IFAST Database Design Document

IFAST information critical to the secretariat, administrator and website is stored in a series of databases. This information is used to manage IRM and SID assignments, bill for services, and trouble shoot problems. Much of the content on the IFAST website is generated from this database on a regular basis.

This document describes the structure of the database and the purpose of each part.

Technology Notes

The databases are implemented in FileMaker Version 7. They take advantage of the ability of this version of the software to provide a high degree of separation between the presentation of information (the user interface) and the content itself.

FileMaker provides very powerful capabilities for searching for data, automating the user interface and other capabilities (such as generation of web pages), sorting data and many other functions. Invisible to users of the software much of the time are many facilities to ensure the integrity of the data. Rarely does a computer crash result in the corruption of data. And, even when a database is corrupted FileMaker can usually recover all the data (except for the record being entered or updated at the time of the crash.

These databases are designed to be used in a distributed fashion. Currently some are managed by the secretariat and some by the administrator. The database manager is the only person who can update the database. If others update their copy of a database their changes will be lost when the authoritative manager circulates an update. This is a minor restriction on the usage of the database but allows operation of an integrated set of files without a central database server.

Database Structure

FileMaker databases can be constructed of multiple files. Each file contains one or more database tables. Each table is composed of one or many records, and each record contains several fields, each of which contains one piece of information. Tables can be related regardless of whether they are in the same file or in separate files. The IFAST databases use all of these capabilities.

The IFAST databases are composed of multiple files that should all be in the same folder or directory. For safety, when moving new files into this folder, the FileMaker application should be closed.

Contacts (irm-billing.fp7)

Managed by• Secretariat.

This file contains the list of IFAST contacts, each of which can be classified as an invoicing contact, roaming contact, regulator or other (or multiple classifications).

This database contains only a single table. Each record represents one contact person. There are often multiple records for an organization. Exactly one of these records should be marked as the invoicing contact.

Website• This database is used to produce the Roaming Contact List page on the website.

IRM (irm.fp7)

Managed by• IRM Administrator.

This file contains the list of IRM codes. It contains one table (irm) that contains one record for each IRM that is possible to be allocated. The only time there is more than one record per IRM is in the case of unresolved conflicts.

This database contains the precise status of each IRM, particularly important during the assignment or reclamation process. It also contains a history of all significant changes to the record.

Website• This database is used to produce the IRM web page and IRM PDF file. These are generally updated once every two weeks.

SID (sid.fp7)

Managed by• SID Administrator.

This file contains the list of SID code ranges and also conflicts.

There are two tables. One (SID) contains the list of SID code ranges and the other (SID Conflicts) contains ranges of SID conflicts.

Website• This file is used to produce the list of assigned SID codes (one version sorted by country, one numerically) as well as the list of SID conflicts. These files are updated whenever new information comes to light or a new SID assignment is made (which occurs about once per year).

Invoices (invoices.fp7)

Managed by• Secretariat.

This file contains invoices for IRM codes and other items. It is composed of three tables: Invoices (one record per invoice), Invoice Items (one record per line item on an invoice) and IRMCharges (one record per IRM fee).

Invoices can be created manually or for all IRMs with fees that are outstanding or soon will be. When an invoice is overpaid or underpaid, the database will help create line items

to include the invoice adjustments. The connection with the IRM records mean that the IRM administrator can be informed of all payments that affect IRM codes [this part not yet implemented].

Website• Invoicing information is not published.

User Interface (IFAST-Central.fp7)

Managed by• Database Administrator.

This file is not a database in the normal sense, but provides a central user interface and a great deal of intelligence (scripts). From this one file, all IFAST information can be accessed.

The file does contain two tables. One of them (g) contains only one record with many fields. These contain internal variables for calculations and some settings information. For example, the number of days ahead of present to consider an IRM almost expired is defined here.

