TV Anytime Forum

“PERSONAL DIGITAL VIDEO RECORDERS - PDR’S THE FUTURE OF MEDIA CONSUMPTION”

Presentation by Gary Hayes
Senior Development Producer
Also chair of TV Anytime ‘Business Models & System description group’
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BBC Interactive TV learning lunch - 27 Oct 99
What we will be covering
- The background to the future - personal storage
- The commercial market & access issues
- TV Anytime - Personal storage open standard’s group
- A closer look at some of the TV Anytime work
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Storage possibilities - Introduction

- In the last 10 years there has been a 100 fold increase in the capacity/cost ratio of hard disks - doubling every 10 months
- In 2000, 10 GB of hard disk storage will cost $100, providing four hours of MPEG2 audio-visual storage
- The capacities below, doubling every 10 months or a pessimistic 18 months, are based on 5.5Mbit/s video stored on a $200 disk

<table>
<thead>
<tr>
<th>Year</th>
<th>Pessimistic</th>
<th>Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>8 hours</td>
<td>8 hours</td>
</tr>
<tr>
<td>2005</td>
<td>80 hours</td>
<td>480 hours</td>
</tr>
<tr>
<td>2010</td>
<td>800 hours</td>
<td>28,800 hours</td>
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</tbody>
</table>
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Storage possibilities - Introduction

Forester research in to Personal Storage

- by 2001 900,000 people will be using PDR's
- by 2004 there will be 4 million
- by 2009 80% of the world's developed population will be using Personal Storage systems - whether PC or set top based
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Current broadcast scheduled services model

Note: may or may not have a return path, limited personalisation & local agents

Return path, votes, transactions

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Future PDR model where broadcaster access ‘home networks’

Content or service provider ‘can’ manage storage device

Return - anything on demand contributions

Time shifted & off peak loading of a/v, web & enhanced apps to PDR

Viewer Interface

STORAGE

PPDR

DVD Tape

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Storage possibilities - Benefits for content providers

- Usage reporting data - did people request & store programming
- Profiling the audience - aggregating individuals, public service
- Targeted push/pull services - ads, trails, programmes, apps
- Downloading (Web, TV and eTV) in off-peak hours
- Transaction control - for eCommerce providers
- Rights management - conditional access reporting

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Where storage is headed - it equalises broadcast and ‘pull’ services

Local Storage

PDR

“Home Network Server”

LEARN BACK
Audio Video Experience

LEARN FORWARD
Data rich experience

Mobile Docking & remote connectivity

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b r o a d c a s t e r

anal telcos
Dtt
DSat
DCable
ADSL
IP via Sat
VDSDL
others

LEARN BACK
Audio Video Experience

LEARN FORWARD
Data rich experience

Mobile Docking & remote connectivity

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Storage possibilities - Benefits for content providers

In the **USA** there are nearly 10 million able to adopt PDR technology:
- TiVO announced two recent broadcasting deals:
  - 1 With Direct TV - 7 million subscribers end July
  - 2 with Echostar/WebTV's set top with storage - 2.7 million users

In **Europe** TiVo have partnered with Philips who are building D-Boxes
- Kirsch (German Satellite 1 million - "Premier World" 3 years old) are the first to adopt this new technology
- Philips and TiVo are actively building relationships with Canal + and TPS etc to enter the Euro market
- ‘Singularis’ developed boxes for Ono, Spanish broadcaster. 3.5 mill
- BSkyB are already moving to have their own storage devices
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Current PDR commercial activity

- TiVo service in the US. 48 hours storage as standard. Already provide live linking from promos and ads to PDR functions. Partners - America Online, Discovery, News Corp, TV Guide, NBC, CBS, ABC, Sony & Showtime

- Replay TV. PDR technology. Partners - Time Warner, Disney, Liberty Media, United Television, Matsushita Kotobuki Electronics, and Showtime

- Fast TV in Germany. 30 hours with mobile and internet interoperability - control your PDR via web or mobile phone

- Others include EchoStar's DISH player-WebTV. BSkyB/Java storage & many others kicking off
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The proprietary nightmare

- If there are platforms owners, hardware manufacturers & service providers creating vertical, non standard PDR structures the BBC will be locked out yet again

- Who controls the personal recorders, controls content

- Who controls the personal recorders, controls brand & content owners position - “Dad, let's see what's on TiVo”

- Scheduled TV becomes, to the viewer, mostly irrelevant

- Channels become irrelevant, viewers want ‘content type’ and programme brands begin to dominate

- The BBC will find it impossible to promote, distribute & report if technologically and commercially we have no access to PDRs

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Some of the 28 inaugural member organisations

ONY  CANAL+  Microsoft

BT  BBC Broadcast  NOKIA

NDS  GTE  DIVICom

SHARP  SAMSUNG  NTT Communications

SONERA  Make things click.  Helecon

NOB INTERACTIVE

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Who we are?

