Procedural Creation of Medical Reports with Hierarchical Information Processing in Radiation Oncology

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Abstract

Background: For many years, the oncological doctor's letter has been the pivotal means of information transfer to general practitioners, medical specialists or medical consultants. Yet, both creator and recipient require a high level of abstraction, retentiveness and analysis due to the large number of diagnoses and therapies. In contrast to the commonly used structure of doctor's letters, where all diagnoses and therapies are listed in sequential order with all diagnoses first, it is by no means trivial to establish the important chronological and hierarchical context in the description of oncological cases. Additional aspects of importance are the integration of these letters into existing clinical and departmental information systems (for example via HL7 interface), various export formats (for example PDF, HTML), fax and encrypted email. Moreover these letters need a modern layout that, among others, meets the requirements of corporate design. Methods: The requirements for a doctor's letter system are manifold and can only be represented rudimentarily via a normal word processing system. Due to this deficiency we developed a system that covers all special features and requirements for clinical use. The system is based on a scalable and extensible client-server architecture. We use the programming languages Harbour, C++, PHP and JavaScript, Microsoft SQL database for data storage and the HL7 standard as the interface to other information systems such as hospital information system (HIS). Export formats are PDF, HTML/XML. Layouts are generated with TeX, LaTeX and MikTeX. Results: The aforementioned requirements were resolved with the doctor's letter and finding system IntDok. The hierarchical presentation of diagnoses, histologies and therapies provides the recipient with a first outline of the course of the disease. A strict procedure controls the whole process of document compilation and assists the user with many highly regarded tools such as text blocks, import and export (PDF and HTML/XML including barcodes) functions or HL7 interface to other information systems. The software also provides a sophisticated mail merging. All content from previous letters can easily be inserted into the current document. A TeX-server automatically provides document layout including supreme hyphenation so that uniform and perfect appearance (corporate design) is guaranteed. The documents are saved in a MS-SQL database (almost 230,000 documents since 1991), independent of any proprietary formats such as MS-Word. Conclusion: Creation of documents is fast, simple and well-structured. Sophisticated tools guarantee the optimal use of human resources and time. The system is an important module in our overall digital work environment.

Keywords: Doctor’s letter, clinic management, workflow, quality management

Background and Subject

For many years, the oncologic doctor’s letter is the pivotal means of information transfer to general practitioners, medical specialists or medical consultants. As the personal computer found its way into the standard business environment since the mid-1980s, office software – WordStar, WordPerfect, followed by Microsoft-Word and OpenOffice – were brought to the market. These software packages slowly replaced the traditional way of writing doctor’s letters and reports of medical findings with a typewriter.

Both creator and recipient of an oncologic doctor’s letter require a high level of abstraction, retentiveness and analysis due to the large number of diagnoses and therapies. In contrast to the commonly used structure of doctor’s letter, where all diagnoses and therapies are listed in sequential order with diagnoses first, it is by no means trivial to establish the important chronological and hierarchical context in the description of oncological or traumatological cases. These circumstances were pivotal in the development process of the software, which will be shown here. The project started in 1991 and is still being developed.

The integration of the documents into existing hospital information system (HIS, for various abbreviations see Table 2 in the appendix) or departmental information sys-
tems via HL7-interface [1-3], various export formats (PDF, HTML/XML or TIFF), fax and encrypted email transmis-

sion, a modern layout based on TeX [4-6], to the end of meeting the criteria of corporate design [7] were additional aspects of importance. All documents should be available online [8].

Furthermore, layout and content should be easily adjusted to new requirements. Documents should be stored in a database [9, 10] to maintain platform independence and to fulfill the requirements set by radiation safety legislation [11]. With specific barcodes on each document it becomes possible to automatically distribute the documents to other systems [12].

Finally, another important aim is defined by the effective use of human resources to create the optimal doctor’s letter. Powerful software tools are needed to that end, which are presented in this work as well.

A central requirement for the system presented here is the integration into our digital concept, which has existed for many years [13-15].

**Material and Methods**

The requirements for a doctor's letter system are manifold and can only be represented rudimentarily via a typical word processing system.

Due to this failing, we developed a system (IntDok) that covers all special features and requirements for clinical use. In addition, our current departmental system MOSAIQ (version 2.6, Elekta AB Sweden) does not meet our requirements for writing doctor's letters.

Because of the complexity of the task, a thorough analysis of the requirements was carried out prior to commencement and implementation, where the authors could draw from a wealth of experience. In this context we have seen that there are only a few commercial systems that attended to this matter. Thus, standard programs such as Microsoft Word were and are the tools used for writing doctor’s letters.

Table 1 depicts the requirements that resulted from the analysis mentioned before, including the corresponding year of each step of implementation.

| Year | Requirement |
|------|-------------|
| 1991 | Development environment: |
|      | • dBase (vendor: Ashton Tate/Borland, USA) |
|      | • Clipper (vendor: Nantucket, USA) |
|      |   o compiler version of dBase compatible programming and database system |
|      | • C++ language (vendor: Borland, USA) |
|      | Development of the Medatec Structure Definition Language (MSDL), including the corresponding interpreter/compiler |
|      | Development of an interactive Tool, for generating input masks. |
|      | Interactive Mask Generator (IMAGE) |
|      | Strictly sequential order of all procedural steps |
|      | Mapping of the standard clinical case-orientated structure of clinical departments |
|      | Access rights management |
|      | Interface to the hospital information system (HIS) |
|      | Saving documents in a database (Clipper/dBase) |
|      | Mail merge |
|      | Reusable text blocks / elements |
|      | Import functions |
|      | Hierarchical layout of diagnoses, histologies and therapies in one block |
|      | BDT interface to electronic insurance card |
|      | Migration of Clipper database to advantage database server ADS (vendor: Extended Systems/SAP), still dBase compatible, but with a client server architecture |
|      | Start of migration from MS-DOS to Windows 3.1x |
|      | End of migration from MS-DOS to Windows 3.1x |
|      | Development of the Type Programming Language (TPL), including the corresponding interpreter |
|      | Development of TeX-file enhancing Language (TXF), including the corresponding interpreter |
|      | Implementation of a TeX server |
|      | Support added for relevant file formats like PDF, HTML, XML |
|      | Implementation of a web server for platform independent visualization of the documents |
|      | Streamlining of the software administration |
The following tools have been used to realize the project:

- **Programming languages**: Harbour (xBase, open source) for Windows with C++ (Borland)
  - is the main programming environment for all Windows programs/modules
- **TeX, LaTeX, MiKTeX**: Scripting language
  - is used for the layout design of documents
- **Database**: MS-SQL by Microsoft
  - Storage system for all accruing data
- **Three scripting languages developed in-house**: explained below
- **PHP (Hypertext Preprocessor), JavaScript, JQuery**, (all open source)
  - is used for all web based operations
- **A detailed description of all functionality is beyond the scope of the present work, so that the following paragraphs are limited to the most important functions. IntDok is a module of the parent system MEDATEC, which is explained later in the section technical background. The system has been, and is being, continuously developed in close cooperation with the users. The cooperation with the user was, and still is, a decisive factor for the constant improvement and extension of the system. Above all, the users recognize the strengths and weaknesses of a program best during their daily work.**

Functionality in the period until 1995: The creation of documents was workflow optimized and enabled efficient working. Operation was simple and the guidance through the program is strictly procedural so that even new users readily familiarize themselves with the system.

