NORTH PLAINS SYSTEMS INC.

TeleScope Design Documentation

Database Design

Revision 1.4

1-July-1996

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1. Overview

The design of TeleScope's database must take into account three things:

- Speed of Access
- Completeness of Stored Information
- Utilization of Disk Space

in approximately that order. The database file used to store TeleScope's data will be called "TeleScope DB" on the Macintosh, using Butler as the DBMS. Under different platforms, the database may have a different name.

2. Format of Listings

The sections which follow are descriptions of each field in each table of the telescope database. These descriptions are presented in a tabular format, with the following columns:

Field Source Datatype Description

The *Field* column contains the SQL names of each described field.

The *Datatype* column contains the SQL datatype of the field.

The *Source* column describes where the data for this field comes from. The possible values for this column are:

A Administrator: The data is created by the database administrator, using the TeleScope Director application. Examples of this type of data are name mappings, and user access privilege information.

Ed Editorial: The data in this column comes from the textual editorial data which accompanies the incoming file. All the descriptive textual data falls into this category. For these fields, the equivalent datasets from the NAA/IPTC IIM (Information Interchange Model) are shown wherever possible, to demonstrate how these fields will be filled.

En Engine: The data is created "on-the-fly" by the TeleScope Engine software as the data is inserted into the database. The unique ID fields, and version number fields are examples of this type of data.

F File: The data is retrieved from the incoming file itself. Examples of this type of data are file name, creation date, etc. This is differentiated from editorial information, which may or may not be contained within the file.

V Viewer: The data in this column is filled in by the TeleScope Viewer software, usually in response to user interaction. An example of this type of field is the access control information.

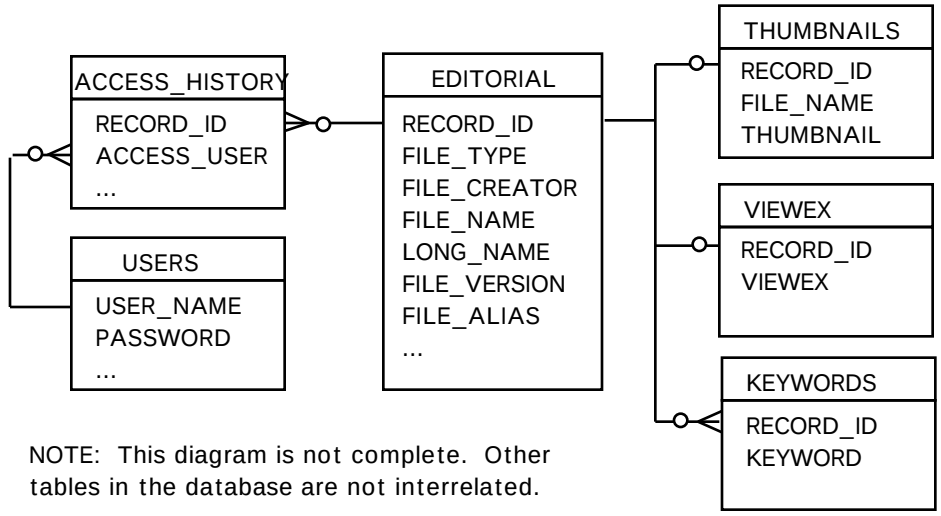
s Note

Since the user can manually enter files into the database using the viewer software, all fields could conceivably be created by the Viewer software. Furthermore, since priviledged users are allowed to modify the editorial content for a file at any time, any *Ed* fields could also be considered to be *V* fields. For clarity, however, the *V* code will be used solely on those fields whose only source is the Viewer software. s

3. Tables

Overview

The following ERM (Entity Relationship Model) diagram displays the relationships between the various tables listed below.



access_history

The access_history table is used to track modifications and downloads of files in the database.