The advantage of segregating the user interface is not only allowing one window to access all IFAST data, but also allowing much easier updating of the user interface. Sending this one file to the secretariat can provide significant new functionality. Prior to this, updating the user interface required that the old file was emailed, data extracted from the old file and then imported into the new file, and then returned to the secretariat.
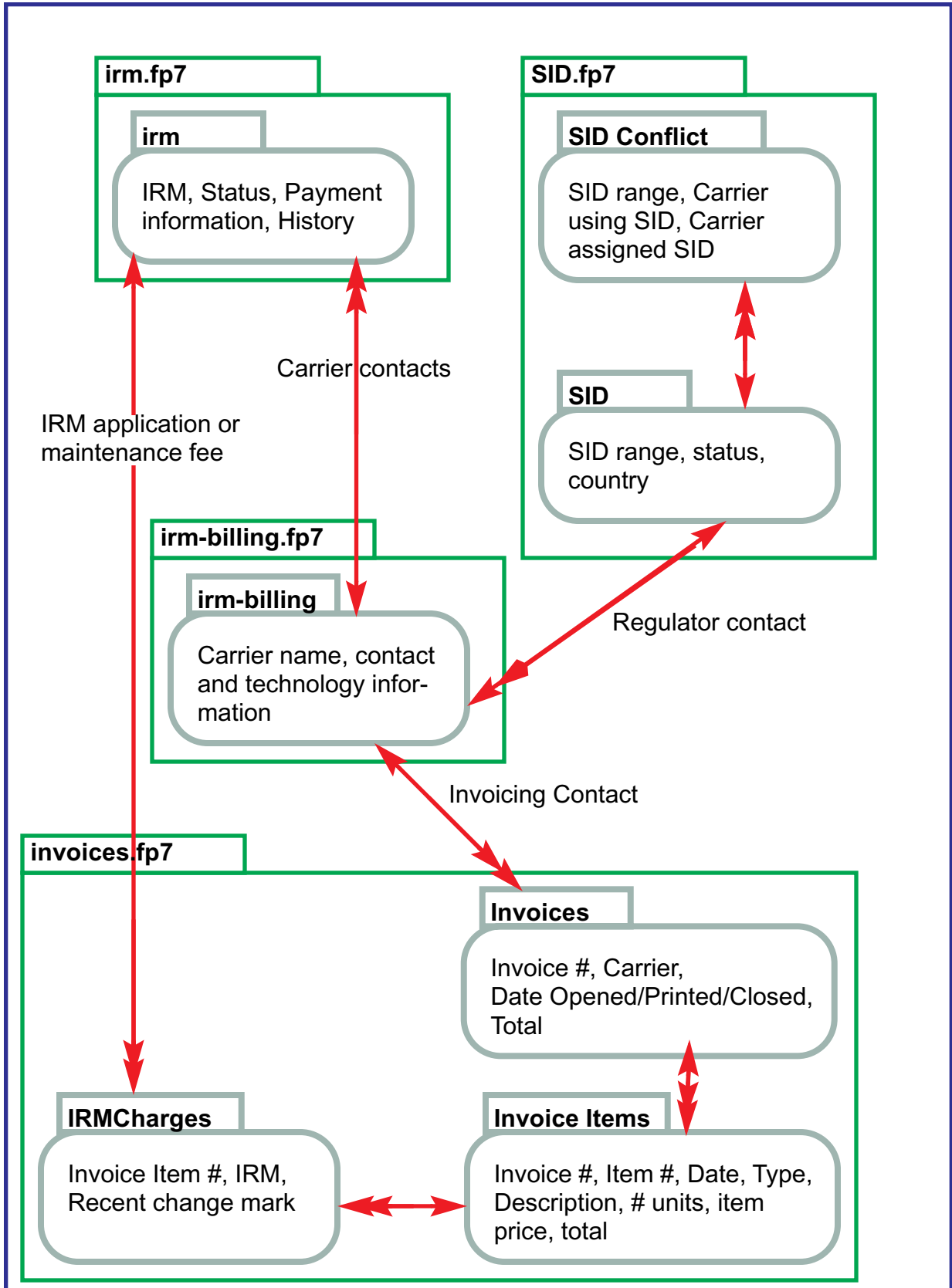
Website• This information is not published.

Entities and Relationships

Databases are generally defined as entities (tables) and relationships between them. The proper normalization of the data structure ensures that data does not have to be dupli-cated, eliminating the possibility of inconsistencies. For example, by separating the carrier contact information from the IRM information, it ensures that the name of the IRM con-tact does not have to be placed in every IRM record associated with a carrier, it allows multiple people to be associated with one carrier, and it makes updating information for a contact more efficient and less error prone.

The graphical convention used is that entities are the blue-green rounded rectangles and the relationships are arrows. The double head means many and the single head means one . So, for example, the relationship between irm and IRM Charges means that one IRM may be associated with zero, one or more charges (e.g. the initial application fee and several annual maintenance fees).

Figure 1: IFAST Database Entities and Their Relationships

irm.fp7

irm

IRM, Status, Payment information, History

SID.fp7

SID Conflict

SID range, Carrier using SID, Carrier assigned SID

SID

SID range, status, country

Carrier contacts

IRM application or maintenance fee

irm-billing.fp7

irm-billing

Carrier name, contact and technology information

Regulator contact

Invoicing Contact

invoices.fp7

Invoices

Invoice #, Carrier, Date Opened/Printed/Closed, Total

IRMCharges

Invoice Item #, IRM, Recent change mark

Invoice Items

Invoice #, Item #, Date, Type, Description, # units, item price, total

Database Functionality

The IFAST Central database not only allows the storage and retrieval of data, it provides a large number of functions that have been custom designed to support IFAST operations.