**Figure 1.** Start screen of IntDok (document producer and handler)
From the outset, we have ensured that documents are created with clinical cases in mind – as it is typically and usually done in clinics (Figure 1) – and in accordance with a comprehensive access and control rights concept.

As early as 1991, a first software version running with the operation system MS-DOS (Microsoft, Redmond) was established in our department which already met the most important requirements. It is noteworthy that, from the beginning, the project included a pseudo-graphical interface that we named ‘ergonomic shell’ (‘ErgoShell’).

In addition, we attached great importance to store all documents within a database, independent of any proprietary file formats as, e.g., MS-Word. We started in 1991 with the Clipper compatible programming environment.

Furthermore, the software offers a sophisticated mail merge system with one main addressee and up to 10 recipients in carbon copy. The software then automatically creates copies for primary care and archive for example. The address field of all copies contains the respective address with automatic adjustment of the salutation (e.g., Mr. or Ms.); manual copying of letters and tedious addressing can be completely omitted.

Import of demographic and clinical case-related data from the hospital information system (HIS) has been implemented in this time interval. As content such as diagnoses, therapies or other assessments can be imported from a patient’s previous documents, it eliminates repetitive input of existing data. User-defined text blocks essentially simplify the creation of documents.

An essential core functionality was to combine diagnoses, histologies and therapies in a hierarchical way (Figure 2). This combination ensures that each therapy (and each histology, if needed) is directly linked to the corresponding diagnose. A tree structure is created with increased comprehensibility that immediately provides the reader with a clear and meaningful overview about recent diagnoses and therapies (Figure 3).

Figure 2 shows a typical input form for an oncological doctor's letter. The secretary fills in the corresponding fields and the letter is then automatically generated based on this data via the corresponding TeX template. Behind most of the fields sub-forms are hidden, which can be reached via the small button to the right of a field. Depending on the requirements, various functionalities are available there. For example, the button right to the field ‘recipient’ leads to a multiple selection list-box to select the different recipients.

Integration of an interface to BDT (Behandlungsdatentransfer = transfer of treatment data) enabled the use of patient’s electronic insurance cards in 1995; BDT is the...
official standard of the federal Health Insurance Association for the exchange of treatment data in Germany. Import of demographic data stored on those cards was possible, rendering the system even more interesting for external practitioners.

**Functionality in the period from 1995:**

**1995 to 1997:** The whole software package was migrated from MS-DOS to Windows 3.1x, facilitating functionality like copy-paste from other programs, or the inclusion of images and graphics; the latter functionality, however, was only in full use from 2005 onward.

**2001:** Since 2001, documents are rendered with a custom-built TeX-Server [4-6] and special templates, so that a thoroughly homogenous and professional corporate design is ensured (Figure 3).

Document authors choose data either from predefined (yet customizable) lists or fill in text fields (Figure 2). The remaining steps including hyphenation and spell checking are carried out by the system. Spell checking is extensible so that medical terms or labels of (generic) drugs are easily added.

In addition, depending on access rights of the user, the finalized document can be locked to prevent further editing.

**2002:** Support added for relevant file formats like PDF, HTML and XML

**2003-2005:** In 2003, we introduced a web server (Web-Doc), developed in-house [8] to make all documents accessible online (Figure 4); with regard to data protection, this service is only available within our secured network (Intranet). In addition, this web server offers other medical documents and findings related to a patient (Figure 5). For this functionality, we have programmed a proprietary interface to access the documents via HTML format (added 2002). We streamlined the software administration, improved configuration options as well as import and export abilities. In addition we enabled the integration of graphics and images.

**2007:** At first, the software architecture was fundamentally re-designed, and modularity was decisively enhanced, so that new requirements could be implemented even easier.

Thus, the system can be used in virtually all medical disciplines, and it is multi-client enabled, serving, for example multiple departments within one clinic. The software provides a high level of configurability and, in addition to standard doctor’s letters, clinical reports (for example about surgical procedures), medical documentation or miscella-

**Figure 3. Example of an oncological doctor letter using TeX Layout.**
neous documents or correspondence can be created.

In 2008 the database was migrated to a MS-SQL [9, 10] database, which is still in use today. It should be noted that all of about 230,000 documents created since 1991 have been successfully migrated despite numerous system up-
dates, underlining the future-proof storage concept.

2009-2010: In this period, we completed the migration from 16-bit to 32-bit operating system.

2010: A speech recognition program (Dragon) was added in 2010. Due to the intervention of the staff council we had to deactivate this feature after 2 months. Since Win-

dows 7, speech recognition has been integrated into the operating system and allows direct dictation in any Win-
dows text box; therefore external recognition software is no

longer required, but can be easily integrated and used in the same way.

All documents are provided with a barcode on each page containing the patient identifier, document quality, number of pages, current page number and clinical case number (Figure 3).

2014-2016: Barcodes gave us the opportunity to automaticaly distribute the documents to other systems via our self-developed import / export tool [12]. As an example:

Finalized doctor’s letters from our department are sent sim-
ultaneously as a PDF, fully automatically and categorized (for example doctor’s letter or finding to the hospital in-
formation system (HIS), as well as to our departmental system (MOSAIQ™)

![Figure 4. Screenshot of a doctor’s letter using the web service interface.](image)

**Technical background**

Finally, we would like to outline the technical back-
ground of the system. Due to the complexity of this topic, we cannot present this in detail in this paper.

IntDok is a module of the parent system MEDATEC (Medical Data and Text processing with Computer). IntDok was the very first module we developed inside this envi-

ronment. Since the developments took place in parallel, a logical separation between the two systems, at least at the

beginning, was not readily apparent.

As mentioned above, custom scripting languages have been developed for this project.
These are:

- Medatec Structure Definition Language (MSDL)
  - Including the corresponding interpreter and compiler
  - Definitions kept in text files with file extension ‘msd’

- Type Programming Language (TPL)
  - Including the corresponding interpreter
  - Definitions kept in text files with file extension ‘tpl’

- TeX-file enhancing Language (TXF)
  - Including the corresponding interpreter
  - Definitions kept in text files with file extension ‘txf’

In principle, this approach can be considered as an early precursor to Document Type Description (DTD) and Extensible Markup Language (XML) system.

