

up-TV

**Ubiquitous Personalized Interactive
Multimedia TV Systems and Services**





The UP-TV Project

The purpose of UP-TV (Ubiquitous Personalized interactive Multimedia TV Systems and Services) is to create advanced and expandable architectures and systems for TV Anytime applications.

UP-TV system aims to provide personalized access to broadband information in an interactive way allowing the user to browse through the content, search for selected content items and organise the content in various ways independently from time and also from place.

The UP-TV will be available as consumer device (single user system) and will be integrated in server

systems for in-house and last mile applications (figure 1).

The research questions targeted in this project focus on the identification of media content that has to be recorded, the placement of those media assets onto single and networked media servers as well as the organization of an efficient and comfortable access to these assets.

Two trial applications scenarios will be implemented and tested. The trials study personal TV in hotel environments (single server system) and in a network of UP-TV servers.

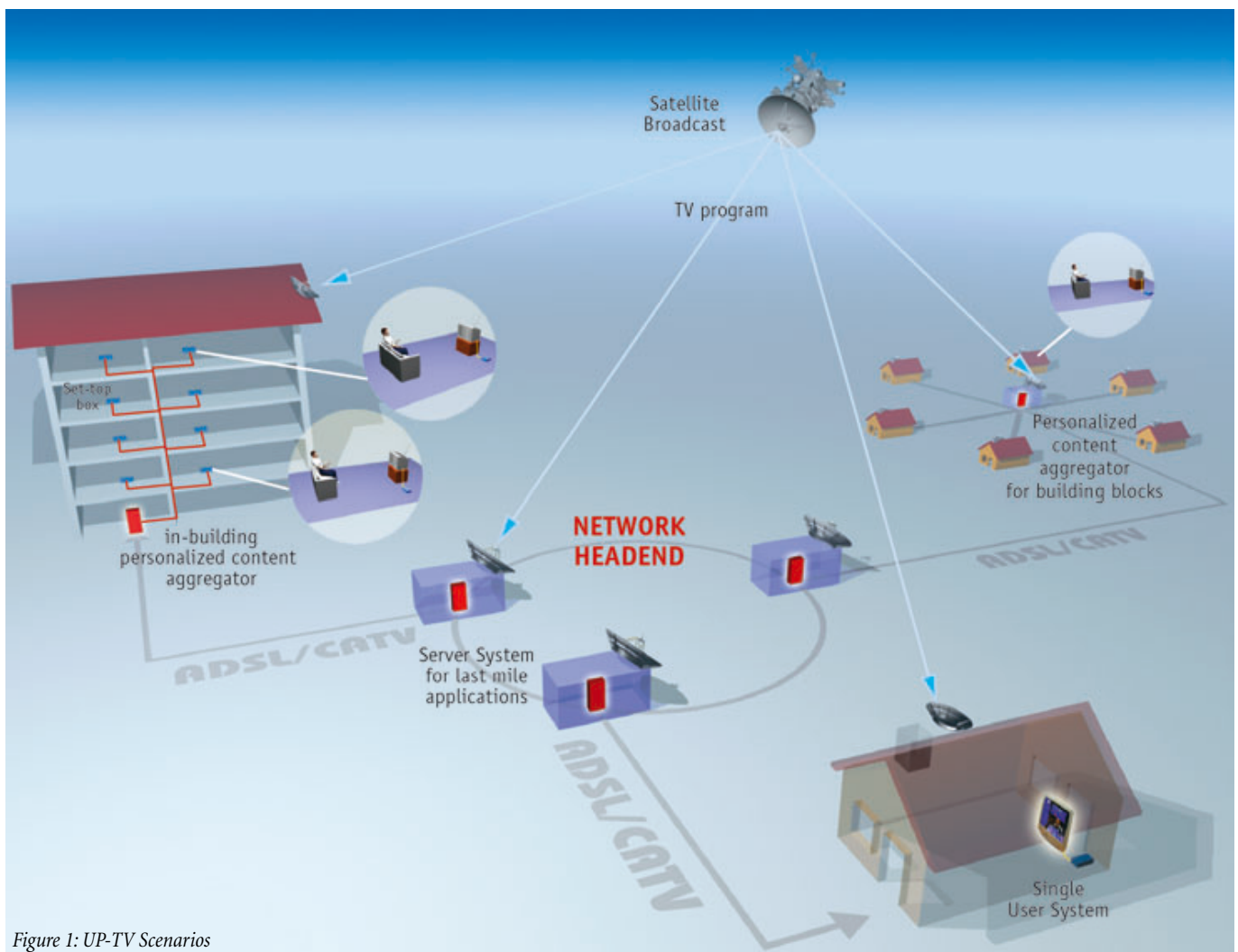


Figure 1: UP-TV Scenarios



UP-TV Single Server System

Personal TV in hotel environments

The UP-TV initial prototype operates as a single server system and plays the role of an aggregator for personalized content. In the initial trials it is installed in a hotel environment with users the hotel guests (Fig. 2). A hotel could be regarded as a single, large dedicated TV Anytime server system. The UP-TV single server system comprises of the two UP-TV servers (Content Server