



## Delivering ShapeShifted TV

*EuroITV 2007 Tutorial*



Ian Kegel  
Future Content Group  
BT Research and Venturing

### Agenda

- Introduction
  - ShapeShifted TV vs. Video-on-demand vs. Broadcast TV
  - Key challenges for delivering ShapeShifted TV
- The NM2 Approach
  - Architecture block diagram
  - Explanation of key components
  - Examples of real Delivery Systems in NM2 Productions
- The Future: Achieving Scalability
  - Future delivery architectures



## In comparison...

### Broadcast TV

- Simultaneous delivery to millions of customers
- One linear programme for everyone
- Interactivity by switching between multiplexed channels

### Video-on-demand

- Single stream controlled by an individual customer
- One linear programme for everyone
- Stream transport controls, links to other content, simple playlists

### ShapeShifted TV

- Single stream controlled by an individual customer
- Programme tailored to customer's preferences
- Limitless potential to interact before, during and after viewing

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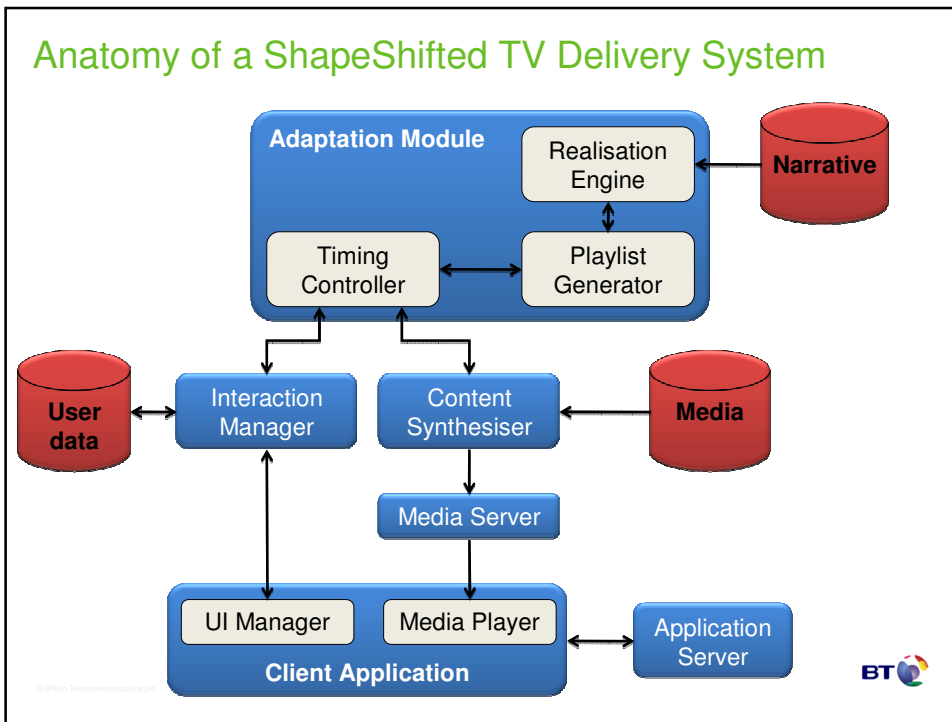
## The Key Challenges

- Personalised video must be delivered over contended IP networks
- Aesthetic and editing standards be maintained when individual stories/programmes are automatically compiled at delivery time
- Many people must be able to access personalised stories simultaneously
- Each person must be able to interact with their personalised story with minimal latency
- **Use the best of breed: ShapeShifted TV does not prescribe a video technology**
- **This is an essential requirement - and can be influenced by all system components, not just perceived quality of video**
- **A key area for future research, which depends on narrative complexity**
- **An essential requirement, and still a challenge for broadcast and VoD**

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## Anatomy of a ShapeShifted TV Delivery System



## Client Application

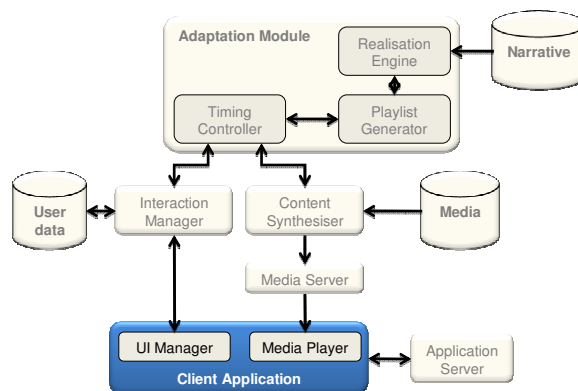
### Technology

• Could be implemented on a wide range of possible platforms, eg.