The Interactive Mask Generator (IMAGE) is an executable binary, which was developed in parallel to the MSDL module.

With these tools, we define both the scope of functions and the program flow for a complete project.

The executable programs are merely single basic modules (kernel) that load, interpret, represent, and store statements from those definitions.

For each project, definition files are created that provide all information necessary for the project (table structures including dependencies, the contents of the input forms and procedural relationships).

These definitions are parsed by the MSDL interpreter and then translated once via the MSDL compiler into a database structure, named structure-DB (strDB). The appearance and functionality of the system will later be determined solely by such a strDB. In a second step, the placement of the fields for every defined input form is determined once using our interactive tool (IMAGE). This tool receives all needed information from the same source (strDB) and stores the field positions in this database (Figure 6).

Because various modules, e.g. doctor’s letter or tumour documentation (TuDok), can be merged, almost any requirement of an institution is relatively easy to model.

Figure 6 shows the module ‘Tumour Documentation’ (TuDok) as an example for a merging candidate.

All input forms are stored in the strDB as well and every single form is generated and displayed on demand from the contents of the strDB.

Due to this procedure, the content of the system is virtually unlimited and the load on the main memory is completely independent of the number of input forms, different document types or the project size. Thus, even very large projects can be realized without difficulty.

For the TeX server, introduced in 2001, two script languages/interpreters were created that combine TeX code with database content. TPL defines the basic types of used tags and TXF extend TeX files and act as a database to TeX interface. Figure 7 shows the basic scheme of the doctor’s letter system.

In the supplements (see appendix II) we have attached examples of definition files without further explanation.
Figure 6. Schematic of the project definition process.

Figure 7. Internal schematic of module IntDok as a part of MEDATEC.
Results

The problems and requirements of creating medical documents discussed in this manuscript have been effectively and smoothly resolved with the doctor’s letter and finding system IntDok. The reader of those documents gets a comprehensive and quick overview of a patient’s history with the help of the hierarchical order of diagnoses, histologies and therapies. Document creation is controlled with a strictly procedural approach and the user is supported by many valuable and essential tools such as reusable text blocks, extensible lists and import and export functions. HL7 interfaces to the hospital information system (HIS) and departmental information system (MOSAIQ™) provides all demographic patient data, addresses and content of those systems to the user. With templates, it is easy to implement the integration of barcodes to meet requirements set by other systems or organizations.

The software offers a sophisticated mail merge mechanism. Hierarchical text blocks of diagnoses and therapies or reporting text from former documents are easily imported into the current document and the user only has to add new diagnoses, therapies or text. Export is possible to PDF or HTML/XML format. A TeX server automatically creates a document layout so that uniform appearance is guaranteed; the adaption to the corporate design of our hospital is an easy task. In addition, including a speech recognition module presents no problem. The documents are stored in a MS-SQL database, independent of any proprietary formats as, e.g., MS-Word. All documents are accessible within a web server. The database comprises all doctor’s letters and reports created in our department since 1991 – approximately 230,000 documents to date. All documents can be transmitted to other systems in PDF format, retaining all necessary metadata, for example diagnoses codes as ICD and qualifiers (e.g. doctor’s letter or finding).

Discussion

The software IntDok allows for quick and structured creation of documents, enabling the handling of hierarchical blocks of diagnoses and therapies and ensures the optimum use of human resources with sophisticated tools. Within a very short amount of time, the user is able to edit very complex oncological doctor’s letters. IntDok is integrated in an excellent way into our multimodal document management [12], introduced in 2013. For over four years, our department has been working almost completely without any ‘analogue’ medium (film- and paperless) [13, 14]. Sending doctor’s letters or reports to remote institutions is the last process linked to paper. We are currently negotiating with an external service provider to receive our documents electronically. The service provider will then send the documents by post to the recipients (patients, doctors in private practice and external clinics). We have simultaneously submitted a request for approval of this procedure to the state data protection authorities. If we succeed in this step, our clinic will also be completely paperless in external communication.

Due to the modular design of the system new requirements can be implemented easily. Thus, the system can be used in virtually all medical disciplines, and it is multi-user enabled, serving, for example multiple departments within one clinic. The software provides a high level of configurability and, in addition to standard doctor’s letters, clinical reports (for example about surgical procedures), medical documentation or any other documents or correspondence can be created.

For many years, MEDATEC was the largest HIS implementation at Freiburg University Hospital, with around 350 workstations in daily routine use. It was used in almost all clinics of the University Hospital and consisted of the modules for example IntDok (doctor's letter), Melody (surgical management), TuDok (tumour documentation), DArzt (emergency outpatient unit).

Participating clinics were dermatology, radiation oncology, head and neck, gynaecology, all surgical clinics (traumatology, orthopaedics, hand and plastic surgery, general and visceral surgery, endoscopic surgery, neurosurgery), internal medicine (endoscopy) and geriatrics. This can also be seen in the attached supplements, the entire system is highly configurable and adaptable.

However, the configuration and adaptation to new requirements requires detailed knowledge of the internal structure and, above all, of the self-developed scripting languages. But due to the fact that the system is not commercially available, it is difficult to implement and maintain in external facilities. Moreover we cannot currently provide the necessary support to external institutions.

The software system is constantly evolving and new features continue to be added. Finally, we are currently planning to port the software system presented here to a 64 bit platform, so that it can make use of larger amounts of memory and increased stability on 64-bit operating systems.

The current HIS systems (e.g. Orbis from Agfa, Millenium/ISH-Med from Cerner, CGM Clinical from CompuGroup, I-Soft from i-Solutions Health and MCC from Meierhofer) have a very good range of functions; however, in our opinion they are very slow in implementing adaptations or even innovative solutions. ISH-Med and SAP offer at least modular and adaptive structures, but are often classified by users as unintuitive and unwieldy.

In addition, none of these manufacturers has attempted so far to control linear accelerators (linac). In view of the relatively manageable number of radiation therapy facilities, the HIS manufacturers avoid the costly step of solving the difficult technical and legal requirements of linac control. Currently only MOSAIQ (Elekta) and ARIA (Varian) are available for radiation oncologies; Raysearch is about to launch the RAYCARE system. However, both Elekta and Varian have only started to develop towards HIS function-
ality in recent years. Therefore, external but integrative software solutions are currently still necessary (as here e.g. IntDok) if you want to work continuously and effectively in a digital environment.

**Conclusion**

Creation of documents using the presented system is fast, simple and well-structured. Sophisticated tools ensure the optimal use of human resources and time. The hierarchical blocks of diagnoses, histologies and therapies give the reader a chronological and rapid overview of the previous course of therapy.