and Metadata Server), the User Interactions Server which collects the guests' interactions with the remote control (in the trials GRUNDIG Roombase Hotel Server), a number of Set-Top-Boxes (INTRACOM's Etherbox, a DVB-C Set-Top-Box with Ethernet interface) and the TV sets.

Each hotel user accesses UP-TV through the TV set installed in her/his room and connected to the Hotel Cable TV network. Set-Top-Boxes are assigned to the hotel rooms in a first-come-first-serve bases through the User Interaction Server. Set-Top-Boxes are connected to the UP-TV servers and the User Interaction Server through the Hotel LAN. The Content Server has a number of DVB-S receivers and

records personalised content. The Data Server receives the updated program metadata through the Internet from the metadata provider (PPS in the initial trials).

The UP-TV aspects supported in the initial prototype are:

- **Content selection for storage** based on the preferences of the predefined groups of users (hotel guests stereotypes). The profiles are TV-Anytime compliant. The content is selected taking into account also the hardware restrictions of single server system (i.e. storage, number of DVB-S receivers/recorders) and by maximizing the customers' satisfaction in total with the recorded programs.
- **Content Management:** Content is indexed based on content metadata, which is TV-Anytime compliant.
- **Metadata Handling:** Automated insertion of programs metadata in the UP-TV content metadata database.
- **TV portal:** Hotel guests browse using the stereotypes pre-recorded content through the TV sets in their rooms and view the selected content by using PDR (Personal Digital Recorder) functionalities.