• The *TV Anytime Forum* has announced its formation at an inaugural meeting held in Newport Beach, CA, 27-29 September 1999.

• The global *TV Anytime Forum* has started work to develop open specifications designed to allow consumer electronics manufacturers, content creators, telcos, broadcasters and service providers to exploit high volume digital storage in consumer platforms.

• The group plans to publish its first specifications in July 2000, and calls for contributions will be issued in December 1999 for a number of work areas including content referencing, metadata and rights management.
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Working groups set up so far:

- 1) Working Procedures
- 2) Work Plan
- 3) Technical Requirements
- a) System Description (Business Models) / Gary Hayes (BBC)
- b) Metadata / Jean-Pierre Evain (EBU)
- c) Security and Rights Management / Guy Hirson (NDS)
- d) Content Referencing / Simon Oren (Homing)
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Distribution Scenario 1: Single aggregator subscription

On Demand Content (“pull”)

Broadcast Content 1 (“push”)

Broadcast Content 2 (“push”)

Service Provider

PDR → TV

PDR → TV
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Distribution scenario 2: Multiple aggregator subscription

- On Demand Content
- Broadcast Content 1
- Other Content

Service Provider
E.g.: BT ADSL

PDR

Service Provider
E.g.: BSkyB

TV

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Example of how we can advise - metadata key areas

• Global content indentifiers (UMIDs)
• Basic ECG content & technical attributes
• Enhanced programming
• Programme segmentation and storage attributes
• Intelligent agents
• Conditional access (ca) & security encryption attributes
• Internet localisation attributes
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Example of UMID. Global - Unique Material Identifier

Basic UMID
- Universal label
- SMPTE UMID – globally unique number
- Length
- Defines the length of the UMID
- Instance number
- Different instances of the main number
- Material number
- Identification of each clip

Signature metadata
- Time/date
- Content creation
- Spatial co-ordinates
- The size of the content 720/576 etc
- Country
- Country of origin e.g.: UK
- Organisation
- Broadcaster e.g.: BBC
- User
- Eg: BBC’s own cross linked reference
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Basic TV content attributes
- Date: Programme/event transmission
- Date carry over: Flag to say item crosses dates i.e.: 24:00
- Time: Transmission in 24 hour clock format
- Timezone: Either International offset or local e.g.: GMT
- Duration: Length of item
- Title: Programme/event name
- Episode Title: Secondary, episode name of title
- Series Title: Umbrella title for all episodes
- Original Episode Title: Original language title if translated
- Synopsis: Descriptor of the item. 58, 100, 150, 700, 1000
- Rights: Transmission rights over varied networks, over time

Yes No flags relating to content
- Repeat: Yes/No
- Live: Yes/No
- Colour: C - colour, B/W, Z - colourised, other
- VD: Viewer discretion
- HD: High definition or not

Genre
- Main genre: The main genre e.g.: Sport
- Sub genre: The sub theme e.g.: Magazine Show
- Main Keyword: Relating to main genre e.g.: Football
- Sub Keyword: Relating to ‘main key’ e.g.: FA Cup
- Keywords: Non category keys e.g.: UK, Scotland, 3rd Round etc.
- Conversion code: A unique classification code that has 4 levels of category
- Extra: Genre fields that 3rd party broadcasters can use based on?
- Global: An agreed global genre wording conversion
- Indexes: Globally recognised cross referenced indexes of genre

Channel Specific
- First showing: Yes/No - is first appearance on channel
- Last showing: Yes/No - last appearance on channel
- Pay per view: Yes/No - scheduled event is p-p-v
- Channel rating: Quality rating assigned by the channel