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**Appendix**

**Table 2**

| List of abbreviations |
|-----------------------|
| BDT | official standard for exchange treatment data |
| C++ | C programming language IDE from Borland |
| DRAGON | Nuance Communications, Inc., Burlington, USA |
| DTD | Document Type Description |
| DV | Data processing |
| ELEKTA | Vendor of accelerators, radiotherapy software, R&V-System |
| ErgoShell | pseudo-graphical User-Interface based on MS-DOS |
| Harbour | xbase compiler open source |
| HIS | Hospital Information System |
| Acronym | Description |
|---------|-------------|
| HL7     | Health Level Seven (standard for exchanging information between medical applications) |
| HTML    | Hyper Text Markup Language |
| ICD     | International classification of disease |
| IMAGE   | Interactive Mask Generator |
| IntDok  | Doctor's letter and finding system (document producer and handler) |
| Javascript | Web scripting language from Netscape |
| JQuery  | JavaScript library |
| LaTeX   | Extension of TeX |
| MEDATEC | Medical Data and Text processing with Computer |
| MikTeX  | Extension of TeX |
| MOSAIQ  | Departmental system (ELEKTA, R&V-System) |
| MRT     | Magnetic Resonance Tomography |
| MSDL    | Medatec Structure Definition Language |
| MS-SQL  | Data-management System (Microsoft) |
| MS-DOS  | Microsoft Disk Operating System |
| MS-Word | text processing system |
| OpenOffice | MS-Office analog package |
| PC      | Personal computer |
| PDF     | Portable Document Format |
| PHP     | Web scripting language open source |
| PID     | patient identifier |
| SQL     | structured query language |
| strDB   | MEDATEC structure database |
| TCP     | Transmission Control Protocol |
| TeX     | Typesetting system |
| TIFF    | Tagged Image File Format |
| TPL     | Type Programming Language |
| TXF     | TeX-file enhancing Language |
| Windows | Operationg system (Microsoft) |
| Windows 3.1 | Operationg System Microsoft |
| WordPerfect | old text processing system |
| WordStar | old text processing system |
| XML     | Extensible Markup Language |
Appendix II

The following supplements would comprise 89 pages. Therefore we have added only a small selection; these are original project files in German language and formatted in Courier New for readability.

**************
Supplements
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File: TYPES.TPL
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*======================================================================*
* TYPES.TPL - MEDATEC - Type Programming Language*
* R. Preiß / F. Heinemann / M. Vogel (c) 1991-2018*
* B A S I S - Typ Definitionen*
*======================================================================*

// Allgemeinchirurgischer Brief
BRFALLG := [ AllgChirBriefData, Adressaten, Kopien, InfoCopy ]
// Allgemeinchirurgischer Kinderbrief
BRFALLK := [ AllgChirBriefData, Adressaten, Kopien, InfoCopy ]
// Allgemeinchirurgischer Endoskopiebericht
BRFENDO := [ AllgChirEndoData, Adressaten, Kopien, InfoCopy ]
// Allgemeinchirurgischer OPBericht
OPALLG := [ AllgChirOPData, Adressaten, Kopien, InfoCopy ]
// Allgemeinchirurgischer OPBericht-Kinder
OPALLK := [ AllgChirOPData, Adressaten, Kopien, InfoCopy ]

// Orthopädischer Brief
BROPRT := [ AllgChirBriefData, Adressaten, Kopien, InfoCopy ]
// Orthopädischer Brief Reichelt
BROPRT1 := [ AllgChirBriefData, Adressaten, Kopien, InfoCopy ]
// Orthopädischer Ambulanzbrief
BROPRT2 := [ AllgChirBriefData, Adressaten, Kopien, InfoCopy ]
// Orthopädischer OPBericht
OPORT := [ AllgChirOPData, Adressaten, Kopien, InfoCopy ]

// Unfallchirurgischer Brief
BROUNF := [ AllgChirBriefData, Adressaten, Kopien, InfoCopy ]
// Unfallchirurgischer Kurzbuch
KROUNF := [ AllgChirBriefData, Adressaten, Kopien, InfoCopy ]
// Unfallchirurgischer OPBericht
OPUNF := [ AllgChirOPData, Adressaten, Kopien, InfoCopy ]

// Handchirurgischer Brief
BROHND := [ AllgChirBriefData, Adressaten, Kopien, InfoCopy ]
// dito mit 3 Unterschriften
BROHND3 := [ AllgChirBriefData, Adressaten, Kopien, InfoCopy ]
// Handchirurgischer OPBericht
OPHND := [ AllgChirOPData, Adressaten, Kopien, InfoCopy ]

BRFSSTHA := [ StthBriefData, Adressaten, Kopien, InfoCopy ]
KLISTTHA ::= [ StthBriefData, Adressaten, Kopien, InfoCopy ]
MVZSTTHA ::= [ StthBriefData, Adressaten, Kopien, InfoCopy ]
KLISTTHP ::= [ StthBriefData, Adressaten, Kopien, InfoCopy ]

StthBriefData ::= [ PatBrief, Diktanden, Bearbeiter, BriefDatum,
                 Aufenthalt, FallNummer, RecordID, GrussFormel,
                 HsetDiagTher, NebenDiag, BriefText,
                 EndeFormel, Nachrichtlich ]

AllgChirBriefData ::= [ PatBrief, Diktanden, Bearbeiter, BriefDatum,
                      Aufenthalt, GrussFormel,
                      Diagnosen, Histologien, Therapien, NebenDiag,
                      BriefText, EndeFormel, Nachrichtlich ]

AllgChirOPData ::= [ PatOP, Diktanden, Operateure, Anaesthesisten,
                    BriefDatum, Aufenthalt, OPSchwestern, Bearbeiter,
                    OPDatum, Diagnosen, Therapien, BriefText, Nachrichtlich ]

AllgChirEndoData ::= [ PatOP, Diktanden, Untersucher, Pflegekraefte,
                     BriefDatum, Aufenthalt, UntersDatum, UntersZeitVon,
                     UntersZeitBis, BriefText, EndeFormel, Praemedikation,
                     Geraete, UMethode, TMethode, Nachrichtlich ]

Untersucher ::= STRING
Pflegekraefte ::= STRING
UntersDatum ::= STRING
UntersZeitVon ::= STRING
UntersZeitBis ::= STRING
Praemedikation ::= STRING
Geraete ::= STRING
UMethode ::= STRING
TMethode ::= STRING

PatBrief ::= [ Name, Vorname, Titel, GebDatum, Geschlecht, Wohnort, Strasse,
              PatPiz ]
PatOP ::= [Name, Vorname, Titel, GebDatum, Geschlecht, Wohnort, Strasse,
           Kasse, Station]

Name ::= STRING
Vorname ::= STRING
GebDatum ::= STRING
Wohnort ::= STRING
Strasse ::= STRING
Kasse ::= STRING
Station ::= STRING
PatPiz ::= STRING

Adressaten ::= MegaAdressat*
MegaAdressat ::= [Adressat, Intro, KopieFirst]