Field	Source	Datatype	Description
record_id	V	Integer	Cross-reference to the *editorial* table.
access_time	V	TimeStamp	The date and time the access was perfomed.
access_user	V	Char(32)	The user name of the user who made the access.
access_approval	V	Char(32)	The name of the user who approved the access.
access_type	V	SmInt	The type of access which was performed. The possible values are: 1 - Download 2 - Editorial modification. 3 - Delete 4 - Insert (Archive)

			5 - Synchronization 6 - Move Files
access_description	V	VarChar(255)	A free-text descriptive field which can be filled in by the approving user.

detail_editable

In the Viewer software, the detail view of a file displays the editorial fields, and allows the user to edit these fields. The database administrator can indicate which columns are editable, on a database-wide basis, using the detail_editable table. There will be one record only in this table, and the columns of this table are all 10-character string values which will contain a series of 'Y' and 'N' characters, representing positional flags as follows:

Position 1: 'Y' indicates the column is editable by the viewer software, and 'N' indicates that it is not. An 'N' in this position overrides any other flags in the string.

Position 2: 'Y' indicates that the entry field in the details view for this column includes a popup menu for selecting commonly-used values for the field. See the Viewer Interface Design document for a description of these popup menus in the interface, and the *popups* table in this document for a description of how the popup menu's text is stored on the server.

Position 3: 'Y' indicates that the popup menu is used for validation of the field (i.e. that the entry in the field MUST be an entry in the popup). If position 2 contains 'N', then positions 3 and 4 are ignored.

Position 4: 'Y' indicates that the popup menu is expandable (i.e. that the menu will have an "Add..." menu item appended to the bottom of it, and the user will be able to bring up a dialog adding their own common values to the popup menu). If position 2 contains 'N', then positions 3 and 4 are ignored.

Position 5: 'Y' indicates that the column is required to have data in it (i.e. that an empty field in the details window is not allowed for this column).

Field	Source	Datatype	Description
date_created	A	Char(10)	See Above.
paper_clip	A	Char(10)	See Above.
category	A	Char(10)	See Above.
sub_categories	A	Char(10)	See Above.
country	A	Char(10)	See Above.
state	A	Char(10)	See Above.

city	A	Char(10)	See Above.
short_description	A	Char(10)	See Above.
long_description	A	Char(10)	See Above.
user_notes	A	Char(10)	See Above.
transmission_name	A	Char(10)	See Above.
transmission_service	A	Char(10)	See Above.
creator	A	Char(10)	See Above.
file_version	A	Char(10)	See Above.

editorial

The editorial table is the main TeleScope repository, used for storing the textual data for each archived file. Note that the contents of the fields in this table are described here for reference only. In reality, the System Administrator, using the name_mappings table, can make it appear to the users that these fields actually contain totally different information (client names, etc.).

Field	Source	Datatype	Description
record_id	En	Integer	A unique identifying code for this record. It is used to join this table to subsdiary tables.
file_type	F	Char(4)	A representation of the type of file which is referred to by this record (eg. “TIFF” or “ESPF”). Originally, this file type is taken from the received file on the Macintosh.
file_creator	F	Char(4)	A representation of the application which originally created the file. This field is only useful on the Macintosh, as the creator signature of the file.
file_name	F	Char(64)	Holds the simple name of the file, without any preceding path.
long_name	F	VarChar(256)	Contains the full name of the file, including access path information in the form: *volume:folder:folder:...:name*

file_size	F	Integer	The size, in bytes, of the original file. This value can be used to determine download times.
file_version	En	SmInt	The version number of the file. This will be used in the future for multi-version control of archived files. For the time being, it will always contain the value 1.
file_alias	F	VarBin	A Macintosh Alias Record to find the file to which this record refers.
file_location	F	VarChar(512)	A platform-independent method of locating the file. The contents of this field are formatted as described in the document *TeleScope Design Documentation - Cross-Platform File Specifications.*
date_created	Ed	TimeStamp	The creation date of the file (either retrieved from the file itself, or from the editorial information which accompanies the file). IIM Source Dataset: Date Created
file_info	En	VarChar(256)	A free-form text field, which is filled in by the I-Piece which reads the file, or by the TeleScope software if the file is graphics. It contains general information about the file, such as the resolution and colour depth for images, or the sample size & sample rate for sounds, etc. This field is displayed as-is to the use in the Viewer's Editorial View.
date_entered	En	TimeStamp	The date and time when the file was first entered into the database.
paper_clip	En	Integer	A field which will be used to tie multiple records in the database together into higher-level structures. At present, this field is unused and will contain zero.

