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TECHNISCHE UNIVERSITÄT ILMENAU

Impressum

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Multimedia Broadcast Data Services

BROADCAST SERVICES

At the Institute for Media Technology there exists a transmitter for Digital Audio Broadcasting (DAB) which is supported by several partners. The broadcast station deals for the development and test of digital broadcast services.

Broadcast services will be a new and interesting market for providers of cell phones, broadcast stations and news agencies. A receiver for such services needs a display, an adequate memory, a processor and a possibility for user input. Mobile clients with a small back cannel to the provider are really interesting. The new generation of mobile phones have the potential to be such clients for mobile services. The services can be transported by DAB, DVB or UMTS, which are digital wireless channels with different properties. Broadcast services across DAB or DVB can be received by everybody. This is a benefit over UMTS. But broadcast channels are unidirectional which is a problem for some services.

Today three kinds of services are important: audio, video and data services. Audio and video services can supported by metadata like an Electronic program Guide (EPG). Data services are receptive or interactive. The interactivity can be local (navigation in the data pool or selection of parts) or full. Full interactivity needs a back channel which is for a broadcast media impossible. The user of such interactive service has to choose another channel for back messages like GSM, UMTS or Internet.

Video services across DAB - Digital Multimedia Broadcast (DMB) - started in Germany in June 2006. This can be pushing other data services because a lot of users will have applicable clients for it.

"MEDIENFUNK-PLATTFORM"

The project "Medienfunk-Plattform" at the Technische Universität Ilmenau investigates technical and social facets of data services. The development and the examination of

applications are in focus of research. The transmission line (DAB/DMB, DVB-H or UMTS) will be used but not changed by our works. For practical tests a DAB transmitter on the mountain Kickelhahn near Ilmenau is used.

The Institute for Media Technology dispose of a Data Inserter DSIP 020 by the company Rohde & Schwarz FTK GmbH which is also a partner in this project. In the last years we realized some data services with the help of students. They developed broadcast services for e-learning, newscast and entertainment [1]. Denis Hagemeier expanded the features of the DSIP 020 in his diploma thesis [2]. Now the unit of equipment can also multiplex DAB compliant audio and DMB compliant video into the data stream to the transmitter (ETI). So we can transmit all kinds of services. This possibility is interesting for some subject areas at the university.

DATA SERVICE "EVENT CALENDAR FOR A REGION"

As an example a data service for an event calendar will be discuss. Parts of this service developed in a practical student course ("Praxiswerkstatt") in the summer term 2006. This local service (for a town or for a region) has to transport information about current concerts, performances, culture and sports events. The user gets information about the kind of event, place and time, possibilities to book tickets and the contact data. The service will also help to get office hours of authorities, departure times or first aid numbers. One focus of this paper is the data structure and the other point is a strategy for an efficient transmission of the data to the user.

The data structure must be helpful for the mobile client. It gets the data across a broadcast service. Then the client has to save and managing the received data. The user of the service wants to find the interesting information easy and fast. But the mobile client has only a small display and a limited memory. The usability may be a problem of mobile data services. That's why the user should be able to create a personal profile for his information requirements. The data structure has to help the client to realize such profile.