Adressat ::= [Anrede, Bezeich, Geschlecht, Institut, Abteilung,
              FunktionsEinheit, Titel, AdrName, Vorname, AdrStrasse,
              AdrWohnort]
Anrede ::= STRING
Bezeich ::= STRING
Geschlecht ::= STRING
Institut ::= STRING
Abteilung ::= STRING
FunktionsEinheit ::= STRING
Titel ::= STRING
Intro ::= STRING
KopieFirst ::= STRING
AdrName ::= STRING
AdrWohnort ::= STRING
AdrStrasse ::= STRING
Kopien ::= KopienBezeichner*
KopienBezeichner ::= STRING
InfoCopy ::= [InfoCopyText]
InfoCopyText ::= STRING
Diktanden ::= Diktand | ZweiDiktanden | DreiDiktanden
Diktand ::= [ Kuerzel, Name, Titel, Funktion ]
Funktion ::= STRING
Kuerzel ::= STRING
ZweiDiktanden ::= [ Diktand1, Diktand2 ]
Diktand1 ::= [ Diktand ]
Diktand2 ::= [ Diktand ]
DreiDiktanden ::= [ Diktand1, Diktand2, Diktand3 ]
Diktand3 ::= [ Diktand ]
Operateure ::= Operateur | ZweiOperateure | DreiOperateur | VierOperateure
Operateur ::= [ Kuerzel, Name, Titel, Funktion ]
ZweiOperateure ::= [ Operateur1, Operateur2 ]
Operateur1 ::= [ Operateur ]
Operateur2 ::= [ Operateur ]
DreiOperateur ::= [ Operateur1, Operateur2, Operateur3 ]
Operateur3 ::= [ Operateur ]
VierOperateure ::= [ Operateur1, Operateur2, Operateur3, Operateur4 ]
Operateur4 ::= [ Operateur ]
Anaesthesisten ::= Anaesthesist | ZweiAnaesthesisten
Anaesthesist ::= [ Kuerzel, Name, Titel, Funktion ]
ZweiAnaesthesisten ::= [ Anaesthesist1, Anaesthesist2 ]
Anaesthesist1 ::= [ Anaesthesist ]
Anaesthesist2 ::= [ Anaesthesist ]
OPSchwestern ::= STRING
Bearbeiter ::= STRING
BriefDatum ::= STRING
Aufenthalt ::= STRING
FallNummer ::= STRING
RecordID ::= STRING
GrussFormel ::= STRING
EndeFormel ::= STRING
BriefText ::= STRING
OPDatum ::= STRING

Diagnosen ::= Diagnose*
Diagnose ::= [ DiagnoseText, ICD ]
  DiagnoseText ::= STRING
  ICD ::= STRING

Histologien ::= Histologie*
Histologie ::= [ HistologieText, KEY ]
  HistologieText ::= STRING
  KEY ::= STRING

Therapien ::= Therapie*
Therapie ::= [ TherapieText, IKPM ]
  TherapieText ::= STRING
  IKPM ::= STRING

NebenDiag ::= [NebenDiagText]
NebenDiagText ::= STRING

HsetDiagTher ::= HsetDHT*
HsetDHT ::= [HsetDiagText, HsetDiagIcd, HsetHistL, HsetTherL]
HsetHistL ::= HsetHist*
HsetHist ::= [HsetHistText, HsetHistKey]
HsetTherL ::= HsetTher*
HsetTher ::= [HsetTherText, HsetTherKey]
HsetDiagText ::= STRING
HsetDiagIcd ::= STRING
HsetHistText ::= STRING
HsetHistKey ::= STRING
HsetTherText ::= STRING
HsetTherKey ::= STRING

Nachrichtlich ::= [ NachrErsteZeil e, NachrFolgeZeilen ]
NachrErsteZeil e ::= STRING
NachrFolgeZeilen ::= NachrFolgeZeil e*
NachrFolgeZeil e ::= STRING

File: MSDL.MSD
-------------
#include "mini.msd"
* Definition der Steuertabelleen *
* XBROWSE   XBrowser-Steuertabelle
* RELATION  Relationen-Steuertabelle
* BOXMENU   Boxmenu-Steuertabelle
* BOXPAGES  BoxPages-Steuertabelle
* PROJEKT   Projekt-Steuertabelle
* RIGHTS    Rechte [unparam.]-Steuertabelle
* DOCASE    CaseKonstrukt-Steuertabelle
* LEITST    Leitstellen-Steuertabelle
* SICHTEN   Leitstellen-Sichten-Steuertabelle
* ZUSTAND   Zustand-Steuertabelle
* AKTIONEN  Aktionen-Steuertabelle
* ETIDEF    Etiketten-Steuertabelle
* REPDEF    Report-Steuertabelle
* SET       SET-Steuertabelle
* QUERV     Querverweis-Steuertabelle
* DOKART    Dokumentations-Art-Steuertabelle
* DOKUS     Dokumentationen-Steuertabelle
* MERGE     Merge-Steuertabelle
* MRG_VAR   Merge-Variablen
* MEM_ART   Memo-Arten
* STD_GRP   Standard-Textblockgruppen
* DBBAUM    Datenbank-Hierarchie
* ESET      Eingabe-Sets
* HSET      Hierarchische Eingabe-Sets
* IMPORTCMD Importaufträge
* IMPORT    DB-Importabläufe
* JOBART    Jobart-Definitionen
* MSDFUNC   Eigene Funktionen
* CHECKSET  Set für Plausichecks für DB-Einträge
* CHECKVAL  Check-Definitionen, die in CHECK-SET verwendet werden*

DEFINE DORG_DB
* Neuer TBROWSER
*====================================================================
:XBROWSE
INFO(XBrowser-Steuertabelle)
FILE(XMSD_XBR.DBF)
ART(S)
DEFINE INDEX
   : DB_NAME(XBROWSE) FILE(XMSD_XBR.NTX) INDEX(YMSDKEY)
END
DEFINE MSD_STRU
   :MSDID     NAME(YMSDID ) TYPE(ID)
   :MSDPAR    NAME(YMSDPAR) TYPE(ID)  && ID der zugehörigen Datenbank
         VAR(BRO_DB)
   :MSDKEY    NAME(YMSDKEY) TYPE(C)   && Browser-Name
         LEN(30)
   :INDEX     NAME(YINDEX ) TYPE(C)   && ID der zugehörigen Indizes
         LEN(54) VAR(BRO_INDEX)
   :BROSPALT  NAME(YBROSPALT) TYPE(C) && Nummer der zugeh. Spalten
         LEN(54) VAR(BRO_SPALT)
:DEFSPALT NAME(YDEFSPALT) TYPE(C) & & Spalte, in die zu Beginn
LEN(2) VAR(DEF_SPALT) & & gesprungen wird

