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# ON THE ADVANTAGE OF RELATIONAL DATASTRUCTURES AND CLIENT/SERVER APPLICATIONS FOR SHOOTING NOISE DATA USING ODBC, SQL AND OLE STANDARDS.

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## 1. INTRODUCTION

An International joint measurement focusing on sound propagation outdoors of blast noise collected a lot of data including pressure time signals, geophysical data, weather data and manifold administration data (see. session 'blast noise propagation and assessment').
To take advantage of the today available technology we developed a relational database structure and dedicated client/server applications to organize and analyze the data. This use of modern computing facilities makes the data available to many presentation and programming software, allows data exchange and new data analyzing algorithms for such a large collection of data. This concept makes use of the implementation of ODBC- (Open DataBase Connectivity), SQL- (Standard Query Language) and OLE- standard (Object Linking and Embedding) on PC-platforms.

## 2. WHAT IS SQL, ODBC AND OLE?

### SQL

Even in 1972 the language SQL was developed to access the data, which are stored in a database. This language is independent of the platform, on which is used. It gives the user the possibility to connect the data, which are stored in different tables, sort them and make selections of this data for certain criteria.

## ODBC

Each developer of databases uses his own database application, whether it is Access, dBase or Foxpro to view and process the data. Besides this, most of these developers also offers programming languages which provides specific commands to access their database. The SQL-Commands have to send through specific software interface to the database engines. For this, the database interface ODBC (Open Database Connectivity) was defined. With this it is possible to access all types of database which provides ODBC with a defined set of commands. This saves developing time and lets the user choose his preferred programs more flexible. [1]

## OLE

In the times of Windows and OS2 not only the kind of database systems, also the database applications itself have changed a lot. Just have a look at the development of word-processing applications as WinWord, AmiPro or others. Today the programming and maintenance of such a program is done no more from one person, but from many, often hundreds of people. This brings many problems in managing these projects. Normally the solution is to split these programs in small pieces. This was practised already under DOS, but it had difficulties in the field of data exchange between these parts.
After the DDE-system (dynamic data exchange) under Windows could not prevail because of its uncertain conduct and the slight speed, a new system was developed. It was named OLE (online linking and embedding).

Thereby it is possible, to prepare small programs (Server), which are independent from each other and can easily serviced and exchange. Since the new software products are now capable of OLE, they can access these self written servers. An example for this is the oscilloscope-server, which can be called by a form of Access.
Further examples are presented in chapters 3. The applications must be developed under MSWindows to use OLE, because OLE is only implemented on this operating system,

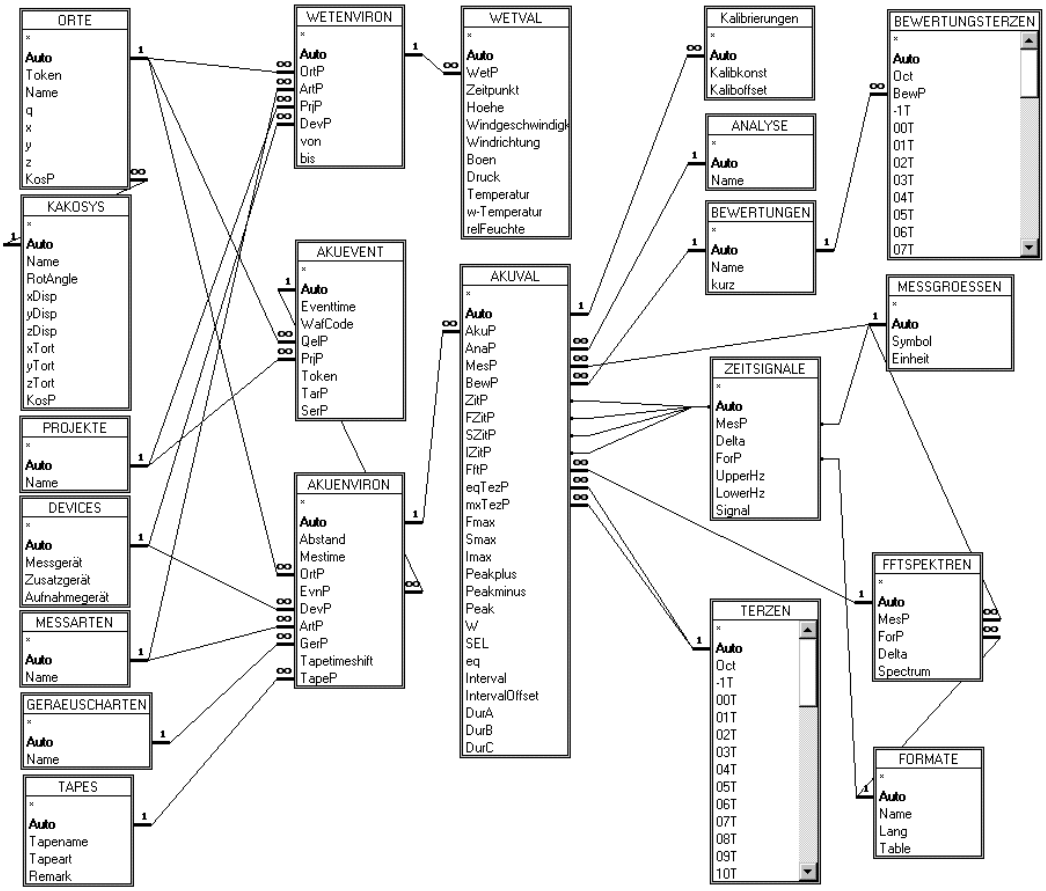
# 2. THE DATABASE-STRUCTURE

The data base exists essentially of 4 parts:

1. General measurement parameters and constants (units, kind of noises, signal formats,...) These tables have be filled already and only need to be changed for special purposes.
2. Parameters, that are specific for a project (measuring - and event-locations, times of events, names of tapes,...)