DATA STRUCTURE

Data services for mobile client are a good example for the importance of metadata in an information channel. The metadata allow an automatic subsequent processing. At the best the user gets the most important event information to his interest automatically. The *Picture 1* shows an appropriate data structure to describe an event. Here are elements
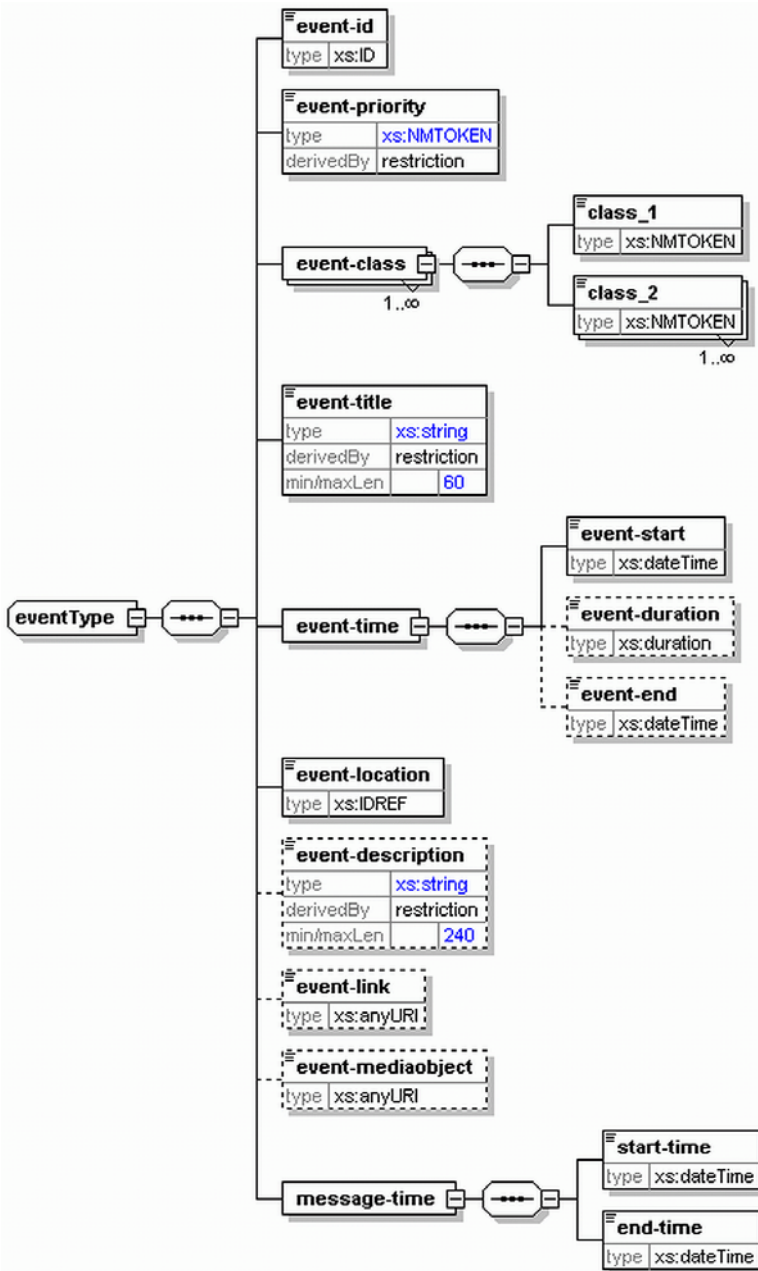
Picture 1: XML Schema for one event

to describe the event and also elements to manage the events on the client. Management events are *event-priority*, *event-class*, *event-time*, *message-time* and *event-location*. They can use to sort and filter the events by the client. The user defines a personal profile to get the most interesting information at first. The metadata help the user to search special events.

The administrator of the service defines the priority due to his estimation or due to the payment of the organizer of the event. Each event belongs to one or more *class_1* like music, cinema or sports. The element *class_2* contains subclasses like football or tennis in the *class_1* sports.

The *event-time* describes the start, duration and end of the event (duration and end are optional) but the *message-time* gives the period in which the message is presented to the user. After the *end-time* the information about the event can delete by the client software.

The *event-location* contains only an ID of the location. The locations are described in other data structure to reduce redundant information. Probably a lot of events take place at the same location - for example in the cinema. This information is more static in relation to the information about the events. The software on the client had to join events and locations.