User Interface Functionality

The user interface functionality aims for a consistent look and feel through common user interface elements. The major elements are:

1. Tabs. Clicking on a tab reveals a page containing one of the major types of data: Contacts, IRM, SID, Invoices, Countries, Settings (Configuration) and Tools. The tabs are color coded, and all pages associated with them use a color scheme based on this color.
2. Sub-Tabs. Most pages have a second row of tabs lower on the page. These provide different views of the type of data selected with the main tab. The Contacts, IRM and SID tabs have sub-tabs that allow a List view (multiple records) or a Detail view (much more information about a single record. The Invoices tab provides three sub-tabs: List (multiple invoice view), Invoice (details for a single invoice) and Item (details for a single invoice line item, including the list of associated IRM codes, if applicable).
3. Multiple Windows. Clicking on a tab or sub-tab with the Alt/Option key depressed opens up the chosen information in an additional window. This allows the user to have some information on the screen for reference, while working on completely different information.
4. Record Insertion/Deletion. A large Green Plus sign is used to add a record of the type indicated by the active tab, and a large Red X is used to indicate deletion of the currently selected record.
5. Navigation. Triangles pointing towards the right are used to navigate towards related data. They are color coded using the color scheme of the destination For example, from the Countries tab a green triangle beside the IRM count for each country navigates towards the IRM codes associated with that country. Similarly, a blue triangle navigates towards the SID records for that country. Clicking on a triangle shows only the associated data. A dark blue triangle is used to go from the selected record in List view to the same record in Detail view.
6. Sorting. Column headings are programmed to allow convenient sorting. Clicking on a column sorts based on that column. For example, clicking on the Carrier column heading in the IRM List view sorts the IRM records by carrier name, alphabetically. The column heading turns Red, Bold and Underlined to indicate this. Reverse sorts are obtained by depressing the Shift key while clicking the column heading. The column heading turns Blue, Underlined and Italic to indicate this. Unsorting the data can be accomplished by clicking twice in the same fashion.

Invoice Functions

Some special functions are available to simplify the preparation of invoices:

1. Print New prints all invoices that have been generated, but never printed.

2. Generate Invoices for all Expired IRMs prints invoices for all IRM codes that have expired (or soon will), but for which invoices have not been generated yet.
3. Print It prints the one selected invoice.
4. Pay It accepts payment information for the invoice, and makes sure that an invoice is not closed until a zero balance is reached. The user is assisted in correcting problems, e.g. with a small credit in the case of a minor underpayment on a large invoice.
5. Email Administrator re: Recently Paid IRMs sends an email to the IRM administrator with a list of IRM codes which have recently been paid for.

IRM Functions

Special functions are provided to manage the IRM resource:

1. Renew All — Sets the renewal date for selected IRMs to one year beyond the present, and ensures that the status reflects that the IRM payments are up to date.
2. Upgrade All — Upgrades the status of a number of IRM codes as they go through the application process.
3. Find Avg. Expiry — Finds the average expiry date for a group of IRM codes. This can be used to establish a common expiry date for all IRMs held by the same company.
4. Clip — Puts information about a group of IRM codes on the clipboard.
5. Find Free Blocks — Finds consecutive IRM codes of a certain size. This helps satisfy requests from carriers that want a block that are together.
6. Export Carrier IRM Usage — Produces a file, suitable for import into a spreadsheet, that shows the IRM usage (number of codes assigned) for each carrier.

IFAST Participant Notification

IFAST participants must be notified when the status of IRM and SID code changes. IRM updates are sent regularly every two weeks and SID changes whenever required. The functionality includes:

1. Updating the status of records that are in the process of being assigned or reclaimed.
2. Producing an email that contains all IRM codes that are being assigned or reclaimed, and presenting it for review and possible modification to the user.
3. Producing the web pages (see Website Content Creation , below) with IRM or SID information.
4. Creating a PDF file (for IRM information only).
5. Emailing the notification to all IFAST participants.
6. Emailing the updated web pages to the website administrators.
7. Emailing the updated database to the secretariat.

Website Content Creation

Much of the content on the IFAST website is generated from the database. The database scripts produce fully functional web pages and, where applicable, initiates an email to the correct people. The web content that can be produced upon demand, or as part of some other functions, includes:

1. IRM list (html format). All IRM s in the application process or in the process of being reclaimed are highlighted. Consecutive IRMs with identical assignment status are merged together to reduce the size of the page.
2. IRM list (pdf format).
3. SID list, sorted by country name.
4. SID list, sorted by SID number.
5. SID conflict list.
6. Roamer contact list (not yet posted on the website due to security concerns).