- Windows Media Center PC
- IP Set-Top Box
- PDA/Mobile
- Networked games console

• HTTP for UI and interaction communication, or for media download

• Appropriate media streaming transport (eg. MMS)

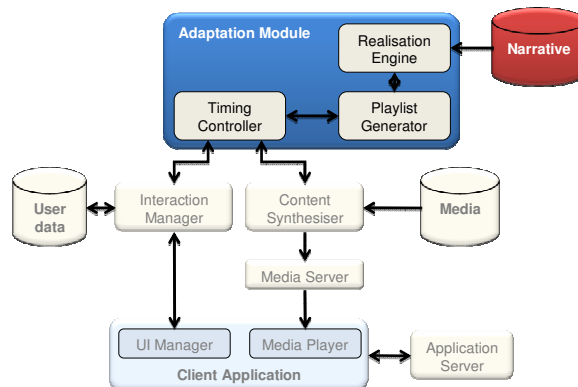


- Proprietary to each ShapeShifted programme
- Responsible for presenting the experience and receiving viewer interaction
- Platform will dictate complexity of local media processing

## Adaptation Module

### Technology

- Multi-threaded Windows console application
- Realisation Engine: SICStus Prolog programme
- XML-RPC interface with simple external API
- Playlist Generator converts internal representation to SMIL



- Generic component with simple external interface
- Responsible for interpreting the narrative model and creating a dynamically-changing playlist which describes the viewer's ShapeShifted programme

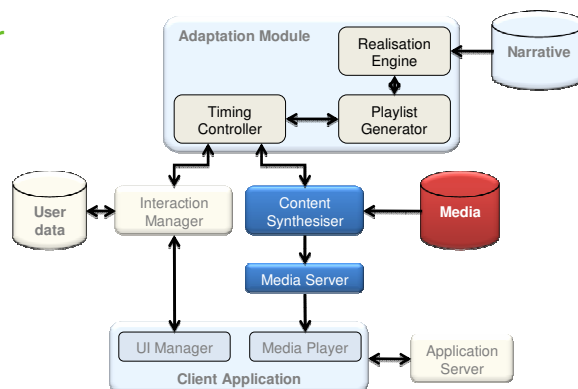
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## Content Synthesiser

### Technology

- C++ application using Microsoft DirectShow libraries
- SMIL playlist parser, with extensions to enable dynamic assembly
- Publish to Windows Media Server, or possibly Flash Media Server
- ... or render to individual media files and schedule distribution



- Media composition engine which interprets dynamically-changing playlists
- Mode of operation depends on platform, eg:
  - Just-in-time render a continuous audiovisual stream
  - Pre-render media components for assembly at the client
- Other approaches may also be possible

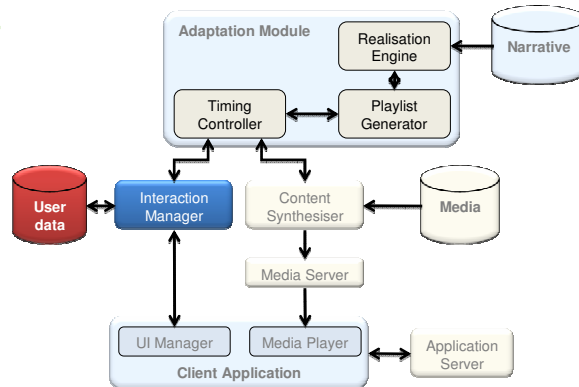
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## Interaction Manager

### Technology

- Java console application
- XML-RPC interface (both client and server)
- MySQL database for profile storage (including defaults)
- Unique ID for user and session



- Intermediate module to manage client sessions
- Responsible for passing client communications the Adaptation module, and for managing user profile data
- Abstracts the management of profile and personalisation information away from the Realisation Engine



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**Gods in the Sky Choice**  
An experimental interactive documentary about the science and mythology of ancient cultures. Using a remote control, viewers select 'Sit-back Entertainment', 'Education' or 'Information' mode, choosing topic, depth and length.

**Accidental Lovers**  
Accidental Lovers is a participatory black comedy about love, for television, mobile phone and Internet. The engager can affect in real-time the unfolding drama of the unlikely romantic couple, Juulia in her sixties and Roope in his thirties.

**Gormenghast Explore**  
An experimental, spatially-organised, interactive dramatisation of BBC TV's adaptation of Mervyn Peake's *Gormenghast*. Visitors explore the 3D environment of the Castle to gain access to the stories of different characters, each freshly reconfigured at every visit.

**Interactive Village**  
A reconfigurable portrait of life in the Czech village of Dolní Rovoň. Movies are compiled dynamically to reflect engagers' choices of place and topic, made via a picture-based interface.

**A Golden Age**  
An ambitious configurable documentary for television, exploring the arts of the Renaissance in England. The engager determines the aspects of this subject which are of most interest.

