**You View from Talk Talk**

November 2011

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## History of TV

| | |
|---|---|
| 1922 | BBC founded |
| 1953 | Live coverage of Queen Elizabeth II's coronation |
| 1955 | ITV launched |
| 1964 | BBC2 launched |
| 1966 | World Cup Final |
| 1967 | BBC2 was broadcast in colour (for Wimbledon) |
| 1982 | Channel 4 launched |
| 1990 | BSkyB formed (merger of Sky TV and British Satellite Broadcasting) |
| 1992 | Video Networks founded |
| 1997 | Channel five launched |
| 1998 | Sky (Digital) launched |
| 2000 | Homechoice launched |
| 2002 | Freeview launched |
| 2006 | BT Vision launched |
| 2010 | Freeview HD launched |

2011: Sky has currently 693 radio and television channels, of which there are 79 radio and 614 TV channels – including 50 timeshift channels, 53 high-definition channels and 1 3D channel. *Subject to change.*

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# TalkTalk TV History

- Video Networks Ltd
  - Founded 1992
  - Development started 1995
  - Trial VOD system in Hull - 1996
  - Initial London VOD trial – 1998
  - "Homechoice" launch - 2000
  - First broadband LLU - 2002
  - Introduced "Replay" service – 2004
  - Migration from ATM to IP network – 2005
  - Worlds first AVC broadcasting – 2005
  - Launch of Adult services – 2006
- Tiscali
  - Purchased VNL – 2006
  - UK-wide and Italy rollouts – 2006/2007
  - Introduced PVR STB – 2007
- TalkTalk
  - Purchased Tiscali – 2009
  - Rebranding – 2010
  - YouView launch – 2012

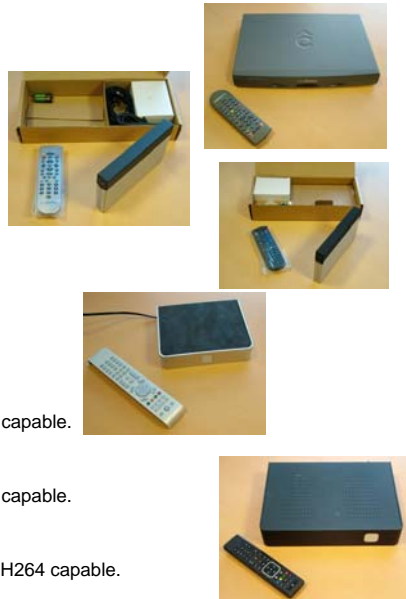A Brighter Place for Everyone

# Features of You View

- **Technical differences /advantages? over Sat:**
  - **Backwards EPG, 7 day catch up**
  - **Interactive, two way data comms.**
  - **Unlimited content, VOD library, search.**
  - **Viewing habit data. Targeting advertising.**
  - **NPVR potential. Multi channel series link.**
  - **Multiscreen potential in and out of the home.**
  - **One multifunctional smart pipe into the home**

- **Economic differences over SAT/DTV**
  - **Low capex entry.**
  - **Lost operational cost base**
  - **pricing**
  - **Multifunctional network (not just TV)**
  - **Flexible Bundle building. Build your own bundle.**
  - **Lower per Channel costs (SAT £500k , DTV £7M, PA)**
  - **Pay for view , simple payment methods.**

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## TalkTalk STB History

- Apple - 1995 (Trial only)
- Oscar - 1997
  - ATM network. External modem.
  - VOD only.
- Tewin – 2000
  - ATM network. Internal modem.
  - VOD and Multicast.
- Lytton/Ayot – 2002
  - ATM/IP network. Internal modem.
  - VOD and Multicast. H264 capable.
- Norton – 2003
  - ATM/IP network. Internal modem.
  - VOD and Multicast. H264 capable.
- Damask – Lab only
  - ATM/IP network. Internal modem.
  - VOD, Multicast and DTT (4 tuners). H264 capable.
- Telsey A&B – 2006
  - IP network. External modem.
  - VOD, Multicast and DTT (2 tuners). H264 capable.
- Telsey C – 2007
  - IP network. External modem.
  - VOD, Multicast, DTT (2 tuners) and PVR. H264 capable.