:LIST NAME(YLIST ) TYPE(C) & & Browser-Anzeige
LEN(254) VAR(BRO_LIST )

:COLOR NAME(YCOLOR) TYPE(C) & & Browser-Farben
LEN(300) VAR(BRO_COL)

:TITEL NAME(YTITEL ) TYPE(C) & & Browser-Titel
LEN(40) VAR(BRO_TITEL)

:SPTITEL NAME(YSPPTITEL ) TYPE(C) & & BrowserSpalten-Titel
LEN(254) VAR(BRO_SPTITEL)

:GRENZEN NAME(YGRENZ ) TYPE(C) & & Grenzen
LEN(300) VAR(BRO_GRENZ)

:KEY NAME(YKEY ) TYPE(C) & & Anwählbare Tasten
LEN(50) VAR(BRO_KEY )

:KEYMSG NAME(YKEYMSG) TYPE(C) & & Tasten-Erklärung
LEN(110) VAR(BRO_MSG )

:FUNC NAME(YFUNC ) TYPE(C) & & Name der selbstdefinierten
LEN(10) VAR(SEL_FUNC) & & Funktion.

:MASKE NAME(YMASKE ) TYPE(C) & & Name der zugehörigen Maske
LEN(10) VAR(BRO_MSK)

:INS_FUNC NAME(YINSFNC) TYPE(C) & & 'Einfüge'-Funktion
LEN(10) VAR(INS_FUNC)

:KOR_FUNC NAME(YKORFNC) TYPE(C) & & 'Korrektur'-Funktion
LEN(10) VAR(KOR_FUNC)

:DEL_FUNC NAME(YDELFNC) TYPE(C) & & 'Lösch'-Funktion
LEN(10) VAR(DEL_FUNC)

:BRO_FUNC NAME(YBROFNC) TYPE(C) & & Func. Umschaltung andere Daten-
LEN(10) VAR(BRO_FUNC) & & Spalte

:USR_FUNC NAME(YUSRFNC) TYPE(C) & & Spez. 'User'-Funktion
LEN(10) VAR(USR_FUNC)

:ZEILEN NAME(YZEILEN) TYPE(N) & & Fenster-Höhe
LEN(2) VAR(ZEILEN)

:SPALTEN NAME(YSPALTEN) TYPE(N) & & Fenster-Breite
LEN(2) VAR(SPALTEN)

:EBREITE NAME(YEBREITE) TYPE(N) & & Eingabe-Feld-Breite
LEN(2) VAR(EBREITE)

:SBREITE NAME(YSBREITE) TYPE(N) & & Browser-Breite
LEN(2) VAR(SBREITE)

:ERGEBNIS NAME(YERGEBNIS) TYPE(C) & & Ergebnis-Ausdruck
LEN(100) VAR(ERGEBNIS)

:SEEK_CMD NAME(YSEEK_CMD) TYPE(C) & & Seek-Befehl
LEN(500) VAR(SEEK_CMD)

:FREEZE NAME(YFREEZE) TYPE(N) & & Eingefrorene Spaltenz. von li
LEN(3) VAR(FREEZE)

:SECWIN NAME(YSECWIN) TYPE(N) & & Zweites Fenster-Breite
LEN(2) VAR(SECWIN)

:SWIDESCR NAME(YSWIDESCR) TYPE(C) & & Zweites Fenster: feste Beschr.
LEN(200) VAR(SWIDESCR)

:SWINHALT NAME(YSWINHALT) TYPE(C) & & 2. Fenster: Ausdrücke
LEN(500) VAR(SWINHALT)

:SWINEXCP NAME(YSWINEXCP) TYPE(C) & & 2.Fenster: Ausnahme-Ausdrücke
LEN(500) VAR(SWINEXCP)

:EING_DEF NAME(YEINGDEF) TYPE(C) & & Vordef. Eingabe/Spalte
LEN(100) VAR(EINGDEF)

:EING_SEEK NAME(YEINGSSEEK) TYPE(C) & & Vordef. Seek-Command/Spalte
LEN(100) VAR(EINGSEEK)

:CARGO NAME(YCARGO) TYPE(C) & & frei verwendbare Infos
LEN(100) VAR(CARGO)

:HILFE NAME(YHELPTABL) TYPE(C) && Hilfetafel zum Selektor
LEN(8) VAR(BRO_HELP)
END

*-----------------------------------------------------------------------
* Relationen
*-----------------------------------------------------------------------
:RELATION
INFO(Relationen-Steuertabelle)
FILE(XMSD_REL.DBF)
ART(S)

DEFINE MSD_STRU
:MSDID NAME(YMSDID ) TYPE(ID)
:MSDPAR NAME(YMSDPAR) TYPE(ID) && ID der Parent-Datenbank
VAR(REL_DB)
:MSDKEY NAME(YMSDKEY) TYPE(C) && MSD-Name
LEN(30)
:INTO_DB NAME(YINTODB) TYPE(C) && ID der abhängigen Datenbank
LEN(10) VAR(REL_CHILD)
:REL_KEY NAME(YRELKEY) TYPE(C) && Relationskey für Indexsuche
LEN(30) VAR(REL_KEY)
:VIA_IND NAME(YVIAIND) TYPE(C) && Index der abhängigen DB
LEN(10) VAR(REL_VIANTX) && für diese Suche
:GET_LAST NAME(YGETLST) TYPE(C) && "J", wenn Relation auf letzten
LEN(1) VAR(REL_GETLST) && Eintrag einer ParentID
END

DEFINE INDEX
: DB_NAME(RELATION) FILE(XMSD_REL.NTX) INDEX(YMSDKEY)
END

*-----------------------------------------------------------------------
* Neues MENUE
*-----------------------------------------------------------------------
:BOXMENU
INFO(Boxmenue-Steuertabelle)
FILE(XMSD_BXM.DBF)
ART(S)
DEFINE MSD_STRU
:MSDID NAME(YMSDID ) TYPE(ID)
:MSDKEY NAME(YVARIABLE) TYPE(C) LEN(10) && Variablen-Name
:PAGES NAME(YPAGES ) TYPE(C) LEN(100) VAR(BXM_PAGES)
:ESC_PROC NAME(YESCPROC ) TYPE(C) LEN(20) VAR(BXM_ESCPR)
END
DEFINE INDEX
: DB_NAME(BOXMENU) FILE(XMSD_BXM.NTX) INDEX(YVARIABLE)
END

*-----------------------------------------------------------------------
* Neues Boxmenue Pages
*-----------------------------------------------------------------------
:BOXPAGES
INFO(BoxPages-Steuertabelle)
FILE(XMSD_BXP.DBF)
ART(S)
DEFINE INDEX
: DB_NAME(BOXPAGES) FILE(XMSD_BXP.NTX) INDEX(YVARIABLE)
END

