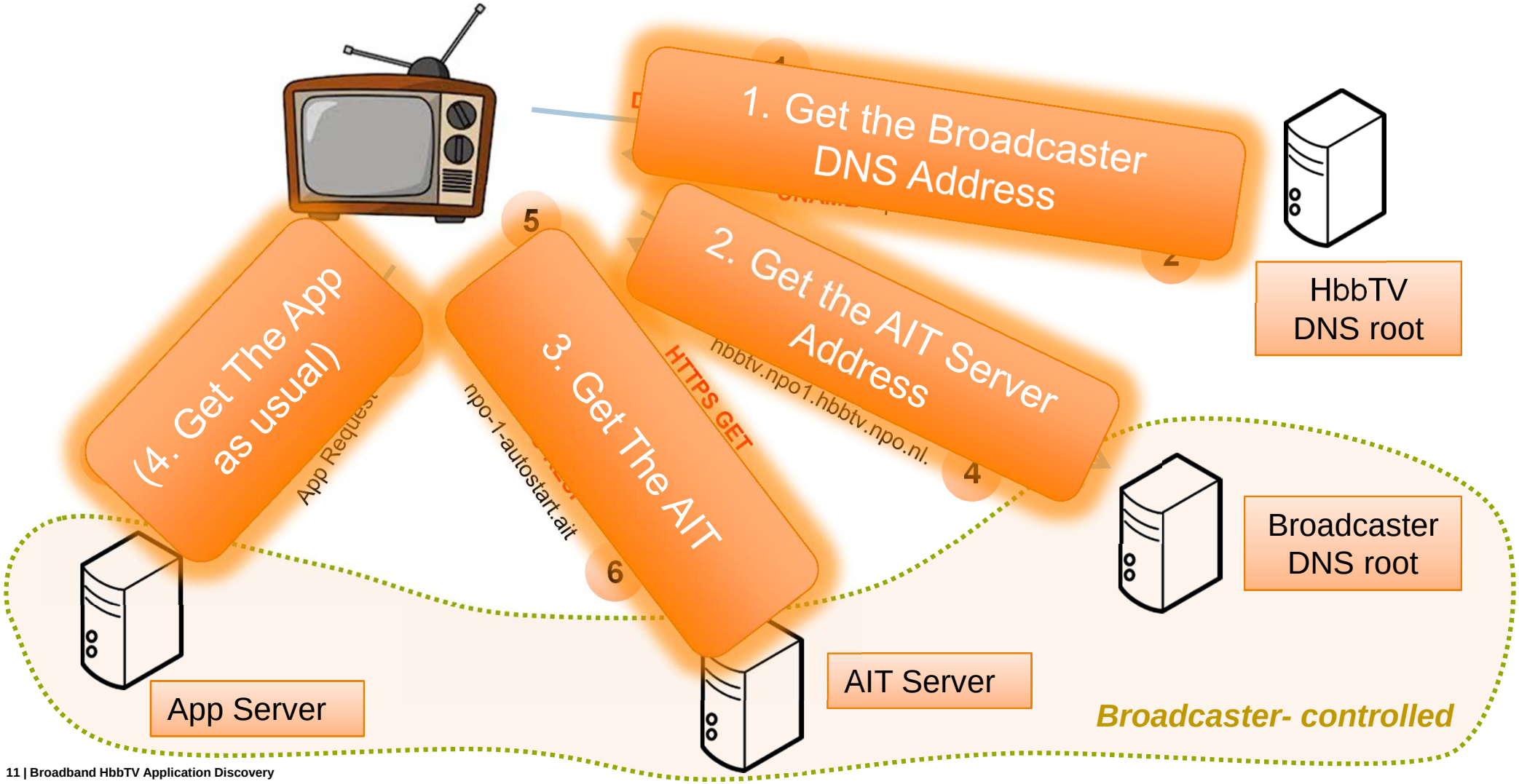
- For the TV to retrieve the App …
  - It needs to know the channel it's displaying
  - It needs to know which server goes with that channel
  - It needs to retrieve the AIT from that server



ARCHITECTURE & EXAMPLE

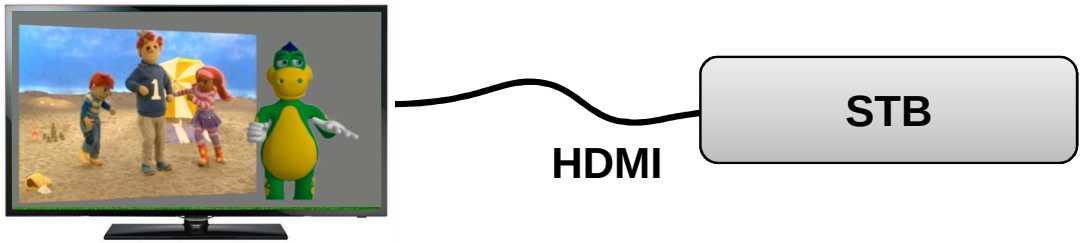


ARCHITECTURE & EXAMPLE



WHEN NO SERVICE INFORMATION AVAILABLE (STB ON HDMI, SCART)

- Need to use a form of Automatic Content Recognition:
- Take **fingerprint** and send to some server
  - Requires many queries; TV doesn't know when channel changes …
- Extract a **watermark** from audio or video
  - Could make HbbTV work even for recorded content … but not a requirement
  - Requires some sort of standardised watermark
  - HbbTV will not standardise watermarking solutions ... But ATSC is doing this for its ATSC 3.0 → see next presentation



PRIVACY CONSIDERATIONS

- Any solution should take **privacy considerations** into account
- Don’t enable third party to learn consumer’s **TV viewing behaviour**
- Pinging some central server with Channel ID on every channel change is **not acceptable**

- Solution: load a bunch of data when a terminal boots for all channels that are available; require that is stays in cache for a few hours
- DNS design inherently makes tracking difficult for third parties

- For the rest, things work the same as broadcast-signalled HbbTV as far as privacy is concerned
  - i.e., be able to show call to action (‘red button’)
  - Then load app when user presses that button

STATUS

- Specification work in HbbTV has finished for the case where we have Service Information
- Publication after Test Assertions ready; work on “Test Assertions” well advanced
- Spec to be published as a document that can be applied to all HbbTV versions
- Liaising with RadioDNS on establishing the required DNS infrastructure

- All HbbTV functionality available for ADB Apps, except for broadcast events / carousel
  - But can use web protocols instead;
  - And can make slightly different apps for broadcast-signalled vs. broadband-discovered

- Open to continuing work for the HDMI (SCART) case when a standardised solution is available that can be referenced

THANK YOU FOR YOUR ATTENTION
TNO innovation for life

Open ACR:
A Standards-Based Approach for Hybrid Broadcast/Broadband TV

Joe Winograd, EVP/CTO, Verance

HbbTV Symposium, December 2015

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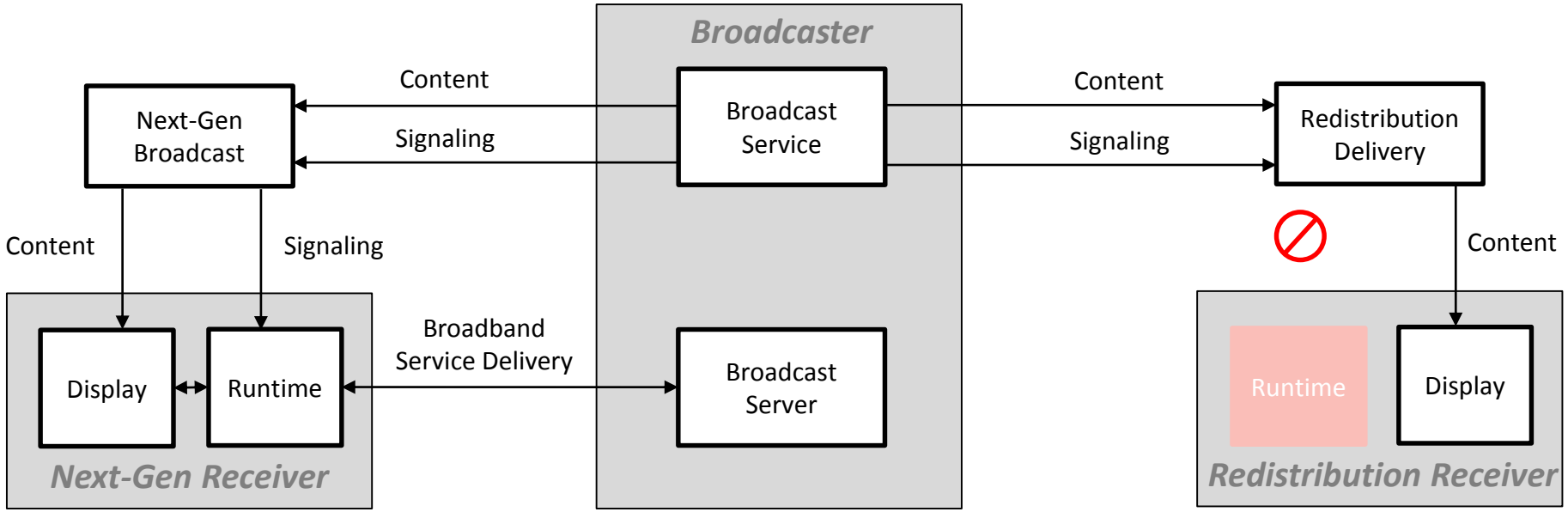
Many Redistribution Paths Do Not Carry Broadcaster Signaling



- 90%+ of US viewers receive broadcast TV via redistribution
  - MVPD STB connected to TV via HDMI
  - Redistribution diversity increasing (OTT, CVP-2, mobile broadcast…)
- Many redistribution paths do not deliver signaling, making advaced services unavailable to viewers
- This obstacle exists in many regions of the world

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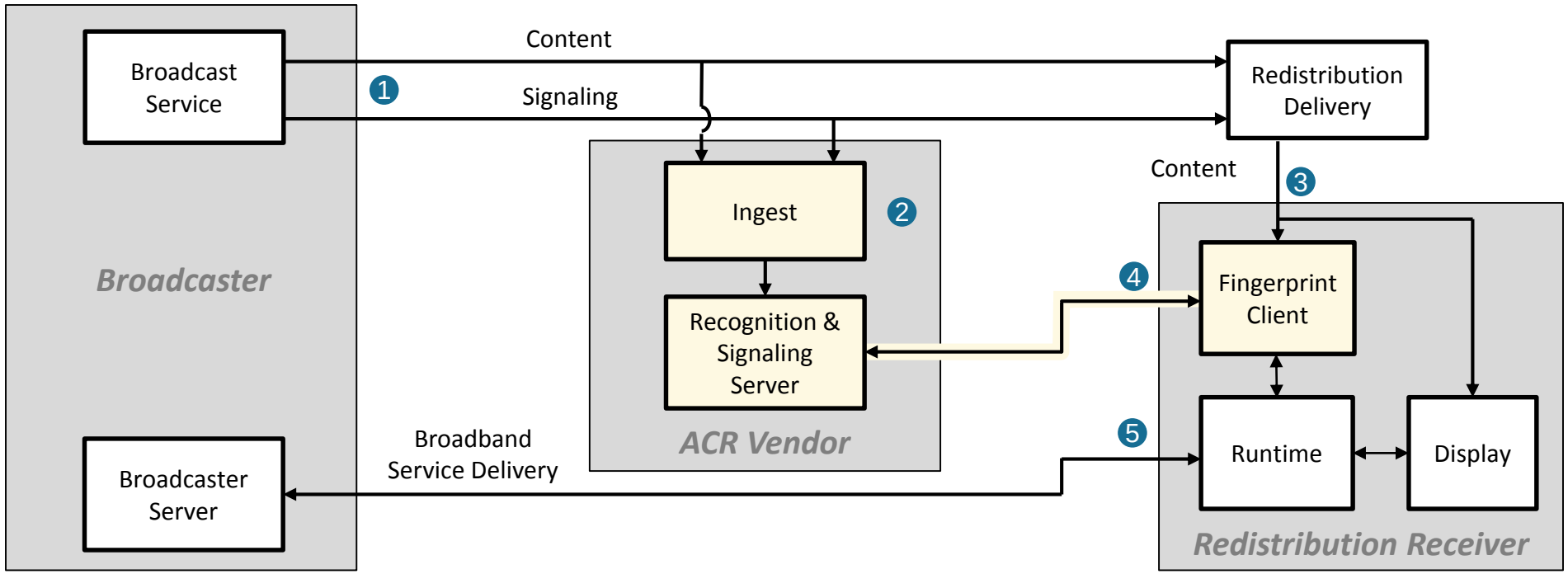
ACR Solution with Fingerprinting (ATSC 2.0 A/105)



- TV manufacturer selects ACR vendor with proprietary fingerprint technology
- ACR vendor manages proprietary service platform to ingest broadcasts and recognize and serve signaling to TVs
- *Limitations:*
  - Broadcaster has no involvement or control
  - TV manufacturer must adopt proprietary and closed technology
  - ACR vendor may modify broadcaster signaling and receives viewing data

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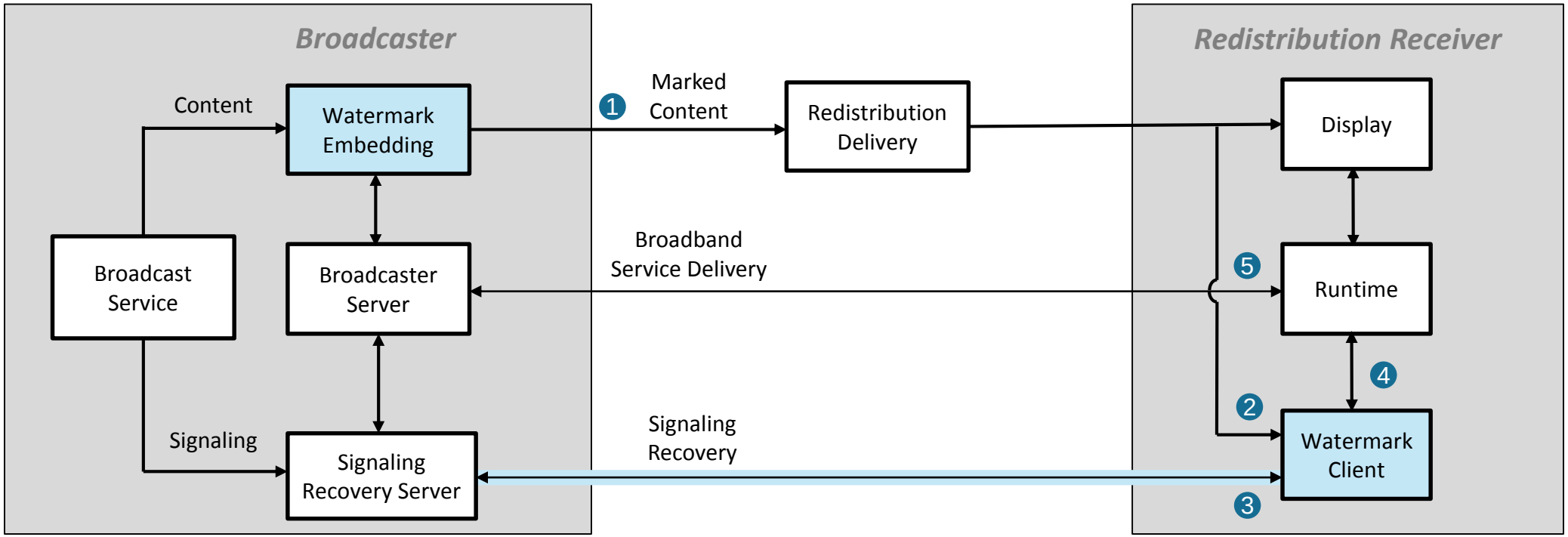
ATSC Open ACR Architecture



- Open emission specifications for audio and video watermarks carried in broadcast content
  - Receive server URLs, frame-accurate timestamps, and real-time event info with 1.5 second repetition/recovery rate
- Open network protocol specifications for receiver/broadcaster interaction *with no ACR middleman*
  - RESTful HTTP for low-cost scalability, web-equivalent privacy & security, all signaling delivery under broadcaster control

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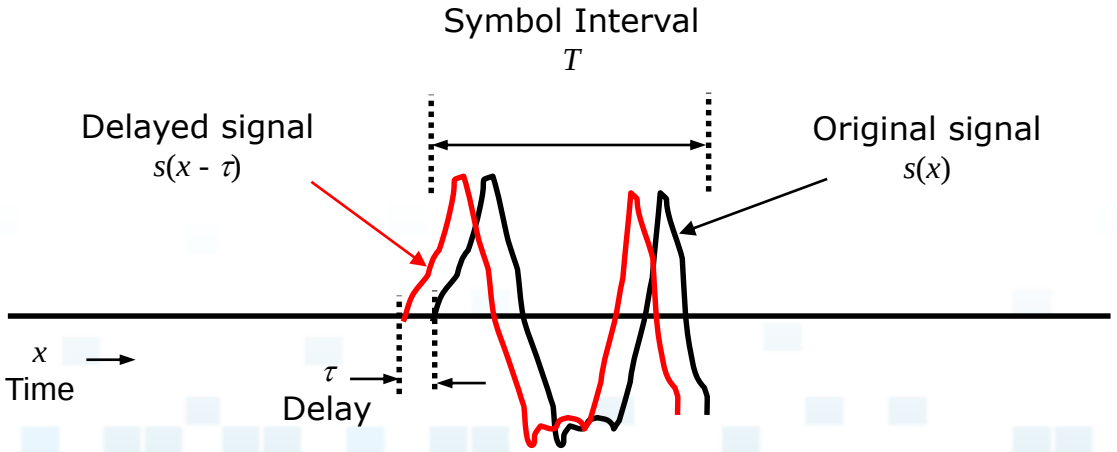
Audio Watermark Technology

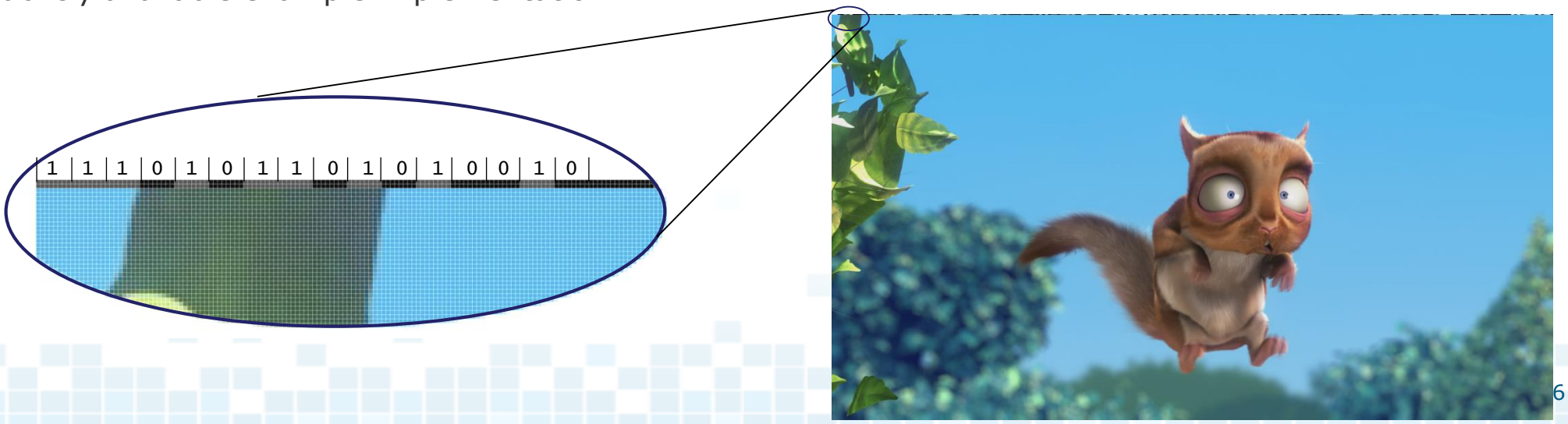
- Differential autocorrelation modulation in 2.5 kHz-5 kHz frequency band
- 50-bit data payload transmitted every 1.5 seconds with error protection
- Perceptually transparent with EBU Broadcast Quality
- Reliable through cable / satellite / OTT redistribution channels to 32 kbps stereo, including during silence
- Supports timing recovery with 2ms accuracy
- Removable, modifiable, extensible via layering
- Publicly available example implementation

$$R(t,\tau) = \int_{t-T}^{t} s(x)s(x-\tau)dx$$

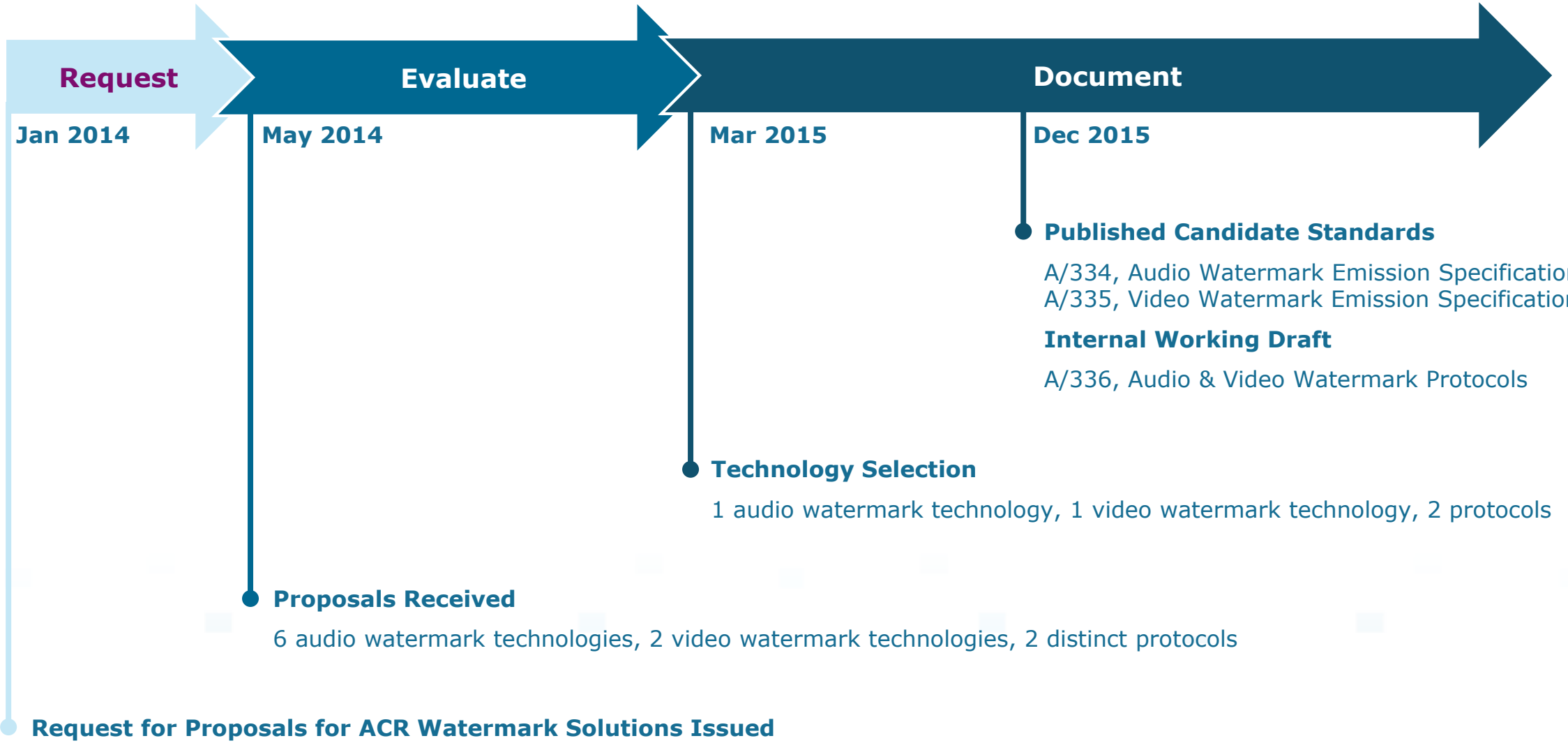


Video Watermark Technology

- Luminance modulation in video lines 1 and 2
- Multiple data rates supported (240 bits-per-frame and 480 bits-per-frame)
- 50-bit data payload transmitted every 1.5 seconds with error correction
- Additional data capacity allows direct delivery of signaling to offline receivers
- Reliable through cable / satellite / OTT redistribution channels to 2.5 Mb/s
- Removable, modifiable, extensible
- Publicly available example implementation



ATSC Open ACR Initiative



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Protecting TV Receivers Against Attacks via the Broadcast

Jon Piesing

Chair DVB TM-MIS

Background

- Several security researchers have experimented with attacks on TV broadcast
  - Intercept broadcast TV signal, modify & re-transmit
  - Demonstrations given to HbbTV and DVB audiences
- Experiments focus on interactive elements of the broadcast
  - Theoretical possibility of modifying video, audio or subtitles
    - Likely to be more complex and with a range of counter-measures
  - Some attacks on interactive elements don't need active involvement of the viewer
    - Autostart apps run on changing to a channel just like video and audio
- DVB and HbbTV worked together to define requirements for a solution for interactive services
  - DVB is now working on a solution that meets those requirements

Why Now?

- Attacks via broadcast have been discussed for at least 15 years
  - Initially called “man in a van attack”
- Several things have changed in the last few years
  - Price and size of DVB-T modulators has fallen
    - E.g. UT-100Cfor US$170 - $230 http://www.hides.com.tw/product_cg74469_eng.html
  - Price & size of equipment to modify streams has fallen
    - Can now be done in software on a Raspberry Pi
  - TV sets now use commodity software
    - Exploits for bugs in open source software (e.g. libraries and/or browsers) can be aimed at TVs

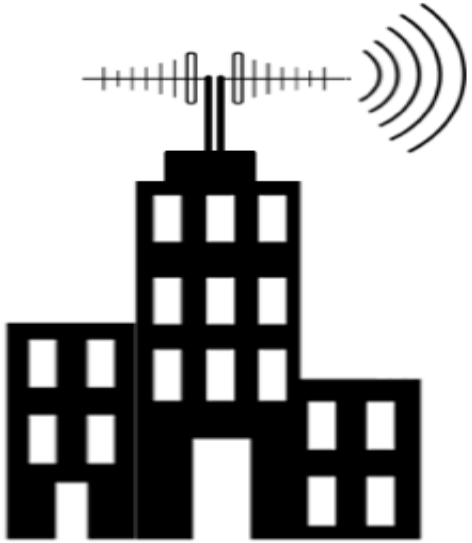
Example Terrestrial TV Attacks

Transmission mast

MITM drive-by re-transmission

Urban / suburban DTT receivers

Terrestrial Transmitter

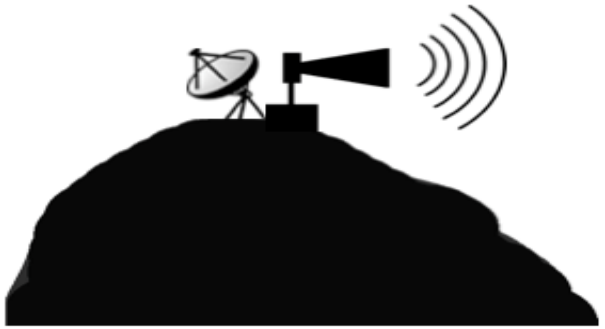


MITM Static Retransmission

Multiple Dwelling Unit (MDU)
Or Cable/IPTV/Relay Station ingest point

Example Satellite TV Attacks

Satellite broadcast



Static satellite re-transmission

Urban / suburban DSAT receivers

Satellite broadcast

(persistent vs transient)

Multiple Dwelling Unit (MDU)

How Many People Might an Attack Reach?

- Densely populated urban area might have up to 5900 people per square km
  - Mobile attack with 60m radius would therefore cover 67 people or 29 households
    - TV reception on the attacked multiplex would also be blocked for a much larger area around the 60m attack radius
- Degree of success depends on proportion of TVs that are;
  - Both smart (i.e. connectable) and actually connected?
  - In use at the time?
  - Tuned to a channel on which the attack is happening?
  - Vulnerable to the exploit(s) selected by the attacker?
- Making assumptions and multiplying these out suggest 30 attacks might be needed to get a single victim
  - If 10-second attacks are performed every 30 seconds and are limited to 4.5 hours each day of peak viewing time, then 540 attacks can be performed in each session and should yield about 14 victims

Source: DVB CM-SEG calculation based on publicly available statistics

Work in DVB

- Detailed threat analysis
  - Far more detail than is included in this presentation
- Solution in 2 parts
  - Mechanics of how to authenticate data in the interactive broadcast
    - See next slide for some details
  - How to establish trust
    - E.g. Broadcasters issue certificates to themselves which become trusted over time as they are seen by a TV
    - E.g. Broadcasters issue certificates to themselves which are cross-sponsored by others so as to become trusted without any delay
    - E.g. Platform operator or network operator issues certificates to broadcasters
    - Still a work in progress
      - Searching for solution that is adaptable between markets where service providers can be expected to cooperate and other markets where this cooperation is less likely. Unfortunately the protection that can be provided may not be the same in all markets

Some Technical Details

- Authentication messages are added to the broadcast
  - Contain hash values for AIT and object carousel sections
  - Also contain a signature to validate the hash values
    - See “how to establish trust” for how a certificate would be obtained to verify this
- Authentication messages can be carried either
  - in the PID carrying the AIT and/or carousel they authenticate or
  - in another PID, e.g. for a carousel spread across multiple PIDs
- Receivers cache validated hash values and match them with incoming AIT and object carousel sections
  - Incoming AIT and carousel sections are kept in a quarantine buffer until a matching hash value is found or the buffer becomes full

What Comes Next

- Finishing the specification
  - Making good progress
- Test descriptions and test material
  - DVB does not do testing – this will be up to HbbTV and other users of the specification
- Deployments
  - This work is an insurance policy & Insurance policies have a premium
  - Participants in each market will have to evaluate the risks and decide if the premium is worth paying

Thank You

Operator Applications: What, Why and How?

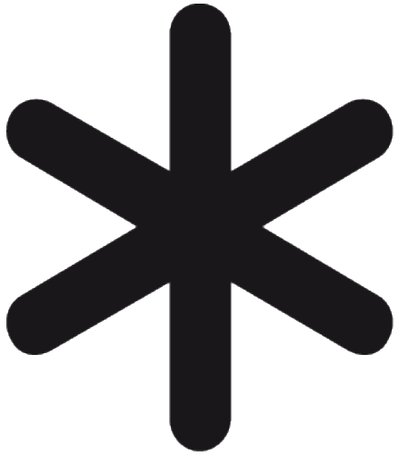
Matthew Huntington, CTO Freesat

HbbTV Symposium, 9th December 2015

freesat

metaphor

FREETV
ALLIANCE



FREETV ALLIANCE

Operator Applications: What, Why and How?

What?

sky guide
8.00pm Mon 18 Jul
ALL CHANNELS
Today 8.00pm 8.30pm 9.00pm
101 BBC ONE
EastEnders
Judge John Deed
102 BBC TWO
Universi..
Top Gear
The Kuma..
103 ITV1 London
Who Wants to Be a Milli..
Fanny and..
104 Channel 4
Arctic Adventurers
The Battle..
105 five
Floyd's India
House..
Lying In Wait
106 Sky One
Star Trek: The Next Gene..
Star Trek:..
109 UK Gold
Are Y..
Keeping Up Ap..
dinnerladies
110 UK Gold+1
Casualty
The Bill
111 UK Gold 2
EastEnders
Doctors
The Bill
112 LivingTV
Kojak
The Profes..
Page Up
Page Down
+24 Hours
-24 Hours
Press SELECT to view

sky Home

4.00pm Doctor Who AD,W,S

Father's Day: 08/13. Sci-fi fantasy with Christopher Eccleston as the time-travelling hero. Rose goes back to 1987 to witness the day her father died. Can she leave the past alone?

TV Guide 4.05pm Mon 17/03

All Channels | HD & 3D | Entertain | Docs | Lifestyle | Movies | Sports | News

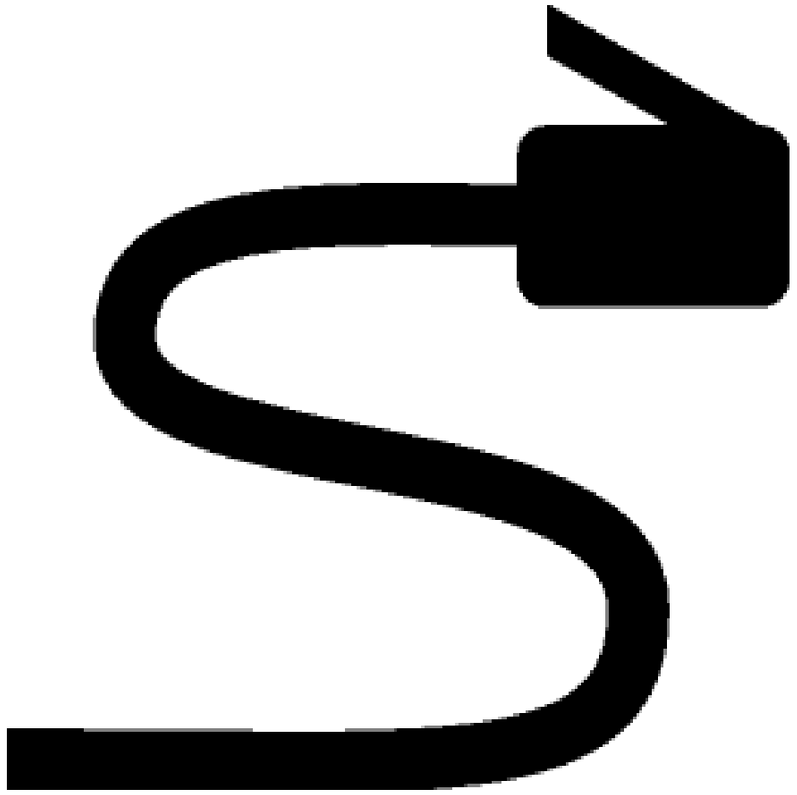
- - -	Today 4.00pm	4.30pm	5.00pm	ch+
109 Watch HD	Doctor Who		Babylon 5	
110 GOLD	As Time Goe..	Goodnight Sweetheart	One Foot in the Gra..	
111 Dave HD	Man v. Food	Man v. Food	Top Gear	
112 Comedy Cen HD	Two And A Half Men	Two And A Half Men	Friends	
113 Universal HD	Law & Order		Without A Trace	
114 Syfy HD	Warehouse 13		Buffy the Vampire S..	
115 BBC Three HD	..programmes start at 7.00pm			
116 BBC Four HD	..programmes start at 7.00pm			

Catch Up TV Planner +24 Hours -24 Hours ch-

Press SELECT to view or R to record

Free-TV-View Operators have emerged with retail supply chains with No STB subsidies.