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## STB evolution

**Tiscali TV STB**

- Sourced from Telsey S.P.A
- Sigma Designs 8634 chipset
- DVB-T enabled (dual tuner)
- MPEG1/MPEG 2 / MPEG 4(h.264)
- SCART and HD outputs (HDMI output with HDCP)
- USB port interface
- Single Ethernet port
- 160 GB hard disk drive
- Linux operating system

**YouView STB**

STB software developed by Tiscali.
(DRM by Verimatrix)

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## YouView Introduction

- A partnership between the BBC, ITV, C4, Five, Arqiva, BT and Talk Talk to build an open TV platform.
- YouView provides a common, consistent user-interface that links broadcast and IP content.
- A common technical standard provides seamless access to a range of third-party services through a common, simple, user experience
- Service providers develop their services through their own applications launched from the main YouView EPG.
- Apps are developed by each shareholder, and can utilise the delivery and security features of the STB as they see fit.
- STB runs Flash and a Browser.
  - Walled garden of applications and websites only.
  - Access to platform managed by YouView JV.

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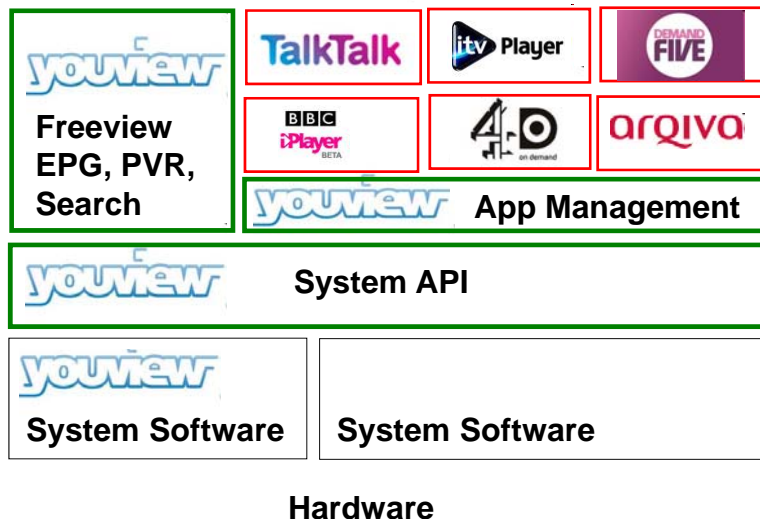
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## The YouView STB

- Freeview+ HD
  - HD Channels
  - PVR (300 GB Minimum)
- YouView supply main Freeview EPG
  - Forward schedules for 7 days
  - Backwards schedules show catch-up content availability
- YouView provide content browsing capability
  - Content metadata aggregated from all content providers
  - Browsing by genre
  - Text search
- YouView provides method to launch third party apps:
  - Content portals
  - Web Apps (future)

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## STB Building Blocks

**Freeview EPG, PVR, Search**

App Management

**System API**

**System Software** | **System Software**

**Hardware**

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## Content Types
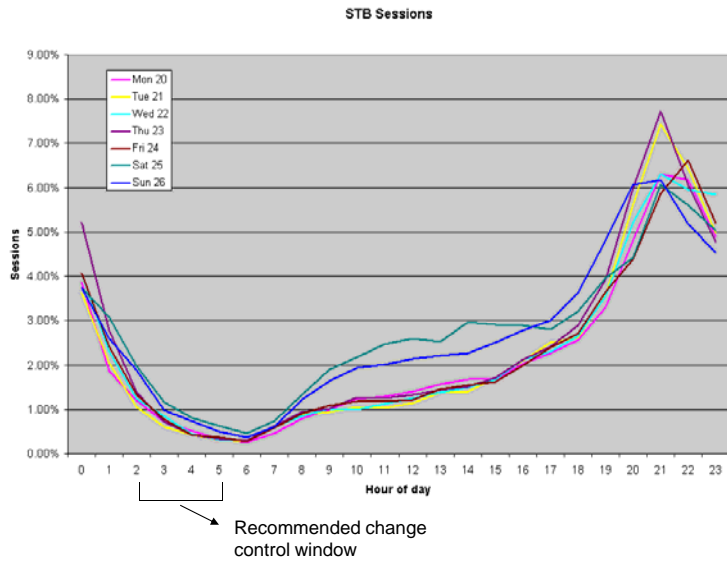
- Live channels via Freeview
  - Live channel reception from DVB-T/T2 tuners.
- Live broadcast trick-play
  - Current Freeview channel recorded to hard drive, allowing trick-play actions (pause, ff, rewind).
- Live channels via multicast **TalkTalk**
  - Live broadcast channels delivered from multicast-capable network.
- PVR recordings
  - Playback of recordings scheduled from Freeview or multicast.
- Catch-up content
  - Broadcaster catch-up services (7-day historical).
- On-demand content **TalkTalk**
  - Other VOD content: movies, TV, music, etc.
- Content Download (Post launch) **TalkTalk**
  - For high bit rate content (HD?) content can be requested for background download to the hard drive for later viewing.
- "Push VOD" (Post launch)
  - Hidden, automated PVR recording of very high popularity catch-up content from Freeview. Used as a local cache for catch-up services.