3. Data, collected during the measurement (recorded time histories, Levels, third octaves, weather data...)
4. Analysing data (calculated time histories, Levels, third octaves, FFT-spectra,...)

All data are collected in many related tables. The picture shows the structure of the database without pertinent Description - and Error- tables. The structure of the database (tables, relationships, indices) itself is also added in several tables, including international commentary, so that everyone can understand the structure without large previous knowledge of it.




Picture 1: Structure of IFLBASE

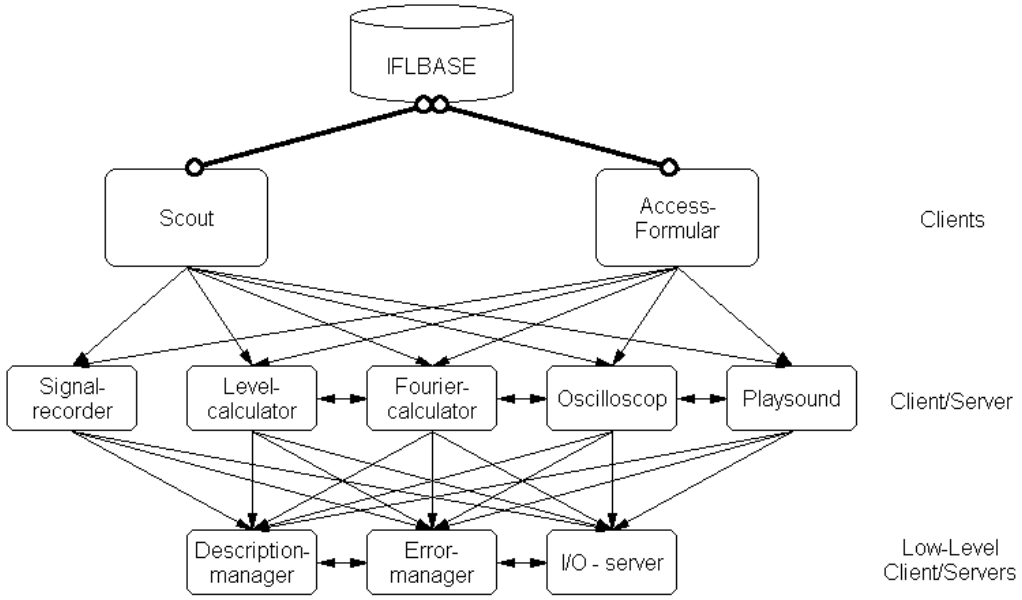
At first glance this structure may look very complex. However the data can be shown very easily in the common used table format by using SQL-queries. Thereby a sorting and selection of the data can be done simultaneously. These produced tables can be take over by other applications, as Excel or word processing programs.

## 3. CLIENT/SERVER APPLICATIONS

Not all data can be shown by SQL-queries or Access-forms. In some other cases, the user don’t want to see the data in tables but in more

useful way. Examples for this are the oscilloscope display for time signals, the display for third octaves and the diagram for level histories.

For this purpose small applications are written, which presents the data in the wanted format. This applications are called Server, the calling programs are the clients. These servers can call further servers; the server is therefore also a client. To work with the database, at first a program like Access or Scout is started. Within these program e.g. a measurement is selected,
to which one would like to see the time signal. This application calls up now the oscilloscope server. To calculate now the level histories of this time signal, the oscilloscope server will call the Server for acoustic calculations. This program can calculate many acoustic parameter like L - , A - and C -weighted levels, third octaves, energy and many more.
Because of the open laid structure, it is possible for each programmer to write his own servers in each programming language that supports ODBC.




Picture 2: Yet implemented Client/Server-Applications

## 4. NEW ANALYSING METHODS

With the query and sorting possibilities, questions on the data can be processed within very short time. Of course, many of these questions would have been able to be answered by laborious compiling of the data from the up to now usual datalists; but many of these questions were directly rejected at the estimate of the expense.

## 5. WHAT COMES NEXT?

Up to now some Client / Server applications are developed, which work with the IFLBASE - structure. These are used already in different institutes, that belong to the ADHOC-Working group. The further goal is now, to develop of the existing applications further and to create new ones for more purposes. Thereby not all possibilities of the database are still used. Through the dissemination of the database and their applications also in other research fields, it becomes necessary to expand and update the structure of the database. For this it is necessary to have much know-how from the respective research field, so that these expansions must be done locally. These changes can be tested then directly at the practice. Now the changes can be reached to all other users. To do this, it is need to set up an international information structure, which makes it possible to maintain and establish the database and their applications not central (->Internet).
As it was in our Norwegian trials, it is possible that a database of one project is present in different places and is processed there. So a further important point is the development of a possibility to adjust such a database even if the state of each of its replicants are not the same.

## 6. CONCLUSION

We developed a database structure as well as some Client / Server applications, which offers the fast and easy access on all data belonging to a measuring project. The new possibilities of the data management SQL, ODBC and OLE are used to minimise the organisation time.
It was considered to create the most flexible database structure as well as the applications. So expansions can be done very easily and the system is future proof.

## REFERENCE

[1] Microsoft Developer Network, Edition April 1996