Free-TV-View Operators also heavily use integrated digital TVs (IDTVs)



While Pay-TV operators have been able to bring services to IDTVs through CAMS IPTV operators have not been able to do this.

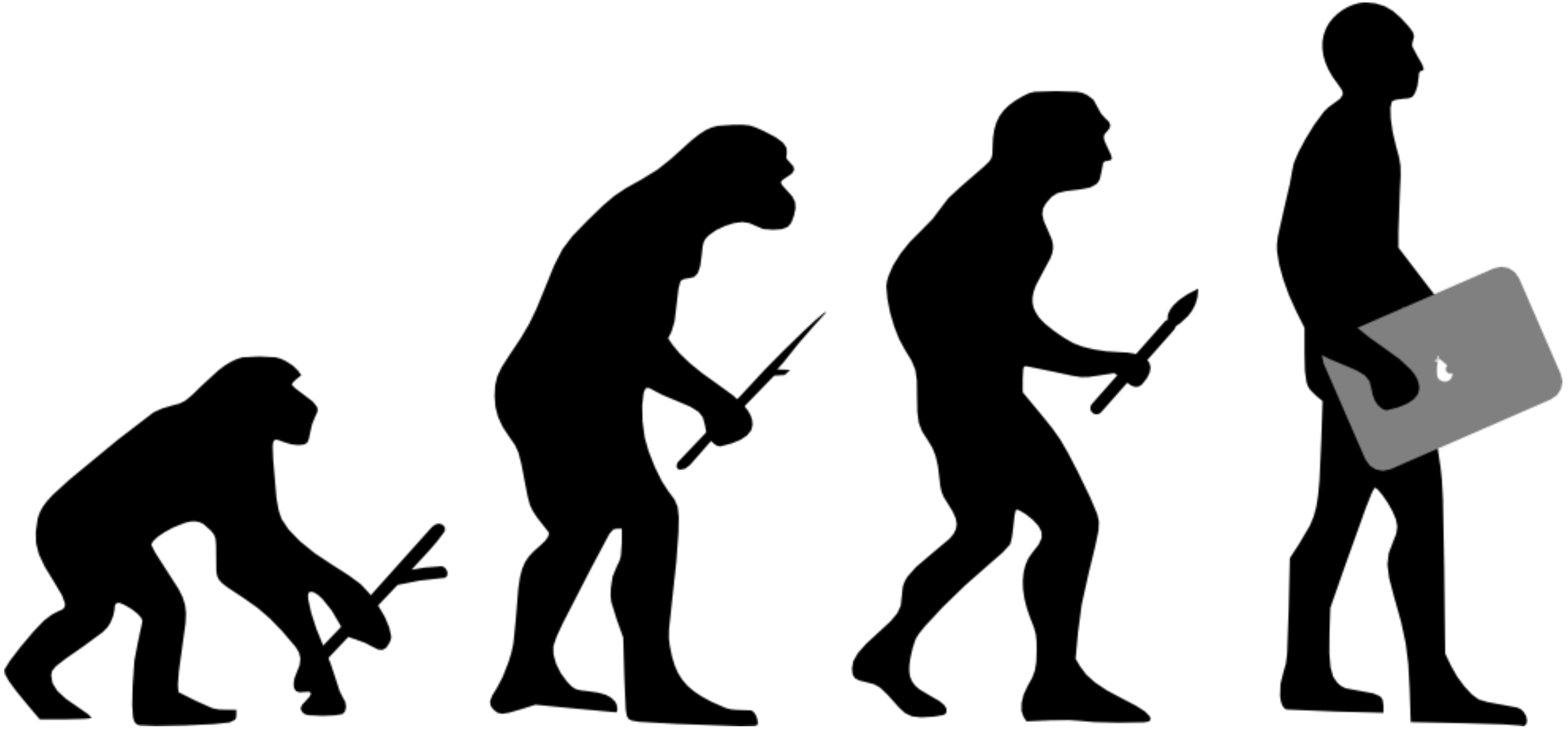
Why bother with Operator Apps. Aren’t manufacturers interfaces good enough?

They deliver consistent branding for the operator,
this ensures that viewers know the service is from that operator and will value the service more.

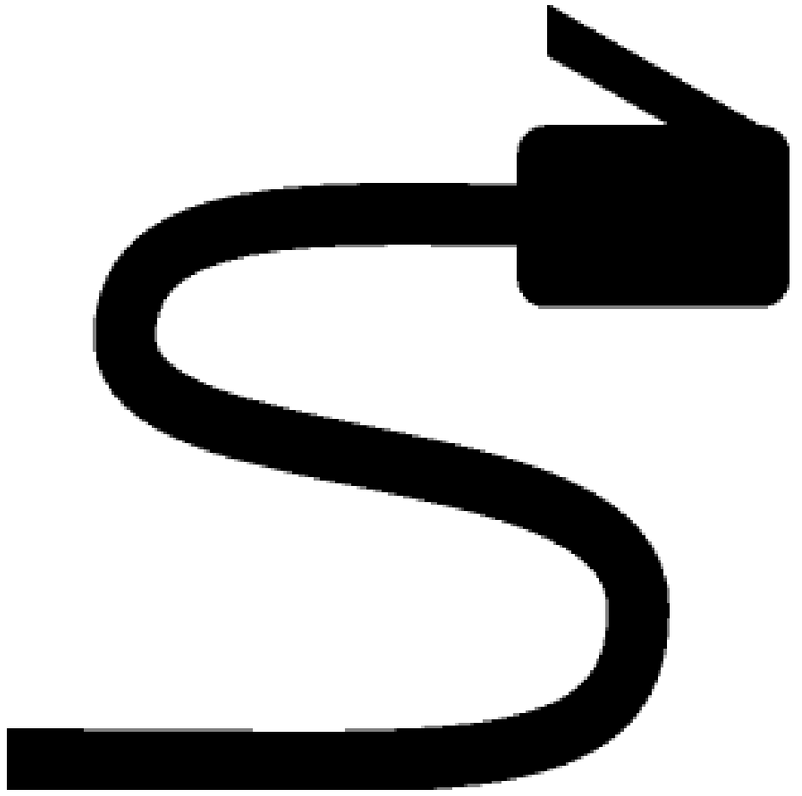
They can deliver a compelling look and feel, that easy and effective to use. Also one that is tailored to the needs of the operator’s customers and not a global compromise.

It is also easier to market a service with an operator app as you can show the features as delivered by the operator not some abstract representation.

An operator app leads to consistent customer support, when a consumer has a problem the customer service representative knows what experience they are looking at.

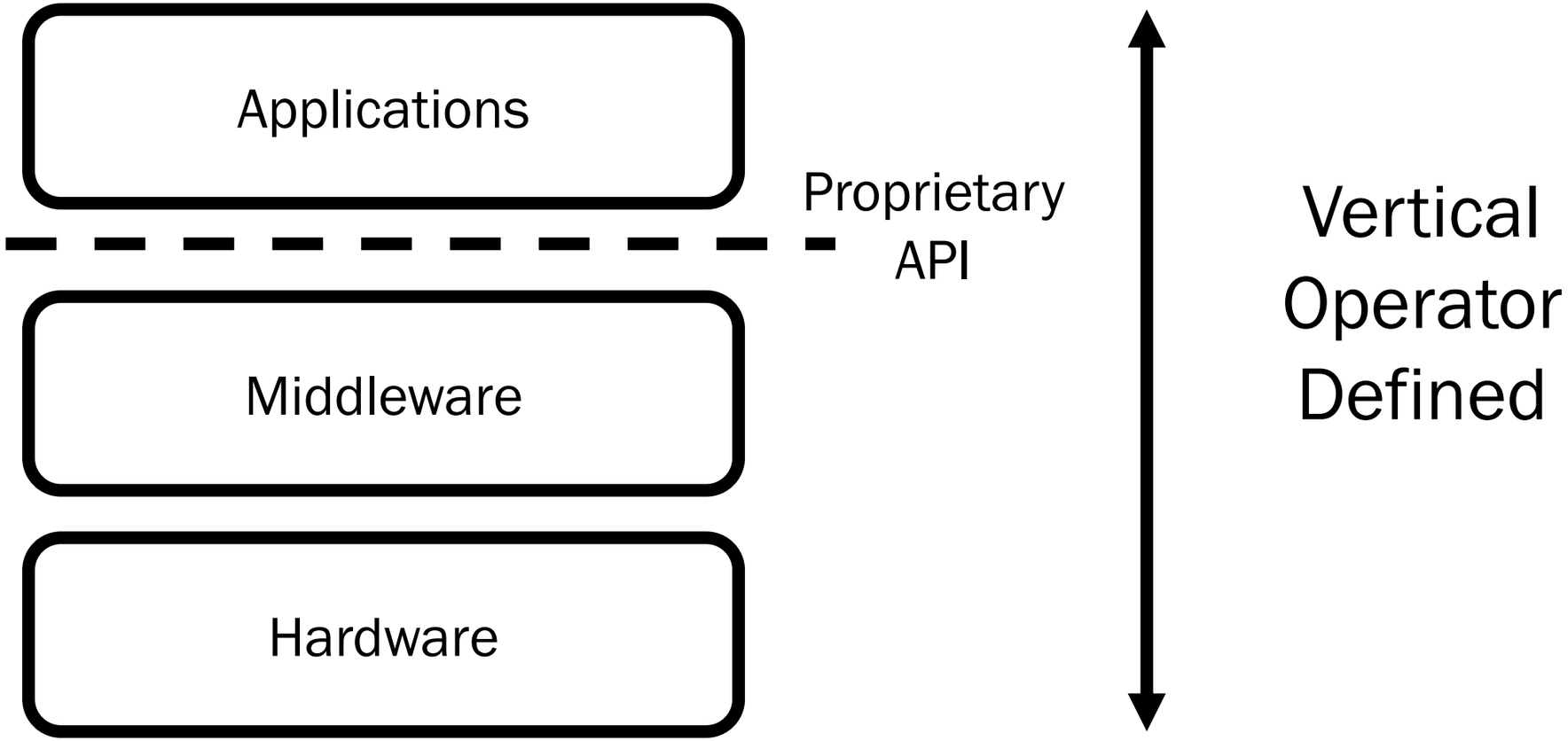


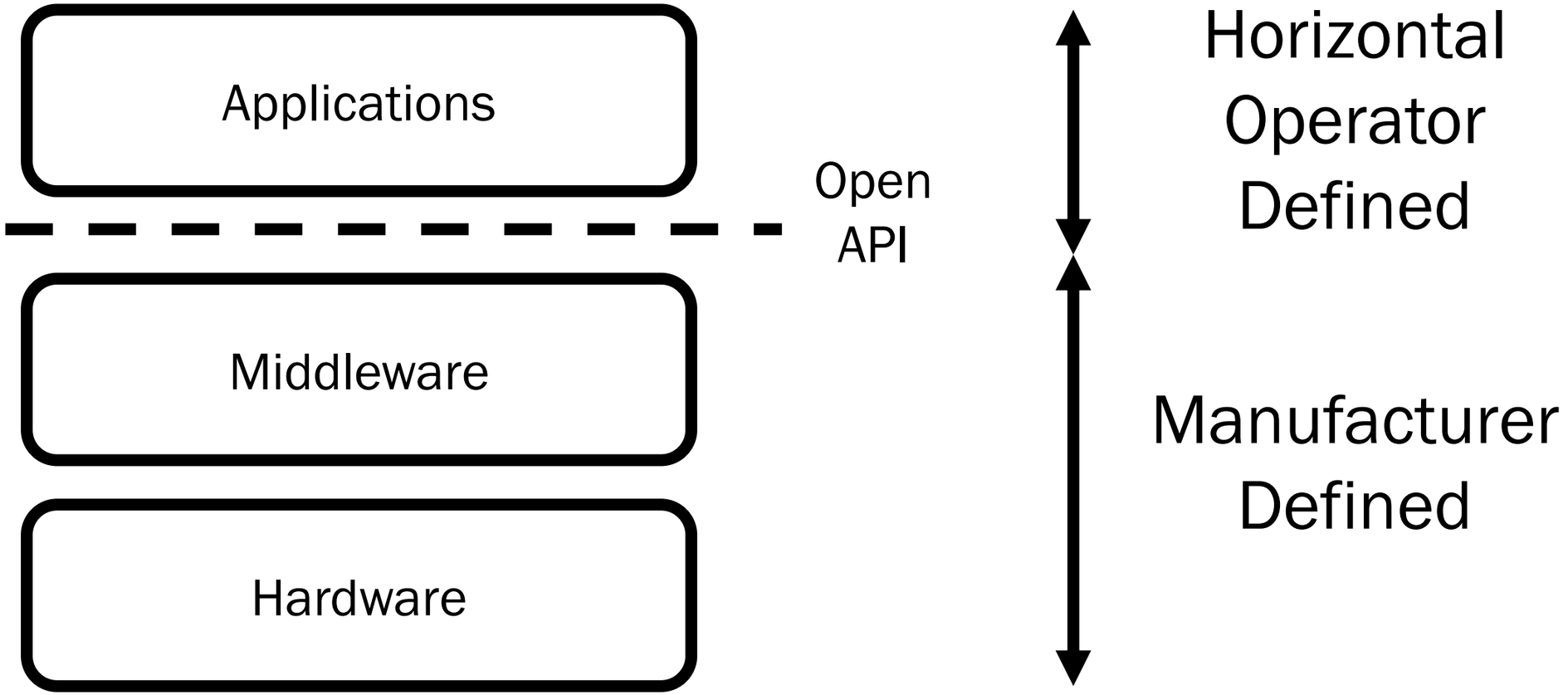
An operator application also supports service evolution, as new features are required to be competitive, an operator can introduce them, as long as the underlying hardware support them. Manufacturers have no real incentive to deliver updates to existing products.



IPTV operators have a particular problem – even if a TV support TV over IP, the guide data delivered with in does not follow a DVB standard and so manufacturer guides just don’t support them.

How?


Applications
Proprietary
API
Middleware
Hardware
Vertical
Operator
Defined


Applications
Middleware
Hardware
Open
API
Horizontal
Operator
Defined
Manufacturer
Defined

Source
TV
App TV
Elion
HDMI1
DVI PC
Ext.
Screen Mirroring
Network
KALLASPRIIT: k...

TODAY

10:50 AM

Seven Morning News

11:30am - 12:02pm (NC) (CC)

Latest news, sport and weather updates from Australia and around the world. (2015)

	EARLIER	NOW	11 AM	11:30	12 PM	12:30
2	ABC	Q&A	Catalyst	Eggheads	ABC News at Noon	National
3	SBS ONE	German News	Spanish News		Arabic News	Turkish Ne
7	7	The Morning Show		Seven Morning Ne…	Borderline Murder	
9	9	Mornings	Nine Morning News		The Ellen DeGeneres Show	
10	ten	Studio 10	Bondi Vet		Dr. Phil	

CHANNELS | BACK/RETURN | EXIT | OPTIONS | MENU | SET REMINDER

FRANSAT CONNECT

ACCUEIL

FRANSAT CONNECT

ACCUEIL | GUIDE TV | REPLAY & VOD

SERVICES | FAVORIS | RADIOS

TF1 | 2 | 3 | CANAL+ | 5 | M6 | arte | 8 | W9 | TMC | ▶

MON COMPTE | AIDE

20:08

freesat

tv guide

Available until 17 Aug

BBC one HD

Horrible Histories

1 hr SUB SL AD

earlier today BBC one HD

yesterday

Eastenders

Casualty

16:30	Horrible Histories	Watch now
17:00	Newsround	Watch now
17:15	Pointless	Watch now
18:00	BBC News at Ten	Watch now
18:30	BBC London News	Watch now
19:00	The One Show	Watch now
19:30	Fake Britain	Available soon

BBC one HD

now

HOME –24hrs P Page down P Page up +24hrs

freeviewplus™

FRANSAT
CONNECT

freetime
by freesat

HbbTV

IPF
OPEN IPTV FORUM

HbbTV

Bilateral Agreement

Standard

Privileged

Operator Specific

Thank You

freesat

metaphor

FREETV ALLIANCE

HBBTV & OPERATORS: WHAT'S NEXT?

Dr. Oliver Friedrich, Telekom Innovation Laboratories

Image source: http://i.huffpost.com/gen/1737085/images/o-KID-TV-facebook.jpg

AGENDA

01 2016+ Challenges

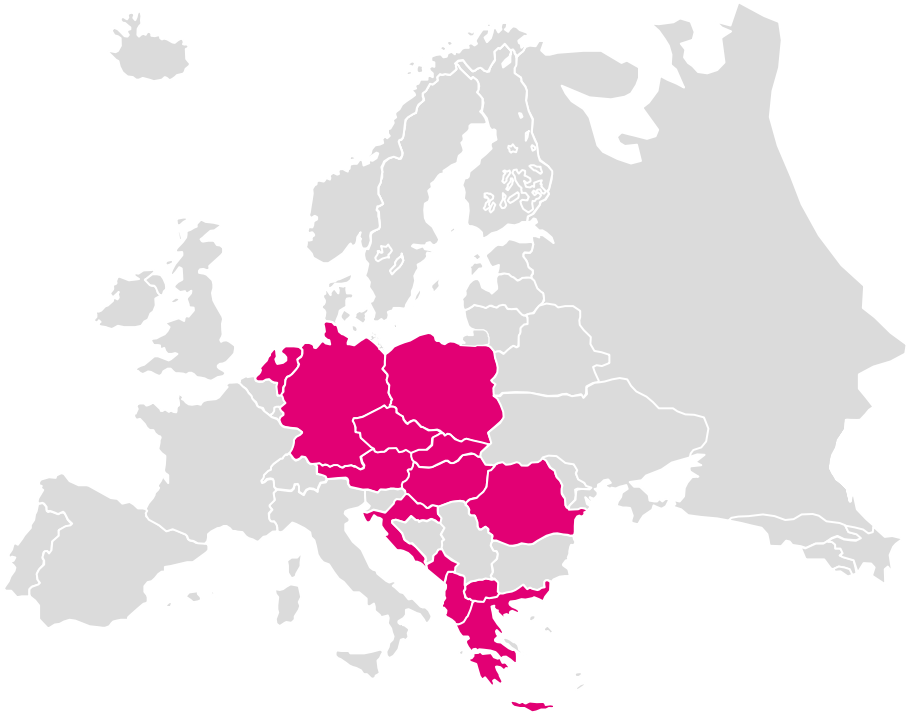
02 HbbTV in Deutsche Telekom – an Update

03 HbbTV Operator Apps

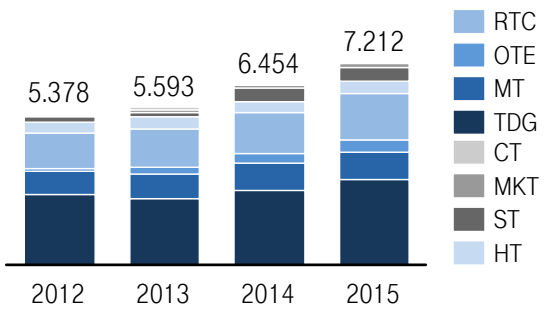
04 Mobile First – Opportunity or threat for HbbTV

05 W3C & HbbTV

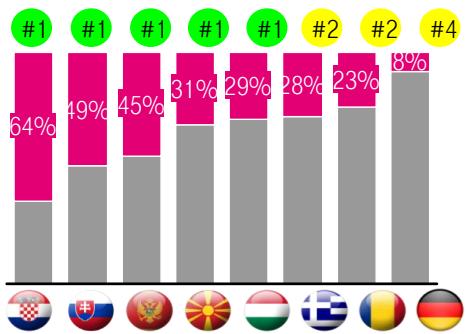
2016+ CHALLENGES



DT's PayTV Subscriber development (2014 in mn)*



DT's PayTV market shares & positions (2014)*



- How to grow in in classical fixed line IPTV/Hybrid TV markets?
- How to grow in countries with a mobile only footprint?
- What is the future of the STB & how to approach the OTT business?
- HbbTV & HbbTV Operator Apps as chance to grow throughout partnering and cost reduction

* Pay-TV subs cover customer paying for receiving encrypted TV service (recurring)

HBBTV IN DEUTSCHE TELEKOM - AN UPDATE

- Deutsche Telekom's HbbTV strategy is **still under development**
- It became clear that there is **no business case for just enabling red button applications** from the broadcasters on own STBs
- W3C's HTML5 specification as a first class citizen for all new deployments
- HbbTV is much more considered as a potential option for Deutsche Telekom's upcoming new platform rollouts to allow:
  - the cost effective and easy **integration of broadcaster apps** and the apps of other partners
  - To **reduce the cost for the integration third party devices Operator Apps on Connected TVs**
  - To **streamline own portal developments**
  - To **re-think second screen** (HbbTV Cast?)

HBBTV OPERATOR APPS

- Deutsche Telekom is fully supporting HbbTV‘s new „big ticket“ called Operator Apps
- Simplicity is a must for this initiative

- Focus must lie on standardizing the core aspect only and core business need: **Enable IP & Hybrid TV delivery for operators**.

- Avoid starting from scratch: Re-use OIPF STB-less spec
  - Bootstrap
  - Multi app handling & interaction
- Interact with W3C

MOBILE FIRST – A THREAT FOR HBBTV?

- Latest figures[1] show that OTT streaming devices gain more and more momentum
- Furthermore “mobile first” usage scenarios start to dominate content consumption scenarios
- Operators around the globe have understood and define products representing either a mixture of OTT and managed TV or launch TV products also in mobile only countries
- **Can HbbTV take over a leading role in providing an open cast framework?**

[1] http://www.broadbandtvnews.com/2015/11/29/chromecast-leads-streaming-devices-market/

MOBILE FIRST – A THREAT FOR HBBTV?

- HbbTV has to reflect these developments in pushing the HbbTV Second Screen Framework more ahead
- Acceptance of OTT technologies by (IPTV-)operators
  → Challenge multicast
- Drive Cloud-based use-cases in HbbTV
  → Especially Cloud PVR/reverse EPG
- Broadcasters should except the coming end of linear advertisement.

W3C AND HBBTV

- HbbTV relies mostly on Web standards, originating from W3C
- W3C is setting the pace for all screens

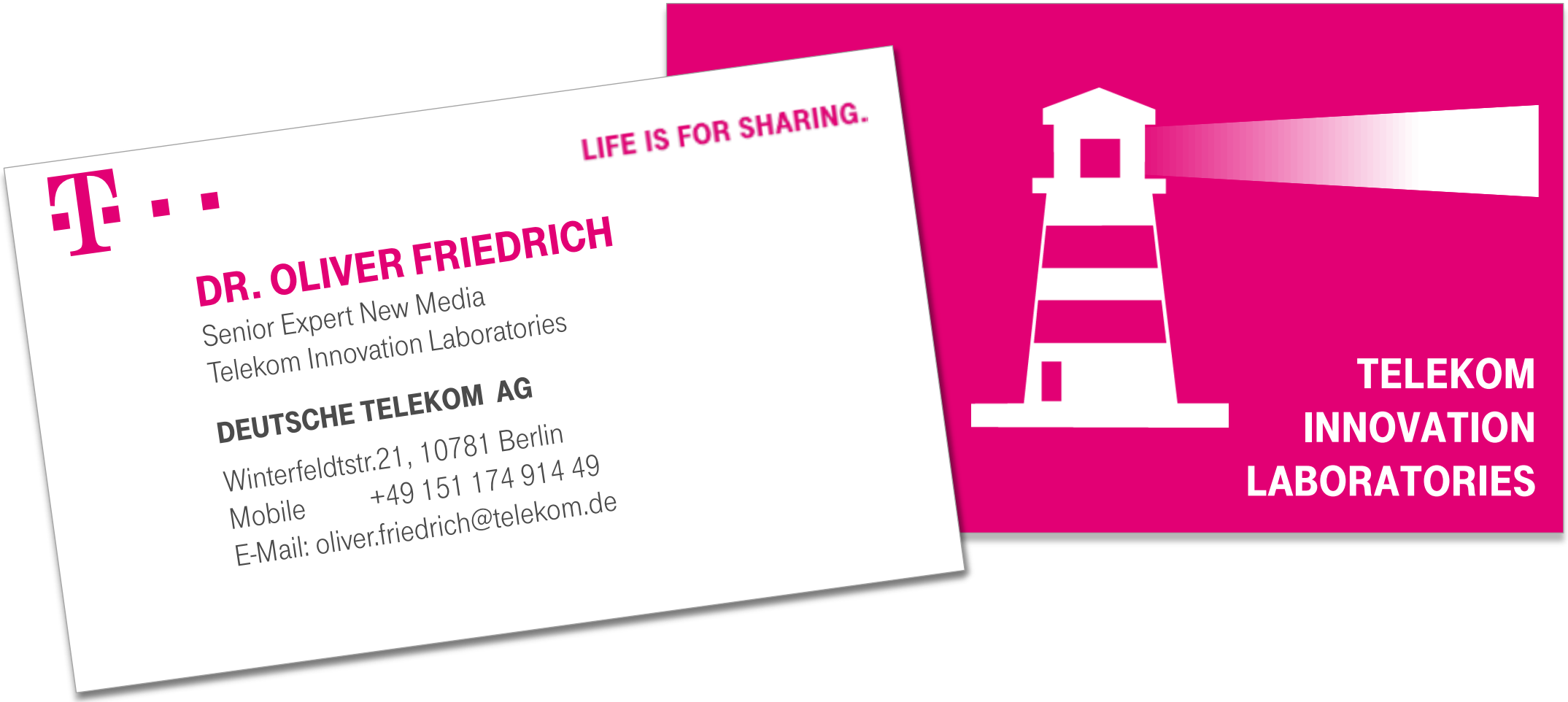
- Deutsche Telekom recommends to align work on all Web related aspects directly with W3C's Web & TV IG
  - HTML5 Encrypted Media Extensions (EME) and Media Source Extensions (MSE)
  - TV Control API
  - Work on Conditional Access
  - Work on Second Screen

Image source: http://bit.ly/1lltSF

KEY TAKE AWAYS

- The success of “HbbTV’ Operator Apps” is highly dependent on a clear focus on the core aspects and business needs of operators and device manufacturers during specification work only
- Deutsche Telekom will push “HbbTV Operator Apps” with help of a parallel go-to-market activity with partners from the Telco- and device manufacturer business.
- Complementary trials in 2016 will establish a W3C-like working mode based on „reference implementations“

CONTACTS


LIFE IS FOR SHARING.
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TELEKOM
INNOVATION
LABORATORIES

freeview™
more free tv

FreeviewPlus Opportunities = targeted campaign

Looking at the potential impact of FreeviewPlus®

And it is clear that FreeviewPlus® can change perceptions of our offer and brand.

"It sounds like an even better way of catching up on missed programs than is currently available to me."

43% of all New Zealanders state that it makes Freeview more appealing.

50% agree it changes the Freeview content equation.

"It sounds like a great alternative to SKY."

STRONGER AMONGST KEY AUDIENCES:

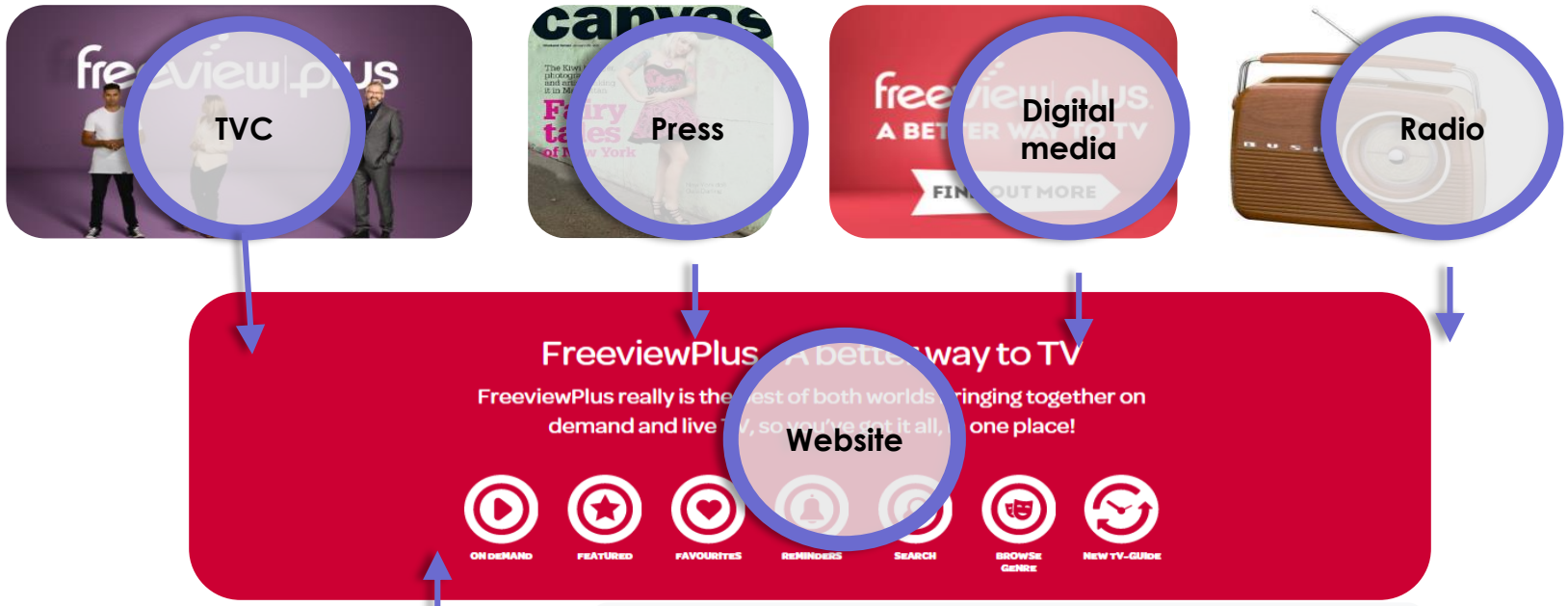
- *Sky TV (non sports) subscribers.*
- *Younger viewers (under 35 years).*

FreeviewPlus is most attractive to **younger viewers (under 35s)** & **non sports Sky subscribers**.

TRA research; n = 500 New Zealanders with a TV, aged 18+.

FreeviewPlus Awareness program

- Promotions on air, online and in press and instore to:-
- Increase awareness, Drive purchase in stores



Media Launch Event

Objective

a) Engage with key media to generate positive press for FreeviewPlus at Launch

b) Achieve national & regional coverage for the launch of FreeviewPlus in technology & media focused publications as well as consumer-facing publications

Media Invited

100+ key journalists and industry partners

Press

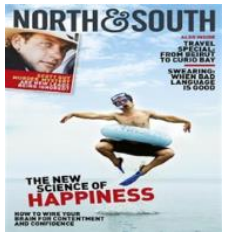
Objective

Generate positive press for FreeviewPlus to raise public awareness about and interest in FreeviewPlus

Activity

a) FreeviewPlus Smart TV & box giveaway promotions across major nationwide & regional press

b) Editorials across national and regional press



Retail Collateral + Training

Objective

- Inform consumers about FreeviewPlus – **what** it is, **why** get it & **how** to get it.

Activity

- A5 bi-fold pamphlet
- Posters in a range of sizes
- FreeviewPlus Demo video in-store display screens
- Staff Training for 2 x major chains

Promotional Media

a) From Launch Day

- National TVC from launch day
- Digital media placements including homepage takeovers

b) 2 weeks after Launch

- Radio commercial all stations
- Radio

Promotional Media – TVC's

Objective

Announce the launch of FreeviewPlus and the integration of live and on demand content from top New Zealand networks TVNZ, MediaWorks and Māori Television.

Execution

A key talent from each of the 3 network.

Promotional Media – Radio

Objectives

a) Announce the launch of FreeviewPlus and highlight the game-changer that FreeviewPlus is for New Zealand free to air television.

b) Generate 'organic' conversation about FreeviewPlus with TV giveaways.