TalkTalk experience.

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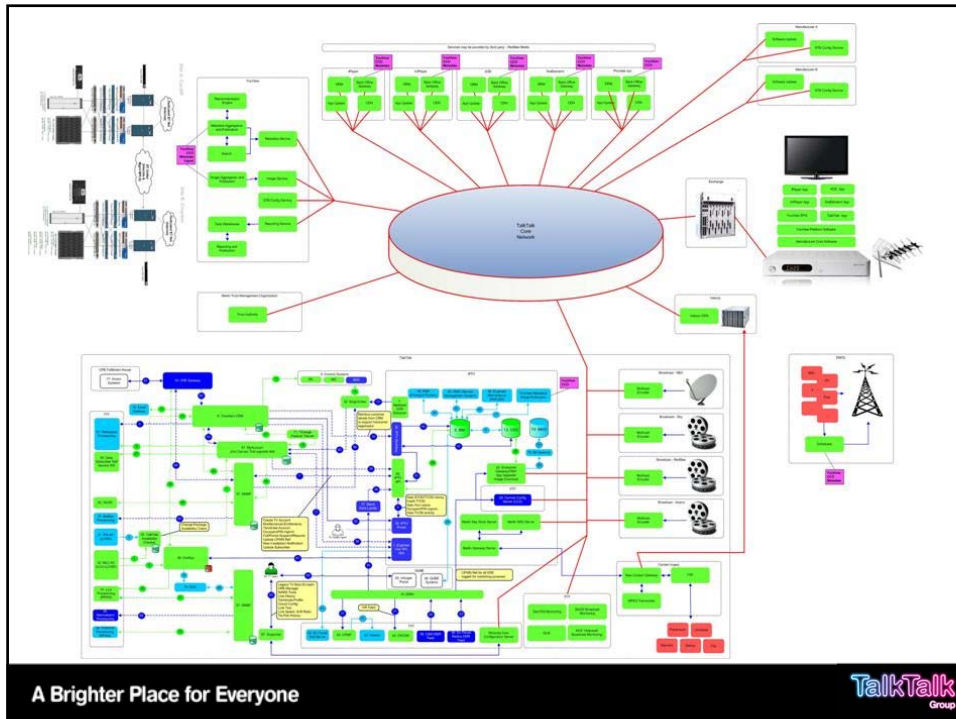
## Daily Demand for TV Service



Leverage our delivery experience to provide both YouView and TalkTalk a high quality, reliable service.

Recommended change control window

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## Challenges of TV over broadband

- **Maturity.**
  - Narrowband voice – ADSL – IPTV all in 5 years.
- **Expectation**
  - Customers reasonably expect a quality service.
- **Delivery networks**
  - Last mile copper.
  - Scaling the core/metro networks. Massive increase in Data.
  - End to end QoS.
  - Multicast vs Unicast
  - Digital rights management. (DRM).
  - Meta data management (dogs breakfast)
- **Other**
  - Regulatory/compliance issues

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## The last mile Challenge

- **Big difference trying to deliver Multicast vs Unicast**
- **Getting low enough error rates for Multicast is difficult.**
- **speed not the big issue, on the face of it 3Meg works.**
  - But, there is more to it.
- **Very difficult to forward-estimate performance at order placement**
- **Bit error rate is critical to quality and its difficult to predict & manage**
- **We use dynamic line managemen (DLM) to reduce errors**
- **Compatibility/sutability of existing network equipment for VOD fault analysys.**

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## Is TV Important?

| Broadcast | Viewers (millions) | Date |
|---|---|---|
| World Cup 1966 (England v. West Germany) | 32.30 | 30 July 1966 |
| Funeral of Diana, Princess of Wales | 32.10 | 6 September 1997 |
| The Royal Family (documentary) | 30.69 | 21&28 June 1969 |
| EastEnders (Den divorces Angie) | 30.10 | 25 December 1986 |
| Apollo 13 splashdown | 28.60 | 17 April 1970 |
| FA Cup replay (Chelsea vs. Leeds) | 28.49 | 29 April 1970 |
| Royal Wedding (Charles & Diana) | 28.40 | 29 July 1981 |
| EastEnders | 28.00 | 1 January 1987 |
| Royal Wedding (Anne and Mark Phillips) | 27.60 | 14 November 1973 |
| Coronation Street (Hilda Ogden leaves) | 26.65 | 25 December 1987 |
| Only Fools and Horses | 24.35 | 29 December 1996 |
| EastEnders | 24.30 | 2 January 1992 |
| …. | | |
| The X Factor (Joe McElderry) | 19.1 | 13 December 2009 |

