SYSTEM ADMINISTRATOR'S GUIDE FOR STAR TRACKER™

Creación de una base de datos y definición de tablas en Access 2 mediante ODBC y una versión superior de Access

StarTracker puede acceder a algunas bases de datos relacionales mediante ODBC, sin embargo, **funciona directamente tan solo sobre Access 2.x (no en versiones superiores.)** Para realizar un diseño de BD accesible directamente por StarTracker, una posibilidad es realizarlo utilizando el entorno que ofrece Access 2.x; dada la dificultad para conseguir esta versión de Access, una solución es realizarlo mediante ODBC y una versión superior de Access. En este documento se describe la segunda posibilidad: Utilizando ODBC para crear la base de datos (primera sección); las tablas son creadas mediante una versión superior de Access (segunda sección).

1. *Creación de una base de datos Access 2.x*

Crearemos una base de datos Access 2.x vía ODBC mediante la aplicación *ODBC*, accesible desde el *Panel de control* del apartado *Configuración* del menú *Inicio* de Windows. En esta aplicación, seleccionamos la pestaña *DSN de sistema* (ver figura 1). Debemos introducir un nuevo origen de datos, para ello se ha de pulsar el botón *Agregar*.

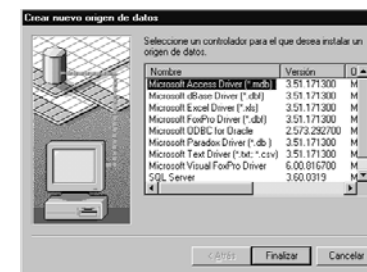Figura 1. Orígenes de datos de sistema.

Figura 2. Selección del controlador del origen de datos de sistema.

A continuación aparece la ventana de selección del controlador para el nuevo origen de datos (ver figura 2). Hemos de seleccionar el controlador correspondiente a Access (*Microsoft Access Driver (*.mdb)*) y pulsar el botón *Finalizar*. Así accedemos a la pantalla donde hemos de introducir los datos del origen de datos: nombre y descripción de la base de datos que vamos a crear (ver figura 3).
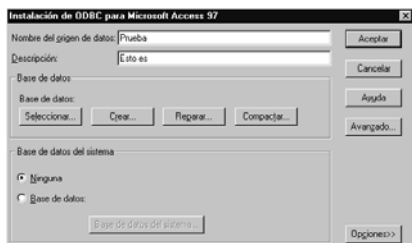

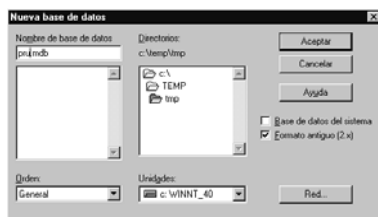Figura 3. Nombre y descripción del origen de datos de sistema.

Figura 4. Fichero y formato del origen de datos de sistema.

Al pulsar el botón Crear, podemos definir el fichero donde se almacenará la base de datos y su formato (ver figura 4). Hemos de seleccionar *Formato antiguo (2.x)*, introducir el nombre del fichero, seleccionar el directorio donde queremos guardarlo y pulsar el botón *Aceptar*.

Figura 5. Nuevo origen de datos de sistema.

Si todo ha ido correctamente, se nos indica mediante un mensaje y, tras validarlo, volvemos a la pantalla de la figura 3. Debemos pulsar *Aceptar*, para acceder a la pantalla de la figura 5, donde ya se puede ver el nuevo origen de datos. Para acabar basta con pulsar el botón *Aceptar* y ya tendremos el origen de datos de sistema creado en el directorio que hayamos indicado.

2. *Definición de tablas para Access 2.x*

Una vez definido el origen de datos de sistema en Access 2.x (ver punto anterior), podemos acceder a él desde el entorno de trabajo de una versión superior de Access para crear las tablas que necesitemos.

En la versión de Access de que dispongamos definiremos las tablas normalmente; también podemos definir los datos incluidos en ellas. Guardaremos la definición en una nueva base de datos.

Para cada tabla que deseemos incluir en la base de datos Access 2.x, estando en el entorno de nuestra versión de Access, la seleccionamos y, pulsando el botón derecho del ratón sobre ella, escogemos la opción *Exportar* del menú de operaciones (ver figura 6).