Execution

a) Radio commercial played out RadioWorks(shareholder) stations from July – September

b) Ad libs / editorial on to talk about FreeviewPlus and giveaway TVs

Promotional Media – Digital

Objectives

a) Announce the launch of FreeviewPlus and highlight the game-changer that FreeviewPlus is for New Zealand free to air television.

b) Stimulate awareness and interest and drive traffic to www.freeviewplus.co.nz for more information.

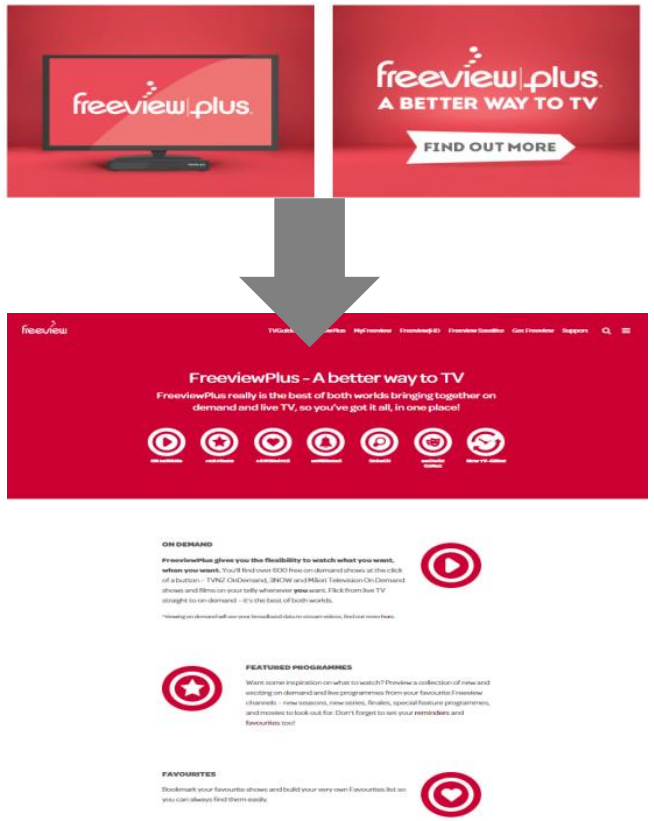
Activity

a) Homepage takeovers on stuff.co.nz, tv3.co.nz & tvnzod.co.nz

b) Animated & static digital banner placements on mobile and desktop sites, with clear CTA

c) All banners redirect to www.freeviewplus.co.nz

d) New webpage contained all key info about FreeviewPlus and how to get it.



Promotional Media – Digital

Sample 300 x 600 animated banners shown here; simple colour swipes creates a clean look and use of contrasting bright hues used create excitement..

Additional launch support

Contact Centre & EmailSupport

- New enquiry process
- FreeviewPlustraining
- Contact Suite reporting updated to capture FreeviewPlus queries and feedback.

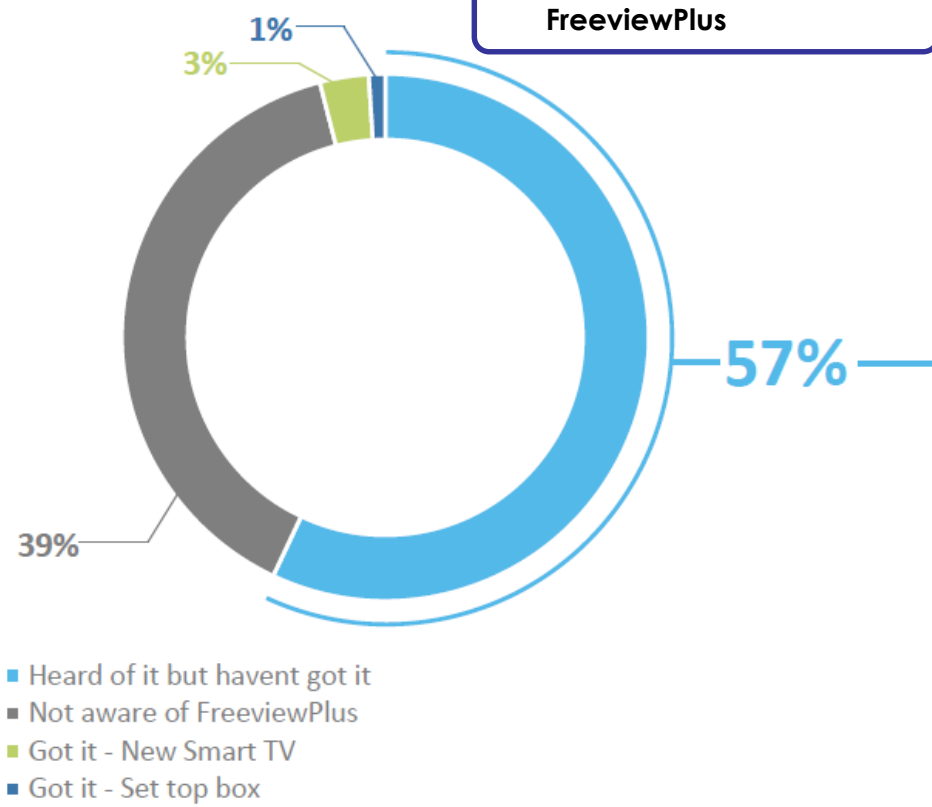
Manufacturers

- Samsung & Panasonic products labeled FreeviewPlus
- AerialBox T2100 and T2200 POS and with FreeviewPlus packaging
- LG & Sony POS with “Get FreeviewPlus Ready” feature page .

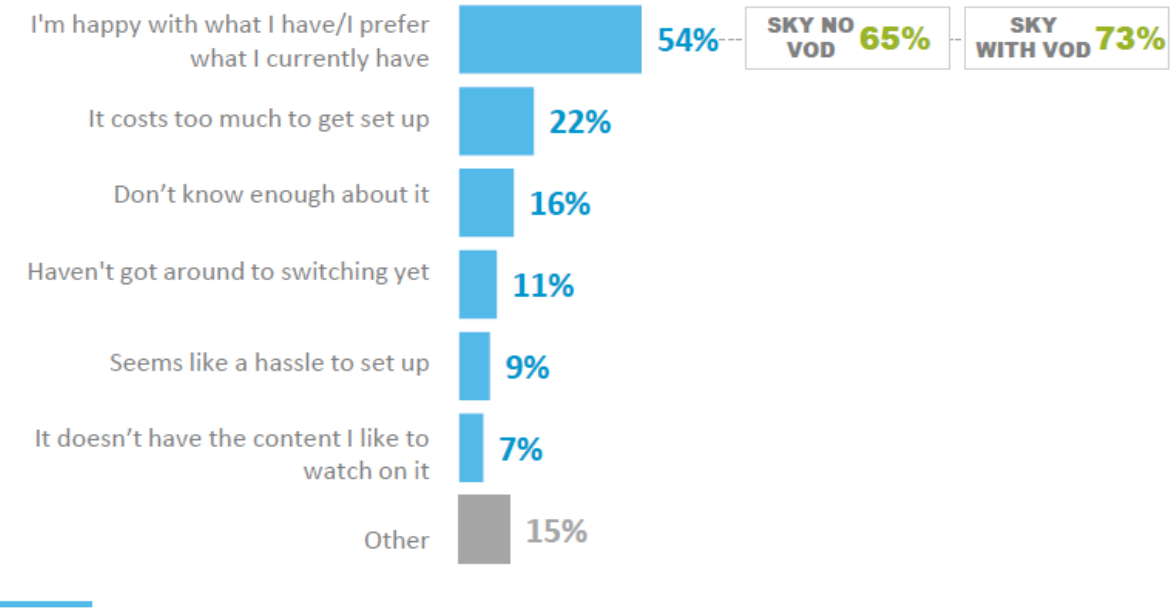
Result = FreeviewPlus Awareness

- 3 months after Launch
- 61% Aware of FreeviewPlus

AWARENESS OF FREEVIEWPLUS



OF THOSE WHO DON'T HAVE IT, WHY NOT?



XX% SIGNIFICANTLY LOWER THAN TOTAL | XX% SIGNIFICANTLY HIGHER THAN TOTAL

Q2) Before today had you heard of FreeviewPlus? n=589 Q3) Have you got FreeviewPlus? n=589 Q4) Why don't you have FreeviewPlus? n=337 Base Size: Total respondents n=589

Colmar Brunton 2015 ©

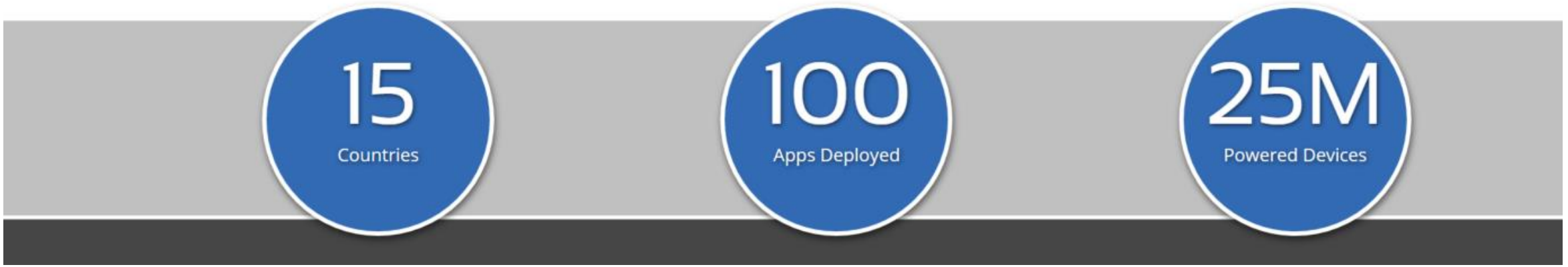
HbbTV Database

HbbTV Symposium 2015, London

December 8th-9th, 2015

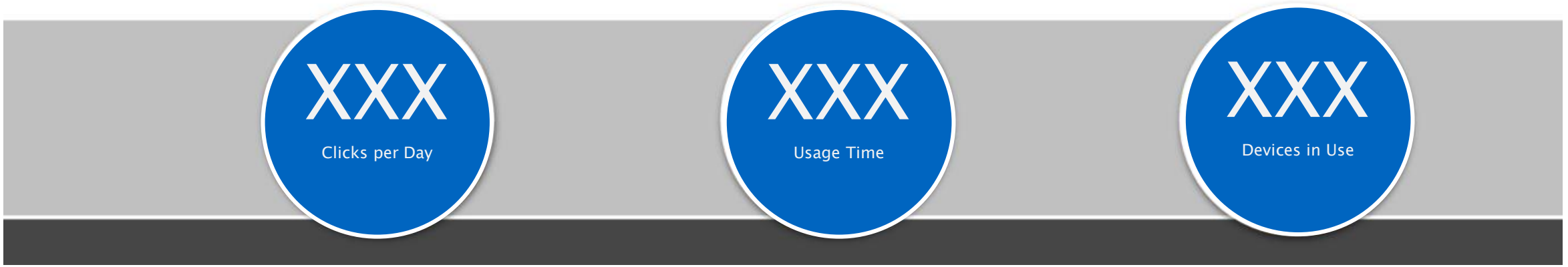
Heinrich E. Haase

HbbTV – Database Project



- ***What?***
  - HbbTV-Database Project to collect HbbTV related worldwide Market-data.
- ***Why?***
  - Use these data as a promotion and information sharing tool for the HbbTV community (Broadcaster, Manufacturers, Service Providers and potential new HbbTV members).
  - thus increase the adoption and the usage of the HbbTV standard.

HbbTV – Database Project



- ***For Whom?***
  - Data will be publicly available on the HbbTV-Website
- ***How?***
  - “Call for Information” will be issued shortly
  - Collect freely available data on the market
  - Anonymize data as much as possible
  - Looking for volunteers per country / region

HbbTV – Database Project

- ***Which Data?***
  - General HbbTV Market Data per country (Broadcasters / Service Providers / Networks, # of devices/ services / applications…)
  - HbbTV specific information (version, DRM in use…)
  - Service usage information (Red Button click rate, usage time…)
  - Any other information (Advertisement revenues, Shopping information…)
- ***…and finally: When?***
  - Q1 2016 first results

Contact

- ***…and very finally: How can I contribute?***
  - *Please contact heinrich.haase@htbc.de and receive more details*

Your cooperation and input is very much appreciated, thanks☺!

Heinrich E. Haase
HbbTV Association, Project Coordinator
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+49 (0) 160 96253792

HBBTV USABILITY ANALYSIS

WIRTSCHAFT
HOCHSCHULE MAINZ
UNIVERSITY OF
APPLIED SCIENCES

By order of:

DEUTSCHE
TV-PLATTFORM

Professor Dr. Sven Pagel
Tobias Simon B.Sc.
Christian Seemann M.Sc.

Department of
Information Systems
and Media Management

>> FINAL REPORT

AGENDA

1. Research Design
2. Applications Test
3. Hardware Test
4. Recommendations for Action

1

RESEARCH DESIGN

Preparation and realisation of a
qualitative, explorative Usability Analysis of HbbTV

1.1 Test Outline

Applications Test:
27. and 28.05.2014

Location:
Observation Lab of the Mainz University of Applied Sciences

Object of Study:
8 applications on 1 device

Goals:
Derive recommendations for action regarding the development of applications for HbbTV

Subjects: n = 12

Hardware Test:
10. and 11.06.2014

Location:
Observation Lab of the Mainz University of Applied Sciences

Object of Study:
1 application on 4 devices

Goals:
Derive recommendations for action regarding the development of HbbTV capable devices

Subjects: n = 14

1.2 TV Broadcasters

full-range networks

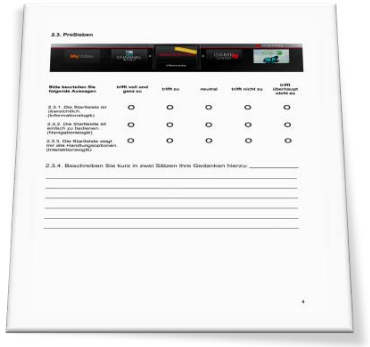
home-shopping networks

1.3 Device Manufacturers

in alphabetical order

1.4 Methods of the Test

- Eyetracking (A)
- Post-Test Questionnaire (A,H)
- Retrospective Think Aloud (A)
- Video Observation (A,H)
- RC Puzzle (H)



A = Applications Test
H = Hardware Test

2 APPLICATIONS TEST

8 applications on 1 device

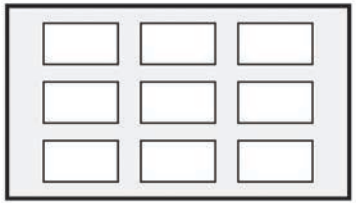
Results and the recommendations for action derived

2.1 User Interfaces

2.2 Switching between applications

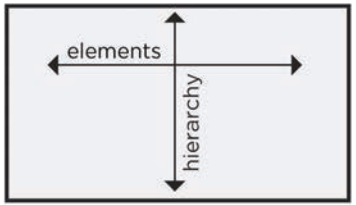
2.3 Navigation within applications

2.1 User Interfaces



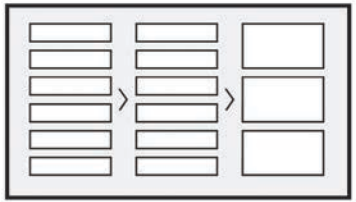
TILES

EXAMPLES



TWO-AXES

EXAMPLES



COLUMNS

EXAMPLES

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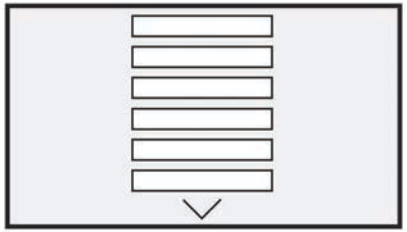
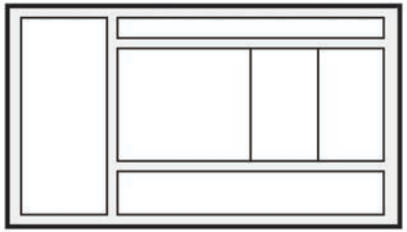
2.1 User Interfaces



LIST

EXAMPLE



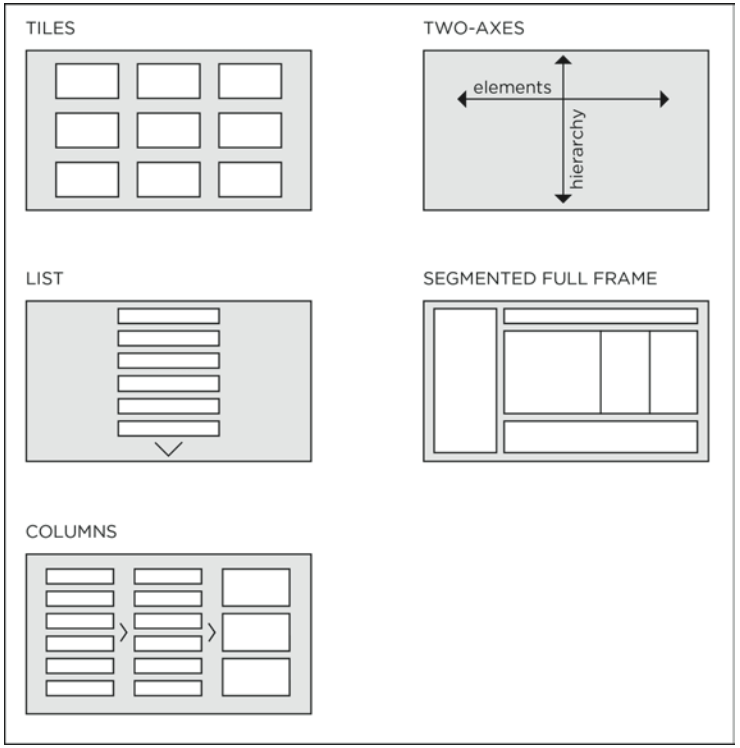
SEGMENTED FULL FRAME

EXAMPLE

2.1 User Interfaces

Rating (post-test survey) of interfaces according to:

- clarity
- ease of use
- operating options
- suitability for search of video content
- suitability for browsing video content
- orientation



2.1 User Interfaces

Two-Axes	List	Tiles	Segmented Full Frame	Columns
2.1	2.3	**1.7**	2.0	**1.6**

Rating on a five-point scale: 1 = best, 5 = worst

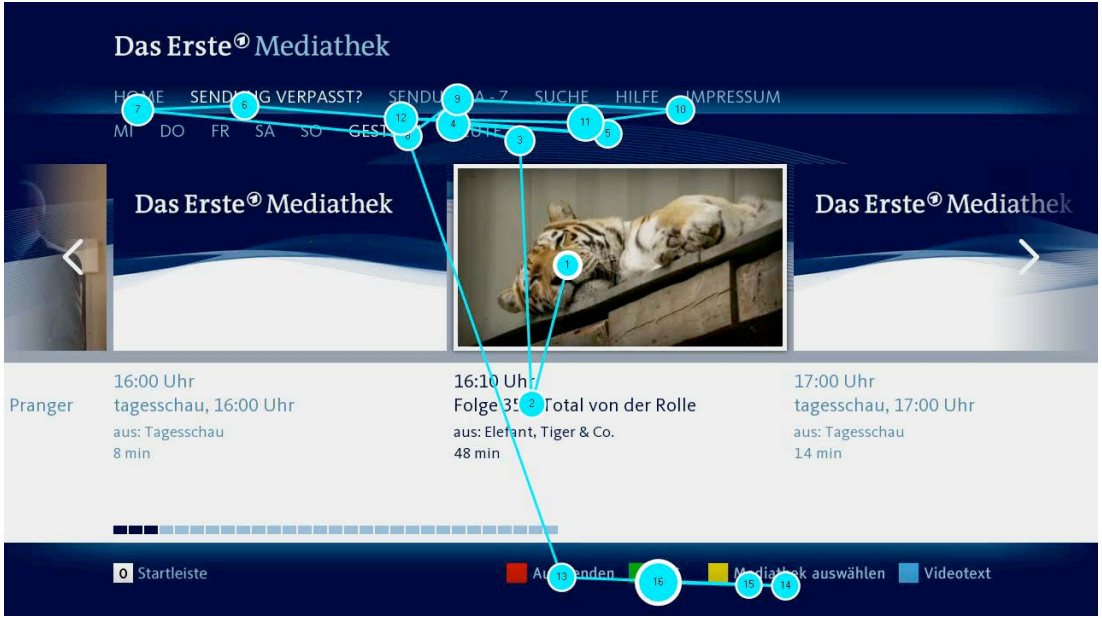
The results shows that **all navigation models tested worked very well**.

Columns are particularly suitable for applications with a great navigational depth (many hierarchy levels).

2.2 Switching between applications

"heat map" with the accumulated data from subjects 3, 4, 5, and 6
Task: "Please switch to the Electronic Program Guide (EPG) of Das Erste."

2.2 Switching between applications



Video 2: Gaze plot subject 3
Task: "Please switch to the Electronic Program Guide (EPG) of Das Erste."

2.2 Switching between applications

Recommendations for Action

Direct links between different applications should be offered whenever possible (e.g. as a shortcut).

Internal plurality (inconsistent use of the keys within one channel) should be avoided especially in the color allocation.

If two applications already offer contentual connections, direct links should be set (e.g. program preview and VoD offers).

2.3 Navigation within applications

Problems also occurred when **subjects “lost” their cursor** and were unable to identify their current position or which elements they could select next.

It should be ensured that the **user can identify the current position of the cursor at all times** and know which elements they may select next.

The return key should be available to the user on all navigational levels of the application.

2.3 Navigation within applications

Das Erste	ZDF	Pro Sieben	RTL	ARTE	RTL2	QVC	Sonnen-klar.TV
1.7	2.2	2.3	2.1	3.0	2.3	1.8	**1.6**

Rating on a five-point scale: 1 = best, 5 = worst

criteria: simplicity, clarity, information content, intuitive operation, visual presentation, comfort of use

The navigational structure of **Sonnenklar.TV** in particular was praised by the subjects for its **simplicity and clarity**.

"Very simple, and it is easy to find one's way around." *subject 10*
"Very 'simple' design. Very good overview." *subject 4*

The navigational structure of **DasErste** was also well received by the subjects. **Complex yet structured.**

2.3 Navigation within applications

Recommendations for Action

The navigational structures should be kept **as complex as necessary** but **as clear and simple as possible**. The subjects preferred few menu items and simple graphics.

3

HARDWARE TEST

1 application on 4 devices

Results and the recommendations for action derived

3.1 Basics

3.2 Ideal Remote Control

3.3 Directional Pad

3.4 Media and Color Keys

3.5 Performance and Feedback

3.1 Basics

All subjects were able to familiarize themselves quickly with the various RC units and solve their tasks.

A effectiveness of the usability is given.

9 aborted tasks

on

240 subtasks given

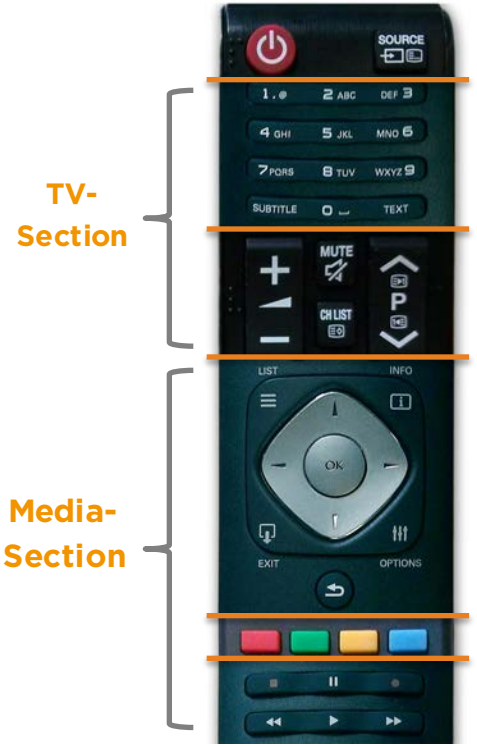
3.2 Ideal Remote Control

RC Puzzle

After the subjects had completed all their tasks, they were asked to assemble their **ideal remote control** from the control elements in the figure above and to explain their choices of individual components.

3.2 Ideal Remote Control

- Ideal RC, as assembled from the individual preferred elements
- Vertical segmentation into a TV segment and a media segment
- The remote control should be clearly segmented and structured.



3.2 Ideal Remote Control

The aggregated ratings for all remote controls resulted in a very condensed field. The overall rating covers the following aspects:

- Feel
- Positioning of keys
- Clarity
- Legibility of labels
- Imagery used

Samsung (keys)	Samsung (touch)	Toshiba	Philips	Sony
2.3	2.6	2.4	2.2	2.7

Average rating of all quantitative questions in the Post-Test Survey [rating on a five-point scale: 1 = best, 5 = worst]

3.3 Directional Pad

The D-pad on the right was the one most frequently used by the subjects for their ideal remote.

The subjects placed the D-pad in a central position.

Explained by:

- “good feel”
- “easy-to-understand key arrangement”
- “generally uncluttered keypad”

3.3 Directional Pad

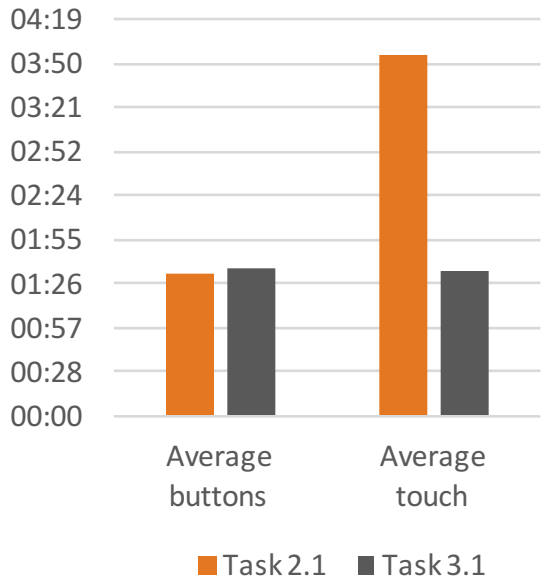
Learning Effects

Average Task 2.1	Average Task 3.1
1:33 (n=34)	**1:36** (n=31)

Average (touch) Task 2.1	Average (touch) Task 3.1
3:55 (n=5)	**1:35** (n=4)

Task 2.1: Run video (either directly from the video library or via EPG). Mean value across n operations (in minutes)

Task 3.1: Run video via the alternative method (EPG or video library, depending on method chosen in Task 2). Mean value across n operations (in minutes)



Learning effect with the touch-pad remote control

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3.3 Directional Pad

Recommendations for Action

- The D-pad should be located in a central position on the remote control.
- The D-pad should feel different than the surrounding keys.
- It is advisable not to place too many other keys in the immediate vicinity of the D-pad.
- Innovative remote control may be added as an alternative.

3.4 Media and Color Keys

Nearly all subjects preferred the remote controls' media keys over the on-screen control elements to navigate within the videos.

(Task 2.2: Fast-forward to 20:00; Task 2.3: Pause video playback; Task 2.4: Re-start video playback)

13 of the 14 subjects integrated media keys into their ideal remote.

3.4 Media and Color Keys

In some cases, the color keys had been assigned additional functions specific to the device. They were activated before the HbbTV app had loaded completely.

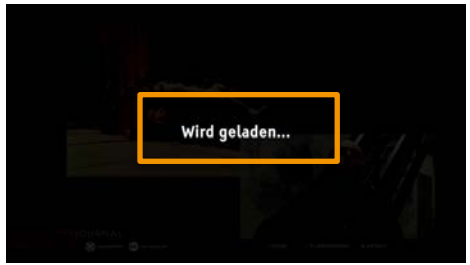
A dual assignment of the keys should be avoided.

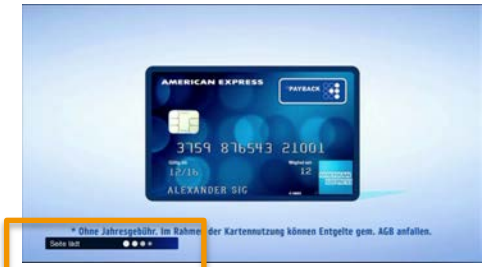
The “home” key led to unexpected device menus (not HbbTV)

subject 7, 36:50 - 37:50 (hardware test)

3.5 Performance and Feedback

A good performance played a major role for the subjects. When loading delays occurred, however, the subjects found it useful when they were visualized clearly.





Example: Feedback application

Example: Feedback device

3.5 Performance and Feedback

Recommendations for Action

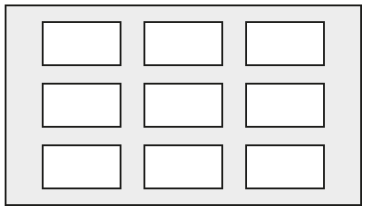
- Loading and waiting times should always be indicated clearly.
- Loading times should be kept as short as possible.

4 RECOMMENDATIONS FOR ACTION

4.1 Recommendations for TV Broadcasters

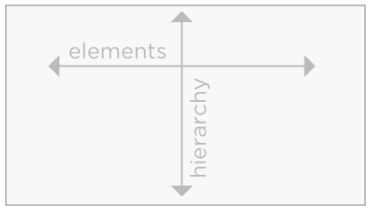
User Interfaces

TILES



Rating = 1.7

TWO-AXES



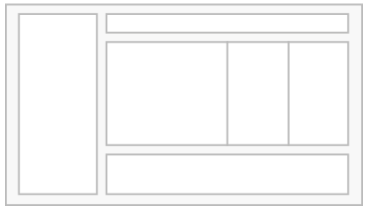
Rating = 2.1

LIST

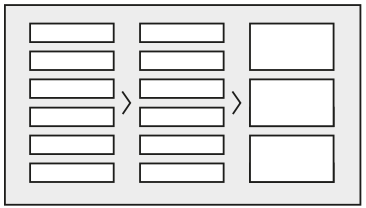
Rating = 2.3

Rating = 2.0

SEGMENTED FULL FRAME



COLUMNS



Rating = 1.6

rating on a five-point scale: 1 = best, 5 = worst

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4.1 Recommendations for TV Broadcasters

- Use color keys for application switching.
  Keep Key consistency
- Columns are particularly suitable for applications with a great navigational depth (many hierarchy levels).
- If two applications already imply contentual connections, direct links should be set (e.g. program preview and VoD offers).
- Return key availablity should be ubiquitous on all navigational levels.
- Loading and waiting times should always be indicated clearly.

4.2 Recommendations for Device Manufacturers

- D-pad location should be central and haptically set off
- A second, innovative remote control may be added as an alternative.
- A dual assignment of the color keys should be avoided.
- The remote control should be clearly segmented and structured.
- Loading and waiting times should always be indicated clearly.

Next Steps

- International version of the study
- EU funding proposal
- **We are looking for international partners. Please feel free to contact us**
  sven.pagel@hs-mainz.de

THANK YOU!

Feel free to download the complete report:

http://www.tv-plattform.de/images/stories/pdf/studie-usability-hbbtv-smarttv-2014-en.pdf

CONTACT

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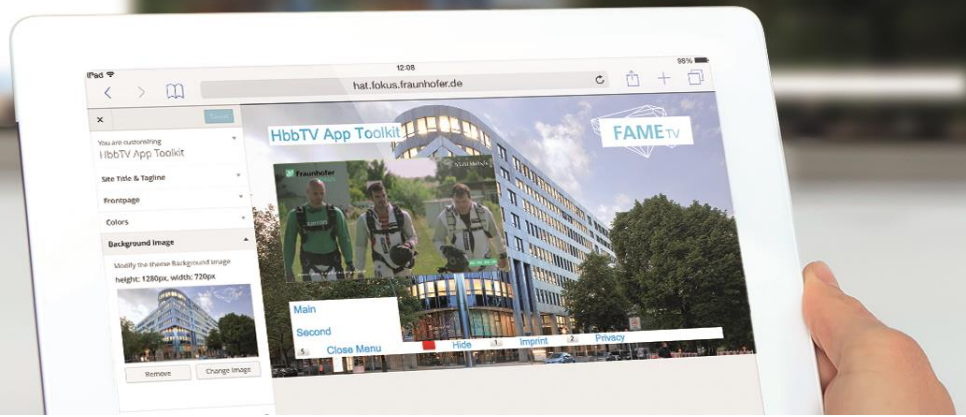
HBBTV APPLICATION TOOLKIT – BUILDING POWERFUL HBBTV APPS



Stephan Steglich <stephan.steglich@fokus.fraunhofer.de>
Competence Center Future Applications and Media (FAME),
Fraunhofer FOKUS - Research Institute for Open Communications Systems

HbbTV APPLICATION TOOLKIT

Fraunhofer FOKUS

#HbbTVSymposium December 2015, London

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TEST ON REAL DEVICES

CREATE AN HBBTV APPLICATION? JUST THIS…?

```
<!DOCTYPE html PUBLIC "-//HbbTV//1.1.1//EN" "http://www.hbbtv.org/dtd/HbbTV-1.1.1.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">

   <head>

      <meta http-equiv="Content-Type" content="application/vnd.hbbtv.xhtml+xml; charset=utf-8" />

   </head>

   <body>

   </body>

</html>
```

landing.html

HBBTV APPLICATION TOOLKIT

- Editor that enables
  - a fast and easy creation of **HbbTV applications**
  - without any technological knowledge
  - in every modern bowser

- Template based app creation with customizable UI (Branding)
  - Templates tailored to the TV screen!