**My News & Sports My Way**  
A digital interactive archive that allows engagers to discover, select and recombine news and sports items into stories which meet their individual tastes.

**City Symphonies**  
An experimental interactive production that updates the montage-based genre of the 1920s. The production allows visitors to explore the city of Cambridge, through their own choice of topic, length and time of day.

**RuneCast**  
RuneCast fortune-telling offers visitors their own personal entrance to the authentic mythworld of the Vikings. Real-time layering, oral-storytelling and musical structures and techniques, combined with chance operations, make every visit unique.

**nm2**

## Example : MyNews&SportsMyWay

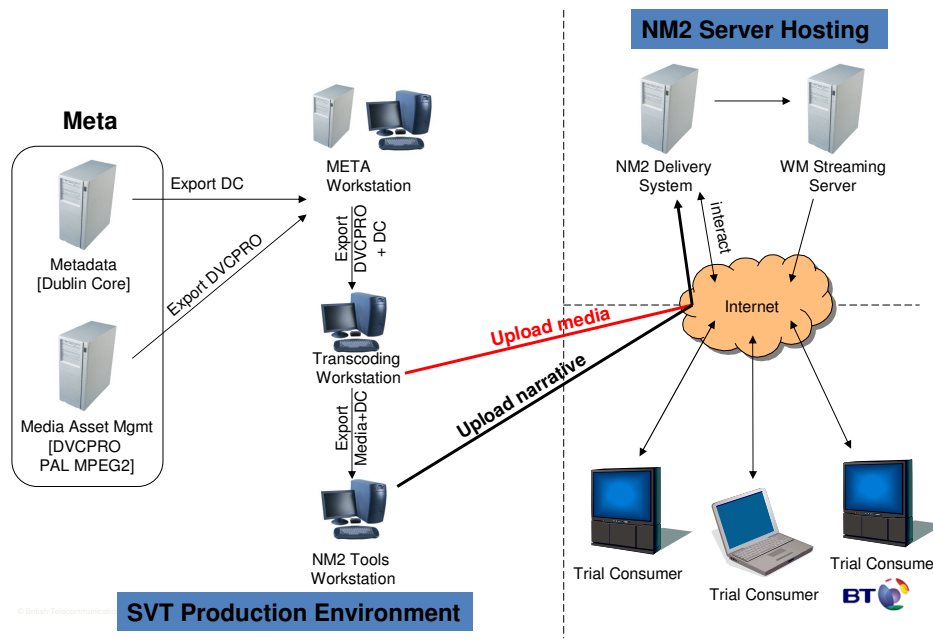


- An interactive personalised news application for broadband TV
- Viewers' preferences expressed in a simple online profile
- 'MyNews' section offers a short, up-to-date programme containing only news stories which are of interest to the viewer
- All stories can be dynamically ShapeShifted during playback
  - "More content", "Related stories"
  - "More or less time"
- Installed with the Swedish national broadcaster (SVT) for a live trial in May 2007



**Direct connection to the newsroom system means that up-to-date news can be combined with a comprehensive archive.**

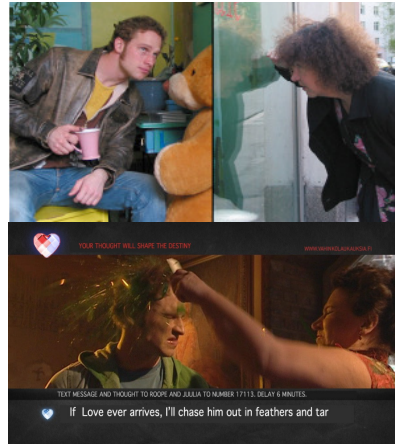
## MyNews&SportMyWay – Production and Delivery System Architecture