Figura 6. Exportación de una tabla Access.

A continuación seleccionamos el nombre de la base de datos Access 2.x como destino para almacenar la tabla a exportar (Ver Figura 7).

Figura 7. Selección del lugar de almacenamiento de una tabla Access.

Al pulsar el botón *Guardar* nos ofrece la opción de exportar sólo la definición de la tabla o bien la definición y sus datos (ver figura 8). También nos permite cambiar el nombre a la tabla que exportamos. Si la tabla ya existe podemos reemplazarla con la nueva versión.

Figura 8. Selección de los elementos a exportar.

Deberemos realizar las operaciones descritas para cada una de las tablas a exportar.

Si abrimos la base de datos Access 2.x desde nuestra versión de Access, podemos consultarla, también nos permite introducir o modificar datos, sin embargo no podemos modificar el diseño realizado (ni siquiera eliminar tablas).

Por tanto, ya que necesitaremos hacer cambios en el diseño, es recomendable **trabajar siempre sobre la base de datos de la versión superior de Access** y exportar cualquier cambio en los datos o en el diseño a Access 2.x siguiendo el procedimiento descrito.

Nota IMPORTANTE:

StarTracker usa varias tablas internas para sus operaciones, sin embargo, **basta con crear las tablas de hechos y dimensiones**, y configurar adecuadamente el fichero STARTRAK.INI para que el resto de tablas se creen automáticamente.

SYSTEM ADMINISTRATOR'S GUIDE FOR STAR TRACKER™

OVERVIEW

Star Tracker has been developed as a tool for answering real business questions in the terms that businesses find most useful. While most database reporting and query tools can do an adequate job of formulating simple queries and reports, they often fall short in their ability to produce the meaningful and sophisticated business metrics and ratios that can be extracted from large, complex databases.

The enormous quantities of transaction-level data from point-of-sale and banking systems, combined with low-cost high-capacity relational database servers introduces a new source of business information calling for new, highly sophisticated analytical techniques. Star Tracker supplies these techniques, and is specifically designed to be used for analyzing extremely large databases.

About the System Administrator's Guide

This *System Administrator's Guide for Star Tracker* is intended for the DBA or system administrator who will be setting up the environment in which Star

Tracker is used, as well as for the business analyst who wants to explore in detail the inner workings of Star Tracker. A companion document, the *User's Guide for Star Tracker*, covers Star Tracker's windows, menus, and controls, and contains examples of use.

This *System Administrator's Guide* contains the following sections:

Star Tracker Architecture covers the Star Tracker's client/server relationships and the components that comprise the system.

Star Tracker Installation covers installation of the Star Tracker software on a client PC, and how to configure the serving database to support the system. A sample STARTRAK.INI file is presented in its entirety.

STAR TRACKER ARCHITECTURE

This section describes Star Tracker's architecture in a client/server relationship.

System Overview

Star Tracker is a PC tool that runs in conjunction with a relational database management system (DBMS). The tool is designed to run in a PC client under Windows 3.1 or later, and Windows 95. The DBMS may reside on a network server, or be colocated in the PC with the Star Tracker client application. The illustration in Figure E.1 shows the important components of Star Tracker in a typical client/server configuration.

Connectivity between the client application and server database is typically provided via a LAN using Microsoft's Open Database Connectivity (ODBC) software on the client side, and the DBMS vendor's ODBC-compliant gateway on the server side. ODBC server software is available for most major relational database servers and Star Tracker explicitly supports Red Brick, Oracle, Sybase, and Informix. As an alternative, a PC-compatible serving database, such as MS Access, may be colocated in the PC with the client application.