HbbTV
APPLICATION
TOOLKIT

HBBTV APPLICATION TOOLKIT

- For WordPress

- **Wordpress Theme + Plugins:**
  - Project site: https://www.fokus.fraunhofer.de/go/hat
  - Documentation: http://fraunhoferfokus.github.io/HAT/
  - Code: https://github.com/fraunhoferfokus/HAT

- Web Frontend based on CSS3, HTML5
- Editor runs on all (modern) browsers

HBBTV APPLICATION TOOLKIT

- Run HbbTV Apps together with your existing (WP hosted) websites
  - Use same content, media library, user accounts, site features, etc…

- HAT includes (HbbTV specific) templates, modules, and plugins such as
  - Picture Galleries, Video Galleries, Text, Logo, Custom Menus & Navigation, Imprint
  - Interactive video, social media, companion screen support, 360° video playback

CONCEPT

HbbTV Application Toolkit **Editor**

Generating HbbTV Apps by using a collection of **modules**

Text

Menu

Layout

Broadcast

Social Feed

Image

Video

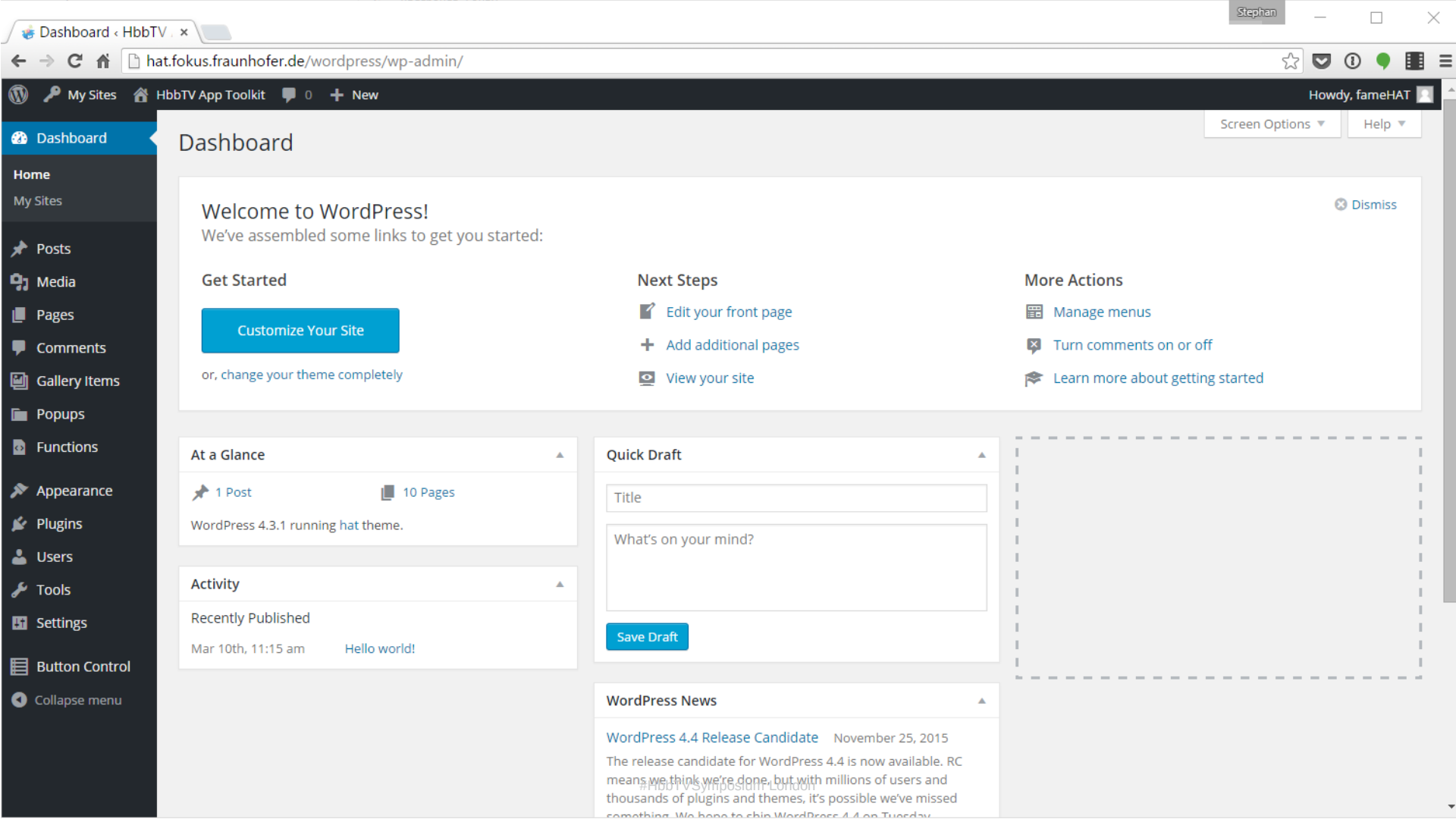
Gallery

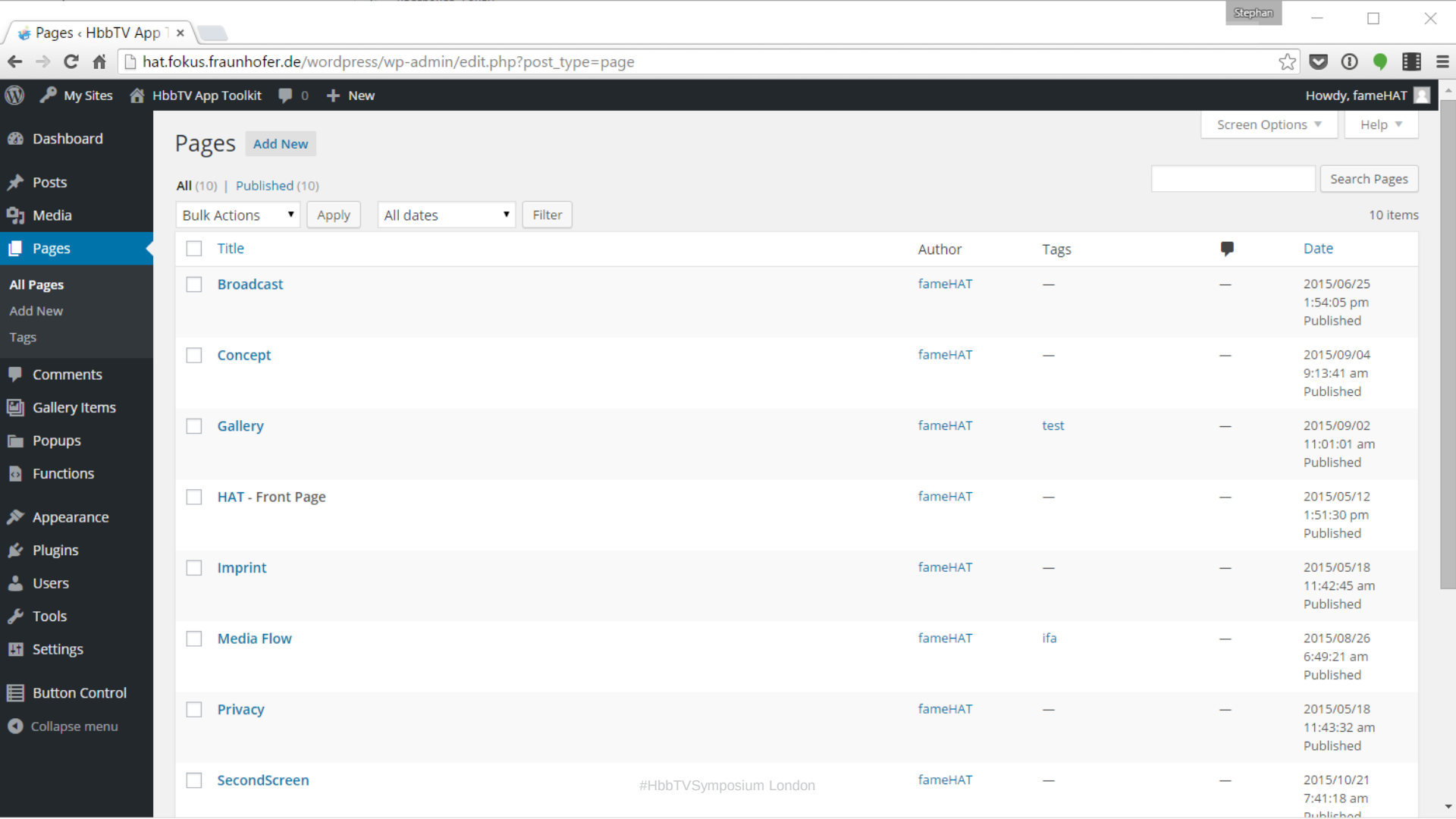
Popup

HbbTV App 1.

HbbTV App 2.

Fraunhofer FOKUS


Dashboard ‹ HbbTV
hat.fokus.fraunhofer.de/wordpress/wp-admin/
Stephan
My Sites
HbbTV App Toolkit
0
New
Howdy, fameHAT
Dashboard
Home
My Sites
Posts
Media
Pages
Comments
Gallery Items
Popups
Functions
Appearance
Plugins
Users
Tools
Settings
Button Control
Collapse menu
Screen Options
Help
Dashboard
Welcome to WordPress!
We've assembled some links to get you started:
Dismiss
Get Started
Customize Your Site
or, change your theme completely
Next Steps
Edit your front page
Add additional pages
View your site
More Actions
Manage menus
Turn comments on or off
Learn more about getting started
At a Glance
1 Post
10 Pages
WordPress 4.3.1 running hat theme.
Activity
Recently Published
Mar 10th, 11:15 am
Hello world!
Quick Draft
Title
What's on your mind?
Save Draft
WordPress News
WordPress 4.4 Release Candidate
November 25, 2015
The release candidate for WordPress 4.4 is now available. RC means we think we're done, but with millions of users and thousands of plugins and themes, it's possible we've missed



Pages ‹ HbbTV App

hat.fokus.fraunhofer.de/wordpress/wp-admin/edit.php?post_type=page

My Sites | HbbTV App Toolkit | 0 | New | Howdy, fameHAT

Dashboard
Posts
Media
Pages
All Pages
Add New
Tags
Comments
Gallery Items
Popups
Functions
Appearance
Plugins
Users
Tools
Settings
Button Control
Collapse menu

Pages

Add New

Screen Options | Help

All (10) | Published (10)

Search Pages

Bulk Actions | Apply | All dates | Filter

10 items

Title	Author	Tags		Date
Broadcast	fameHAT	—	—	2015/06/25 1:54:05 pm Published
Concept	fameHAT	—	—	2015/09/04 9:13:41 am Published
Gallery	fameHAT	test	—	2015/09/02 11:01:01 am Published
HAT - Front Page	fameHAT	—	—	2015/05/12 1:51:30 pm Published
Imprint	fameHAT	—	—	2015/05/18 11:42:45 am Published
Media Flow	fameHAT	ifa	—	2015/08/26 6:49:21 am Published
Privacy	fameHAT	—	—	2015/05/18 11:43:32 am Published
SecondScreen	fameHAT	—	—	2015/10/21 7:41:18 am Published

Dashboard
Posts
Media
Pages
All Pages
Add New
Tags
Comments
Gallery Items
Popups
Functions
Appearance
Plugins
Users
Tools
Settings
Button Control
Collapse menu

Content Box Middle

Contenttype: Text
Navigable: ☑
Title: Future of TV

Add Media | Visual | Text

HAT is based on WordPress and allows to create HbbTV applications in a very simple, fast and efficient way. It allows content creators without specific technical skills to build interactive TV applications and has been implemented by Fraunhofer FOKUS.

HbbTV APPLICATION TOOLKIT

p

Save Changes

Content Box Left

Contenttype: Social

Parent

(no parent)

Template

Three Columns

Order

0

Need help? Use the Help tab in the upper right of your screen.

Featured Image

Set featured image

Tags

Add

Separate tags with commas

Choose from the most used tags

Publish

Preview Changes

Status: **Published** Edit
Visibility: **Public** Edit
Revisions: **3** Browse
Published on: **May 12, 2015 @ 13:51** Edit

Move to Trash | Update

Edit Page ‹ HbbTV A

Stephan

hat.fokus.fraunhofer.de/wordpress/wp-admin/post.php?post=16&action=edit

My Sites | HbbTV App Toolkit | 0 | New | View Page | Howdy, fameHAT

Screen Options | Help

Edit Page Add New

HAT

Permalink: http://hat.fokus.fraunhofer.de/wordpress/ View Page

Revisions

fameHAT, 7 months ago (May 18, 2015 @ 11:31:39)

fameHAT, 7 months ago (May 18, 2015 @ 11:29:10) [Autosave]

fameHAT, 7 months ago (May 12, 2015 @ 13:51:30)

Content Box Middle

Contenttype: Text

Navigable: ☑

Title: Future of TV

Add Media | Visual | Text

HAT is based on WordPress and allows to create HbbTV applications in a very simple, fast and efficient way. It allows content creators without specific technical skills to build interactive TV applications and has been implemented by Fraunhofer FOKUS.

#HbbTVSymposium London

Design of template-three_columns

Page Attributes

Parent

(no parent)

Template

Three Columns

Order

0

Need help? Use the Help tab in the upper right of your screen.

Featured Image

Set featured image

- Dashboard
- Posts
- Media
- Pages
  - All Pages
  - Add New
  - Tags
- Comments
- Gallery Items
- Popups
- Functions
- Appearance
- Plugins
- Users
- Tools
- Settings
- Button Control
- Collapse menu

HbbTV App Toolkit
Fraunhofer FOKUS
Social Feed
DW Innovation
vor 2 Stunden
#FOKUSMWS talks
TV&Media: What we have today will probably look very different in 2 yrs time, thinks Pablo Argon @ericsson
Travellers Meet
vor 2 Stunden
#MTM15 talks
MTM "Rare Breed" Speaker - Dilip Bam. Most people call him eccentric. But we think he is most normal... fb.me/Fdkka891
MTM India
vor 2 Stunden
#MTM15 talks
500 days on the road. 5 days to go.
http://fb.me/3BLw4inJz
Future of TV
HAT is based on WordPress and allows to create HbbTV applications in a very simple, fast and efficient way. It allows content creators without specific technical skills to build interactive TV applications and has been implemented by Fraunhofer FOKUS.
HbbTV APPLICATION TOOLKIT
5 Menu
Hide
Privacy
2 Pop-up
3 Concept
SAMSUNG

Edit Page ‹ Verknallt | Edit Page ‹ HbbTV A

hat.fokus.fraunhofer.de/wordpress/wp-admin/post.php?post=195&action=edit

My Sites | HbbTV App Toolkit | 0 | New | View Page | Howdy, fameHAT

Screen Options | Help

Dashboard
Posts
Media
Pages
All Pages
Add New
Tags
Comments
Gallery Items
Popups
Functions
Appearance
Plugins
Users
Tools
Settings
Button Control
Collapse menu

Edit Page Add New

Gallery

Permalink: http://hat.fokus.fraunhofer.de/wordpress/?page_id=195 Change Permalinks View Page

Layout

Box Width 50 %

Box Aligment Center

Content Box

Contenttype: Text

Navigable:

Title: Gallery

Add Media | Visual | Text

Design of template-fullpage

Page Attributes

Parent

(no parent)

Template

Full Page

Order

0

Need help? Use the Help tab in the upper right of your screen.

Featured Image

Set featured image

Tags

Add

Separate tags with commas

test

HBBTV APP TOOLKIT – LIVE CASES

PLUGINS

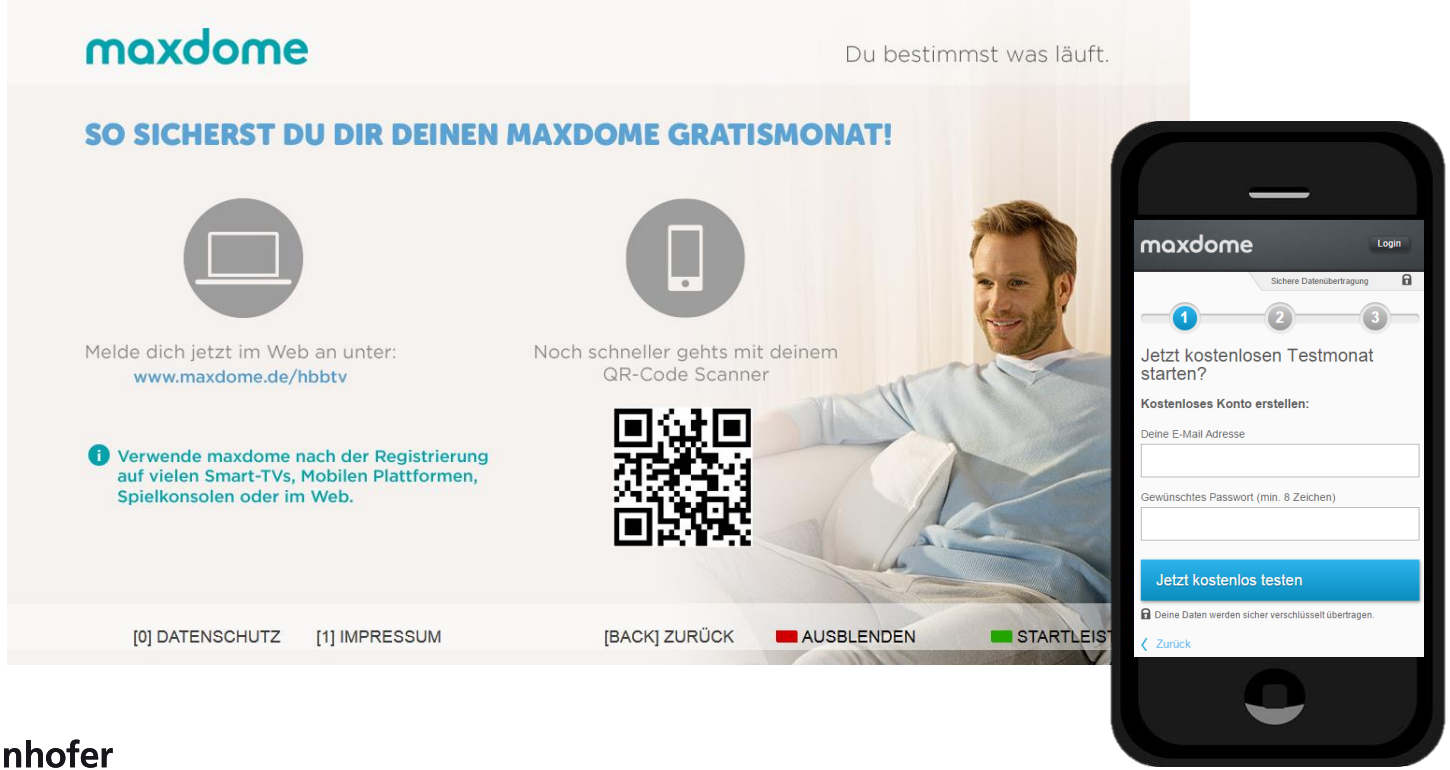
1. Social Media
2. Interactive Video
3. Companion Screen support
   - Companion Screen (launch, sync, communicate, …)
4. Dynamic Ad-insertion
   - Display personalized (in-stream (pre-roll, mid-roll, post-roll), overlay, …) Advertisements in HbbTV
   - Support of DVB/DASH events, VAST
5. 360° Video playback

grenzenlos
25h
Mauerfall
DIE SOCIAL TV-APP ZUM MAUERFALL-JUBILÄUM
#rbb25h
rbb
FERNSEHEN
rbb
LIVE
"Lichtgrenze" © Kulturprojekte Berlin
Live-Blog
rbb-info
vor 3 Minuten
Gleich geht's los und wir berichten wieder live aus
Sophie
vor 7 Minuten
Andreas
vor 12 Minuten
Ausblenden
0 Startleiste
1 Datenschutz
2 Impressum
RBB-ONLINE.DE

verknallt&abgedreht
www.verknalltundabgedreht.de
Mo - Fr um 16:05 auf rbb
LAURA
#verknallt15
verknallt&abgedreht
vor 11 Tagen
Date Doktor
vor 11 Tagen
@verknallt: Ja hat Spaß gemacht!
:-)
Date Doktor
vor 11 Tagen
Ausblenden
0 Startleiste
1 Datenschutz
2 Impressum
3 LiveBlog aus
SAMSUNG

Fraunhofer FOKUS

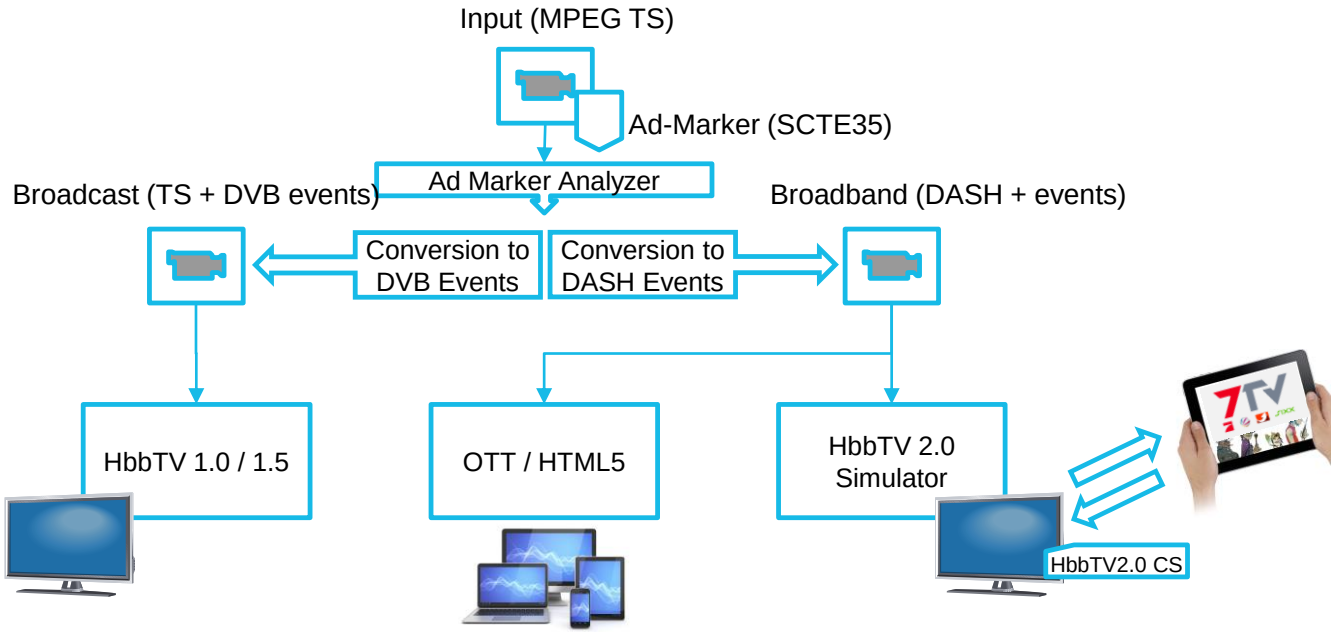
SECOND SCREEN ADVERTISING

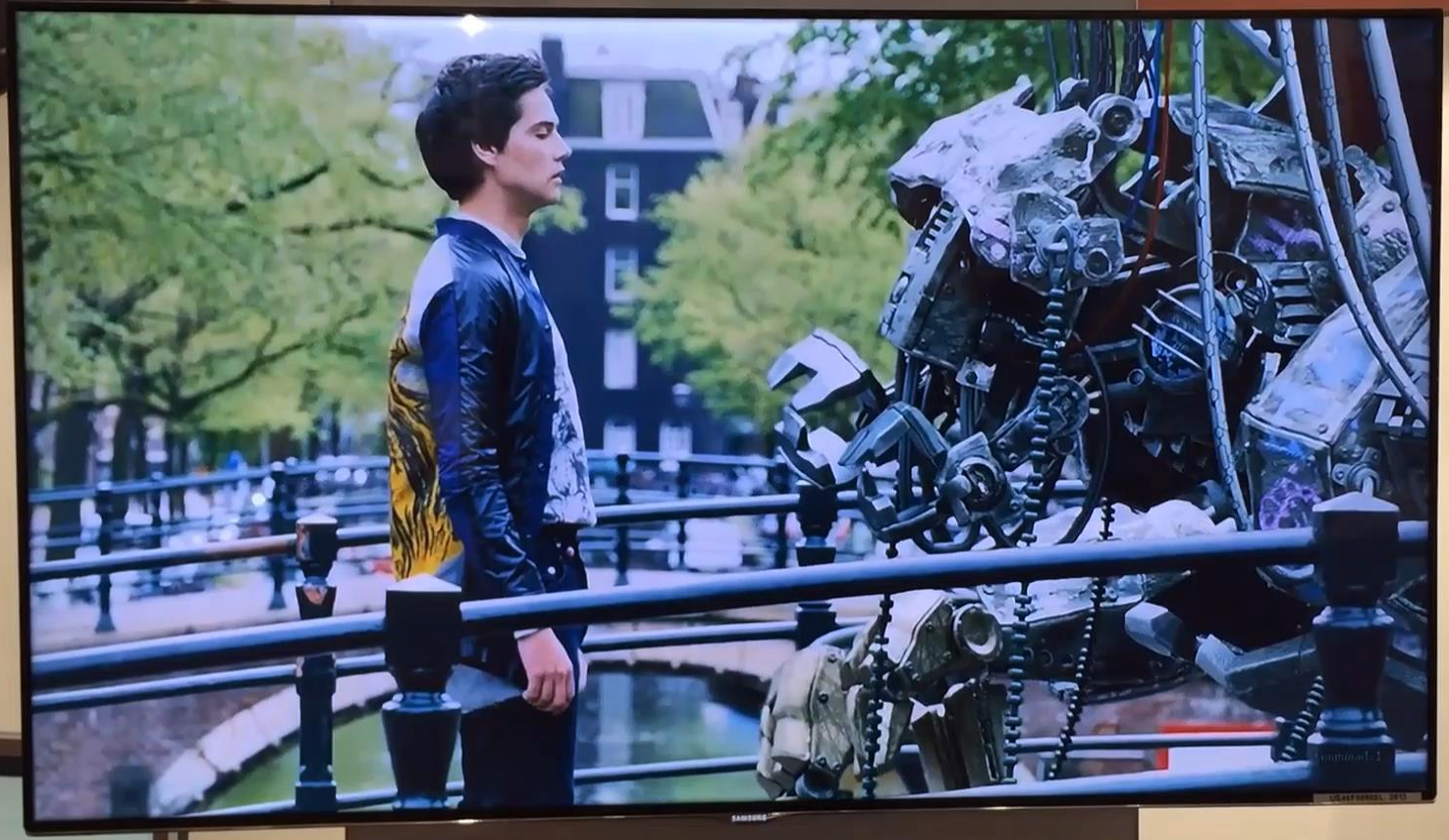


Fraunhofer
FOKU
Intro
The
Fut

DYNAMIC AD-INSERTION FOR HBBTV 2.0

Highlevel Solution Overview

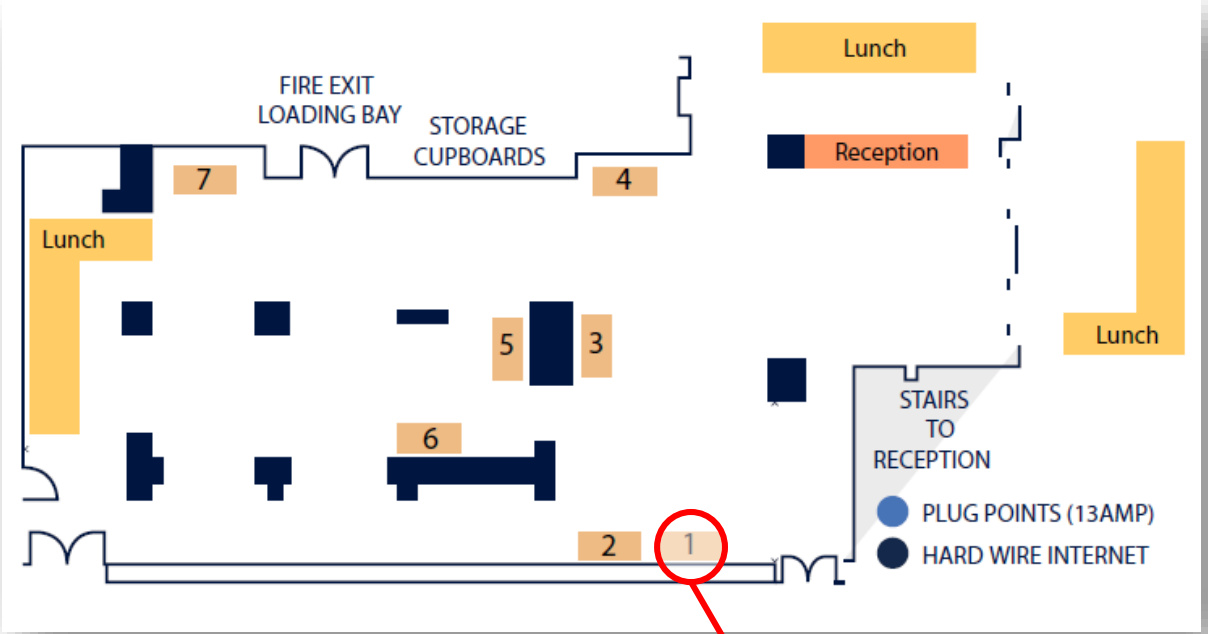




VISIT OUR DEMO BOOTH

Fraunhofer FOKUS Demos

- HbbTV App Toolkit – HAT
- 360° Video Playout for HbbTV
- Ad-Insertion
- Multiscreen



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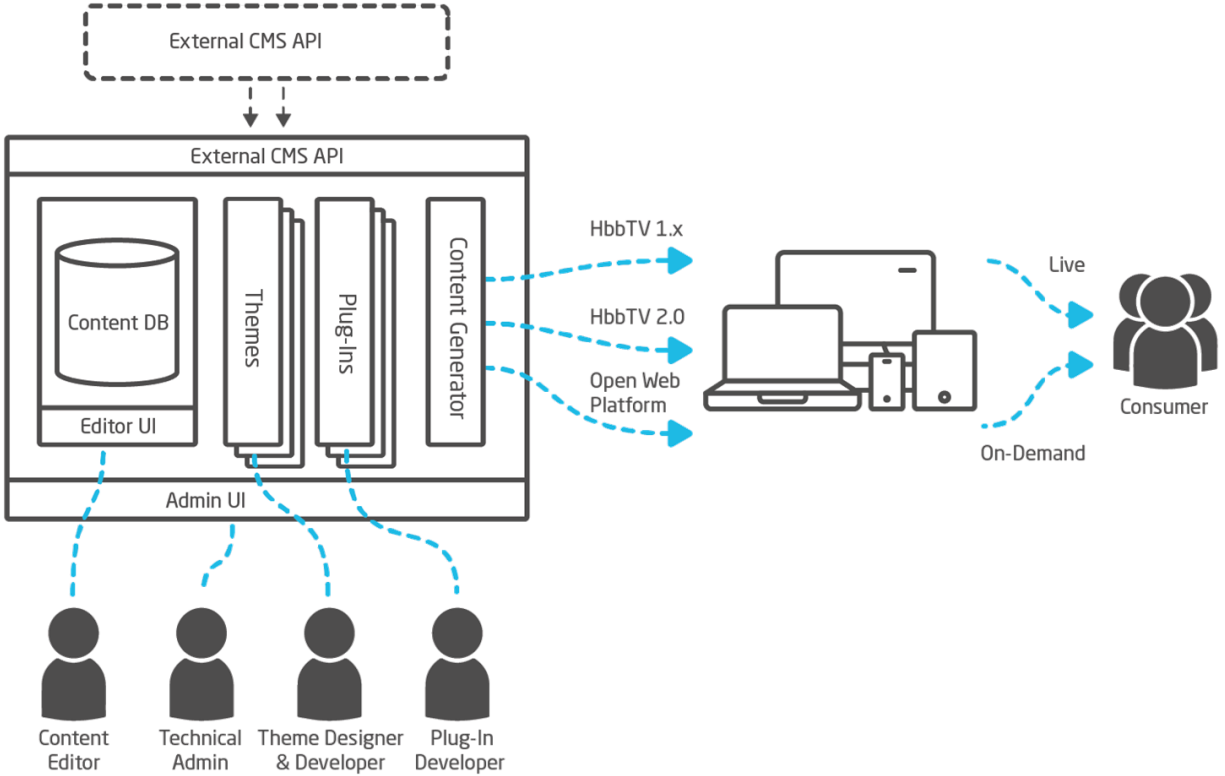
MPAT - MULTI PLATFORM APPLICATION TOOLKIT



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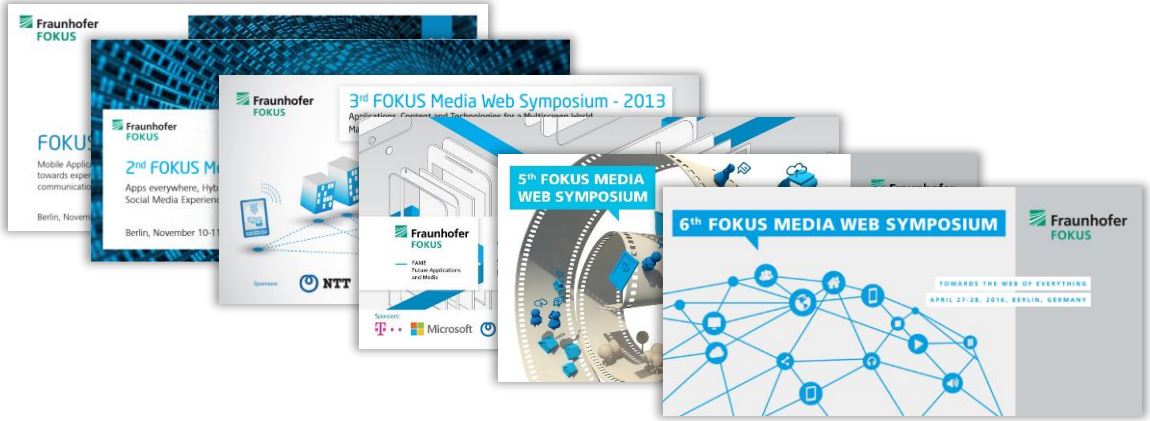
NEXT STEPS / RELEASES

- Responsive++
  - Live vs on-demand
- Towards multi-platform
  - HTML5
  - Mobile
  - Smart TVs
  - “Sticks”
- Set of themes and plug-ins, including
  - Breaking news (Alerts, Warnings)
  - EPG
  - Games / Quiz
  - Video chat
  - Shopping
  - Payment
  - Widgets aka Weather
  - …

6TH FOKUS MEDIA WEB SYMPOSIUM – WWW.FOKUS.FRAUNHOFER.DE/GO/MWS



June 15-16, 2016, Berlin

6th FOKUS Media Web Symposium: Towards the Web of Everything

The 6th FOKUS Media Web Symposium will focus on the convergence of the Media Web and the Internet of Things. Within the Conference, several Workshops and Tutorials offer the latest insights in Connected TV, Web Technologies, Streaming Media and Multiscreen Solutions.