ARCHITECTURE

Each data service needs client-server architecture. The server collects, structures and manages the data. In our case the server generate XML files with structured date. These files go over IP to the inserter. That device multiplexes this service to the Ensemble Transport Interface (ETI) which goes to the transmitter. The client gets the XML files over a DAB data channel. It can process and save the data.
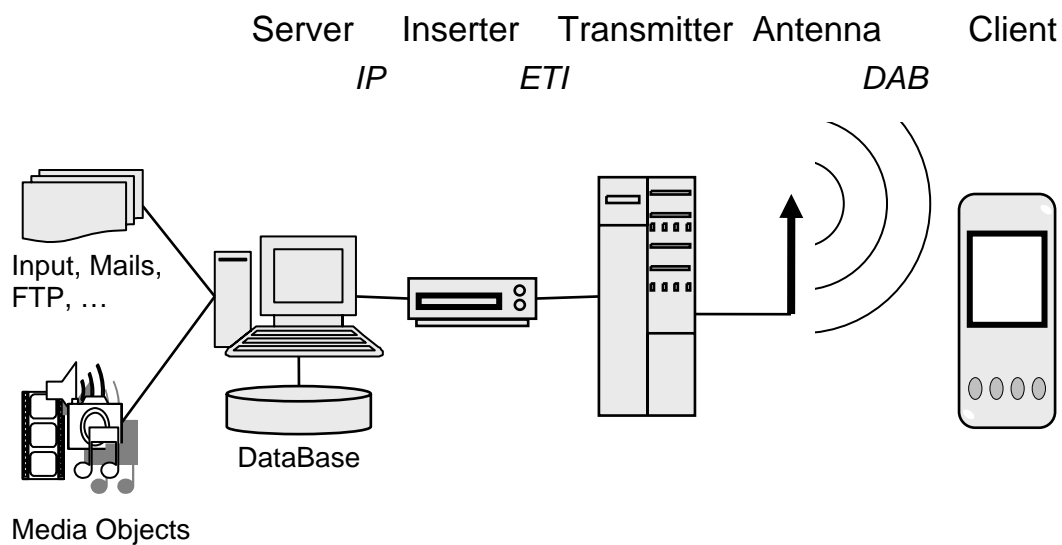
Picture 2: Client-server-architecture for the data service

A challenge is the effective transmission of data. It had to work good in the two cases: the client is switching on and the client is collecting data over a long time. The user wants actual information after a short period in both cases.

STRATEGY OF TRANSMISSION

How many data are to transmit? The information about one event spans 600 Bytes in the maximum, if there only textual information. Additionally there are data about the locations, office hours of authorities, departure times or first aid numbers. The amount of data depends of the dimension of the city or region but we can estimate it to 50 Kbytes. If there is information on 1000 events, it's necessary to transmit 650 Kbytes. The transmission time along a small data channel of 16 kbps over DAB is then 325 s. So the user had to wait more then five minutes till all data on his client. But it's possible to transmit the most important data in a shorter period. They get a higher priority for broadcasting. If there are media objects to illustrate the events (pictures, songs, videos) the transmission

time is match longer or you need a larger channel. The table lists the different kinds of data which are to send.

ID	File	Type	Transmission Priority	Typical Size [Kbytes]	Number
C	configuration data	XML	1	1	1
E1	events for the actual day (high priority)	XML	1	15	1
E2	events for the actual day (low priority)	XML	2	50	1
E3	events for the next days (high priority)	XML	3	50	1 - 2
E4	events for the next days (low priority)	XML	4	50	1 - 5
L	locations	XML	1	50	1
O	office hours of authorities	XML	2	10	1
D	departure times	XML	3	50	0 - 5
F	first aid numbers	XML	2	10	1
A	actual information (local)	XML	1	10	0 - 1
M	media objects	JPG, MPG, …	5	20	0 - 100

Table 1: Classes of files for broadcasting

The server had to generate these files from the actual data in its data base. It pushes the data to the inserter after an arbitrary period. A so-called WebCarousel exists at the DAB data inserter. It sends a list of files cyclically to the transmitter. The files have different priorities. So the most important data broadcasted after a shorter period then files with lower priority.

The client gets the XML files and the media objects. It saves and structures the information. Now the client software can present the most interesting information to the user according his profile. But the user can also search in the hole data pool for other events. The client needs a good user interface because the console has only a small display. An intelligent client learns the preferences of the user from his interactions. So the profile can improve by-and-by.

CONCLUSION

The broadcasting of an event calendar may be in interesting example for a data service. These data are important for mobile users. The service is suitable for small mobile cli-

ents like cell phones. But the provider can distribute the event information along some channels like WWW, journals and broadcast data service. It may be an interesting commercial solution for a publishing company.

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[2] Hagemeier, Denis: Erweiterung eines DAB-Dateninserters um Multiplexer-Fähigkeiten, Diplomarbeit, TU Ilmenau 2006

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