As shown in the illustration in Figure E.1, the following components are required for the operation of Star Tracker.
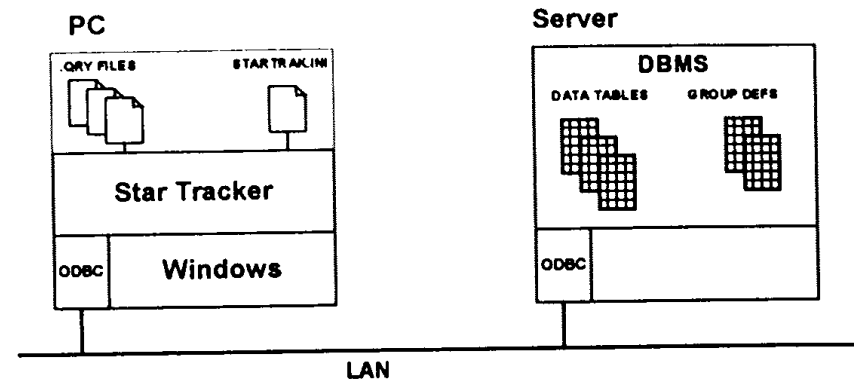

FIGURE E.1

Star Tracker client/server components.

Client Components

Star Tracker client software: This software is installed as a typical Windows application in the client PC.

ODBC Client Software: Microsoft ODBC software must be installed in the client PC for client/server installations. ODBC is not required if Microsoft Access is being used as the database in a non-networked PC.

STARTRAK.INI file: The STARTRAK.INI file contains parameters needed by ODBC, and also contains database table and field definitions. This file is added to the client PC at installation time by the System Administrator. It is located in the client's STARTRAK directory.

Saved Query files: Saved Query files (.QRY files) contain predefined report definitions that Star Tracker can run from the client machine. Saved Queries are automatically created when a user saves a modified or newly created report, and they can also be independently loaded by the System Administrator to allow the end user to run reports without having originally created them. Saved Query files are located in the client's STARTRAK directory.

Server Components

Database Management System (DBMS): This is an ANSI SQL–compatible relational database management system, such as Red Brick, Oracle, Sybase, or Informix.

ODBC Server Software: ODBC server software is required. In some cases this will be colocated with the DBMS, and in some cases this may be located in the PC as gateway compatibility software.

Data Tables: These are the DBMS tables to be queried by Star Tracker. They are classified by their contents as either *dimension* tables or *fact* tables, and must be capable of being joined in a star join schema.

Group Definitions Tables: These tables reside in the DBMS and contain definitions of Star Tracker *groups* that can be shared by multiple Star Tracker users. There must be a group definition table associated with each dimension table in the star join schema(s).

STAR TRACKER INSTALLATION

This section describes the installation of Star Tracker on the client system. It also describes in detail the STARTRAK.INI file and the contents of the Group Tables in the DBMS.

Client Software Installation

All of the Star Tracker components required for the PC client are contained on Star Tracker installation disks or on the Star Tracker CD-ROM. Upgrades to Star Tracker software are available on the author's home page: http://www.rkimball.com.

Running Setup

To install Star Tracker, place the CD-ROM included with this book into your CD-ROM drive. From the Windows Program Manager, select **Run** from the **File** menu. Assuming that your CD-ROM drive is drive D, enter the command line:

D:\SETUP

Then click the OK button. This will launch the SETUP program.

Unless you specify otherwise, the setup program will create a directory called STARTRAK on your hard disk in which the application and its supporting files will be installed.

Star Tracker is a Visual Basic program. If you do not already have Visual Basic 3.0 installed on your computer, the Setup Program will install several .DLL files and .VBX files in your STARTRAK directory required for running Visual Basic programs. To uninstall Star Tracker, simply delete the STARTRAK directory and all its contents.

The setup program will also install a STARTRAK.INI file in your WINDOWS directory. This file contains database descriptions. Consequently, it must be customized to describe specific databases you will be accessing with Star Tracker. This customization process is discussed in a later section of this guide. The STARTRAK.INI file supplied with the system contains descriptions needed for accessing all the databases described in this book.

TUTORIAL DATABASE

Star Tracker installation disks contain a small tutorial database (ORDERS.MDB), which is referenced in *the User's Guide* (Appendix D). This database uses a runtime version of Microsoft Access, also included on the installation disks. You do not need to install ODBC in order to use this tutorial database. The CD-ROM version of Star Tracker supplied with this book contains all of the databases described in the book. These databases, as well as the ORDERS database, reside on the CD-ROM. A local Access database will be created automatically by Star Tracker to house the auxiliary files that Star Tracker needs.