Fraunhofer FOKUS

More information at:
www.fokus.fraunhofer.de/go/hat

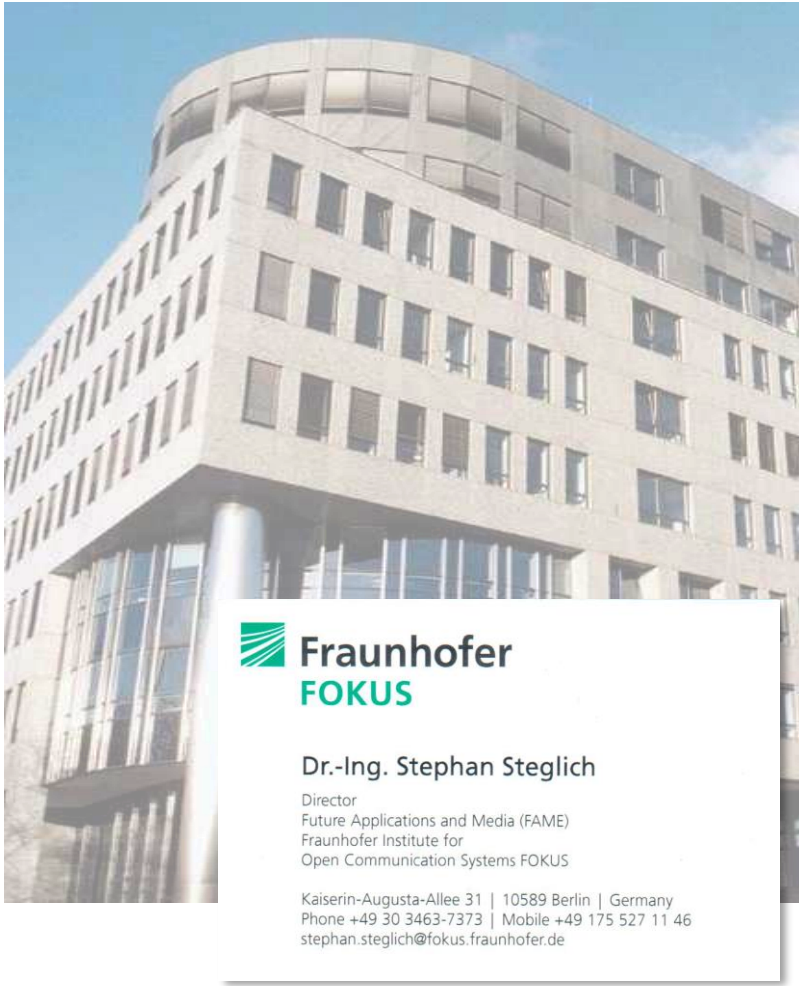
Thank you for listening!
Questions?

Fraunhofer
FOKUS

Fraunhofer Institute for Open Communication Systems

Kaiserin-Augusta-Allee 31
10589 Berlin, Germany

www.fokus.fraunhofer.de



Removing boundaries between Smart TV and HbbTV

• Making universal TV applications easy •

Petr Mazanec, CTO

Mautilus, s.r.o

petr.mazanec@mautilus.com

@PetrMazanec

mautilus
SOFTWARE SOLUTIONS

About Mautilus, s.r.o.

- 5 years of experience with Smart TV and HbbTV apps development
- 50+ TV applications delivered worldwide
- Located in Brno, offices in Vienna and Dubai
- Clients: Telefonica, icflix, CME(VOYO), HBO.GO, MTG, SIEMENS, ServusTV, ShowMax,…

Smart TV/HbbTV ➧ Challenges

- Smart TV:
  - Fragmentation
  - Application lifetime
  - Rapid application development
- HbbTV:
  - Fragmentation
  - Server side
  - Monetization

Smart TV → Fragmentation

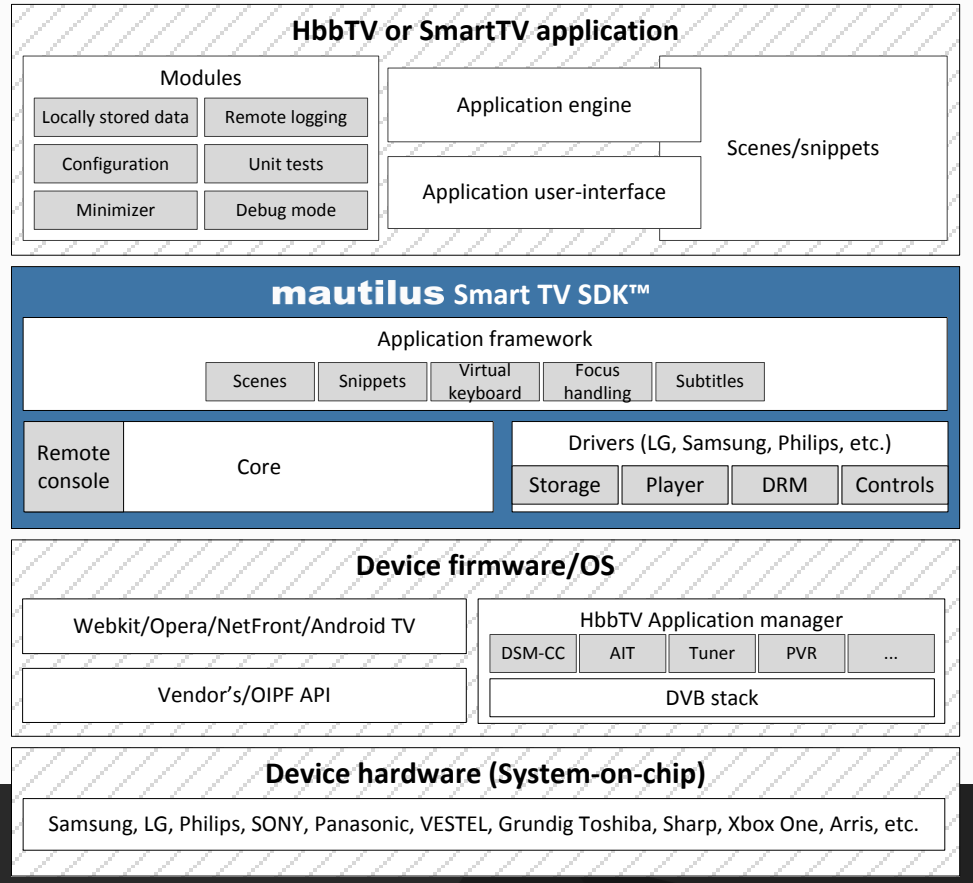
- Many TV vendors
- Different approach to platform-based features
  - Player/DRM/4K
  - Keyboard
  - Storage
  - Multitasking features
  - Resolution (HD/Full HD)
  - Platform bugs/issues
  - Performance
- It is worse then 3 years ago

Smart TV ➧ Lifetime

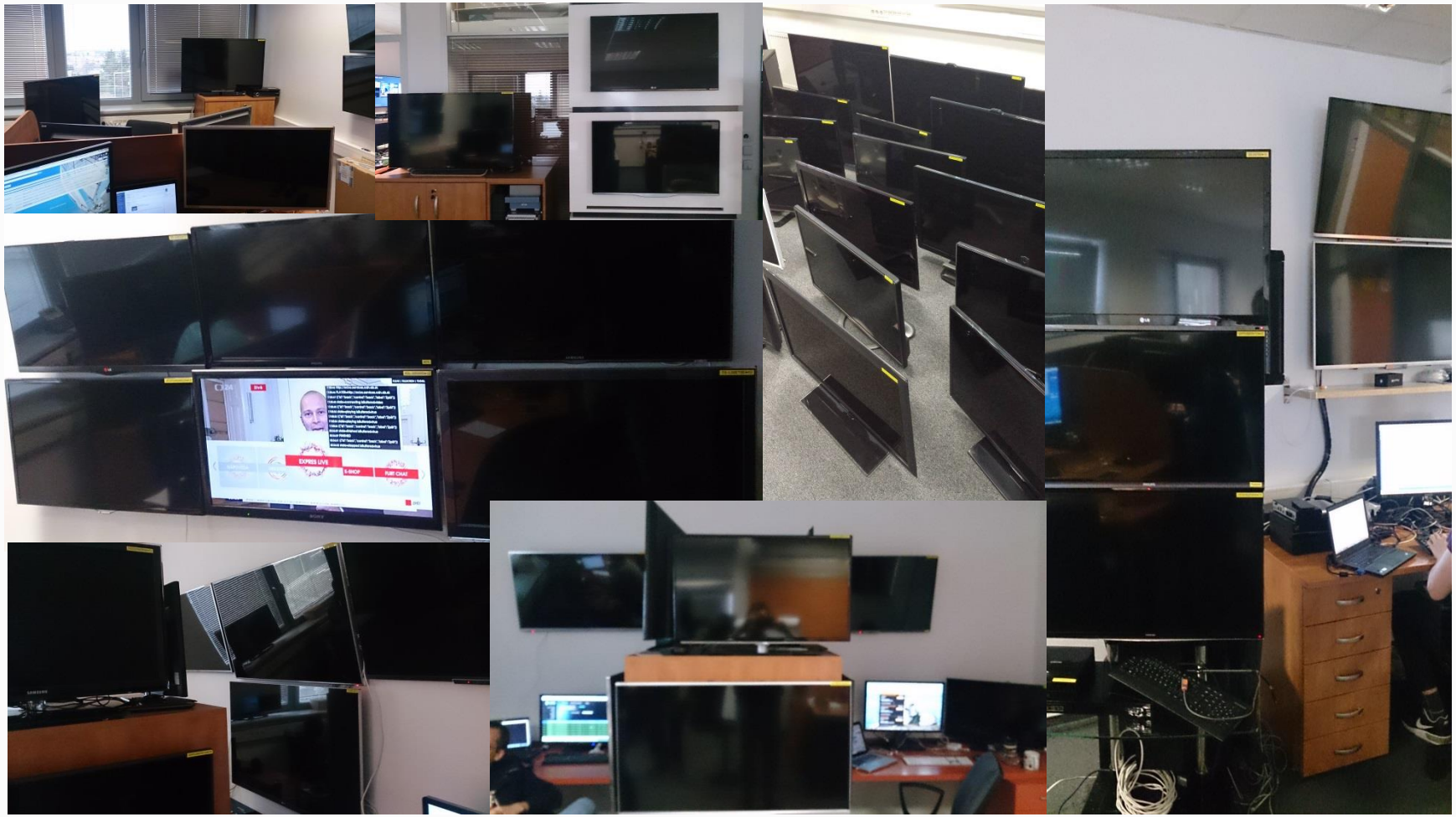
- Long maintanence
- TV life time 6+ years, e.g. 700.000 TVs sold yearly in Czech Republic
- We have to support TVs from 2012/2011
- Essential requirement: Having unified code/solutions across applications

Smart TV ➧ Answer is: Mautilus SmartTV SDK™

- 5 years of experience
- New BSD license, GitHub, free support



Smart TV ➧ Testing



HbbTV ➧ Fragmentation

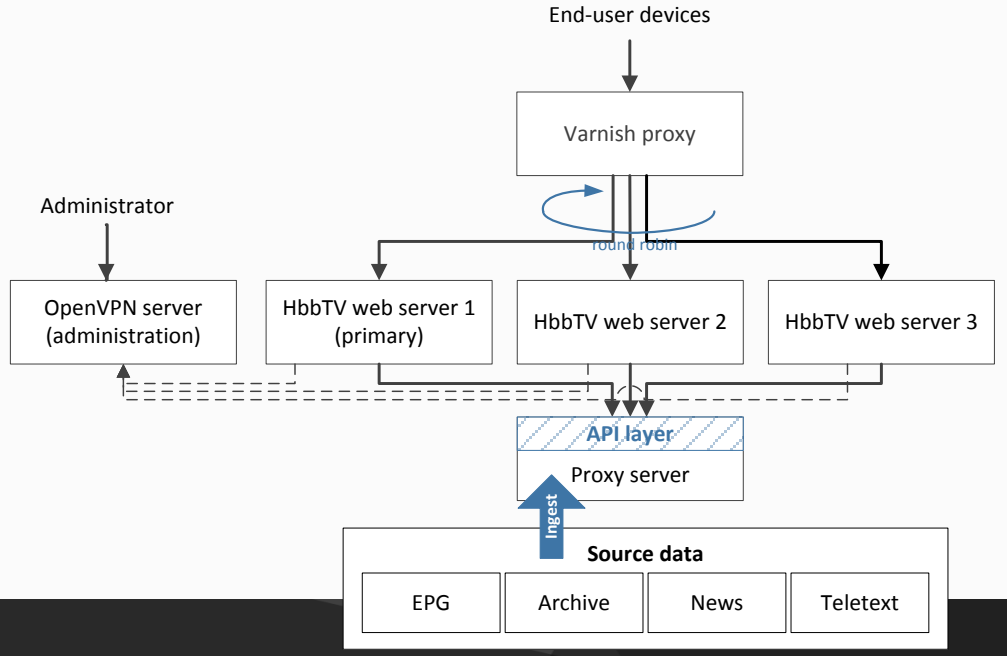
- Low-end DVB set-top boxes deployed
- Performance issues
- Need for analytics – 90% of viewers are using 5-10% of TV models
- MPEG-DASH support missing on HbbTV 1.1.1
- Fragmented delivering path (DVB-T/S/C, IPTV)
- Solution?
  - More devices for testing, more testing
  - Installation of local DVB-T circuits to simulate real conditions

HbbTV ➧ Monetization

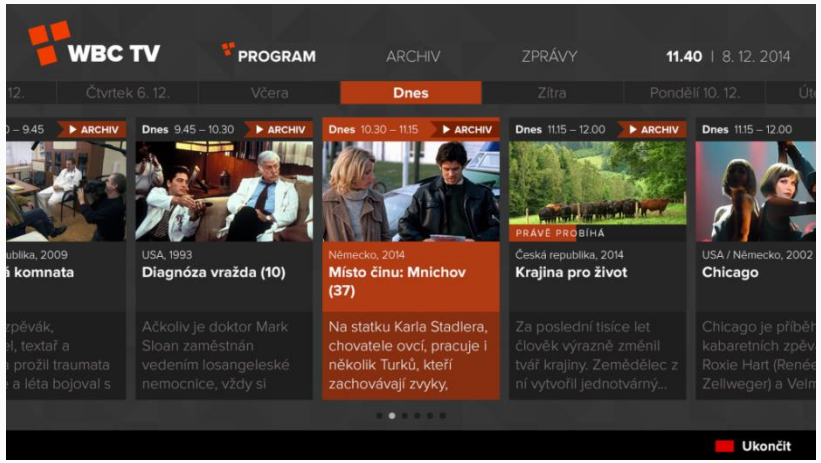
- Broadcasters do not have "always good" experiences with OTT, their AVOD archives already available on web/mobile
- Many AVOD services, FTA DVB channels
- Missing DRM
- What we could do?
  - Monetize without direct payment (advertisements)
  - Offer unique services, which cannot be done on other platforms
  - Customize while-label solution

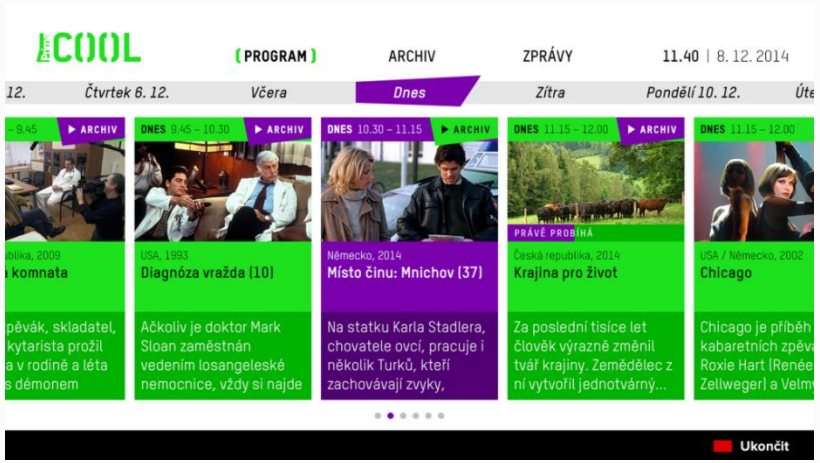
HbbTV → White-label

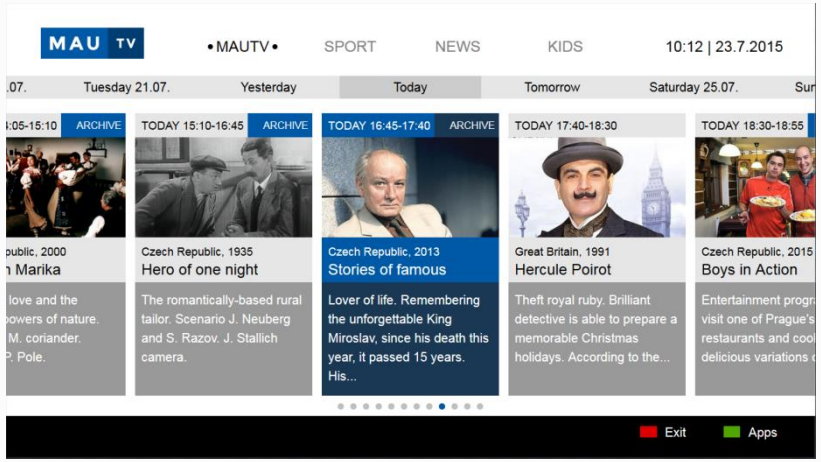
- Make the investment low, but do not compromise the quality:
  - OPEX only, monthly payment: 179 EUR/channel
  - Fast delivery
  - Comes with the backend development support

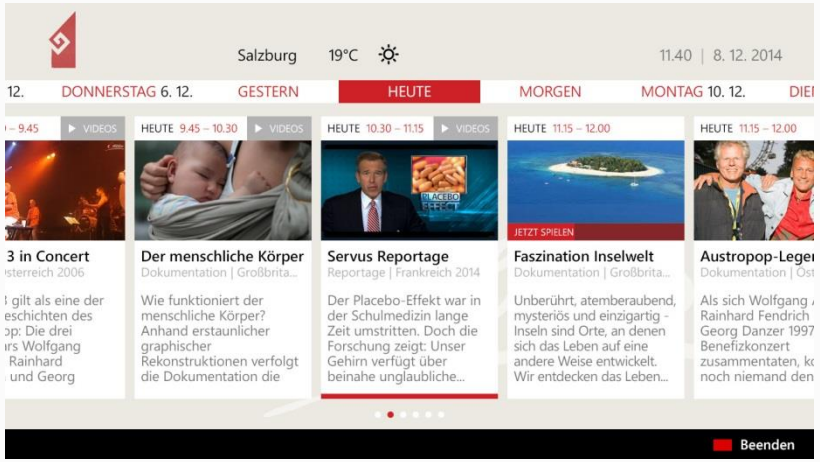


HbbTV → White-label customizations









Thank you for your attention

petr.mazanec@mautilus.com

@PetrMazanec

TERAVOLT

ELECTRIFYING MEDIA

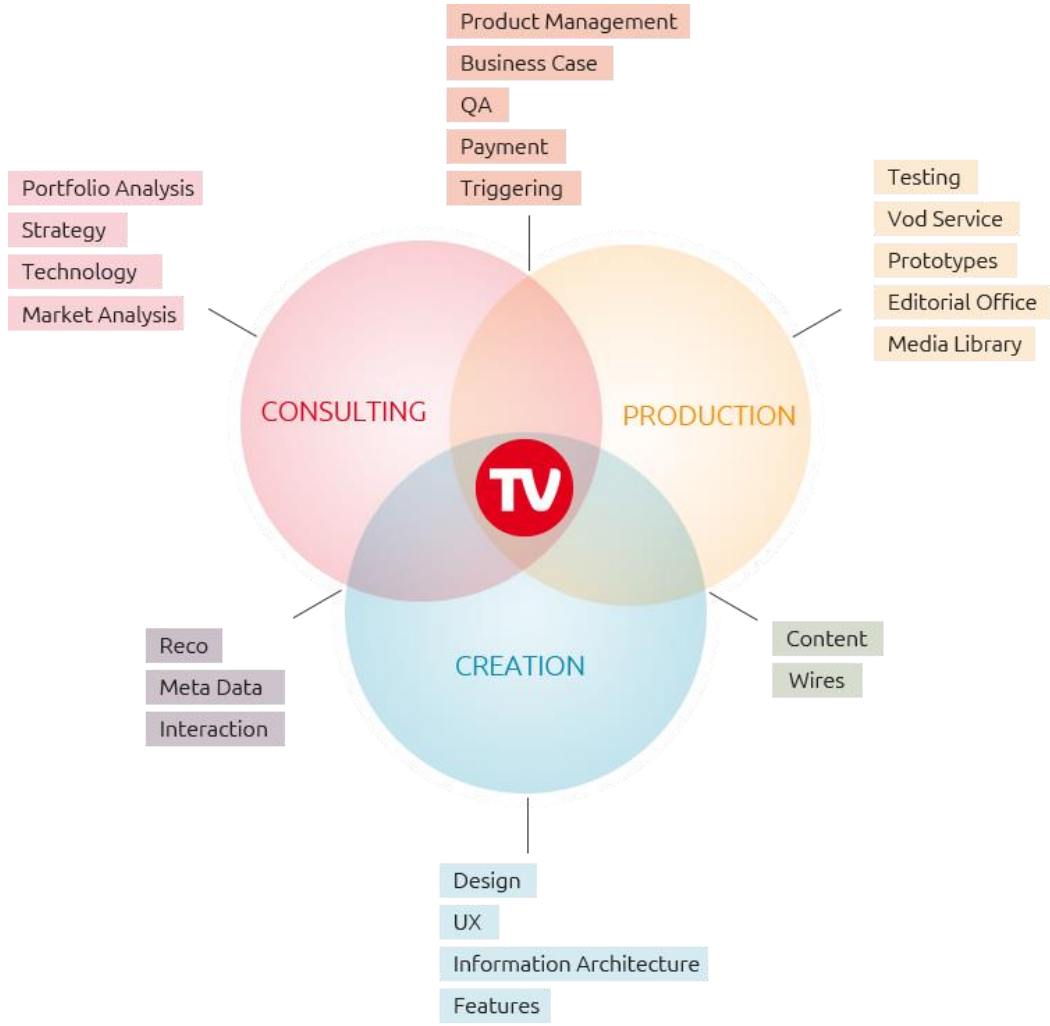
SMARTPAGES: THE NEW WAY OF CREATING HBBTV CAMPAIGNS

Positioned in the heart of digital media **transformation** we realize award winning products for the who is who

Positioned in the heart of digital media transformation we realize award winning products for the who is who

TeraVolt – Business Areas

Consulting, Production and Creation



References

Awards

Owned

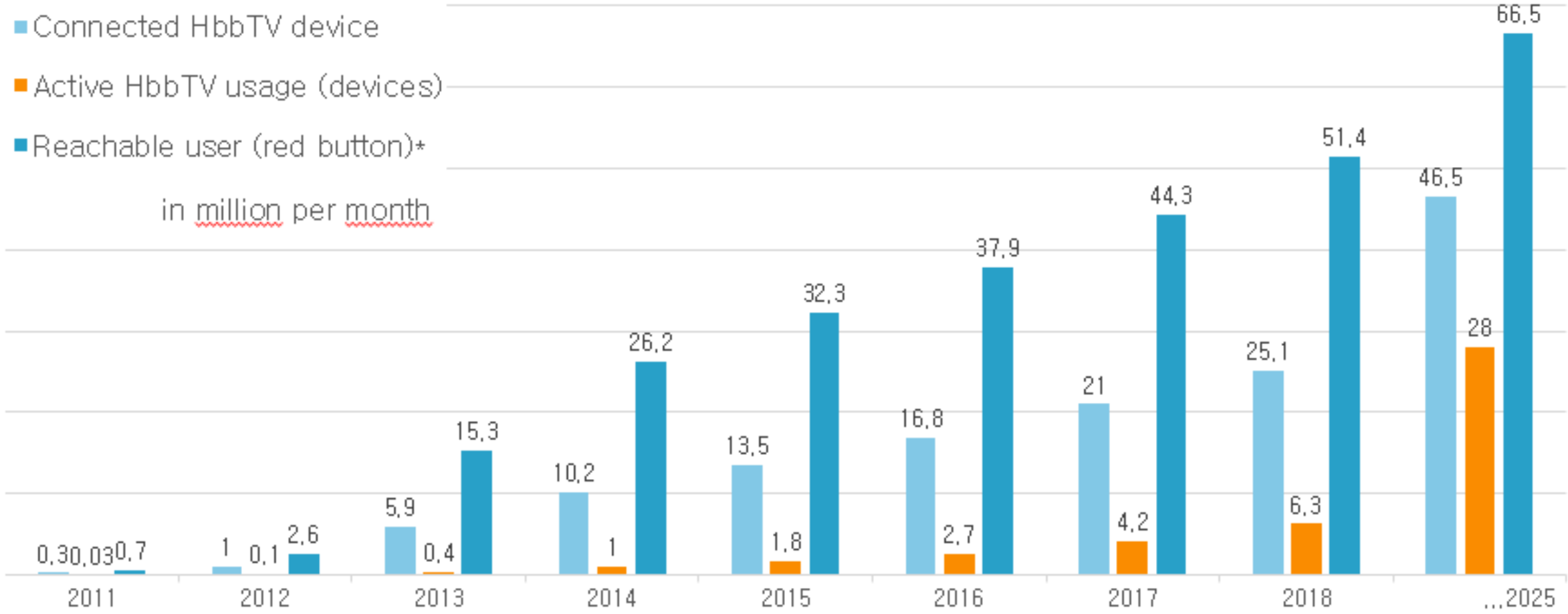
HBBTV SYMPOSIUM 2015, LONDON

TERAVOLT TV ELECTRIFYING MEDIA

Engagement is futures currency – HbbTV as an approach to transform TV viewers to engaged users

Strong growth in reachable devices & active HbbTV usage

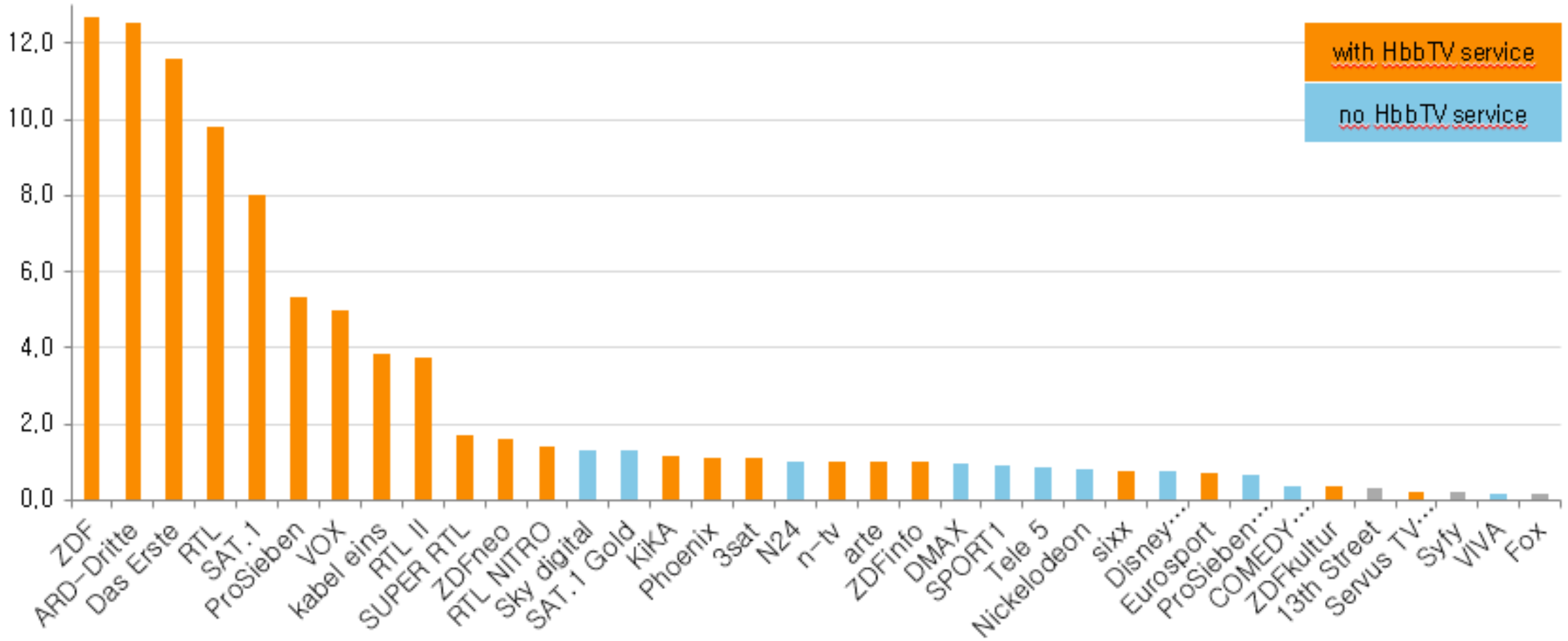
Status and forecast HbbTV in Germany



* on average 2,6 individuals per household (P7S1 survey)

HbbTV is already used by most German broadcasters

Broadcaster and HbbTV offer by audience share in %, January – August 2015



ProSiebenSat.1 achieves a CTR from an average of 0.84%

ProSiebensat.1 Click-Through-Rate Red Button Trigger

CLICK-THROUGH-RATE	Pro7	Sat.1	Kabel1	SIXX
Max. CRT Red Button	3,59	5,40%	3,70%	3,40%
Ø CRT Red Button	0,83%	0,98%	0,77%	0,76%
Min. CRT Red Button	0,27%	0,21%	0,21%	0,25%

Success factors for CTR: Creative → Content/Benefit → Call To Action

Challenge: Scaling the HbbTV advertising business for broadcaster, agencies and advertiser