category	Ed	Char(10)	Rough category into which the file falls. IIM Source Dataset: Category
sub_categories	Ed	Char(128)	Supplemental category words which further define the category of the file's contents. IIM Source Dataset: Supplemental Category (concatenated)
country	Ed	Char(32)	Country of origin of the file. IIM Source Dataset: Country Name
state	Ed	Char(32)	Province or state of origin of the file. IIM Source Dataset: Province/State
city	Ed	Char(32)	City of origin of the file. IIM Source Dataset: City
short_description	Ed	VarChar(256)	Brief description of the file's contents (also used to generate keywords). IIM Source Dataset: Headline
long_description	Ed	VarChar(2048)	Long description of the file's contents (also used to generate keywords). IIM Source Dataset: Caption
user_notes	Ed	VarChar(256)	Any user descriptions or notations about the file. IIM Source Dataset: Special Instructions
transmission_name	Ed	Char(32)	Name of the file's contents, as assigned by the transmitter of the file. IIM Source Dataset: Object Name
transmission_service	Ed	Char(32)	Identifies the transmittor of the file (if there is one). IIM Source Dataset: Service ID
creator	Ed	VarChar(256)	Name of the person or organization which created the

			file's content. IIM Source Dataset: Byline

i_pieces

This table contains the I-Piece™ information required by both the Viewer and Engine software. It is stored in the database to provide easy access for all software components, programmatic installation and simplified network-wide updating of I-Pieces. This table stores in a VarBin field the actual contents of an I-Piece file (which is a DLL under Windows, and CODE resource on the Macintosh). For the Macintosh, the file is stored in the database in AppleSingle format (to provide for the necessary resource fork of the file). Both the Engine and Viewer software will, on startup, check this table and compare the modification dates in the table with those of the equivalent files on their respective machines. Newer or non-existant I-Pieces will be downloaded from the database at startup time.

Field	Source	Datatype	Description
i_name	A	Char(64)	The file name of the I-Piece file as it will appear in the file system of the downloading computer.
i_flavour	A	Char(1)	Either a "W" or "M", which indicate that the file is a Windows DLL or a Macintosh CODE Resource file, respectively.
i_priority	A	Integer	The respective priority of the I-Piece (which determines in what order they will be called by the TeleScope software), this field also acts as a unique signature number for an I-Piece. North Plains will maintain a registry of these priority numbers.
i_modification	A	TimeStamp	The modification date of the file contained in the database. If this date is greater than the modification date of the equivalent file on the downloading software's system, it will refresh the DLL or ASLM with the database version.
i_piece	A	VarBin	The contents of the DLL or CODE Resource file (depending on the contents of the i_flavour field). For Macintosh files, this field contains a file stored in

			AppleSingle format. For Windows DLL files, the binary data in this field is the file's contents.

jobs

To ease data entry, TeleScope maintains a table of "jobs" or commonly-used editorial information about files. These named jobs can be used in any of the editorial entry dialogs used in the TeleScope Viewer, Engine or other software to quickly fill in the fields of the dialog.

Field	Source	Datatype	Description
job_name	V	Char(32)	The name of this "job," which will appear in the "Job:" popup menu in the editorial entry dialogs.
job_data	V	VarChar(2048)	A block of text which describes the contents of the editorial fields for this "job." The contents and format of this field are identical to the contents of the "•Editorial Info" file used by TeleScope Engine, and described in the document: *TeleScope Design Documentation - Editorial Info File Format*.

keywords

To accentuate quick searches in the database, a normalized keyword table is provided, which contains keywords that describe individual records. There may be more than one keyword in this table referring to one record in the editorial table.