Customizing the STARTRAK.INI File

The STARTRAK.INI file contains parameters Star Tracker needs to find and interpret database contents. This section describes each section of the STARTRAK.INI file. The final section of this *System Administrator's Guide* contains a complete STARTRAK.INI file illustrating all parameter uses.

It is a text file located in the STARTRAK directory. The STARTRAK.INI

file contains a header section followed by one or more database sections. Each database section can contain one or more database family sections. A database family must define a star join schema containing one fact table and one or more dimension tables:

```
[header section]
[database section]
        [family section]
                family name
                fact table name
                fact table field definition(s)
                        . . .
                dimension table definition(s)
                        . . .
                time dimension table name
        [family section]
                        . . .
[database section]
```

Each line in the STARTRAK.INI file follows the same syntax of label-colon-space-parameter, for example:

Fact Table Caption: Detergents Facts

Any line in the file may be commented out by preceding the label with the keyword "Comment".

Header Section

The Header Section appears first in STARTRAK.INI, and contains the following parameters:

Date: *yymmdd*
Time: *hhmm*
Query Path: *pathname*
Default Font: *fontname*
Private Group User Name: *username*
ODBC database: *database_name*
ODBCSRV: *server_name*

ODBCDSN: *ODBC DSN*
ODBCDBQ: *default_database_name*
ODBCUID: *user_id*
ODBCPWD: *password*

yymmdd: The date on which the .INI file was last modified. (not automatic)
hhmm: The time at which the .INI file was modified. (not automatic)
pathname: The directory path to the directory containing Star Tracker's .QRY saved query files.
fontname: The name of the default font used to print Star Tracker reports.
secret: The enabling password supplied to your organization to allow Star Tracker to access ODBC databases. Of course, it is not literally "secret."
username: The user name for this workstation that will be used by Star Tracker to identify and view private constraint definitions. The user name Public is used to make public accessible constraint definitions.
database_name: Default value of ODBC database name for the Login dialog.
server_name: Default value for ODBC server name for the Login dialog.
ODBC DSN: Default value for the ODBC DSN parameter for the Login dialog.
default_database_name: Default value for ODBC database for the Login dialog.
user_id: Default value for ODBC User ID for the Login dialog.
password: Default database logon password, normally omitted. User will be prompted if this is omitted.

Database Section

The .INI file may contain one or more database sections. Each database section starts with the following three parameters, which may be followed by multiple family sections:

Database Type: *type_name*
Database Path: *path_name*
Database Name: *database_name*
Allow Drill Across: Yes / No
Single Dimension Display: *Yes / No*
Auto Pretty Print Field Names: Yes, **Abbreviations:** SKU, ID, PO, HQ, KEY
type_name: Database brand name: **ORACLE, ACCESS, REDBRICK, SYBASE, INFORMIX**

path_name: DOS pathname of the database if local; otherwise **null**.

database_name: Database file name if local, database name if server.

Allow Drill Across enables the ability to drill across between fact tables. The fact tables must be on the same DBMS. Single Dimension Display affects the formatting of the depiction area. Schemas with more than six dimensions will use the single-dimension display mode regardless of this setting. Auto Pretty Print Field Names affects the capitalization of names on the screen. Every word token will start with an initial capital letter. Words can be made all capitals by declaring them as abbreviations, as in the example above.

Family Section

Syntax Notes: In the following section:

. . . means multiple instances allowed.

[ ] means optional parameter.

Each database section may contain one or more family sections. Each family describes a group of tables that comprise a star join schema—one fact table, and one or more dimension tables. The same table may appear in multiple families. For example, a PRODUCTS table might appear in a family used for retail sales reporting and for manufacturing.