## Example : *Accidental Lovers*

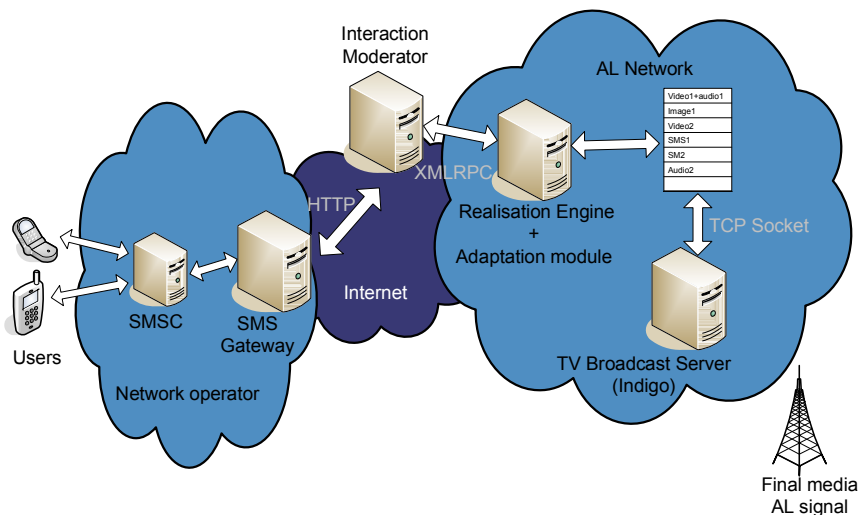


- A participatory black comedy about love for television, mobile phone and Internet
- Text message comments drive the love relationship between an unlikely couple
- Combines the worlds of TV chat and musical drama
- Broadcast 12 times on YLE TV1 in Finland during Christmas 2006
- Over 1M viewers in total, peak per broadcast over 100,000
- “*Want a happy ending? Just text while you watch*” – Guardian, 8/1/07

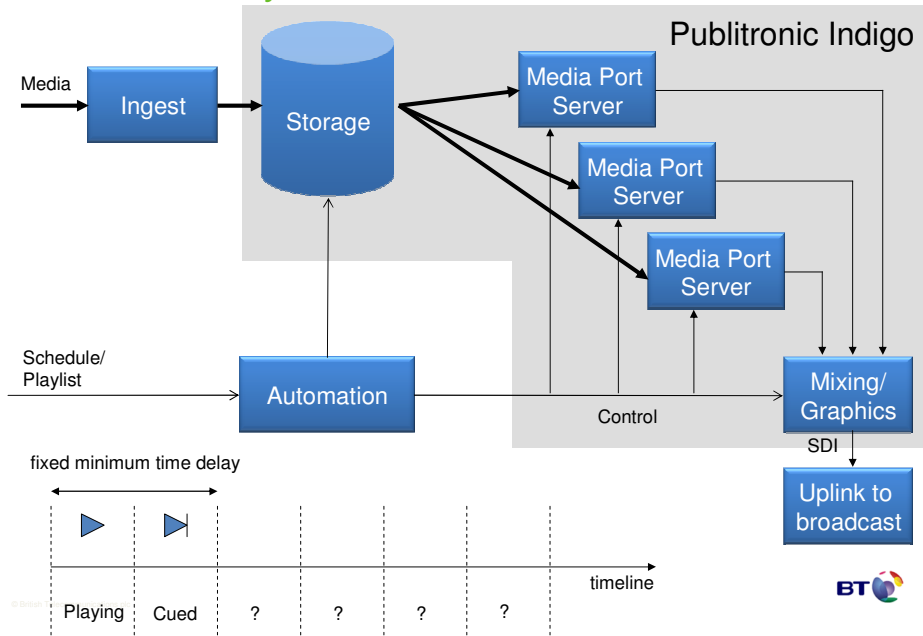


**Automatic creation of the narrative means that the programme can be screened again and again with different, compelling results.**

## *Accidental Lovers* Broadcast Delivery System



## Broadcast Payout



## The Future: Achieving Scalability

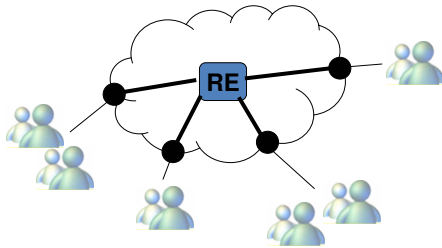
- Narrative Optimisation
  - Can reduce processing time in the Realisation Engine
  - Optimiser component built for this purpose
  - Caching strategies for narrative objects
- Composition Optimisation
  - Live streaming vs. download-and-play
  - New composition models to better support interactivity
  - Distributed architectures
  - Hardware assistance
- Application environment
  - Narrative responsibility vs. application responsibility
  - New cross-platform technologies
    - MS Silverlight, Adobe Apollo

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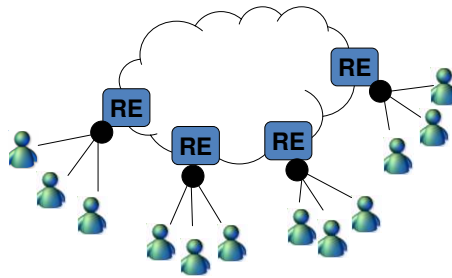
## Future Delivery Architectures

*Evolving ShapeShifted TV delivery*



- Realisation in core network
- Customisation to communities/geographical areas delivered by IP multicast.
- Multicast or generic PVR download

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- Realisation at edge of network
- Personalised stream per individual or small group
- Multicast, VoD, PVR playlist control
- Home Network and P2P?



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ian.c.kegel@bt.com