Field	Source	Datatype	Description
keyword	Ed	Char(32)	Any word which can be used to quickly search for the file. IIM Source Dataset: Keyword (normalized) The engine will also create keywords from "important" words in the long_description and short_description fields. The definition of "important" is described fully in the Director interface design document.

record_id	En	Integer	Cross-reference to the *editorial* table.

name_mappings

Because TeleScope is not aimed at a specific market segment, it is impossible that the field names chosen for the database, generic as they may be, will fit the user interface needs of different markets. For this reason, the name_mappings table contains text strings to be used in the Viewer's user interface when referring to fields of the database. There will be one record only in this table, and each field in this record will contain the text string which the Viewer will display to the user in menus, the details view, etc.

Field	Source	Datatype	Description
date_created	A	Char(32)	
paper_clip	A	Char(32)	
category	A	Char(32)	
sub_categories	A	Char(32)	
country	A	Char(32)	
state	A	Char(32)	
city	A	Char(32)	
short_description	A	Char(32)	
long_description	A	Char(32)	
user_notes	A	Char(32)	
transmission_name	A	Char(32)	
transmission_service	A	Char(32)	
creator	A	Char(32)	
file_version	A	Char(32)	

popups

The popups table is used to store commonly used field values for specific columns in the *editorial* table. These values are loaded by the Viewer software at startup time, and are used to populate the popup menus which appear in the details view. It should be noted that, in the Viewer's interface, the date_created and long_description fields do not have popup menus associated with them. For this

reason, and records in the *popups* table with column_idx values of 1 or 9 will be ignored.

The text contained in the records of this table may also contain *meta-data*, which describes the way in which the text appears in the popup menu. The meta-data characters should be parsed out of the string before placing it into the popup menu.

Separators If the first character of the text is a '-', then the rest of the text in the item should be ignored, and the item treated as an unselectable separator item in the popup menu (usually represented as a grey horizontal line or dotted line).

Text Style The character '<', if it appears in the text, will be followed by one of the following: 'B', 'I', 'O' or 'U', representing bold, *italic*, outline, or underline, respectively. If the slash is followed by any other character, it should be removed from the text before insertion into the popup menu (this effectively precludes the use of the '<' character in the text).

Field	Source	Datatype	Description
column_idx	A	SmInt	The index of the column to whose popup menu this text belongs. This field may have one of the following values: ~~1 - date_created~~ 2 - paper_clip 3 - category 4 - sub_categories 5 - country 6 - state 7 - city 8 - short_description ~~9 - long_description~~ 10 - user_notes 11 - transmission_name 12 - transmission_service 13 - creator 14 - file_version
popup_idx	A	SmInt	The index representing where in the popup menu the text will appear. Popup indices are numbered from 1, and will be contiguous through to the maximum number of items on the menu.
popup_text	A	Char(64)	The text which will appear in the popup menu for this field. See the notes above for a description of

			the meta-data which may appear in this text.

sequences

The sequences table always contains a single record. This record is used to control the unique record_id fields which are used in several tables in the TeleScope database. The contents of the single record_id field in the sequences table will be the current maximum record_id used in the rest of the TeleScope tables. When a file is inserted into the database, the sequences table is queried to get the current maximum record_id, this value is updated to reflect the new insert(s) being performed, and the sequences table is updated. This allows for multi-user concurrent entry of files into the database without race conditions forming.

Field	Source	Datatype	Description
record_id	All	Integer	The current maximum record_id in use within the TeleScope database.

thumbnails

The thumbnails table contains the graphical thumbnail representation for each file in the editorial table. The thumbnails are stored in a separate table in order to speed access to the textual information in the editorial table during searches and queries.

Field	Source	Datatype	Description
record_id	En	Integer	Cross-reference to the *editorial* table.
file_name	F	Char(64)	The simple name of the file, without any preceding path. This data is duplicated here and in the *editorial* table, so the Viewer can get it for display in the thumbnail view without having to execute a join into the *editorial* table.
thumbnail	En	VarBin	A JFIF stream which, when decompressed, will be a (128 x 128 pixel) thumbnail representation of the file.

users

The TeleScope Viewer is access-controlled software, meaning that users must log in to the database, and their activities within the viewer are controlled by access priviledges. The users table details these access priviledges for each user.