DEFINE MSD_STRU
:MSDID    NAME(YMSDID ) TYPE(ID)
:MSDKEY   NAME(YVARIABLE) TYPE(ID) && ID der zugehörigen Datenbank
:PAGETITEL NAME(YPAGETITEL) TYPE(C) LEN( 40) VAR(BXP_PGTIT)
:MODULES   NAME(YMODULES)  TYPE(C) LEN(300) VAR(BXP_MOD)
:MODFUNC   NAME(YMODFUNC)   TYPE(C) LEN(300) VAR(BXP_FNC)
END

*-----------------------------------------------------------------------*

* PROJEKT-Definitionen
*-----------------------------------------------------------------------*

:PROJEKT
INFO(Projekt-Steuertabelle)
FILE(XMSD_PRO.DBF)
ART(S)
DEFINE MSD_STRU
:MSDID    NAME(YMSDID ) TYPE(ID)
:MSDKEY   NAME(YVARIABLE) TYPE(C) LEN(10) && Variablen-Name
:ROOT     NAME(YROOT    ) TYPE(C) LEN(50) VAR(PRJOOROOT)
:LOKAL    NAME(YLOKAL   ) TYPE(C) LEN( 1) VAR(PROJLOKAL)
:KUERZEL  NAME(YKUERZEL ) TYPE(C) LEN(10) VAR(PROJKURZ)
:Beschrb  NAME(YBeschrb ) TYPE(C) LEN(30) VAR(PROJDESC)
END

DEFINE INDEX
: DB_NAME(PROJEKT) FILE(XMSD_PRO.NTX) INDEX(YVARIABLE)
END

*-----------------------------------------------------------------------*

* unparam. RECHTE-Definitionen
*-----------------------------------------------------------------------*

:RECHTE
INFO(Rechte [unparam.]-Steuertabelle)
FILE(XMSD_RIG.DBF)
ART(S)
DEFINE MSD_STRU
:MSDID    NAME(YMSDID ) TYPE(ID)
:VAR      NAME(YVAR     ) TYPE(C) LEN(10) && Public-Variablen-Name
:DESCR    NAME(YDESCR   ) TYPE(C) LEN(50) && Beschreibung des Rechts
:SET      NAME(YSET     ) TYPE(C) LEN(10) && zug. Auswahlset
:MODUL    NAME(YMODUL   ) TYPE(C) LEN(10) && zug. Modul o. allgemein && (dann leer)
:MAX      NAME(YMAX     ) TYPE(C) LEN( 1) && enthält das max. Recht
:NOR      NAME(YNOR     ) TYPE(C) LEN( 1) && enthält Default-Recht
END

DEFINE INDEX
: DB_NAME(RIGHTS) FILE(XMSD_RIG.NTX) INDEX(YMODUL)
END

*=====================================================================*

*  Cas

Case-Konstrukte *
*---------------------------------------------------------------*
:DOCASE
INFO(CaseKonstrukt-Steuertabelle)
FILE(XMSD_CAS.DBF)
ART(S)
DEFINE INDEX
  : DB_NAME(   DOCASE) FILE(XMSD_CAS.NTX) INDEX(   YMSDKEY)
END
DEFINE MSD_STRU
  :MSDID  NAME(YMSDID    ) TYPE(ID)
  :MSDKEY NAME(YMSDKEY   ) TYPE(C) LEN( 10)  && MSD-Name
VAR(DOCASE_BED)
  :CASE   NAME(YCASE     ) TYPE(C) LEN(500)  && CASE-Bedingungen
  :OTHERWISE NAME(YOTHERWISE) TYPE(C) LEN( 50)  && Otherwise-RetVal
VAR(DOCASE_OTH)
  :RETURN NAME(YRETURN   ) TYPE(C) LEN(100)  && 'normale' RetVals
VAR(DOCASE_RET)
END
*=======================================================================
* Leitstellen-Definition (LS=Leitstelle)
*-------------------------------------------------------------------------------
:LEITST
INFO(Leitstellen-Steuertabelle)
FILE(XMSD_LST.DBF)
ART(S)
DEFINE INDEX
  : DB_NAME(   LEITST) FILE(XMSD_LST.NTX) INDEX(   YMSDKEY)
END
DEFINE MSD_STRU
  :MSDID  NAME(YMSDID    ) TYPE(ID)
VAR(   LS_ID)
  :MSDKEY NAME(YMSDKEY   ) TYPE(C) LEN( 10)  && MSD-Name
VAR(   LS_ID)
  :DB     NAME(YDB      ) TYPE(C) LEN(10)   && Datenbank
VAR(   LS_DB)
  :INDEX1 NAME(YINDEX1  ) TYPE(C) LEN(10)   && Index 1 (über KEYIDs)
VAR(   LS_NTX1)
  :INDEX2 NAME(YINDEX2  ) TYPE(C) LEN(10)   && Index 2 (über LS-Datum)
VAR(   LS_NTX2)
  :BFORM  NAME(YBFORM   ) TYPE(C) LEN(12)   && Berichts-Formular
VAR(   LS_BFORM)
  :VUDAT  NAME(YVUDAT   ) TYPE(C) LEN(10)   && Variablen-Namen des
VAR(   LS_VUDAT)
  :DESCR  NAME(YDESCR   ) TYPE(C) LEN(70)   && Beschreibung
VAR(   LS_VUDAT)
  :ZSFELD NAME(YZSFELD  ) TYPE(C) LEN(200) && Zustands-DB-Felder
VAR(   LS_ZSFELD)
  :ZSDESCR NAME(YZSDESCR) TYPE(C) LEN(200) && Beschreibung
VAR(   LS_ZSDESCR)
  :LABT   NAME(YLABT    ) TYPE(C) LEN(40)   && welche Abteilungen?
VAR(   LS_LABT)
  *:RECHT  NAME(YRECHT   ) TYPE(C) LEN(10)   && Rechtevariable
VAR(   LS_LABT)
  *:LKENN  NAME(YLKENN   ) TYPE(C) LEN( 6)   && Leitstellenkennung
VAR(   LS_LKENN)
  :LSRECHTE NAME(YLRECHTE) TYPE(C) LEN( 50) && Rechte für Bereiche
VAR(   LS_LKENN)
LSDBFLD  NAME(YLSDBFLD ) TYPE(C) LEN( 50) && Datenbankfelder für
VAR(LS_DBFLD) && Bereiche
END