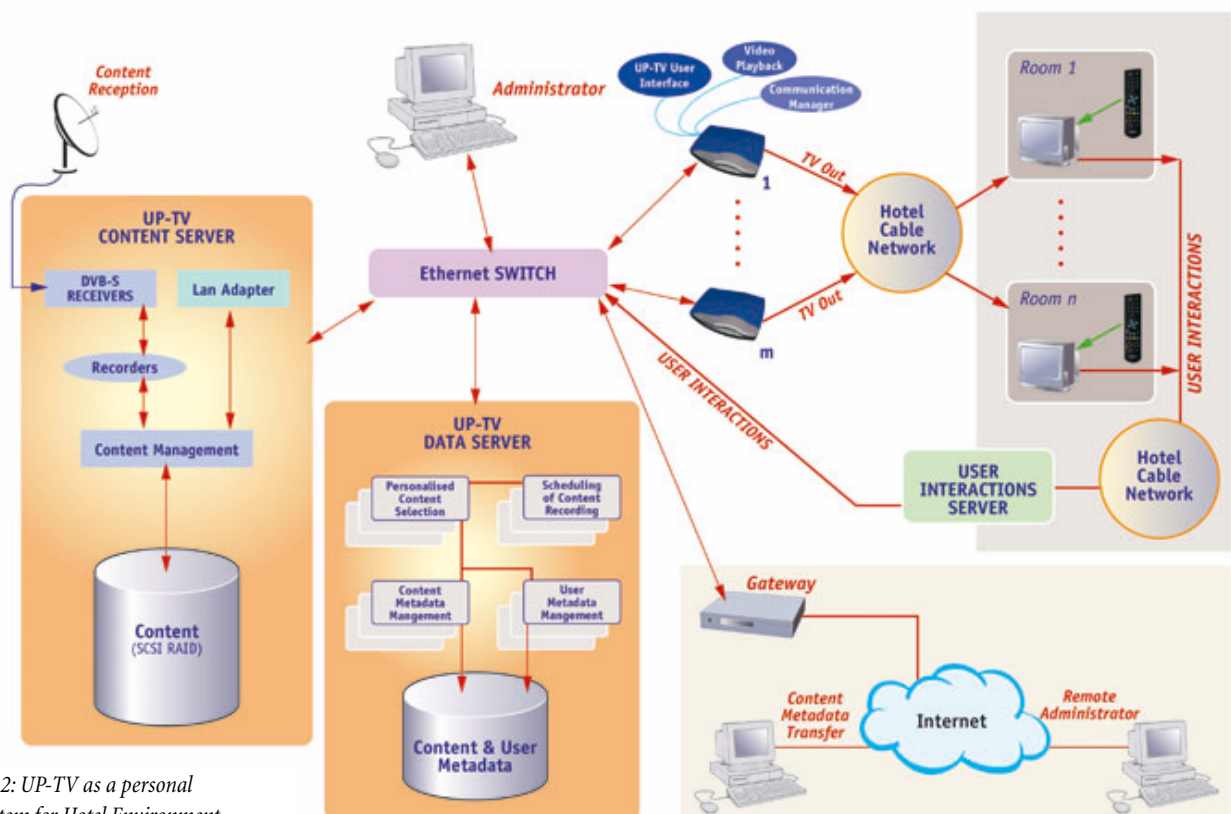


Figure 2: UP-TV as a personal TV system for Hotel Environment

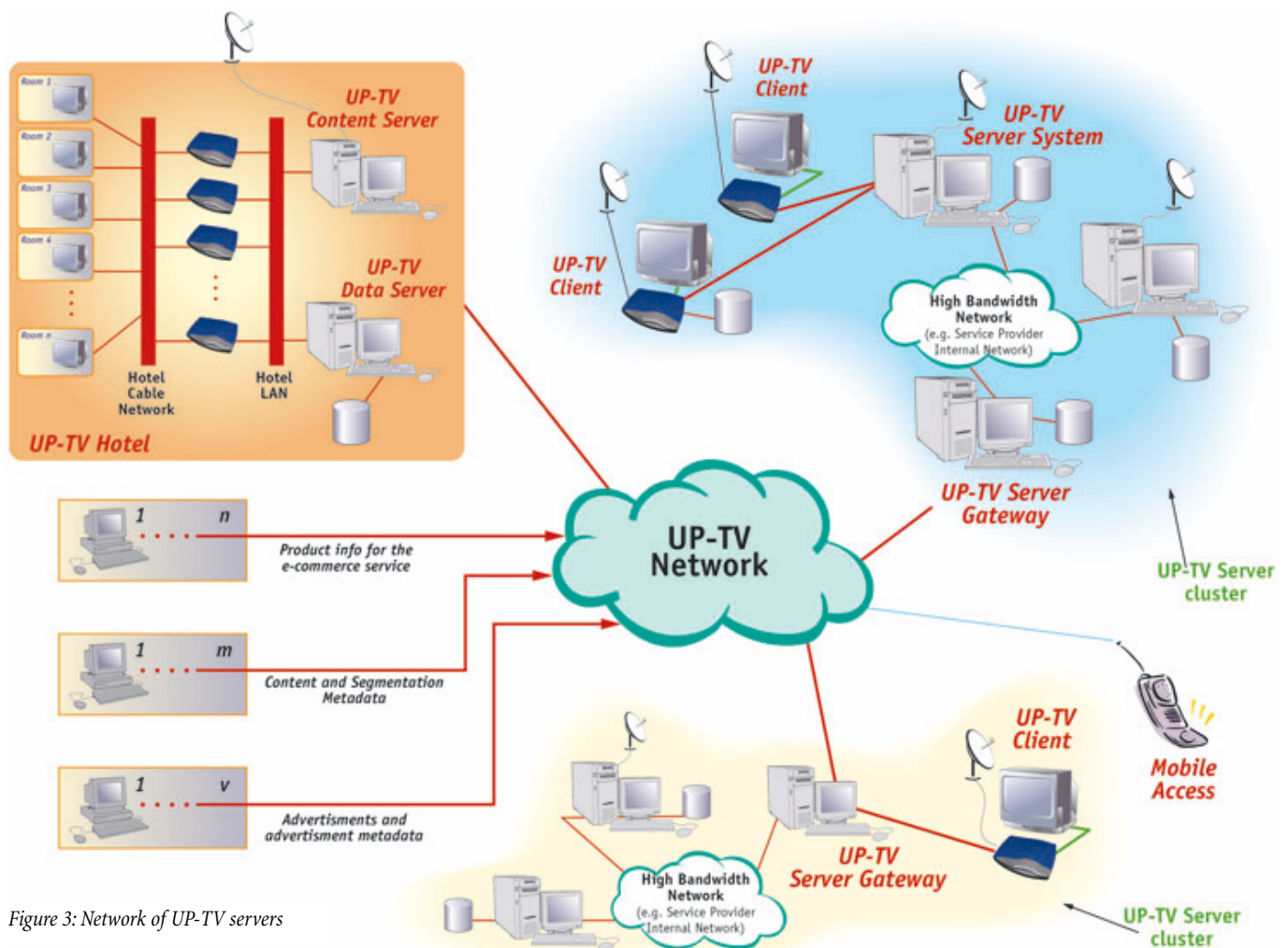


Figure 3: Network of UP-TV servers

Network of UP-TV servers

The UP-TV final prototype consists of a set of UP-TV servers organized in clusters intended to serve a number of clients. UP-TV can operate on Set-Top-Boxes in users' home environment, on hotel central servers and can have the role of content aggregator for buildings or building blocks.

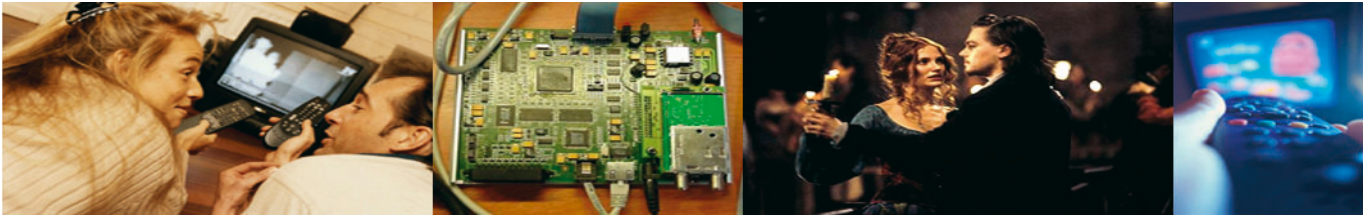
UP-TV servers in the final prototype are partitioned to a set of clusters, as shown in the figure 3. Inside the cluster high bandwidth connections are available, that enable practical content transfer, streamed or offline. These in the final trials are UP-TV servers in different headends in a cable TV network. Between the clusters low bandwidth connections could be available.

Clients' capabilities in the users' home may vary. There could be clients with storing capability or not and clients with recording capabilities or not (e.g. with satellite receivers or not). All types of home clients send their requests for content that cannot serve to their local UP-TV server.

The network of servers allows the transfer of User Profile and of the Content in order to support access to personalized content from anywhere, anytime.

The functionalities supported in the final prototype are:

- **Content Personalization:** Content is selected from the UP-TV servers network based on the preferences of each user. The user preferences are being automatically adapted based on the usage history. The user profile and the content metadata are TV-Anytime compliant.
- **Content Placement in the network of servers** by taking into account the characteristics of the UP-TV servers, the users' location (in the network of servers) and the users' profiles, the server connection topology and the bandwidth along with cost and time restrictions. The target is to maximize the consumers' satisfaction in total by providing access to personalized content from anywhere, anytime with optimised use of UP-TV network resources.
- **Content Management and Access:** Distributed indexing mechanisms that work on the content level are supported. Examples are post indexing (segmentation), previewing (summarization) and content-based search (semantic information) on the media assets stored on the TV Anytime server.
- **Metadata Handling:** Automated insertion of content and advertisement metadata.