Challenges scaling the HbbTV business

Improvments needed at many parts of the value chain

Responsibility

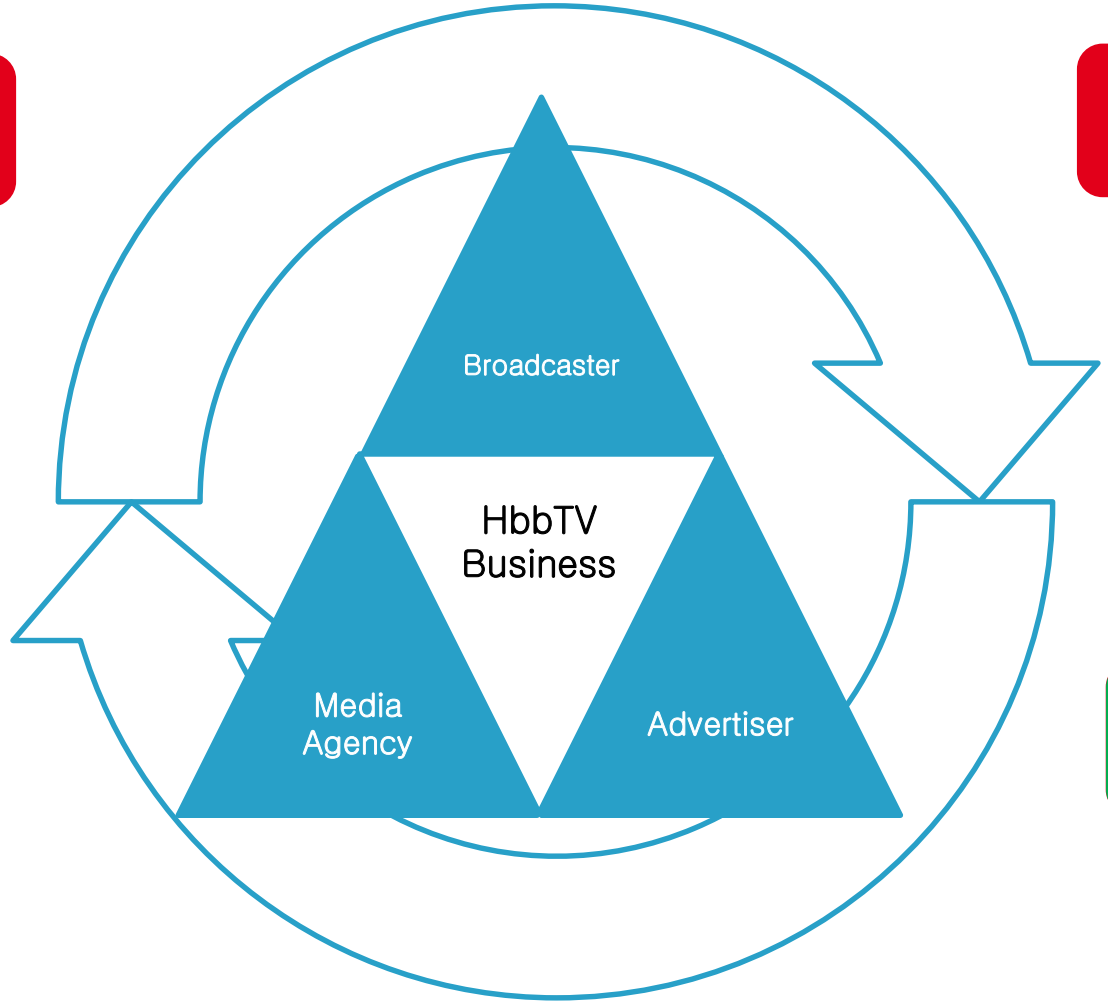
No Metric Standards

Know how

Reach

Costs

Interoperability



TERAVOLT TV
ELECTRIFYING MEDIA

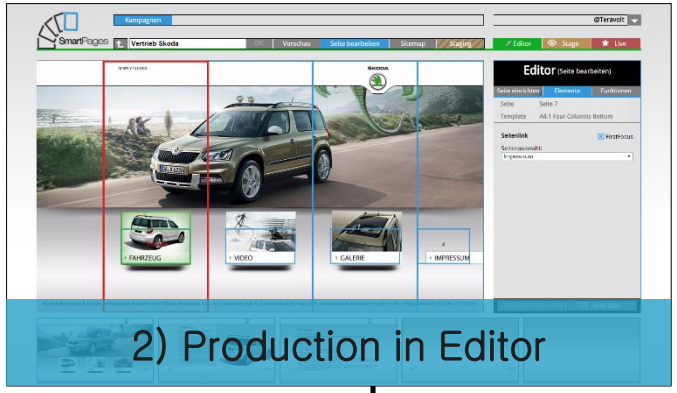
SmartPages enables **simple and efficient** production of campaign extensions for multi screen use cases

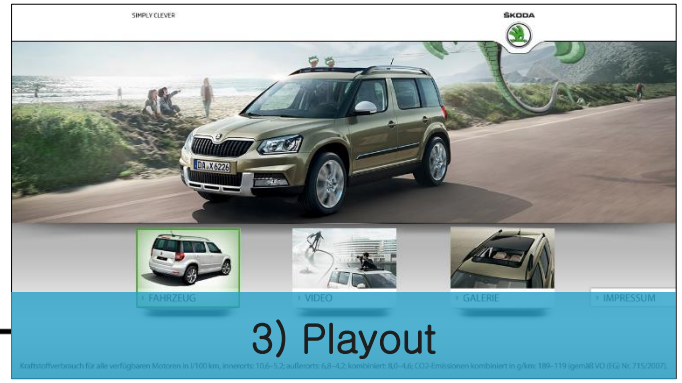
SmartPages is a highly scalable platform for addressable HbbTV campaigns

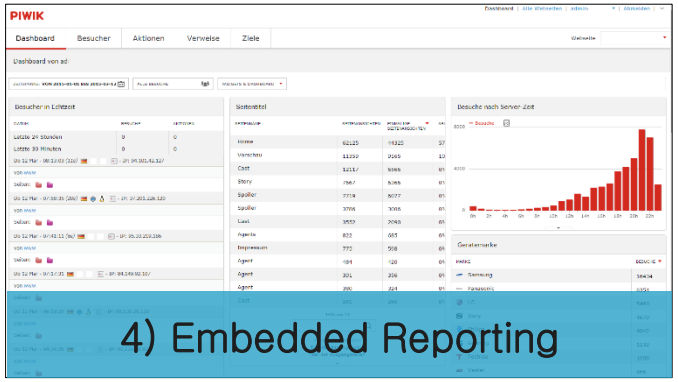
SaaS tool for TV ad campaign extensions

In a few steps to a publishable SmartPages campaign

Process of creation







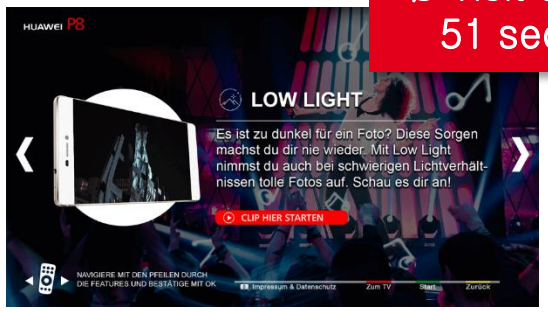
1. Graphic production
2. Upload into WYSIWYG Editor. Buttons are detected automatically by image-difference-method and are linked manually by the user.
3. Automated campaign verification and publication on the system (Editor, Stage, Live) – Create once, publish everywhere!
4. Reporting figures are available immediately.

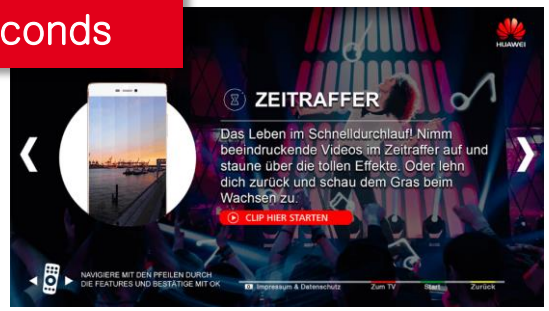
Actual cases proof **the power of engagement** – Best practice campaigns from German broadcasters

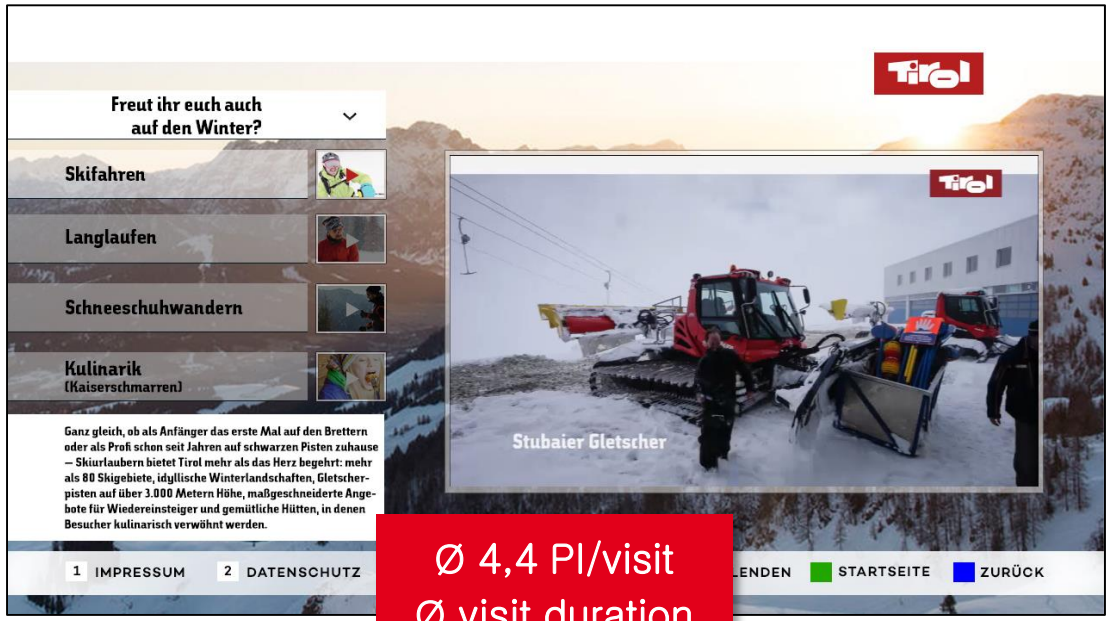
Commercial campaigns

Huawei at RTL2 and Tirol at ProSiebenSat.1 channels

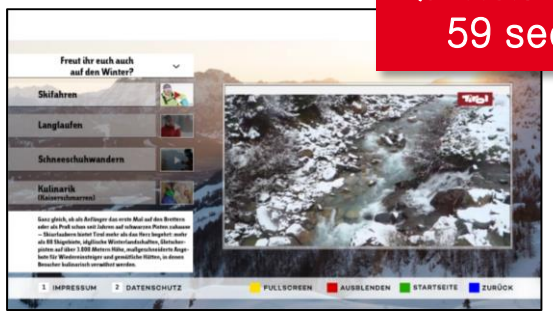
Ø 5,2 PI/visit
Ø visit duration
51 seconds

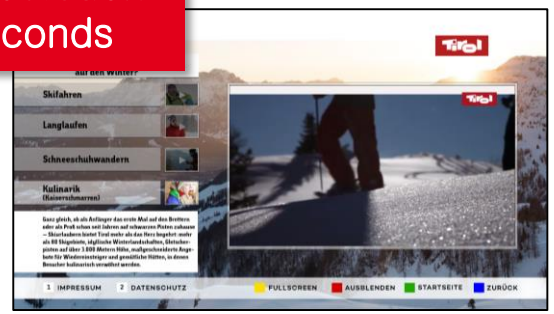






Ø 4,4 PI/visit
Ø visit duration
59 seconds

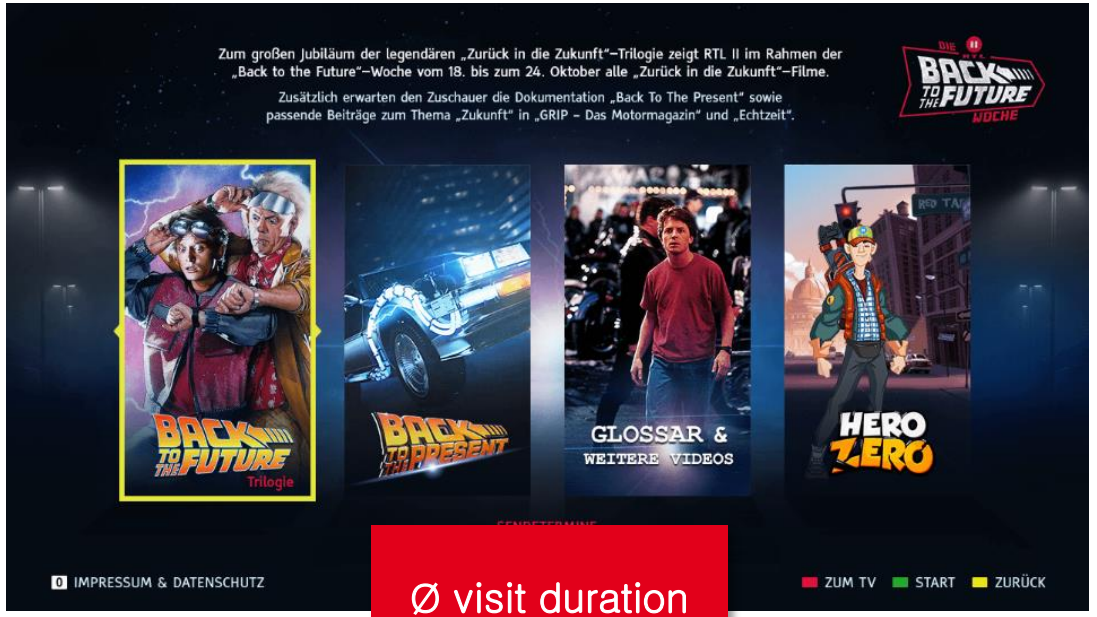




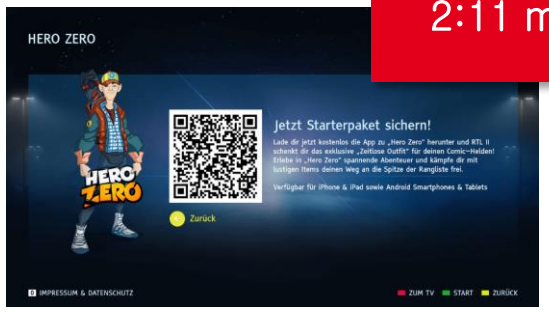
Editorial show related campaigns

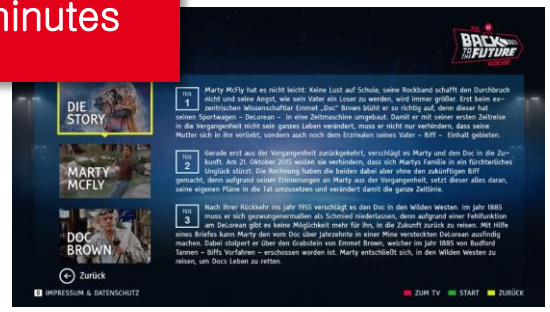
Agents of S.H.I.E.L.D and Back to the Future Week at RTL2

Ø visit duration 3:03 minutes



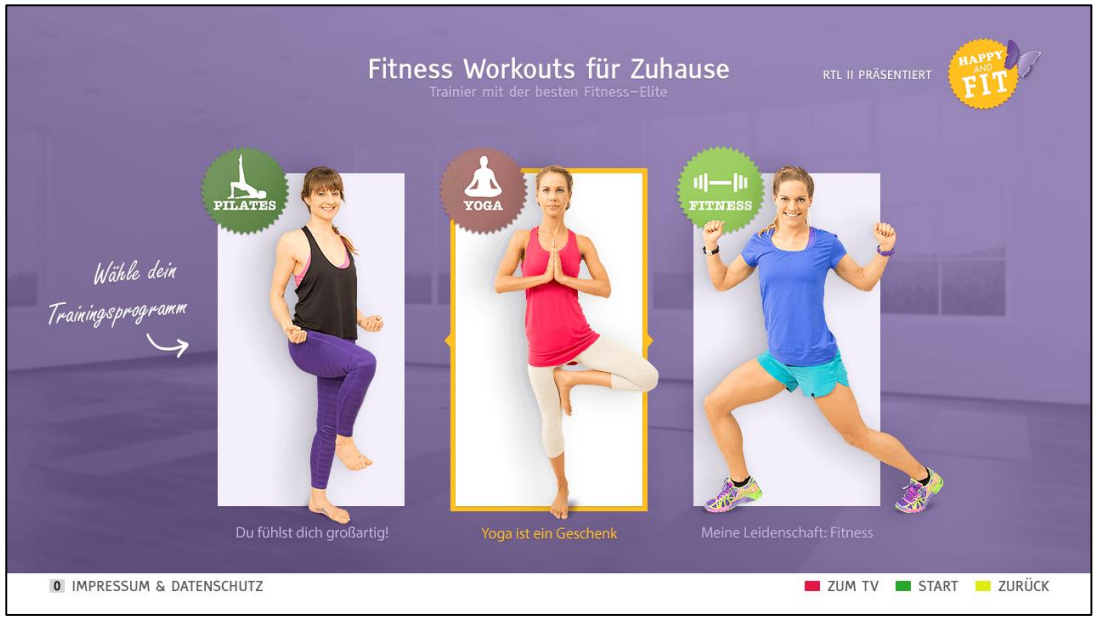
Ø visit duration 2:11 minutes

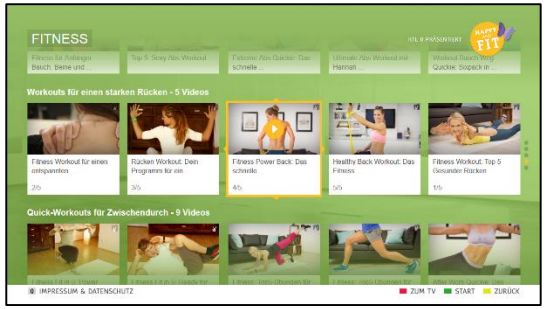


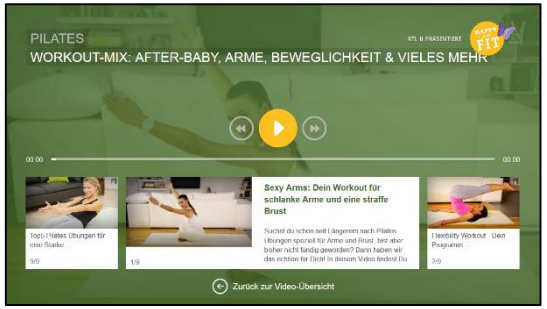


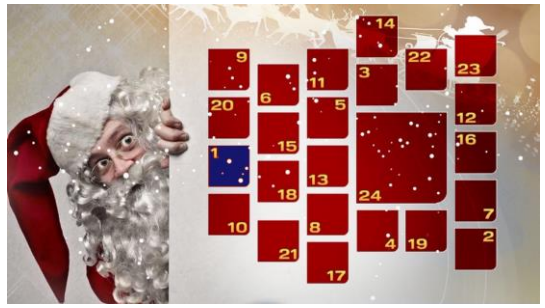
Video driven campaigns and prototyping

Happy & Fit App at RTL 2 and prototypes









Wild Island prelaunch campaign

Lead to very good 17,9% share 14–49 and 10,0% share Z3+ on first episode

Ad Impressions	Red Button: 2.003.705 on 4 channels
Ø Clickrates	Display 0,66% CTR, Startbar: 13,28% CTR

VideoViews	55k VideoViews, Ø2,78 VV/Visit
Ø Visit Duration	1:41 Min Ø Visit Duration on microsite

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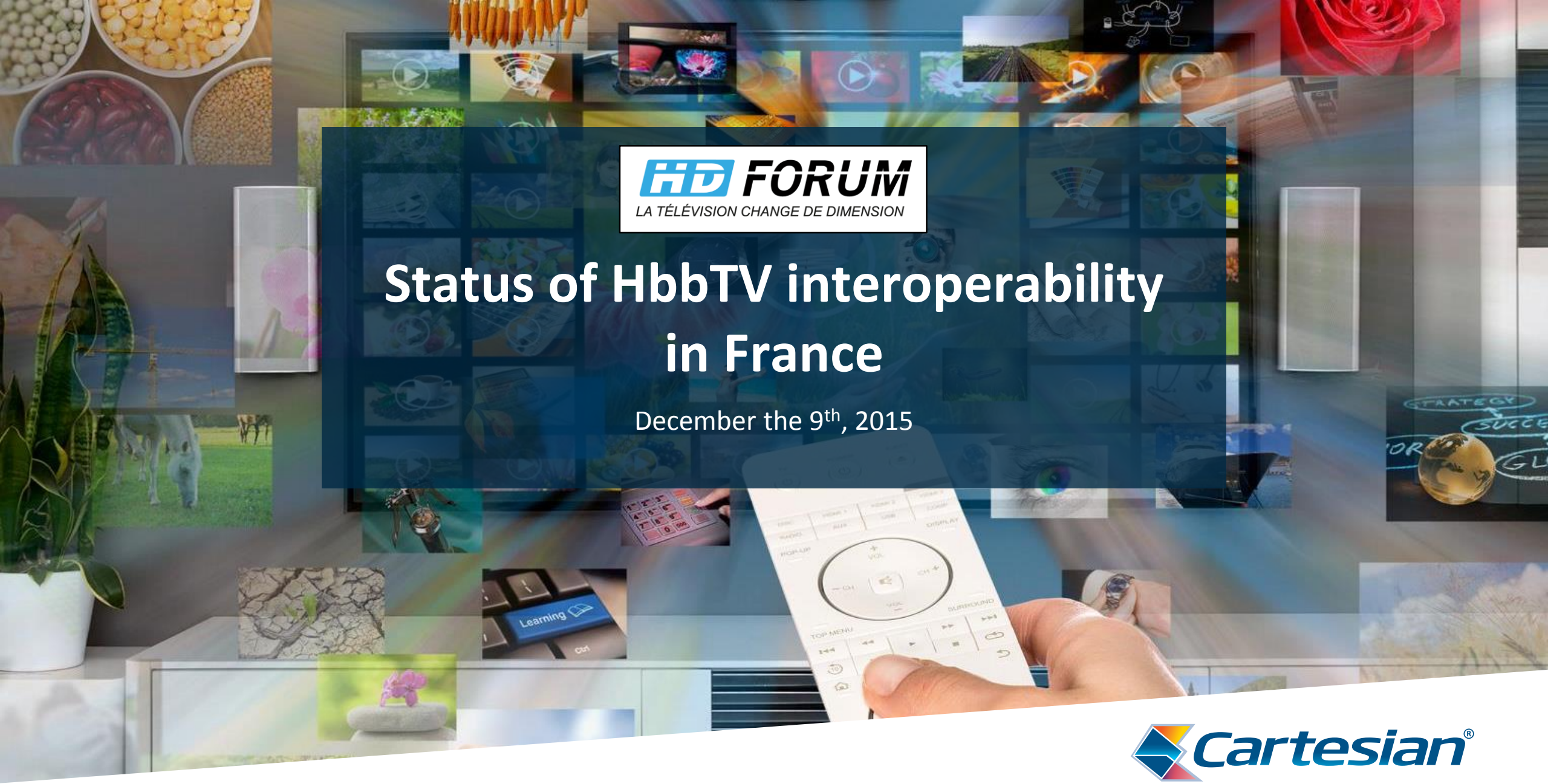
Mobile: +49 170 588 088 1
o.koch@teravolt.tv

34
Employees

11
Major Costumers

10.450
Cups of Coffee p.a.

TERAVOLT TV
ELECTRIFYING MEDIA



Status of HbbTV interoperability in France

December the 9th, 2015

Cartesian®

farncombe

www.cartesian.com

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Objectives of the study

- Since 2005, the HD Forum has coordinated the stakeholders of the French TV market for the adoption of new TV technologies and standards, and has facilitated the evolution of the French TV ecosystem.

- In 2012, the HD Forum has initiated the TNT 2.0 specification along with a set of tests to help develop added-value services together with a framework for interoperability.

- Three years later, in 2015, the HD Forum has appointed Farncombe, now part of Cartesian, to :
  - Undertake a detailed assessment of the interoperability within the French HbbTV ecosystem;
  - Examine the results in comparison with other HbbTV markets;
  - Analyze the causes for the existing interoperability issues;
  - Propose some recommendations to improve the overall HbbTV interoperability in France.

- The outcomes of this study are :
  - A long-form report (60 pages) in French
  - A short-form report (20 pages) in English. The HD Forum is looking at the option to give access to that version to HbbTV members.

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Interviewed companies

Farncombe has conducted 34 interviews with a wide range of players involved in the HbbTV ecosystem in Europe and in Australia.

Application developers	Broadcasters & Operators	Technology providers	Manufacturers	Institutions & Associations
dot screen	ARD	Arkena	LG	AFNUM
MIT-xperts	arte	eurofins | Digital Testing	SAMSUNG	CSA Conseil Supérieur de l'Audiovisuel
sofiadigital	fransat	httv	SONY	digitaluk
WIZTIVI	M6	Intertrust	TPVISION	freeview+plus
tdf	NRJ12	KEEPIXO by ALLEGRO DVT	VESTEL	GfK
	orange	Microsoft		HbbTV
	RTL	OPERA software		IRT
	TF1	tdf		tdt HÍBRIDA

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Approach

- Identification of companies to be interviewed.
- Creation of a questionnaire with specific questions per type of stakeholders.
- Execution of all interviews. Special attention was paid to:
  - The stakeholders' approach regarding interoperability,
  - The perception of the stakeholders about interoperability,
  - The gathering of interoperability facts,
  - The evaluation of the acceptability of possible solutions by the interviewees.
- Analysis of all information gathered during interviews,
- Drafting of report, including a list of possible solutions to improve the HbbTV interoperability in France.

Following this study, the HD Forum will further investigate the opportunity to implement these proposals.

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HbbTV initiatives for compliance and interoperability

Since the early days of the standard, the HbbTV association has committed to provide the means to favour the receivers compliance and the overall interoperability.

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Other initiatives for compliance and interoperability

Individual actions in favour of compliance and interoperability are developed and promoted towards the HbbTV community

HD FORUM

TNT 2.0 tests developed by the HD Forum have contributed to extend DASH and DRM testing.

tdt HÍBRIDA

TDT Hibrida has provided a set of tests on the application life cycle and audio formats.

IRT

The IRT offers a portal for HbbTV developers (Wiki).

eurofins IRT

Both the IRT and Eurofins Digital Testing offer HbbTV code validators.

MIT-xperts

MIT-xperts provides sample HbbTV applications.

Atos

Atos has developed a plugin for Firefox that allows to display an HbbTV application (FireHbbTV)

ARD IRT

IRT and ARD are currently developing an application framework to improve the quality and lead time of HbbTV application development.

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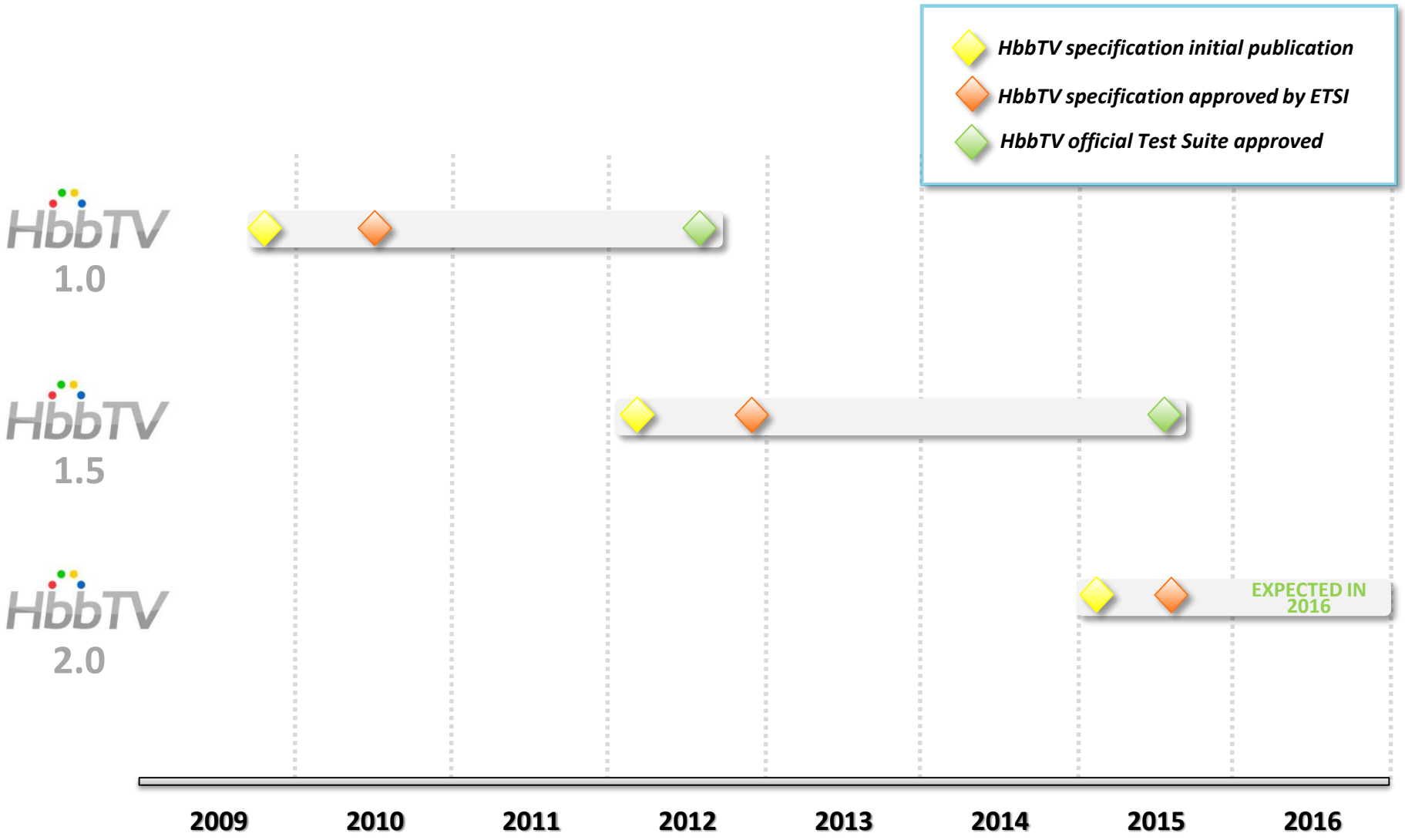
Challenges for HbbTV interoperability



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Challenges for HbbTV interoperability

- The official Test Suite for HbbTV 1.0 and 1.5 has been approved more than 2 years after the release of the specifications.
- The earliest HbbTV-compliant terminals have been deployed before services were actually available.
- As for any new technology or standard, application developers have to embark on a learning curve.
- Most products do not bear the HbbTV logo. Thus, they are not constrained to successfully pass the full official Test Suite.
- By definition, interoperability remains in an unstable equilibrium as applications change over time, new applications are deployed and HbbTV devices are also updated. This requires a sustained effort from all stakeholders.

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Explored HbbTV ecosystems

	Germany	Australia	Spain	France	UK
Prime mean for TV reception	Satellite, Cable	DTT	DTT	DTT, IPTV	DTT, Satellite
Nb of households	39 M	9 M	17 M	28 M	28 M
Nb of HbbTV devices	16 M (Q2 2015)	NA	3 M (Q3 2014)	4.6 M (Q2 2015)	-
Estimated nb of active devices	12 M		1.5 M	< 1 M	-
HbbTV launch year	2010 (IFA)	2014	2013 2014 (TDT Hibrida)	2011 (Roland Garros)	Oct. 2015
Local specification & profile	HbbTV 1.0	FreeviewPlus : HbbTV 1.5 with Marlin or PlayReady	TDT Hibrida : HbbTV 1.5 with Marlin or PlayReady	TNT 2.0 : HbbTV 1.5 with Marlin or PlayReady	FreeviewPlay : HbbTV 2.0 with PlayReady
Actual use of DASH by services	No	Yes	No	Yes	No
Actual use of DRM by services	No	Yes (Marlin & PlayReady)	No (Marlin & PlayReady)	Yes	Yes
Number of channels carrying HbbTV services	> 70	6	~15	~15	BBC, Channel 4, Channel 5, itv
Certification	No	FreviewPlus	TDT Hibrida	No	FreeviewPlay
Certified terminals whitelisting via embedded certificate	-	Yes	Certificate delivered but not used	-	Yes
Local interoperability events	Yes	Yes	Yes	No	To be defined
Facilitators, industry or certification bodies	IRT, Deutsche TV-Plattform	Freeview	TDT Hibrida Cellnex Telecom	HD Forum	Digital UK
Status of interoperability perceived by market players	Good	Good	Good	Average	-

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The French HbbTV landscape

- France as well as Germany have pioneered HbbTV services (example: the Roland Garros application by France Televisions in 2011).
- French broadcasters proposed innovative and ambitious services such as MyTF1 VOD, Start-Over on France Televisions (Salto) and LCP-Public Senat, Multicam application during sports events on France Televisions.
- Technology-wise, France has been the first country to use DASH and deploy DRM within HbbTV services.

However…

- France faces an important fragmentation of the TV reception modes (DTT, IPTV, Cable, Satellite) where only DTT and some satellite networks carry HbbTV services.
- The offer in catchup services is richer on operator boxes than on HbbTV services (for economic reasons).
- Limited coordinated communication towards the general public on HbbTV services, resulting in a lack of consumer awareness.

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Main interoperability issues reported in France

Application execution & UI issues:

- CSS : often used in a non-compliant manner by applications, leading to different terminal behaviours.
- Cookies: before 2013, the support of cookies was not always correctly implemented within terminals.

Video-related issues:

- Video object :
  - Non-deterministic behaviour when instantiating the A/V player (in particular when codecs are changed).
  - Implementation of event notifications are not always fully compliant with the specification
- MPEG-DASH streaming :
  - Multi-language, especially on-the-fly language selection is not supported well
  - Subtitles (not specified by HbbTV 1.0 and 1.5)
  - Trick plays are not supported well

DRM-related issues:

- Some terminals don’t support 16 bytes initialization vectors.
- An ambiguity of the endianness of the DRMSystemId has led to implementations which are incompatible with each other.

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Analysis of causes

- Some developers, with good expertise in Web development, but less familiar with HbbTV specificities, first develop a Web application, and then modify it until it operates properly on the set of terminals used for validation. This leads to non-compliant applications, prone to later interoperability issues. This approach tends to rarefy.
- Applications are sometimes tested against an insufficient number of terminals.
- Upstream collaboration between broadcasters and manufacturers is sometimes too limited (France under-represented in interoperability workshops).
- Insufficient market-specific testing of terminals with deployed services.
- Lack of maturity of the whole industry regarding MPEG- DASH. The HbbTV DASH profile does not specify how to implement subtitles or trick plays.
- Difficulty to reconcile all DASH profiles. Generally, the HbbTV DASH profile is not supported by all DASH packagers. Service providers aim at minimizing the number of streams generated for all the targeted platforms, which is challenging for HbbTV devices.
- Access to DRM integration guidelines is sometimes too challenging.