*---------------------------------------------------------------------
* Leitstellen-Sichten
*---------------------------------------------------------------------
:SICHTEN
INFO(Leitstellen-Sichten-Steuertabelle)
FILE(XMSD_LVI.DBF)
ART(S)
DEFINE INDEX
  : DB_NAME(SICHTEN) FILE(XMSD_LVI.NTX) INDEX(YMSDPAR+YMSDKEY)
END
DEFINE MSD_STRU
  :MSDID   NAME(YMSDID ) TYPE(ID)
  :MSDPAR  NAME(YMSDPAR ) TYPE(ID) && ID der Leitstelle
  :MSDKEY  NAME(YMSDKEY ) TYPE(C) LEN(10) && MSDL-Kurzname
  :DESCR   NAME(YDESCR ) TYPE(C) LEN( 70) && Beschreibung
VAR(LV_DESCR)
  :INDEX   NAME(YINDEX ) TYPE(C) LEN(10) && Index für Sicht
VAR(LV_NTX)
  :FILTER  NAME(YFILTER ) TYPE(C) LEN(200) && Filter-Bedingung
VAR(LV_FILTER)
  :OPTSEEK NAME(YOPTSEEK ) TYPE(C) LEN( 30) && Such-Bedingung
VAR(LV_OPTSEEK )
  :OPTLIMIT NAME(YOPTLIMIT) TYPE(C) LEN( 50) && Such-Grenze
VAR(LV_OPTLIMIT)
  :ANZEIGE  NAME(YANZEIG ) TYPE(C) LEN(600) && Anzeige
VAR(LV_ANZEIG)
  :INFO     NAME(YSINFO ) TYPE(C) LEN(999) && String für ESHINF-
VAR(LV_SINFO) && Meldung
  *:IFUSERART NAME(YIFUSRA ) TYPE(C) LEN( 3) && Bedingung für
VAR(LV_IFUSRA) && Benutzerart
  *
  :COND     NAME(YCOND ) TYPE(C) LEN(100) && Bedingung
VAR(LV_COND)
END

*---------------------------------------------------------------------
* Steuertabelle für Zustände der endlichen Automaten
*---------------------------------------------------------------------
:ZUSTAND
INFO(Zustand-Steuertabelle)
FILE(XMSD_ZUS.DBF)
ART(S)
DEFINE INDEX
  : DB_NAME(ZUSTAND) FILE(XMSD_ZUS.NTX) INDEX(YMSDPAR)
END
DEFINE MSD_STRU
  :MSDID   NAME(YMSDID ) TYPE(ID)
  :MSDPAR  NAME(YMSDPAR ) TYPE(ID)
  :MSDKEY  NAME(YMSDKEY ) TYPE(C) LEN(10) && MSDL-Kurzname
VAR(ZS_ID)
  :DESCR   NAME(YDESCR ) TYPE(C) LEN(40) && Beschreibung
VAR(ZS_DESCR)
*:COLOR  NAME(YCOLOR ) TYPE(C) LEN( 8)   && Farbgebung
         VAR(ZS_COLOR)
*:ZNR    NAME(YZNR   ) TYPE(C) LEN(10)  && Datenbankfeld
         VAR(ZS_ZNR)
*:CODE   NAME(YCODE  ) TYPE(C) LEN( 2)  && Kodierung des Zustands
         VAR(ZS_CODE)
END

*------------------------------------------------------------------
*  Steuertabelle für Aktionen der endlichen Automaten
*------------------------------------------------------------------
:AKTIONEN
INFO(Aktionen-Steuertabelle)
FILE(XMSD_AKT.DBF)
ART(S)
DEFINE INDEX
   : DB_NAME(AKTIONEN) FILE(XMSD_AKT.NTX)
   INDEX(YMSDPAR+YMSDKEY)
   *INDEX(YMSDPAR+upper(YDOMAIN)+YMSDKEY)   RP 20.07.95
END
DEFINE MSD_STRU
   :MSDID      NAME(YMSDID  ) TYPE(ID)
   :MSDPAR     NAME(YMSDPAR ) TYPE(ID)
   :MSDKEY     NAME(YMSDKEY ) TYPE(C) LEN(10)
   :DESCR      NAME(YDESCR  ) TYPE(C) LEN(60)  && Beschreibung
             VAR(AC_DESCR)
   :FROM       NAME(YFROM   ) TYPE(C) LEN(80)  && Quell-Zustand
             VAR(AC_FROM)
   :TO         NAME(YTO     ) TYPE(C) LEN(80)  && Ziel-Zustand
             VAR(AC_TO)
   :IF         NAME(YIF     ) TYPE(C) LEN(100) && Bedingung
             VAR(AC_IF)
   *:IFUSERART NAME(YIFUSRA ) TYPE(C) LEN( 3) && Bedingung für
            && Benutzerart
            VAR(AC_IFUSRA)
   :COND       NAME(YCOND   ) TYPE(C) LEN(150) && Bedingung
            VAR(AC_COND)
   :PRE        NAME(YPRE    ) TYPE(C) LEN(100) && Allgemeine
            && Vorbedingung
            VAR(AC_PRE)
   :DOMAIN     NAME(YDOMAIN ) TYPE(C) LEN( 3) && Definitionsbereich
            VAR(AC_DOM)
   :ACTION     NAME(YACTION ) TYPE(C) LEN(40)  && Aktion
            VAR(AC_ACTION)
   :PARA1      NAME(YPARA1  ) TYPE(C) LEN(100) && Parameter 1
            VAR(AC_PARA1)
   :PARA2      NAME(YPARA2  ) TYPE(C) LEN(100) && Parameter 2
            VAR(AC_PARA2)
   :INIT       NAME(YINIT   ) TYPE(C) LEN(20)   && Initialisierungs-
            && Punkt.
            VAR(AC_INIT )
            && für globale Funktionen
   :EXIT       NAME(YEXIT   ) TYPE(C) LEN(20)   && Exit-Funktion
            VAR(AC_EXIT )
END

*------------------------------------------------------------------
*  Steuertabelle für Etiketten-Definition
*:ETIDEF
INFO(Etiketten-Steuertabelle)
FILE(XMSD_ETI.DBF)
ART(S)
DEFINE INDEX
 :ETIDEF1 DB_NAME(ETIDEF) FILE(XMSD_ET1.NTX) INDEX(YMSDKEY)
 :ETIDEF2 DB_NAME(ETIDEF) FILE(XMSD_ET2.NTX) INDEX(YORIGDB)
END
DEFINE MSD_STRU
 :MSDID NAME(YMSDID ) TYPE(ID)
 :MSDPAR NAME(YMSDPAR ) TYPE(ID)
 :MSDKEY NAME(YMSDKEY ) TYPE(C) LEN(30)
 :DESCR NAME(YDESCR ) TYPE(C) LEN(30) && Beschreibung
 VAR(ETI_DESCR)
 :ANZEIGE NAME(YANZEIGE) TYPE(C) LEN(500) && Etiketten-Inhalt
 VAR(ETI_ANZ)
 :DB NAME(YDB   ) TYPE(C) LEN(256) && Quell-Datenbanken
 VAR(ETI_LDB)
 :ORIGDB NAME(YORIGDB ) TYPE(C) LEN(10) && Original-Datenbank
 VAR(ETI_DB)
END