- **TV portal:** UP-TV users are able to edit their profiles, specify their future locations, preview content and perform content-based search through the TV sets in their hotel rooms or at their homes.
- **Ubiquitous access to TV Anytime services:** User profiles and personalized content travel among the UP-TV servers based on the access location of the user. Users are able to access the system from anywhere with the use of mobile terminals (Mobile phones and PDAs).
- **E-commerce services:** Support of e-commerce services with the use of a web-like interface accessible through the UP-TV system.
- **Targeted Advertising/Enhanced TV:** Delivery of advertisement messages related to the user's personal preferences and usage history.
- **Collaborative filtering:** Provision of recommendations of programs based on selections of users with similar preferences. In this way we can also take into account trends between social groups.

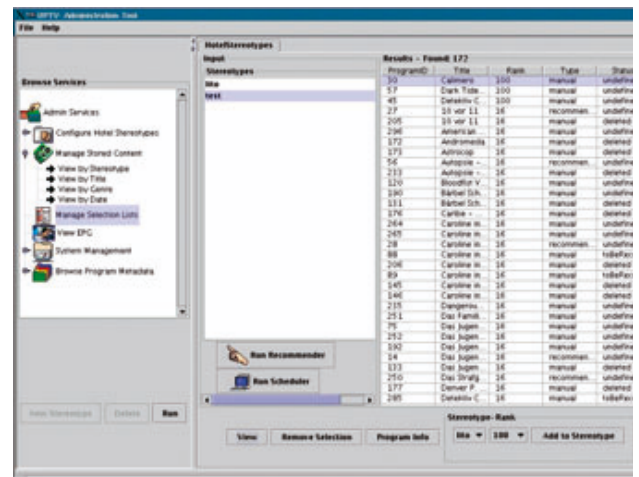


Figure 4: UP-TV Administration Tool-User Selection List

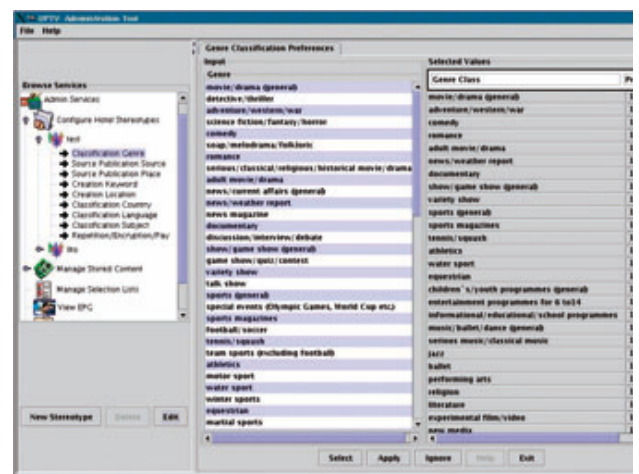


Figure 5: UP-TV Administration Tool-Stereotypes Manipulation



Figure 6: UP-TV PDR User Interface-Program Details Screen



Figure 7: UP-TV PDR User Interface-Editing of Travel Path



Figure 8:
Mobile Access to UP-TV System

UP-TV Innovative Features

- Provision of personalized content based on user preferences
- User Profile adaptation based on usage history and collaborative filtering
- User Mobility Support by providing personalized content from anywhere in the UP-TV network
- Access to UP-TV services with the use of mobile devices
- Content Selection for storing based on users' profiles
- Distributed search for content in the network of servers
- Optimized use of UP-TV network resources, like storage capacity and bandwidth with target to maximize the consumers' satisfaction in total
- Content and Segmentation Metadata TV-Anytime compliant
- User Profile and Usage History Metadata TV-Anytime Compliant



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Technical University of Crete (MUSIC/TUC)
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December 1st, 2000

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35 months

Project web site:

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