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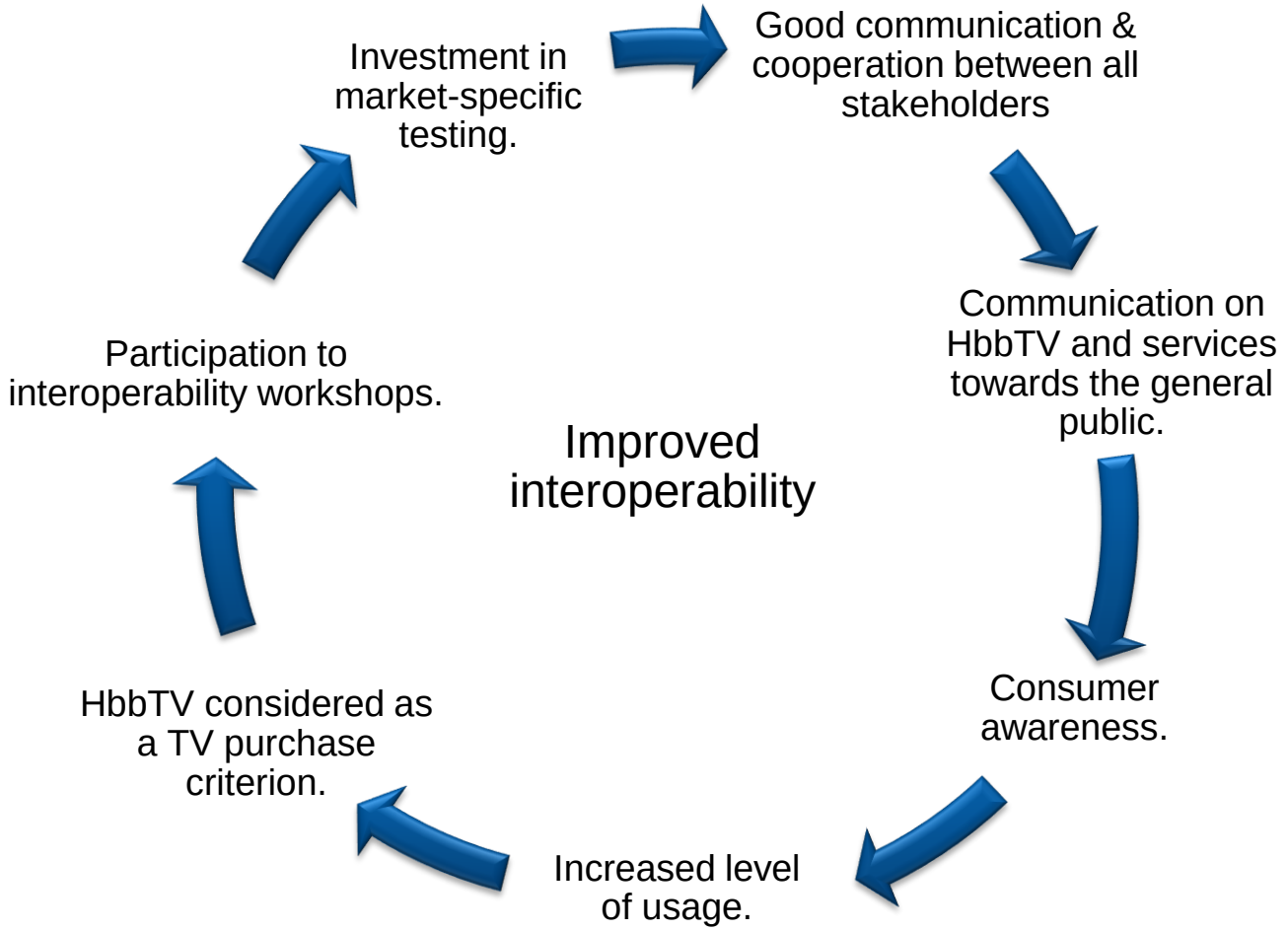
Lessons learnt from other markets

Australian, Spanish and German examples tend to show a number of factors that lead to a virtuous circle of better interoperability.



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Possible actions to improve interoperability in France

- The study concludes with a list of actions, that may be undertaken to improve interoperability.
- These possible actions are classified by categories of stakeholders. There are actions for:
  - Application developers,
  - Broadcasters,
  - Terminal manufacturers,
  - Dash Packager vendors,
  - DRM vendors,
  - A coordination entity (e.g. HD Forum).
- These actions have been listed extensively to feed the thoughts of the HD Forum, which will decide their interest for the French market and their possible implementation

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What's next?

- In many countries, HbbTV is key in broadcaster' strategy.
- TV manufacturers are all investing in HbbTV that is fully part of their SmartTV product line.
- The French market will grow by 2 to 3 Million new HbbTV devices every year.
- HbbTV may soon enable the largest TV/OTT platform, provided that interoperability is properly managed.

It is up to the HD Forum to decide what to do next…

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Thank You!

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HbbTV Test Suite

The foundation of interoperability

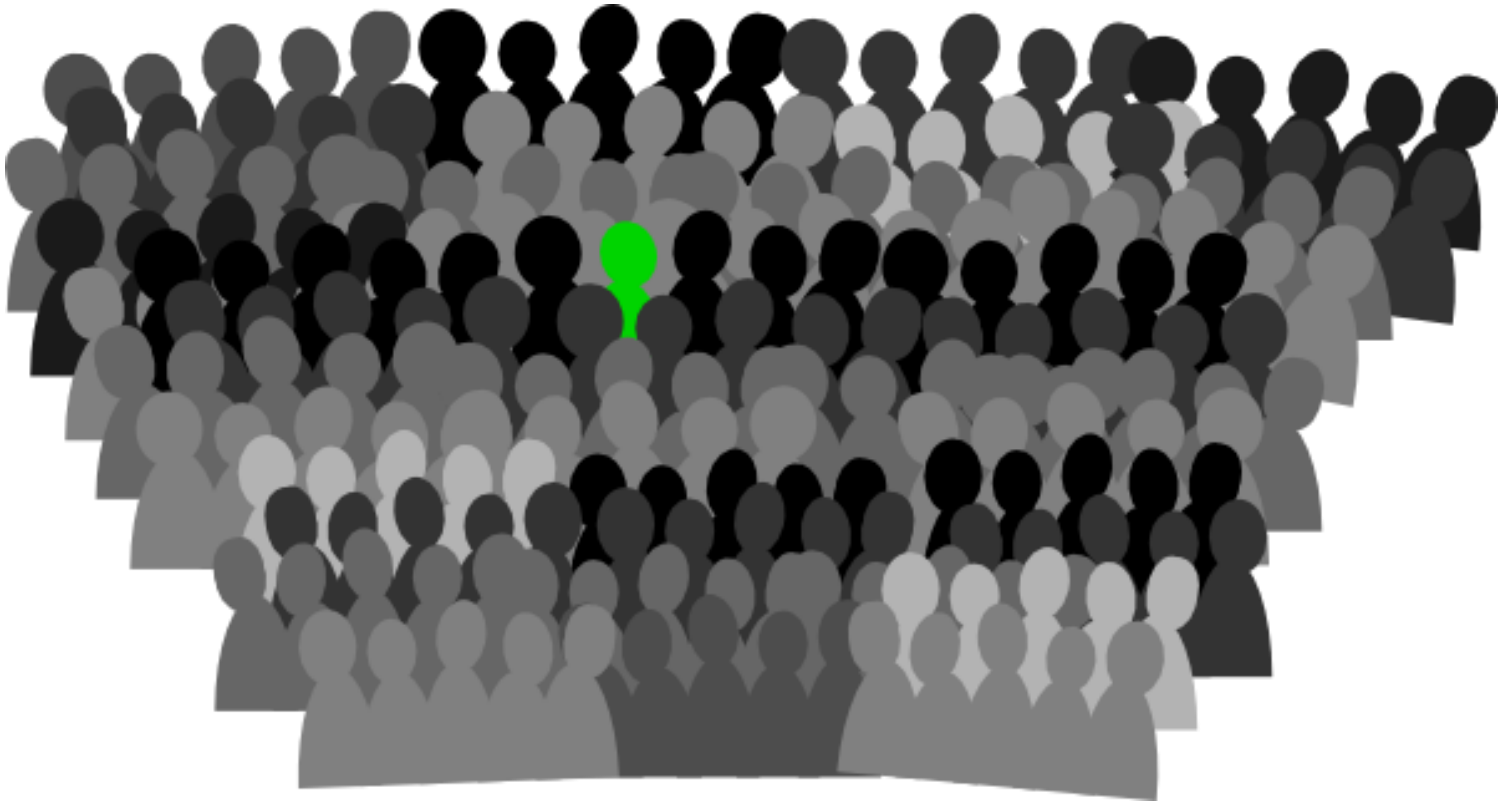
Ian Medland, DTG Testing
Chair of HbbTV Testing Working Group
imedland@dtg.org.uk

Conformance testing

Are you the one?

150+ FreeviewHD tests

2 passed without retest



HbbTV test suite

- Why do we need it?
- What is it?
- How is it made?
- How is it used?
- How can I get involved?

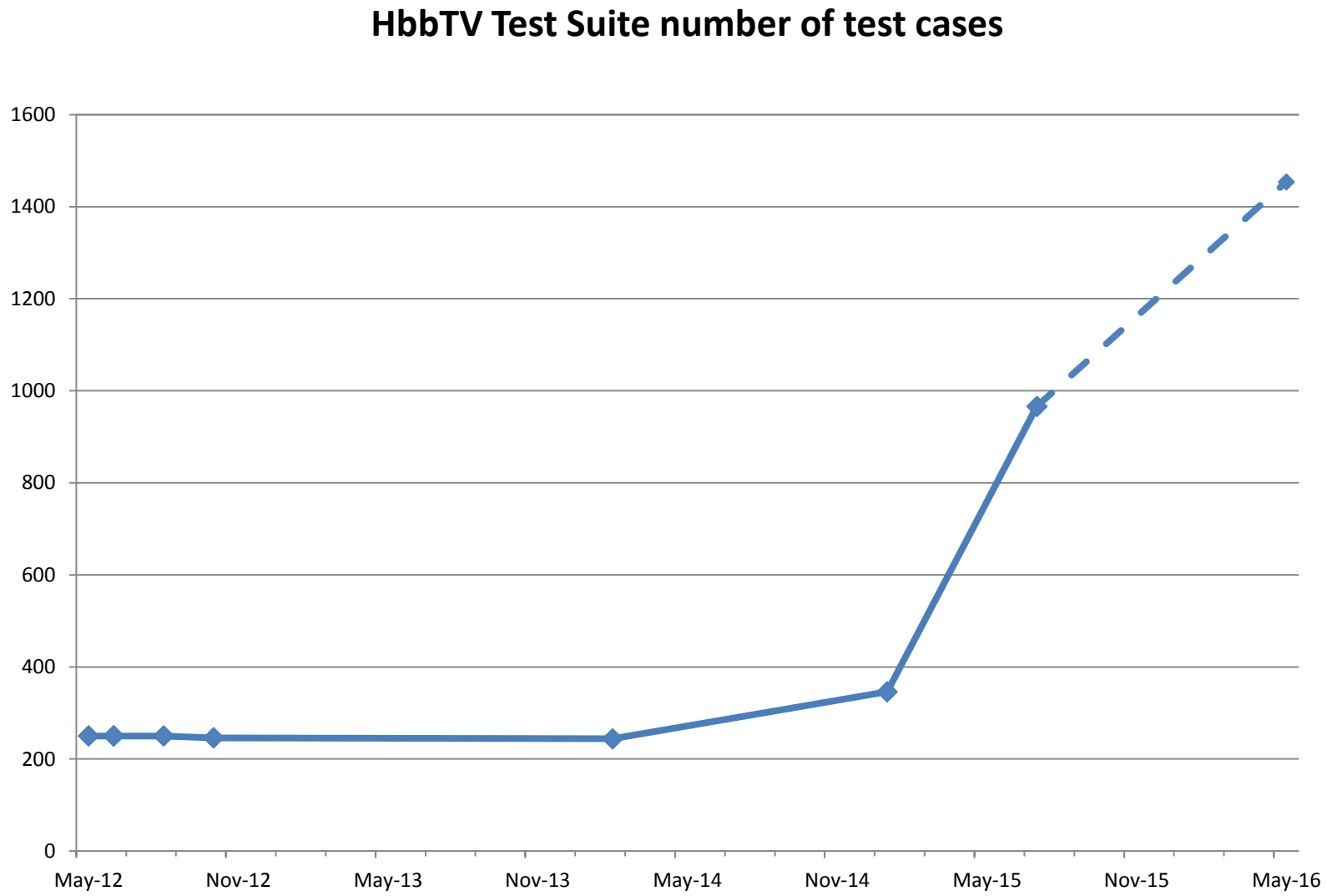
Why do we need it?

- Minimum interoperability standards on which to build services
- Industry specified, reviewed, approved and maintained
- Basis for all platforms using HbbTV
  - Often with local additional test requirements

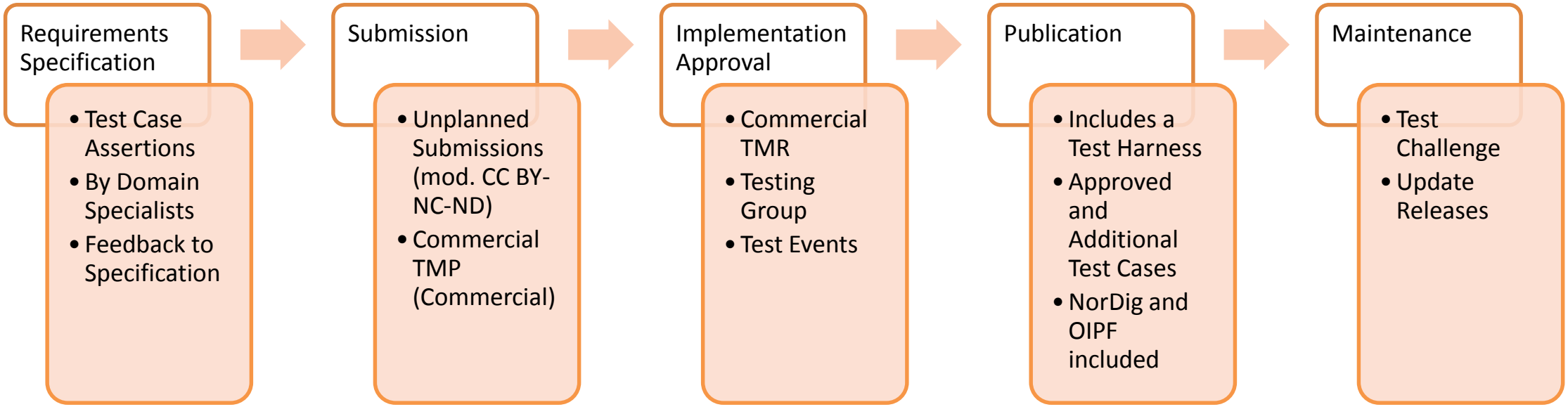
What is it?

- Over 950 Test Cases
- Provides wide coverage of the HbbTV specified and profiled APIs and content formats
- Designed for automated execution and results submission

What is it?


HbbTV Test Suite number of test cases
1600
1400
1200
1000
800
600
400
200
0
May-12
Nov-12
May-13
Nov-13
May-14
Nov-14
May-15
Nov-15
May-16

How is it made?



How is it used?

- Typically manufacturers can self-certify
- Registered Test Centres
  - Independent conformance testing
  - Currently five registered
- Manufacturer testing
  - Integrate with development and QA processes

How is it used?

- HbbTV logo
- Platform operators
  - Evidence of testing
  - Spot checks

How can I get involved?

I’m in!

How can I get involved?

DTG Testing

- We rely on continuous involvement to enhance the product
- Feedback from application authors and platform operators
  - Interoperability problems
  - Scenarios or test case implementations

How can I get involved?

- Review test cases
- Testing events
- Contribute on the mailing list
- Working Group telco every 2nd Wednesday afternoon

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HbbTV Symposium
London
8th 9th December 2015

HbbTV App Testing- Challenges and Solutions

Bob Campbell

CTO Eurofins Digital Testing

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About Eurofins Digital Testing

- The Leading Digital Media Testing Company
- ISO17025 Accredited
- 162 people in UK , Belgium and Hong Kong
- Formed in June 2015 combining Digital TV Labs and Testronic Labs
- Part of €5billion Eurofins Group
- HbbTV Board Member and Registered Test Centre
- Main contributor to HbbTV Association Official Test Suite
- Built test suites and run test services for France TNT2, Spain TDT, Germany Media Broadcast, Australia and New Zealand Freeview Plus and Freeview Play

DIGITAL TV LABS

UKAS TESTING 8159

Testronic
Our assurance is your guarantee

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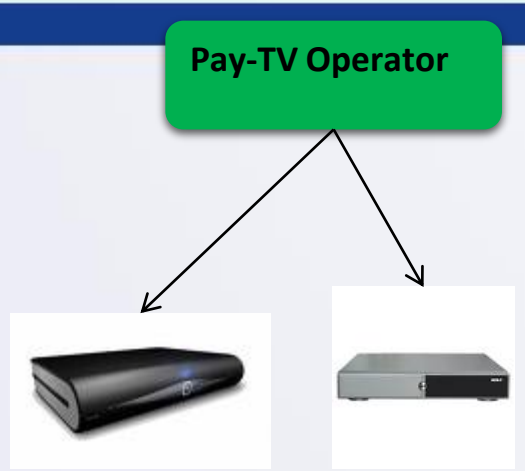
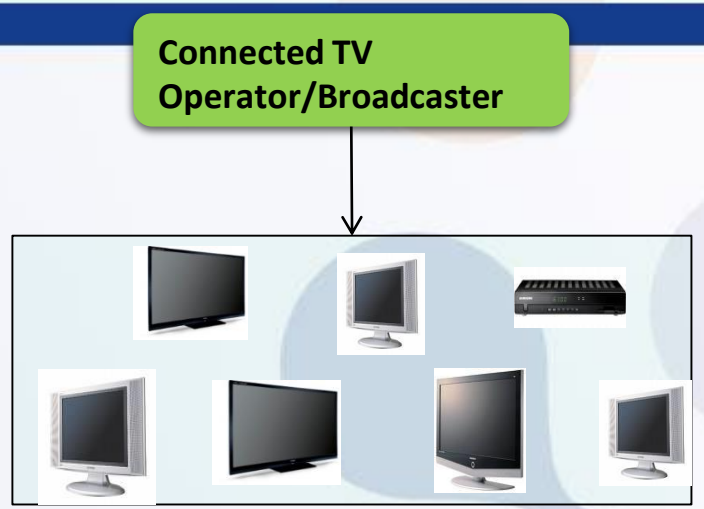
HbbTV Challenges



"OLD WORLD"

- Proprietary Middleware
- Operator owns STB
- Interoperability by heavy testing
- Head-end "camping"
- Small number of devices



"NEW WORLD"

- Lots of different devices
- Typically Horizontal market
- No control of platform
- Interoperability challenge

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What is Interoperability?

- **HbbTV's big advantage is many devices**
- **HbbTV big disadvantage is many devices**
- **Interoperability means:**
  - Same App works on all devices
  - App developer writes app once. No "If device = x do y"
  - App developer does not need to debug the TV
  - App developer can update the app with confidence
- **Interoperability means:**
  - Lower costs of app development
  - Lower costs of manufacturers
  - Lowers churn
  - Consumer gets what he expected
  - Happier customers
  - Reduces time to market

Things just work!!

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Interoperability Headache

Estimate 50+ manufacturers of HbbTV Devices.

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Interoperability Headache Plus

2016

2015

2014

HBBTV 2.0

HBBTV 1.5

HBBTV 1.1

Low-End Platform

Mid-End Platform

High-End Platform

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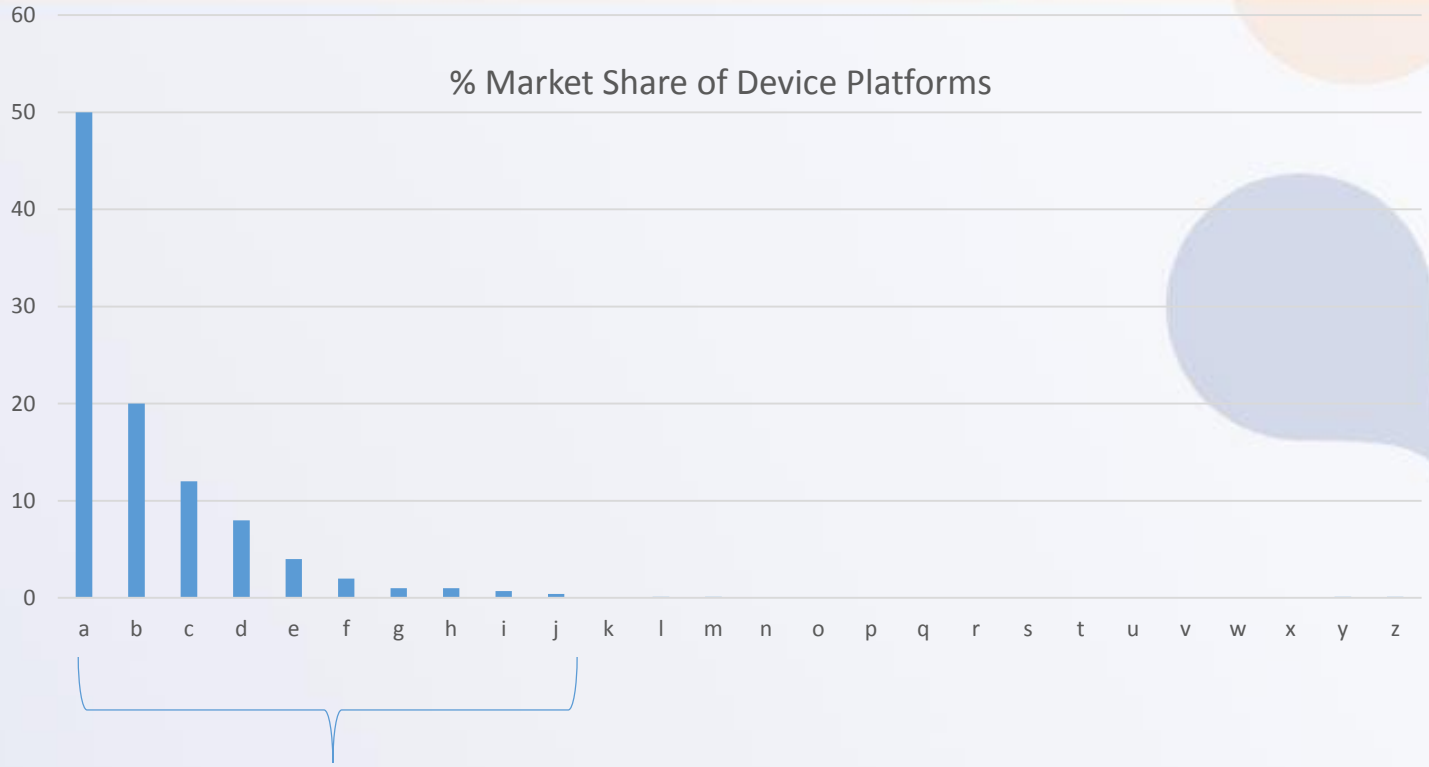
Not all Manufacturers are Equal



App Developers Select
Main Devices

Manufacturers -Jekyll and Hyde

- In many markets manufacturers are under no compulsion to run the HbbTV Test Suite
- Some national/operator platforms enforce testing & certification, including apps.
- Dr Jekyll Manufacturers
  - *Care about brand and quality*
  - *Will run and pass the HbbTV Test Suite*
  - *Also do their own App testing*
- Mr Hyde manufacturers
  - *Low margin and costs*
  - *No thorough HbbTV testing (recent test >40% failure rate*)
- Common Issues –DASH, Ad Insertion, GIF animation and general performance, DRM, state transitions
- Conclusion:

  Devices are very variable!

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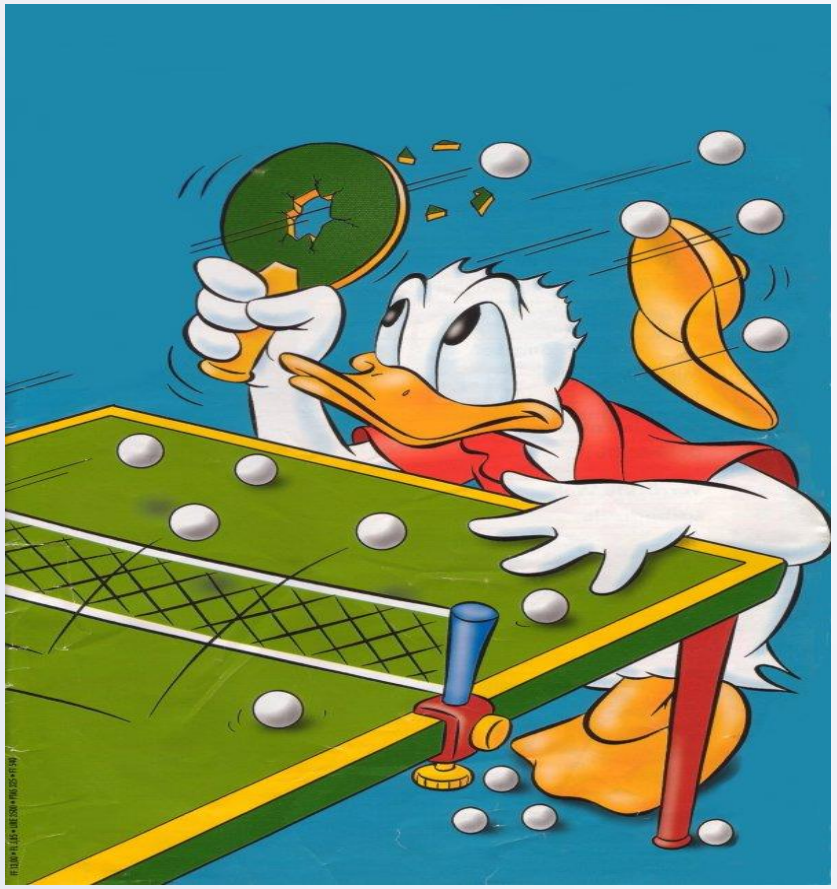
TV App Ping Pong



App Developer: Is my App or is it the TV?

TV Manufacturer: Is my TV or is it the App?

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Manufacturer Perspective

- Some apps
  - don’t implement the spec correctly, or do things not included in spec (e.g. downloadable fonts)
  - do things in spec not well covered in HbbTV Test Suite (e.g. stateful applications)
  - depend on wider eco system (dynamic content from multiple sources, CDN for video etc)
- Security: increasingly high profile and a major concern for consumers.
- Can and do test against apps
  - in recorded streams (not necessarily current – what if they change)
  - sometimes live (if not geo-blocked or whitelisted…)
    - e.g. Eurofins Ligada iSuite comes with a Live app test suite

- Manuf. end up doing a lot of debugging e.g. (among others)
  - Wrong mime type in HTTP response header from server
  - Incorrect (missing?) error handling, leading to applications hanging
  - Application not XHTML compliant
  - Failing to stop broadcast video while playing OTT content
  - Incorrect use of SetFullScreen() API when app launches, giving incorrect aspect ratio for broadcast video
  - Applications requesting more keys than necessary on start-up
  - Error on web server meaning that broadcast video was completely covered by a white square
- If problems can’t be resolved then blacklisting (by app, or tv) = lost revenue

HbbTV White and Black Listing

- App can conditionally run on devices
- Device can conditionally run apps!
- HbbTV app can access UserAgent String
  - Different HbbTV versions support
  - Reject untested devices
  - Different app version for low end devices
  - Reject known problem devices
  - BUT not as robust as using device certificates

- Device certificates
  - Device tested and certificates enable access to the platform
  - e.g. FreeviewPlay

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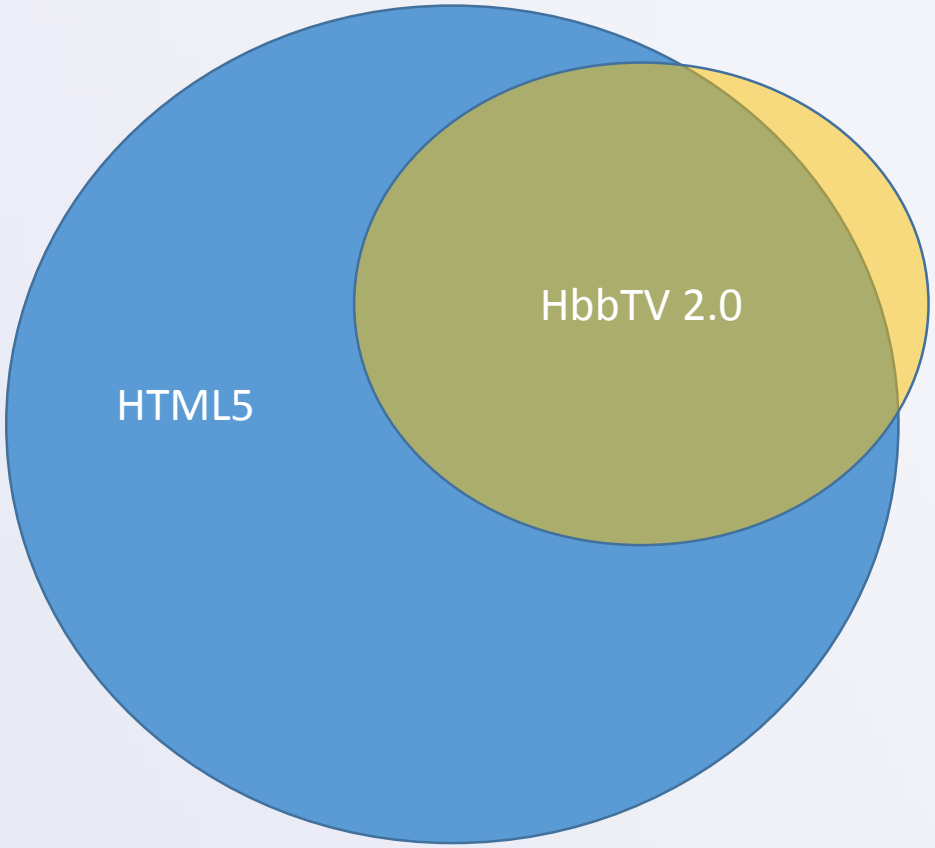
HbbTV is not just HTML on a TV



HbbTV is a sub-set of HTML5

HbbTV has API extensions

- AIT Stream Launching
- DSM-CC Apps
- Restricted Memory footprint
- Life cycle management
- Performance variation of platforms
- Operator mandated optional functionality

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HbbTV App Testing Options

- **Standard Web HTML App test tools/approaches don't work**
  - No WebDriver support
  - Need AIT Stream launcher
  - Unable to test stream dependent features
  - Automation hard: IR blaster, screen capture and analysis

- **HbbTV Application Testing Approaches**
  - Do nothing – let the customer find the bugs ☹
  - Use a PC simulator
  - PlugFests
  - Manual testing "receiver zoo" and Live App test suite
  - Black box testing – S3 type automation
  - Static analysis testing
  - Software instrumentation tools

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PC Simulator

- Run HbbTV app on PC adapted browser
- Eg Mozilla plug-in FireHbbTV from ATOS
- Disadvantages:
  - Test platform is not the same as deployment platform(s)
  - Some APIs/capabilities not implemented
  - Unable to test stream dependent features
  - Risk of false positives and false negative test results

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HbbTV PlugFests

- Run by HbbTV Association (and others in country)
- Open to non-HbbTV members
- Variety of participants
  - *Manufacturers*
  - *App developers*
  - *Operators/broadcasters*
  - *Service providers*
- Particularly good for early access technologies (eg HbbTV2.0)

Also

- Wiki resource for app developers:
  - http://www.hbbtv-developer.com/site/wiki/index.php/HbbTV_Wiki
- HbbTV “Improving Interoperability Task Force”:
  - https://member.hbbtv.org/kws/groups/IITF

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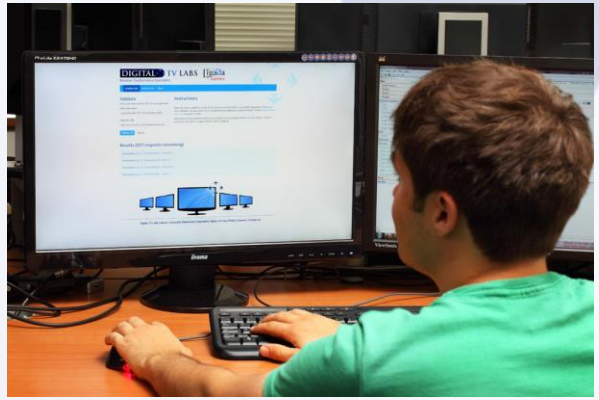
Static Syntax Analysis

- **HbbTV Application Validation Tools**
  - Static syntax web tool
  - Check that applications are only using HTML/JavaScript/CSS which is supported by the HbbTV Specification
  - Checks usage of OIPF JavaScript APIs
  - Checks that any files, including media objects, referenced by or contained within the application are accessible
  - Free service
  - Eurofins Validator http://ligada-validator.com/
  - IRT http://hbbtv-live.irt.de/validator/