To minimize end user confusion, each family is listed as a separate database in Star Tracker's Database Finder dialog. Each family section contains the following parameters:

Family: *family_name*
Fact Table Name: *fact_table_name*
Fact Table Caption: *fact_table_caption*
Fact Table Additive Field: *additive_ field_name*, **format** = *fac_format_ template*
   [. . .]
[**Calculation:** {*calculation_name*} = {*expression*}, **format** = *calculation_ format_template*]
   [. . .]
Dimension Table Name: *dim_table_name*, **Dimension Key:** *dim_key*,
     Fact Key: *fact_key*, [**Level Field:** *level_ field_name*],

     Group Table: *group_table_name*, [**protect**: *protected_field_ name* [, . . .]]
[. . .]
Date Field: *date_ field_name*, **table name** = *table_name*, **type** = *field_ type*,
     format = *date_ format_template*
Time Dimension Table Name: *time_table_name*

Note: The third, fourth, and fifth parameters (Fact Table Additive Field, Calculation, and Dimension Table Name) can be repeated as many times as necessary. The Dimension Table Name parameter must be present. The other two are optional, although the database will not be very useful without some additive facts.

family_name: Name for the family, used in the Database Finder dialog.

fact_table_name: SQL name of the family's fact table.

fact_table_caption: Caption to be used for the fact table in the Reporter main window.

additive_field_name: SQL field name of *additive* fact table field.

fact_format_template: Visual Basic format template for displaying data from this field in the Reporter's results spreadsheet.

database_name: Database file name if local, database name if server.

calculation_name: Name for "calculated column" in results table.

expression: Numeric expression definition consisting of result column names and arithmetic operators.

calculation_format_template: Visual Basic format template for displaying data from this calculated field in the Reporter's results spreadsheet.

dim_table_name: SQL name of dimension table.

dim_key: SQL field name of dimension table key used for joining this dimension table to the fact table.

fact_key: SQL field name of fact table key used for joining the fact table to this dimension table.

level_field_name: SQL field name of fact table field used to identify levels for aggregations.

group_table_name:: SQL table name of table containing group definitions (i.e., TIME_GP).

protected_field_name: SQL field name(s) of fields that have browse protection.

date_field_name: SQL name of field to be date-type translated.

table_name: SQL name of table containing field to be date-type translated.

> *date_format_template:* Visual Basic date format template of translation result.
>
> *time_table_name:* SQL name of time dimension table.

Group Tables

Each dimension table in the database must have a corresponding group table into which Star Tracker will place group values created for report definitions. The name of group tables must be the same as the name of the dimension table, postfixed by the string "_GP". Thus, if you have a dimension table named TIME, Star Tracker will automatically create a table named TIME_GP and will place an entry for the default empty group with the name "All Times".

Dummy Table

A table called DUMMY is required in order to support certain SQL constructs. This table will be created automatically by Star Tracker if it is not present in the database.

Studies Table

A table called STUDY_DICT is required in order to support Star Tracker's use of behavioral studies. This table will be created automatically by Star Tracker if it is not present in the database. It is initially empty. Entries are made in this table when the user defines studies. The studies themselves are additional tables named by the user when the studies are created.

Aggregate Map Table

A table called AGGREGATE_MAP is required in order to support Star Tracker's automatic aggregate navigation. This table will be created automatically by Star Tracker if it is not present in the database. It is initially empty. The administrator interested in using this facility should look at the Aggregate Map table supplied with the ORDERS database to see how it is filled in. This is a new facility just added to Star Tracker. Current documentation for aggregates will be maintained on the web at http://www.rkimball.com.

EXAMPLE STARTRAK.INI FILE

The following example shows the contents of a typical STARTRAK.INI file.

Date: 940509
Time: 0813
Query Path: C:\STARJOIN\
Default Font: Utopia
Default ODBC database: testdb
Default ODBCSRV: dsqueryip
Default ODBCDSN: RB
Default ODBCDBQ: testdb
Default ODBCUID: system
Comment ODBCPWD: secret
Comment Autostart: stj0025.qry

Database Type: REDBRICK
Database Path: null
Database Name: SUDS
Allow Drill Across: No

Family: Suds
Fact Table Name: FACT
Fact Table Caption: Detergents Facts
Fact Table Additive Field: PSS, format = 0
Fact Table Additive Field: PUNITS, format = 0
Fact Table Additive Field: UNITS, format = 0
Fact Table Additive Field: UNITSQ, format = 0
Fact Table Additive Field: SPMU, format = 0
Fact Table Additive Field: SPMEQ, format = 0
Fact Table Additive Field: DOL, format = $#,##0
Fact Table Additive Field: SPMDOL, format = $#,##0
Fact Table Additive Field: DIS, format = 0
Fact Table Additive Field: CAD, format = 0
Fact Table Additive Field: MAD, format = 0
Fact Table Additive Field: LAD, format = 0
Fact Table Additive Field: ADISAD, format = 0
Fact Table Additive Field: APPU, format = 0
Fact Table Additive Field: ANPU, format = 0