Field	Source	Datatype	Description
user_name	A	Char(32)	The name the user will use to log in.
password	A	Char(32)	Password field for the user. This field is encrypted in the database to prevent unauthorized access.
access_where	A	VarChar(255)	A field which contains a portion of a SQL *where* clause to be appended to each query the Viewer generates. This can be used to restrict access to particular records of the database. For example, if the access_where field for a user contains "category = 'SPT' or category = 'WLD'", and the user causes the Viewer to generate a query like: "Select ... from editorial where country = 'Canada'", the final query submitted to the database engine would be: "Select ... from editorial where country = 'Canada' and category = 'SPT' or category = 'WLD'".
access_flags	A	Char(20)	A field which is interpreted by the Viewer software as a sequence of individual characters, where each character represents an access permission for Viewer functionality. If there is a 'Y' in a particular position, then that position is said to be "set." If there is an 'N' in a position, then that position is not set. The character positions within the field are defined thus:

Position	Description
1	If set, the user is an administrator and can use the TeleScope Director software to set administrative options for the database.
2	If set, the user can alter the editorial information for a file.

3	If set, the user can download a file and open it in an application, either by using the Download function in the Viewer, or by option-double-clicking on the file's thumbnail in the thumbnail view.
4	If set, the user can view files using the scrolling thumbnail view. If clear, the user can only use the textual editorial view for viewing files. This field is useful for remote access users.
5	If set, the user can insert files into the database using the Viewer software.
6	If set, the user can see the Viewex view of the file.
7	If set, the user can delete files from the database.
8	If set, and position 7 is set, the user must enter an approval name before deleting a file from the database.
9	If set, and position 3 is set, the user must obtain an approval name before downloading a file from the database.
10	If set, the user may issue approvals for deletions.
11	If set, the user may issue approvals for downloads.
12	If set, the user may change their own password. If this field is not set, then the user must ask the database administrator to change their password.
13	If set, the user may use the "Change Multiple..." command in TeleScope Viewer.

		14	If set, the user may use the printing commands in TeleScope Viewer.
		15	If set, the user may use the "Move Files" command in TeleScope Viewer.
		16	If set, the user may add and remove jobs from the Jobs table.
max_results	A	Integer	A value which limits the number of hits a user can successfully have on the results of a query. If this number is exceeded, a warning alert is issued by the Viewer, and the user is either restricted to viewing the first *max_results* records retrieved, or placed back into the find dialog.

viewex

The viewex table contains the viewer extension data used by the viewer to display a useable version of the file to the user (for example, a mid-resolution version of a graphics file, or a snippet of a sound file). The viewex data is kept in a separate table in order to speed access to the textual information in the editorial table during searches and queries.

Field	Source	Datatype	Description
record_id	En	Integer	Cross-reference to the *editorial* table.
file_name	F	Char(64)	The simple name of the file, without any preceding path. This data is duplicated here and in the *editorial* table, so the Viewer can get it for display in the viewex view without having to execute a join into the *editorial* table.
data_type	En	Char(4)	The type of data contained in the viewex column for this row. This information is stored by an I-Piece when it creates the viewex data. There is no registry for this field, as it is usually I-Piece specific.

viewex	En	VarBin	A field whose contents change depending on the file_type field. For graphics, for example, this field will contain another JFIF stream, which is a medium-resolution (512 x 512 pixel) version of the image. The I-Piece which handles the file is responsible for determining and interpreting the contents of this field.

4. Indices

The definition of indices in a relational database is exceedingly important for access speed. Thus, for the TeleScope database, an index should be defined for most major access methods to a table, since speed of access was the most important criteria in this design.

access_history

Field(s)	Duplicates
record_id	Yes
user_name	Yes
access_time	Yes

editorial

Field(s)	Duplicates
record_id	No
category	Yes
city	Yes
country	Yes
date_created	Yes
date_entered	Yes
file_name	Yes
file_type	Yes
paper_clip	Yes
state	Yes
transmission_service	Yes
transmission_name	Yes

keywords

Field(s)	Duplicates
keyword	Yes

record_id	Yes
thumbnails	
Field(s)	Duplicates
record_id	No
users	
Field(s)	Duplicates
user_name	No
viewex	
Field(s)	Duplicates
record_id	No