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## The Importance of Quality

### ITV apologises for clanger after 1.5m viewers miss England goal

Human error caused TV advert to come on during Steven Gerrard's 4th minute goal, channel says



England captain Steven Gerrard celebrates scoring his team's first goal against USA in Rustenburg. Photograph: Empics Sport

ITV yesterday apologised for a clanger almost as big as England goalkeeper Robert Green's after 1.5 million fans watching the World Cup clash with the USA on the broadcaster's HD channel missed Steven Gerrard's fourth minute goal because of a "transmission error".

The company apologised "unreservedly" for the "unacceptable interruption" to the game when human error led to high-definition viewers missing about 20 vital seconds of football.
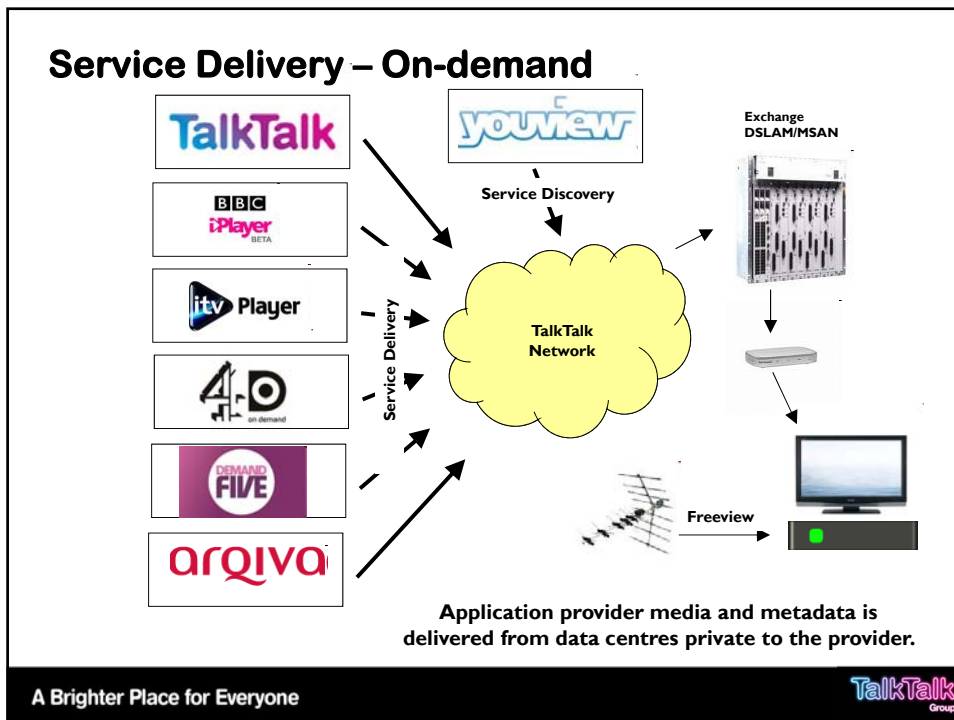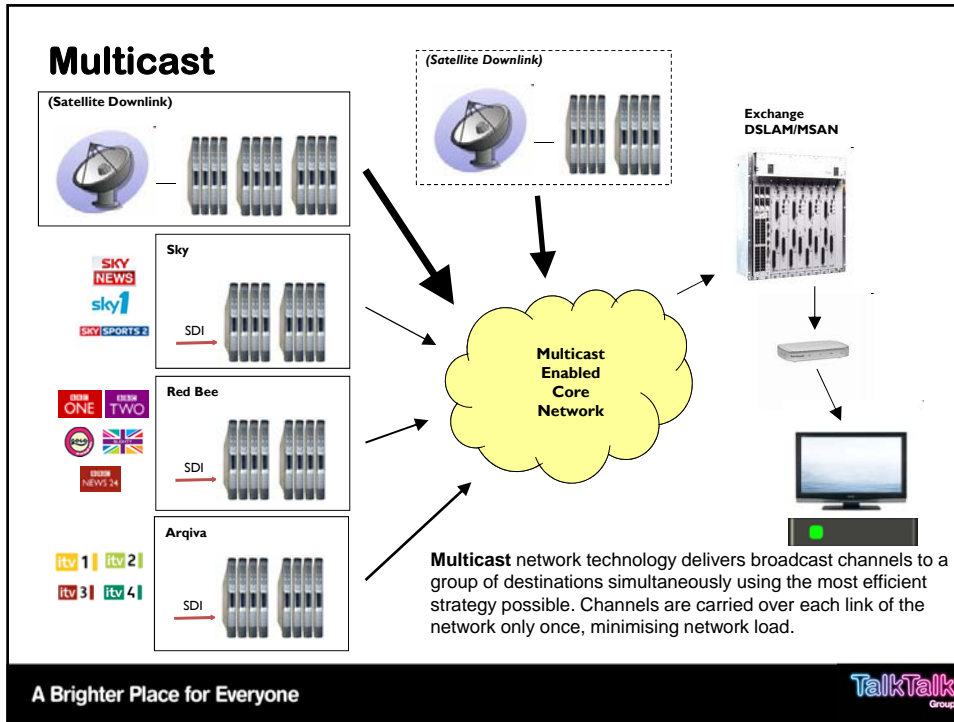
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## Controlling Quality