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HbbTV App Testing Zoo

- Single site for HbbTV device testing
- Check App on wide range of devices and debug
- App developers and broadcasters typically have mini zoo
- Eurofins has a large ‘zoo’ of HbbTV devices –iDTVs and STBs

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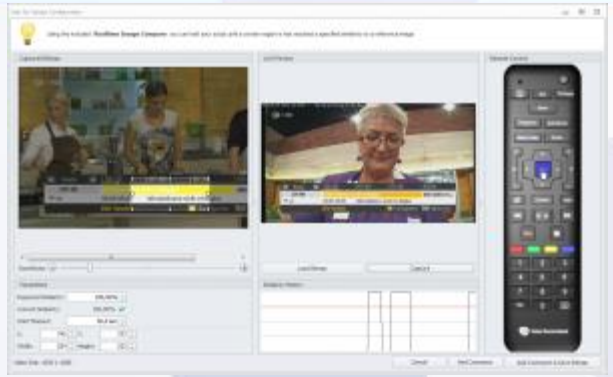
Black Box Testing

Automation Testing for STB and iDTV

- Uses HDMI and screen capture
- OCR and image recognition
- Advantage: non-intrusive
- Disadvantage: High capital investment
- Typical test case costs $300+ each to develop



Example: Eurofins TestWizard

- ScriptStudio productive scripting environment
- RobotManager for test execution control
- Integrated script debugger
- Platform and Device independent
- Detailed reporting and logging
- Multi-device scheduling
- Used by Kabel Deutschland

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Instrumentation Test

Problem: HbbTV Application Testing is largely a manual exercise

- Most TV device browsers don't support WebDriver
  - Standard HTML test tools such as Selenium don't work

Solution: Sengo HbbTV App Testing Tool

- Instrumented approach
  - Intercepts URL and adds test agent to HbbTV app
  - No specialist hardware needed and low cost
  - Test across multiple platforms quickly and easily
  - Works on any app (live, in development, locally served or public)
  - Can analyse DOM to check app execution, performance, player state…
  - Uses web and mobile industry standard Selenium test script
  - Pixel level image capture and analysis not yet supported

Sengo

http://www.eurofins-digitaltesting.com/test-tools/sengo/

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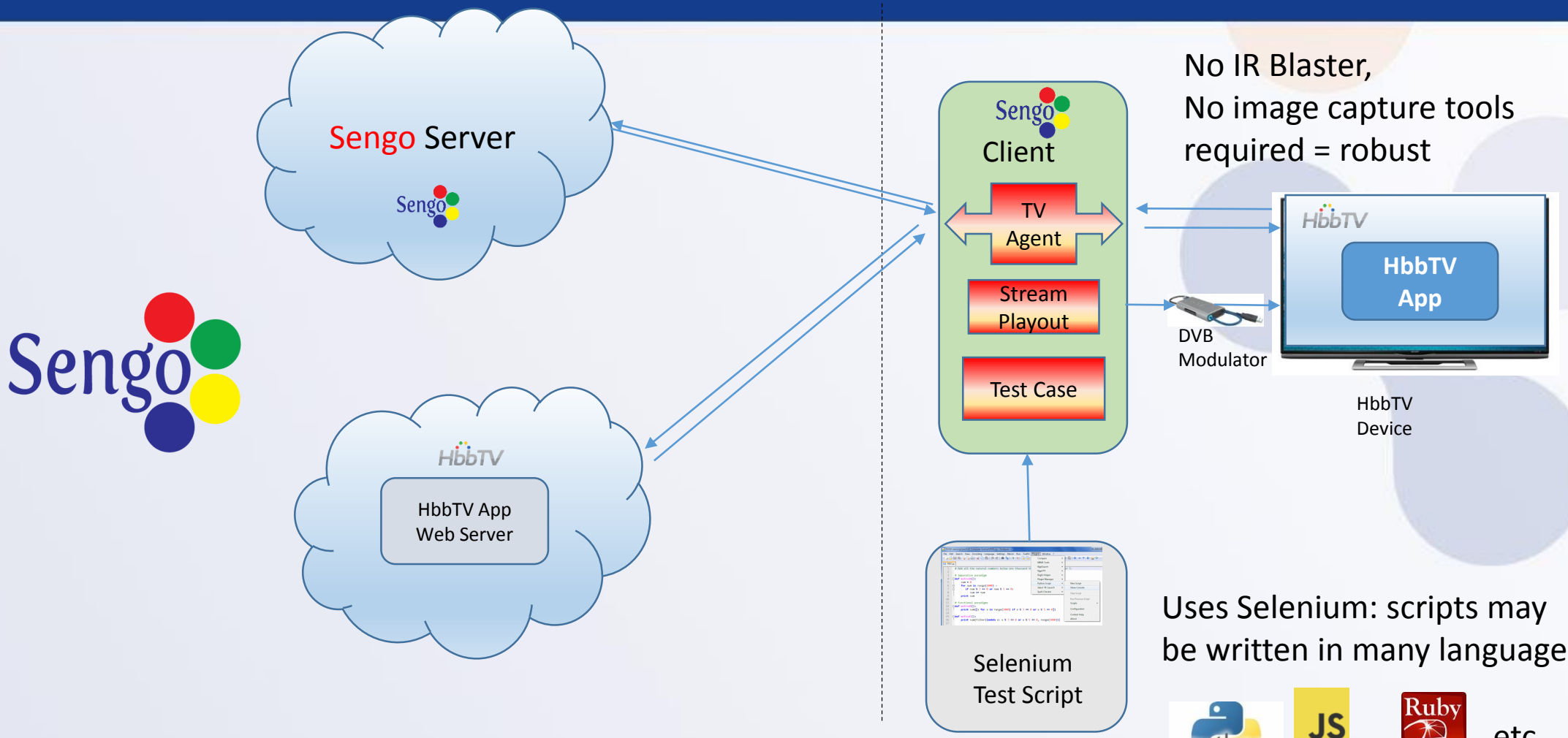
Sengo: HbbTV App Automation Tester



No IR Blaster,
No image capture tools required = robust

Uses Selenium: scripts may be written in many languages

python JS JavaScript Ruby etc.

See our demonstration!

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Designing a Conformance Framework for Freeview Play

Alex Russell – Head of Conformance, Digital UK

December 2015

Why design a conformance framework?

"When you decode the world with design intent in mind, the world becomes kind of magical."

- Roman Mars

Why design a conformance framework?

~15 manufacturers x 8 people involved in testing each device

+12 people supporting it

+3 people from FVP running it

+1 poor sod who has to explain it to everyone

= At least 136 peoples' lives made better

Why design a conformance framework?

"[the purpose of design is] making life better and providing joy."

- Roman Mars

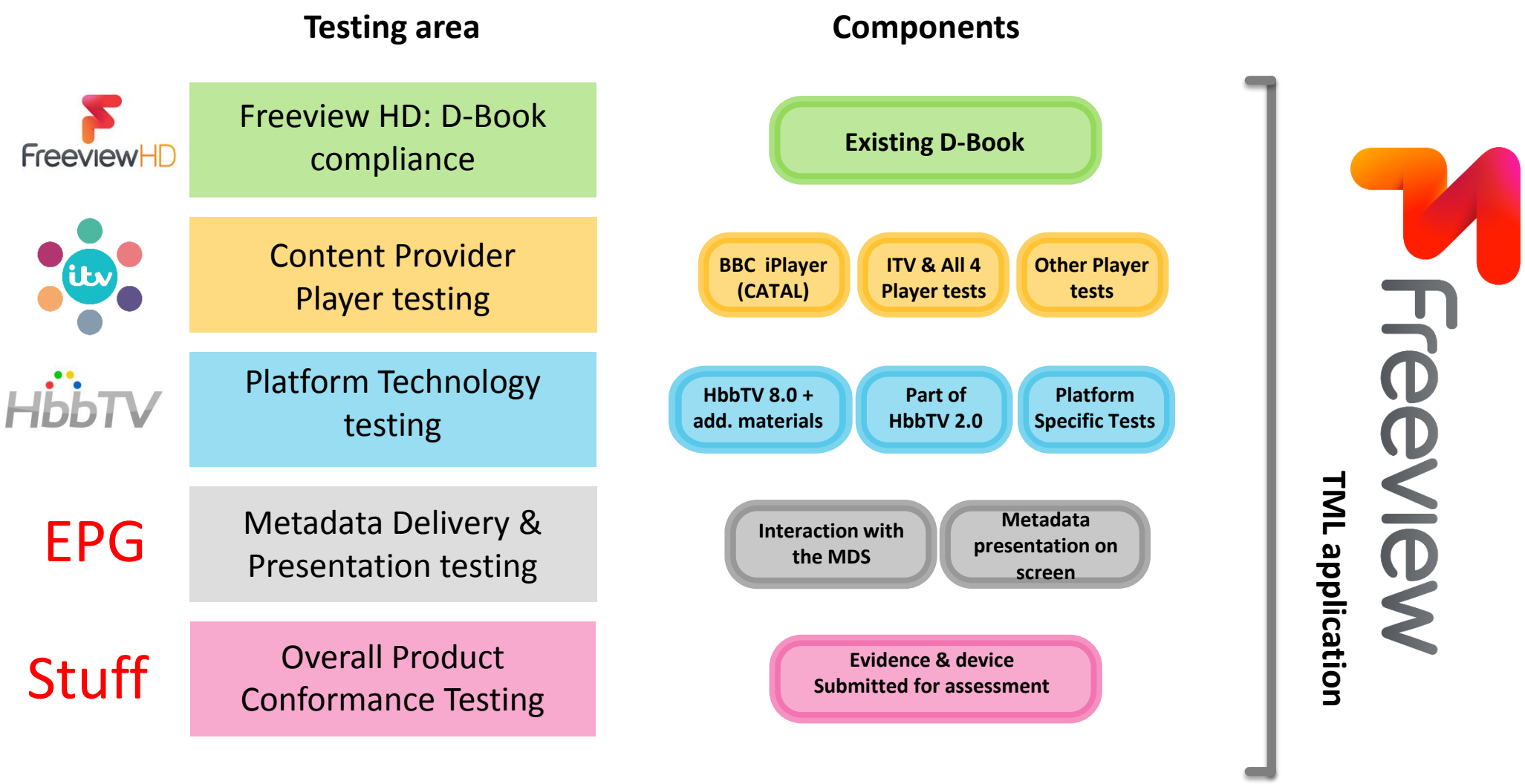
Gardiner
Campbell
Alex
Jackson
Phil
Ian
Medland
Poole
Secker
Foster
Mao
Tallis
Bob
Dan
Yikang
Shorrock
Jon
Yeadon
Jo
Rob
Russell
Peter
Mike
Chris
Andy
Nick
Layton
Foreman
Jones
James

Making life better with a conformance framework – where to start?

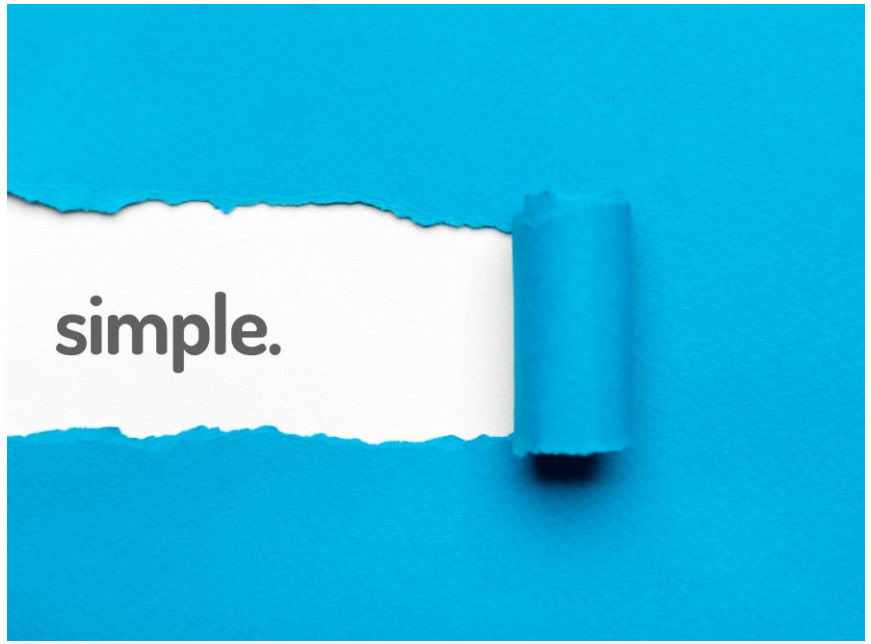
EPG

Other Stuff

Making life better with a conformance framework



Making life better with a conformance framework



- Documentation
- Organization of tests
- Conformance process

- Understanding tests
- Handling test challenges
- Enhancing the framework

The platform operators dilemma

Over time the target requirements for any conformance framework will necessarily change.

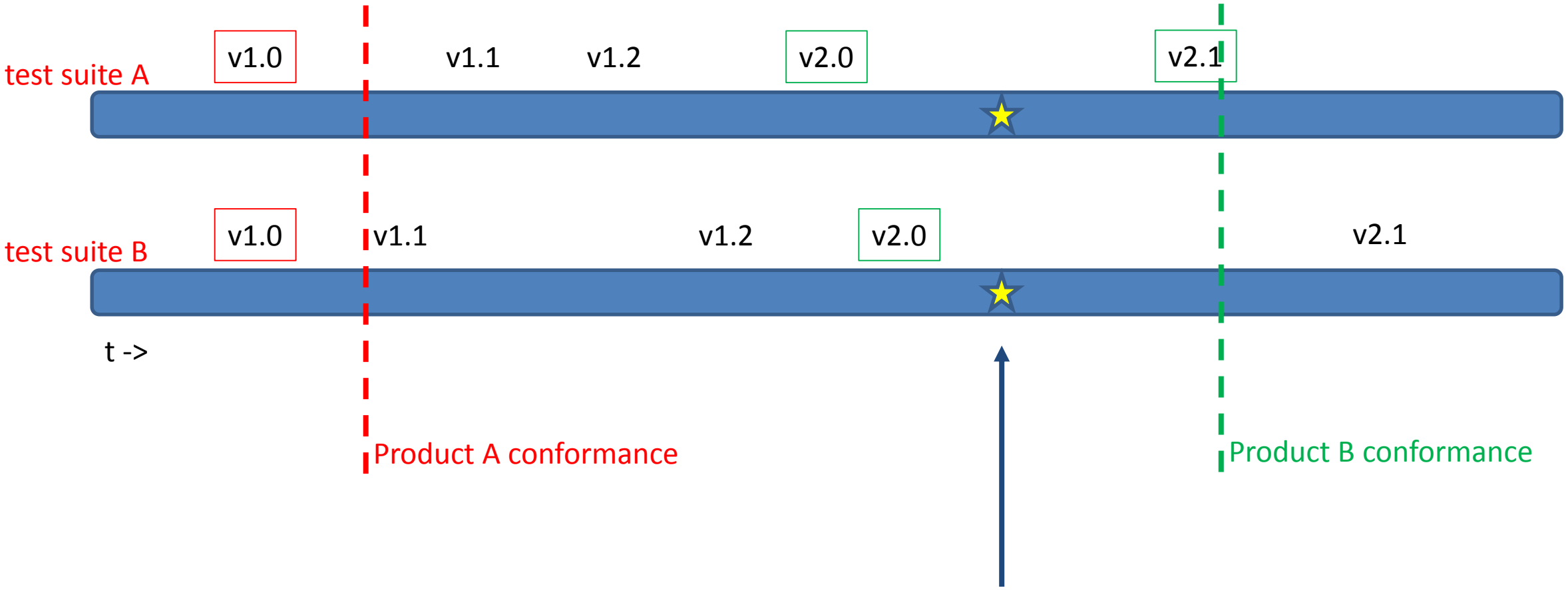
- Anon.

The platform operators dilemma

You've moved the goal posts!

- Anon.

The platform operators dilemma



Early and open dialogue required with manufacturers!

Self test vs independent test

TCA testing area	2016	2017
Freeview HD: D-Book compliance	DTG Testing & self test	DTG Testing & self-test
Content Provider Player testing	Self-test followed by separate certification by individual CPs	Self-test followed by certification by an Independent test-house*
Platform Technology testing	Self test & DUK Verification	Self-test Self-certification Sample checks by DUK
Metadata Delivery & Presentation testing	Self-test & DUK Verification	Self-test Self-certification Sample checks by DUK
Overall Product Conformance Testing	DUK & Freeview review	DUK & Freeview review

Providing joy with a conformance framework?

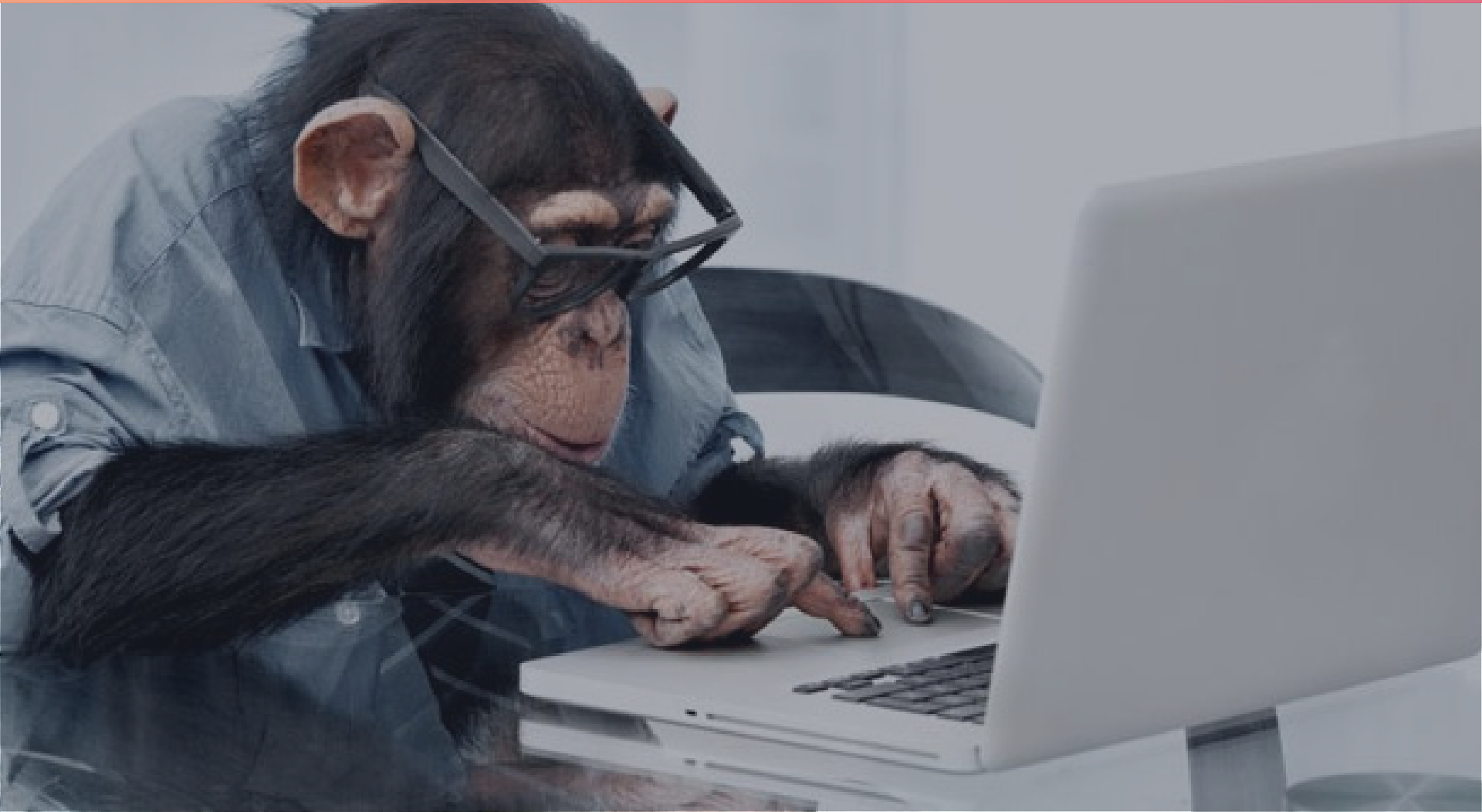
I'll let you know …

Foreman
Gardiner
Shorrock
Medland
Phil
Foster
Nick
Tallis
Secker
Dan
Mao
Rob
James
Yikang
Russell
Alex
Jo
Jones
Yeadon
Peter
Chris
Bob
Ian
Poole
Andy
Jon
Mike
Layton
Jackson
Campbell

SUITE·ST presents:
Automated testing
for everyone
Mirko Nedeljkovic

How it all started

2009
2010
2015

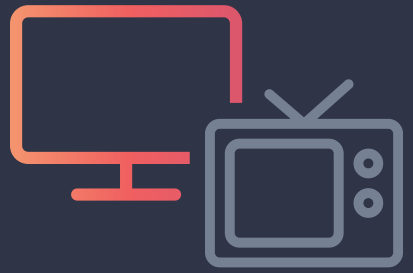


Our device situation

1 **few test devices**

2 customer expectations

3 device cost higher than project value



1 few test devices

2 **customer expectations**

3 device cost higher than project value

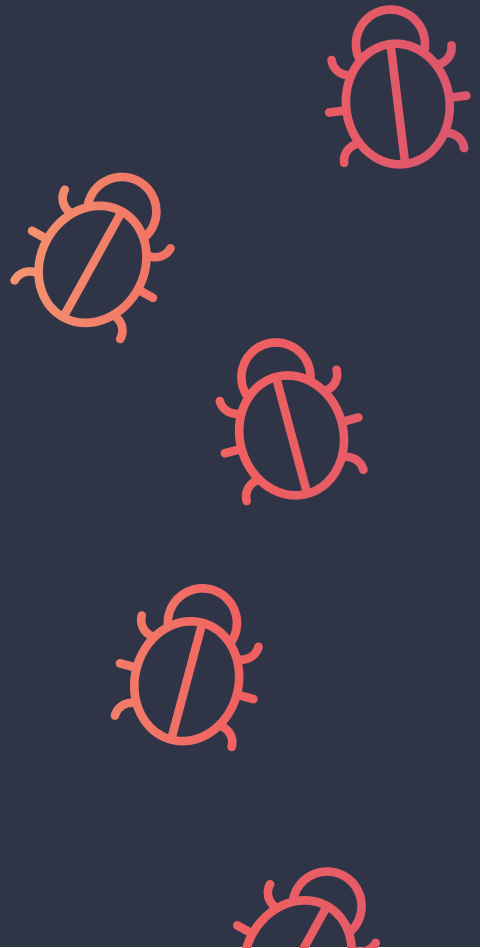
1 few test devices

2 customer expectations

3 **device cost higher than project value**

Sounds bad?
It got **worse**

wasted time and
overlooked **bugs**



not enough TVs
not enough developers
not enough budget

Fail **#1**

= inefficient :(

2009
2014
2015

Something had to change

after WOW?
NO
FAIL
strategy
PLAN
TEAM
2x
HAVE
Realesation
AND THEN...
46x
DRAWER
yours
STEAL
MARKETING
Bussines
All recycling
45% is SALE!
money recycling
15% - ??
A. B.
project titan
A. LUCK
A. 640.320.00
B. 144.000.00
C. 286.000.00
D. 255.500.00
E. 540.000.00
RIGHT NOW DOWN
25% time
COSTUMERS
INTERNET
SUCCES
LOADING TO SERVER
MAIN
other
300
sub
100%
75%
world of starcraft?
world of lost vikings?
A. ASIA
C. USA
B. INDIA

Our **requirements**

- No or almost no involvement of developers in the QA process.
- Creating and running test cases must not require development skills.
- The suite must work on any HbbTV compatible device

- Running the tests must be fast
- Tests should be possible to run on remote devices.
- Tests should be possible to run on any number of devices simultaneously.

First approach

Extensive market research

The **result?**

No suitable solution
on the market

The **bad**

Adapting an existing solution for the web to HbbTV using simulated user interaction

The **ugly**

Lot of effort was burned
during the initial approach

Fail **#2**

Our adaptation only worked

on 6 out of 12 devices

Fail #3

Actual usage was

way too complicated

Valuable insight

never resort
to simulation

everything about
the enviroment
must be **real**

NOT SURE IF TO GIVE UP
OR TRY HARDER

Back to the **drawing board**

Second **approach**

The app is tested
on real devices

Input undistinguishable
from a real user

Tested and operated under
the **exact same conditions**
and manner as **the**
real user will

Hardware for IR
and alternative input
needed inhouse development

steampunk style

All software components
developed **from scratch**

2009
2014
2015

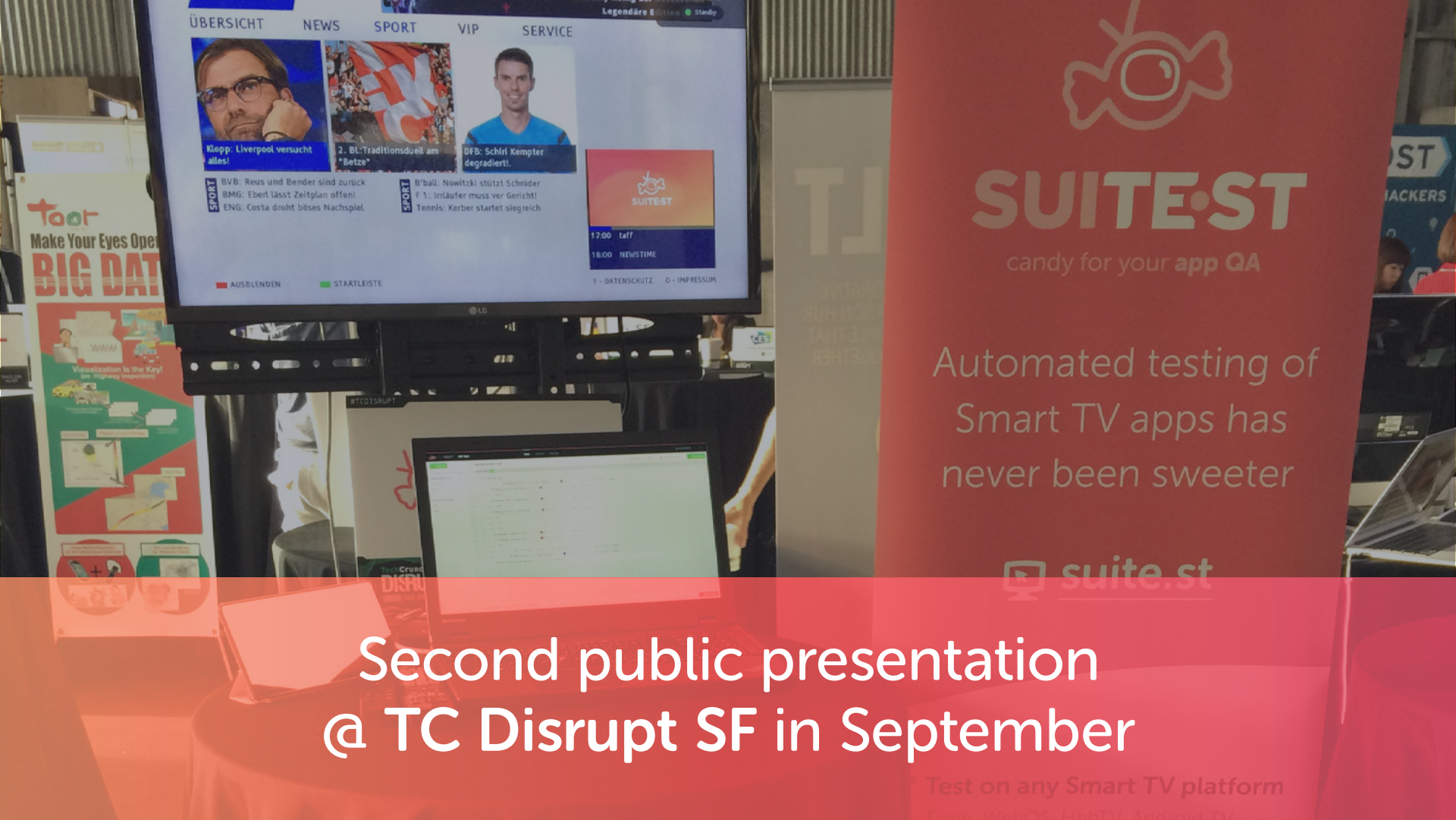
Success

HbbTV and SmartTV devices supported

Testing apps using real devices

No test scripting needed

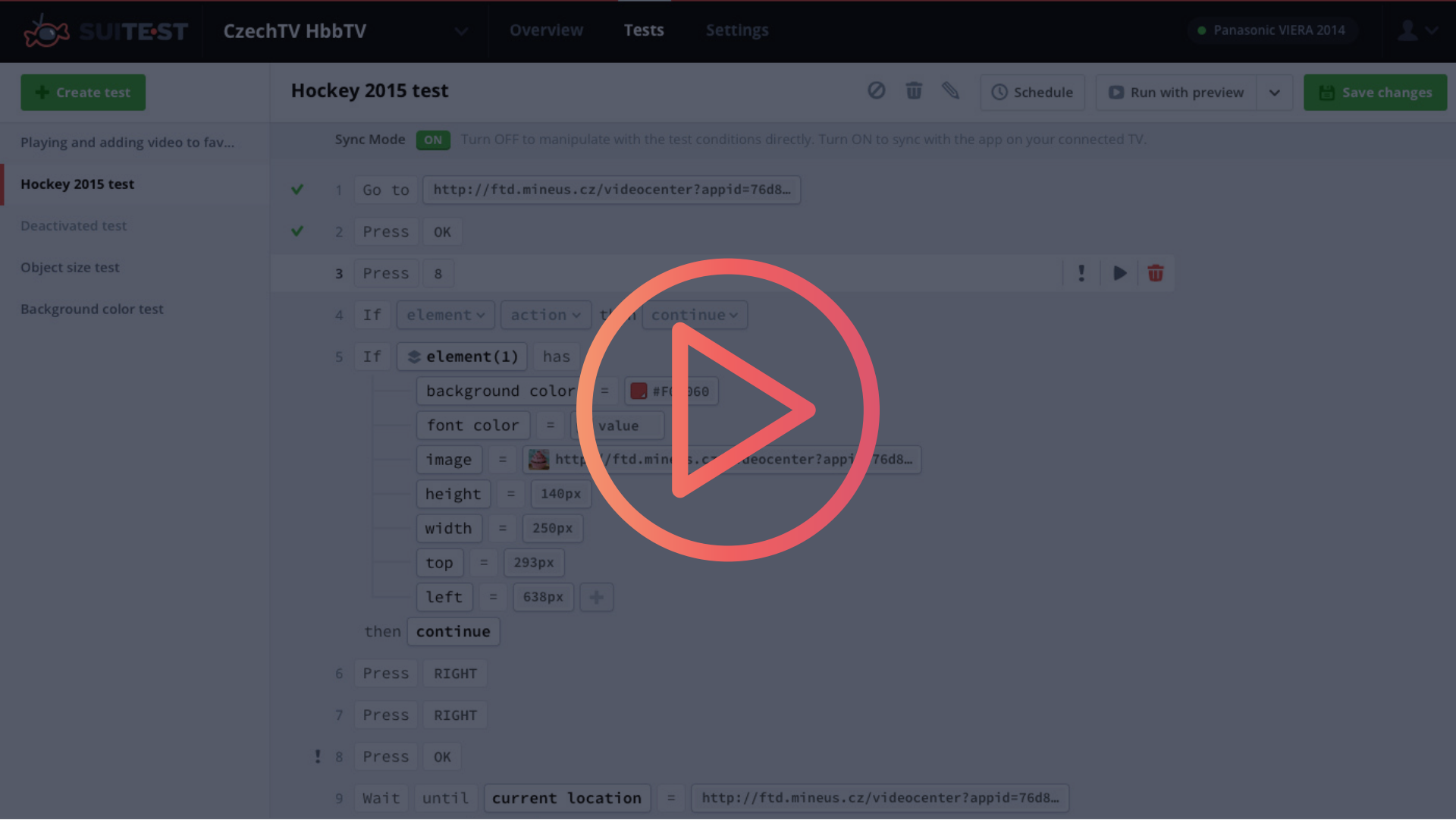
First public presentation @ **MWS** in May



Second public presentation @ TC Disrupt SF in September

First customer installation @ **SWISSTXT** in November

How does it work


SUITEST
CzechTV HbbTV
Overview
Tests
Settings
Panasonic VIERA 2014
Create test
Hockey 2015 test
Schedule
Run with preview
Save changes
Playing and adding video to fav...
Hockey 2015 test
Deactivated test
Object size test
Background color test
Sync Mode
ON
Turn OFF to manipulate with the test conditions directly. Turn ON to sync with the app on your connected TV.
1 Go to http://ftd.mineus.cz/videocenter?appid=76d8...
2 Press OK
3 Press 8
4 If element action continue
5 If element(1) has
background color = #FC060
font color = value
image = http://ftd.mineus.cz/videocenter?appid=76d8...
height = 140px
width = 250px
top = 293px
left = 638px
then continue
6 Press RIGHT
7 Press RIGHT
8 Press OK
9 Wait until current location = http://ftd.mineus.cz/videocenter?appid=76d8...

The wait is over, **we are live!**

Free trial access

Broadcasters and manufacturers
can get their hands on Suitest
for free for a limited time

Public version

We will soon
open the platform
to everybody

Test your apps the **sweeter way**