Dimension Table Name: MARKET, Dimension Key: MKTKEY; Fact Key: MKTKEY, Group Table: Market

Dimension Table Name: PRODUCT, Dimension Key: PRODKEY; Fact Key: PRODKEY, Group Table: Product, protect: PRODDESC, protect: PRODKEY

Dimension Table Name: PERIOD, Dimension Key: PERKEY, Fact Key: PERKEY, Group Table: Period

Time Dimension Table Name: PERIOD

Database Type: ACCESS

Database Path: C:\ACCESS\

Database Name: ORD-ACCT.MDB

Allow Drill Across: Yes

Family: Orders

Fact Table Name: Order Facts

Fact Table Caption: Orders

Fact Table Additive Field: Quantity Ordered, format = #,##0

Fact Table Additive Field: Extended Standard Price, format = $#,##0.00

Fact Table Additive Field: Extended Invoice Price, format = $#,##0.00

Fact Table Additive Field: Manufacturer Discount, format = $#,##0.00

Fact Table Additive Field: Quantity Discount, format = $#,##0.00

Fact Table Additive Field: Gross Invoice, format = $#,##0.00

Fact Table Additive Field: Shipping Charge, format = $#,##0.00

Fact Table Additive Field: Invoice Adjustments, format = $#,##0.00

Fact Table Additive Field: Net Invoice, format = $#,##0.00

Fact Table Additive Field: Extended Standard Cost, format = $#,##0.00

Fact Table Additive Field: Margin Dollars, format = $#,##0.00

Fact Table Additive Field: Tax Dollars, format = $#,##0.00

Calculation: {Average Standard Price} = {Extended Standard Price}/{Quantity Ordered}, format = $#,##0.00

Calculation: {Average Invoice Price} = {Extended Invoice Price}/{Quantity Ordered}, format = $#,##0.00

Calculation: {Average Standard Cost} = {Extended Standard Cost}/{Quantity Ordered}, format = $#,##0.00

Calculation: {Margin Percent} = 100*({Margin Dollars}/{Extended Standard Price}), format = 0.0%

Calculation: {Discounts} = {Manufacturer Discount}$SH{Quantity Discount}, format = $#,##0.00

Calculation: {Discount Percent} = 100*(({Manufacturer Discount}+{Quantity Discount})/{Extended Standard Price}), format = 0.00%

Calculation: {Adjustment Percent} = 100*({Invoice Adjustments}/{Extended Standard Price}), format = 0.00%

Calculation: {Average Tax Rate} = 100*({Tax Dollars}/{Net Invoice}), format = 0.000%

Dimension Table Name: time, Dimension Key: time_key, Fact Key: time_key, Group Table: time

Dimension Table Name: item, Dimension Key: item_key, Fact Key: item_key, Group Table: item, protect: item_key

Dimension Table Name: customer, Dimension Key: customer_key, Fact Key: customer_key, Group Table: customer

Dimension Table Name: program, Dimension Key: program_key, Fact Key: program_key, Group Table: program

Date Field: full date, table name = time, type = Text Date, format = mmm, yyyy

Time Dimension Table Name: time

Family: Consumer Purchase

Fact Table Name: Consumer Purchase

Fact Table Caption: Consumer Purchase

Fact Table Additive Field: Purchase Qty, format = #,##0

Fact Table Additive Field: Purchase Dollars, format = $#,##0.00

Calculation: {Average Retail Price} = {Purchase Dollars}/{Purchase Qty}, format = $#,##0.00

Dimension Table Name: time, Dimension Key: time_key, Fact Key: time_key, Group Table: time

Dimension Table Name: item, Dimension Key: item_key, Fact Key: item_key, Group Table: item, protect: item_key

Dimension Table Name: customer, Dimension Key: customer_key, Fact Key: customer_key, Group Table: customer

Date Field: full date, table name = time, type = Text Date, format = mmm, yyyy

Time Dimension Table Name: time