- **State of the art network**
- **Multicast enabled.**
- **CDN vendor Velocix**
  - Founded 2002, now Alcatel-Lucent
- **QOS in network**
  - TV prioritised but voice is still important.
- **TV sale to pre-validated lines only**
- **TR-069 diagnostics**
  - In modems and STBs. Provides diagnostic data.
- **DSL optimised for TV**
  - Dynamic Line Management
  - Optimise line for quality, not speed.

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## Controlling Quality

- **Aim to reduce calls to Service Centres**
  - Customers don't want to call. Also a cost to us.
  - Allow basic service changes from TV – package upsells
  - Web-based MyAccount service for other queries.
- **High Quality Monitoring of Data Centres**
  - Internal tools for monitoring
    - BAGS (Broadcast head-end monitoring)
    - Service checks
    - Hardware alarms
    - Software alarms
  - External tools for monitoring
    - ZenOSS (Alarm handling)
    - Agama (Broadcast head-end monitoring)

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Multicast

(Satellite Downlink)

(Satellite Downlink)

Exchange
DSLAM/MSAN

Sky

SDI

Red Bee

SDI

Arqiva

SDI

Multicast
Enabled
Core
Network

**Multicast** network technology delivers broadcast channels to a group of destinations simultaneously using the most efficient strategy possible. Channels are carried over each link of the network only once, minimising network load.

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Service Delivery – On-demand

Exchange
DSLAM/MSAN

Service Discovery

Service Delivery

TalkTalk
Network

Freeview

Application provider media and metadata is
delivered from data centres private to the provider.

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## Ensuring Compliance

- **Security**
  - **Data Centre – Restricted access, signing in, CCTV, etc**
  - **IT Security – TalkTalk information security policies**
    - **User access, Passwords, Backup, Encryption, Software Updates, etc.**
- **Content Protection**
  - **No formal standards, but industry best practice**
  - **Content distribution – From ingest to customer**
- **Adult**
  - **No content or metadata visible pre-10pm.**
- **STB Compliance**
  - **EU Power compliance**
  - **EU Safety/EMC compliance**
  - **Hardware compliance: SCART, HDMI, CGMS-A, Dolby, etc**
  - **YouView functional and security compliance**

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## Protecting Content - Digital rights management.

- Studios need to protect their content.
- A range of content protection methods are available:
  - Securely authenticating devices
    - Ensure you don't deliver to rogue devices.
  - Secure network delivery (DRM)
    - Ensure content is encrypted on the network.
    - Ensure decryption keys are delivered to trusted devices
  - Analogue output (SCART) protection
    - Ensure content can't be recorded from the SCART output
  - Digital output (HDMI) protection
    - Ensure content can't be recorded from the SCART output
  - Content forensics
    - Ensure that content that has been stolen can be traced.

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## Content Protection Methods

- Securely authenticating devices
  - Username/password
  - Hardware ID
- Secure network delivery (DRM)
  - Marlin (Used by YouView)
  - Microsoft PlayReady, Google Widevine, Adobe Access, etc.
- Analogue output (SCART) protection
  - No RGB
  - CGMS-A
  - Disable SCART!
- Digital output (HDMI) protection
  - HDCP
- Content forensics
  - Source watermarking
  - Session-based watermarking

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## The near future.

- **Multi room – Multiscreen.**
- **Apps**
- **HD**
- **Network Personal recorder (NPVR)**
- **Protected content delivery in and out of the home.**
  - **Across network DRM.**
- **Smart devices (tablets) as the second screen.**
- **3G/WiFi interworking ,handover.**
- **Targeted advertising.**

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**Thank you**

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