Credit/Info
- Country: Country of production
- Year of production: Year of production
- Original Language: Actual original language title
- Actor List: actor/roles - 10 each include: director, producer
- Crew: Camera, Floor mg etc
- Non actor: Host, Anchor, Correspondents, Guest casts, etc
- Other: Composer, narrator, character voices, etc
- Broadcaster: URL/Content owner/web address, homepage and Email

Technical Attributes (with programme)
- PDS: PDS programming time and date
- Live: Yes/No
- Stereo: Yes/No (excludes two-tone)
- Encryption: Yes/No - program is encrypted
- Language: Languages of program - codes
- Subtitles: Yes/No – open (language) closed (e.g.: ceefax 888)
- Audio signing: Yes/No – type vision, bitmaps
- Source Format: Source code 4/3, 14/9, 16/9, 21/9, Anamorphic
- Audio specials: Alternative audio tracks e.g.: music only, commentary only
- Vision specials: Alternative vision accessible without enhancement

Technical Attributes (at transmission)
- PDS: PDS programming time and date
- Live: Yes/No
- Stereo: Yes/No (excludes two-tone)
- Encryption: Yes/No - program is encrypted
- Language: Languages of program - codes
- Subtitles: Yes/No – open/closed
- Audio signing: Yes/No – type vision, bitmaps
- Format: No 4/3, Yes 14/9, 16/9, 21/9, Anamorphic
- AFD: Active format descriptor. Format spec codes switch
- Audio specials: Alternative audio tracks e.g.: music only, commentary only
- Vision specials: Alternative vision accessible without enhancement

Miscellaneous tech: A batch of unknown tech fields for future use
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**Enhanced Programmes**

Technically able to carry criteria. Dependencies to run properly, tech tree…

- **App Code**
  - HTML 4.0, MHEG 5.0 etc (receiver support)

- **STB support**
  - OS version number per platform and per processor

- **Assets**
  - Have you got all the assets, the parts list

- **Platform flags**
  - I am delivered over DTT, DSat, DCable, ADSL, etc etc

**Features of enhancement**

Enhancement Genre Text/graphic, dynamic synchronous, fully interactive

**Features**

- Video switching, audio switching, commentary, alt video

**Associated**

- Is it programme attached and associated or can be orphaned

**Start time**

- When does it start

**Length of**

- How long is it transmitted for

**Links**

- Connections to other services or internet – yes/no

**World Wide Web Fields to carry time-stamped URL links**

- Transaction
  - Are transactional elements included? What system

- Security
  - Does it contain password protected entry? What system?

- Control
  - Control via qwerty keyboard or remote control or other

- User
  - Does it contain multi-user support – profile and bespoke eProg

- Personalisation Can it import internet profiling – yes/no

- Can it use global personalisation settings – y/n data

- Does it contain ‘bespoke personalisation’ settings – y/n data

**Main Storage Requirements – as ECG basic plus**

- Keywords from global genre/settings, existing systems cross ref. indexes

- Re-broadcast Info What time/date will it be repeated

- Conversion
  - Extra conversion sets from internet programme databases

- Rights
  - Can it be stored and what type of storage, rights codes

**User settings Range of individual user preferences for storage:**

- PIN
  - User individual entry

- Keywords
  - Users particular favourite ‘keyword’ strings

- Priorities
  - Ordered genre of wanted programmes/promo

- Programmes
  - Ordered programme lists – based on UMID & series data

- Dislikes
  - Lists of unwanted genre/keywords

- User ratings
  - Local preferences set as guide by user

- Storage behaviour
  - Auto erase, over record settings Etc etc

**Magazine segmentation (e.g.: news, daytime shows)**

Indexed time from start of main

- Time based indexes each with an attribute & genre sub-set

- Length of sub-section
  - UMID for segment

- Other segment UMIDs allowed either side

- Music UMIDs allowed over section

- Commentary tracks – language & type

- Structural coding – as CD pointers

- WWW link. What URL’s may be linked to the segment

**Multi-linear segmentation (e.g.: docs/drama)**

Indexed time from start of main

- Time based indexes each with an attribute & genre sub-set

- Length of sub-section
  - UMID for segment

- Other segment UMIDs allowed either side

- Music UMIDs allowed over section

- Commentary tracks – language & type

- Structural coding – as CD pointers

- Structural maps – in total VOD route lists

- WWW link. What URL’s may be linked to the segment