

User's Guide for Print Utilities

Tze Khiong Lee

Mallinckrodt Institute of Radiology
Electronic Radiology Laboratory
510 South Kingshighway Boulevard
St. Louis, Missouri 63110
314/362-6965 (Voice)
314/362-6971 (FAX)

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This guide provides instructions for building files which are required by PRINT_MGR. These files include a Print Database File, a Print Files, an Index File, and an Icon File.

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1 Introduction

This document describes procedures for building the files which are required for running the Print Manager. The Print Manager requires two separate databases, a Print database, and an Icon database. The Print database is similar to the databases used by the imaging software, and contains the images for printing. The Icon database maintains the icons (limited images) of images that can be displayed by the Print Manager to represent the images stored in the Print database. The following diagram shows the compositions of the two databases, and how they are related.

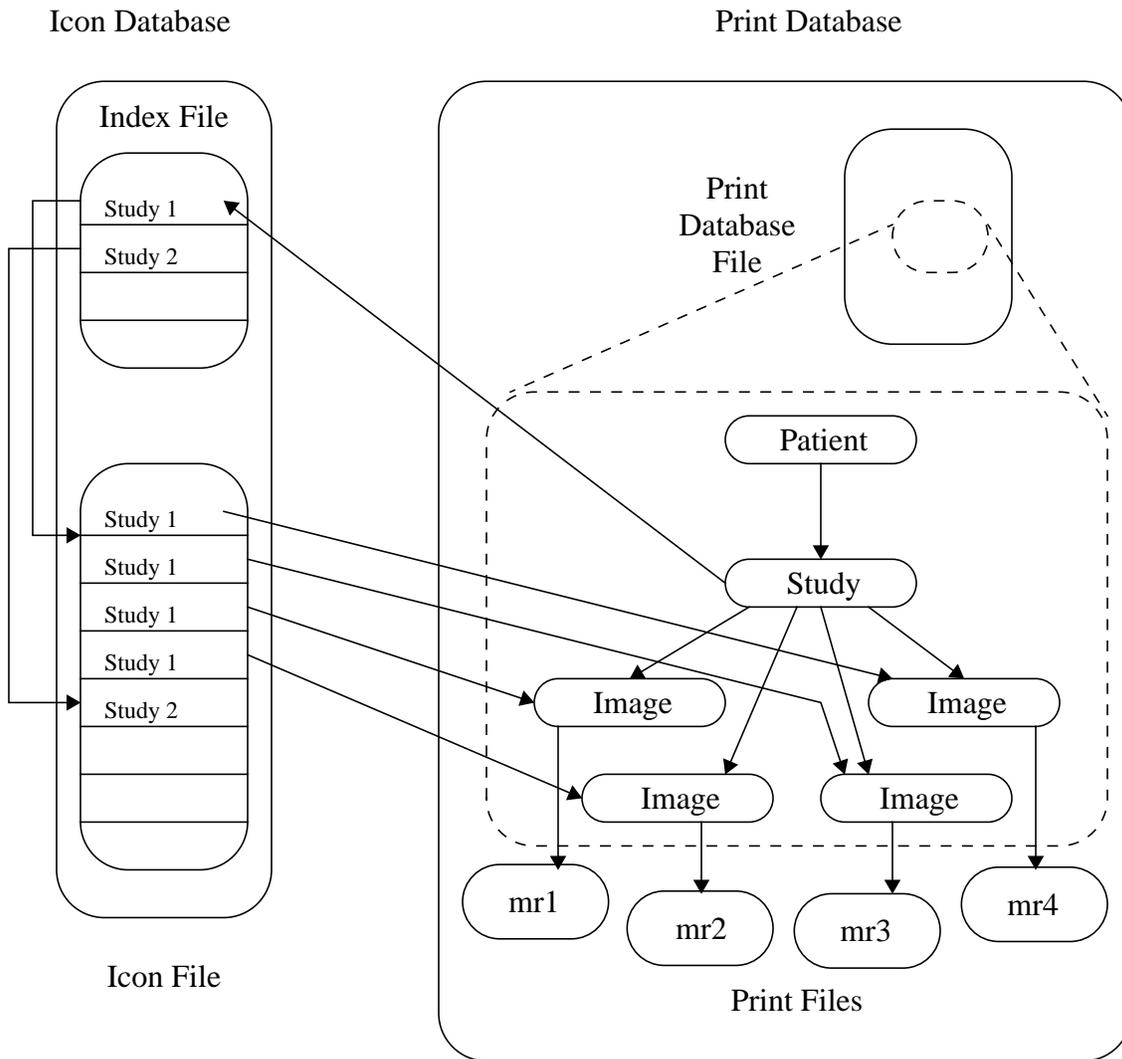


FIGURE 1. Relationship between Files used by Print Manager

The Print database consists of a database file and several print files. The database file has complete information on all four levels; patient, study, series, and image. However, the Print Manager disregards the series information and groups images that belong to the same study. The actual print images are stored in separate files (one file per image) and are referenced by the database through their pathname.

The Icon database consists of a look-up table file (Index File) and an icon storage file (Icon File). In the Icon File, the icons belonging to the same study are stored together in consecutive locations of the file. Each table entry in the Index File represents one study and references the location of the study's icons in the Icon File. The table entry contains the location of the first icon of that study in the Icon File.

2 Configuring Print Directories

The script `print_layout` is used to create the directory structure assumed by the print demonstration. This script should be run once to create the directory structure. It assumes there exists a root directory for the print demonstration and creates subdirectories from the root directory. A default root is defined by the script and may be changed by the user.

3 Building Icon & Print Databases with Script Files

Two scripts have been made to automate the steps for creating all the files. They are `create_icons` and `icon_script`. The relationship between `create_icons` and `icon_script` is shown in Figure 2 below.

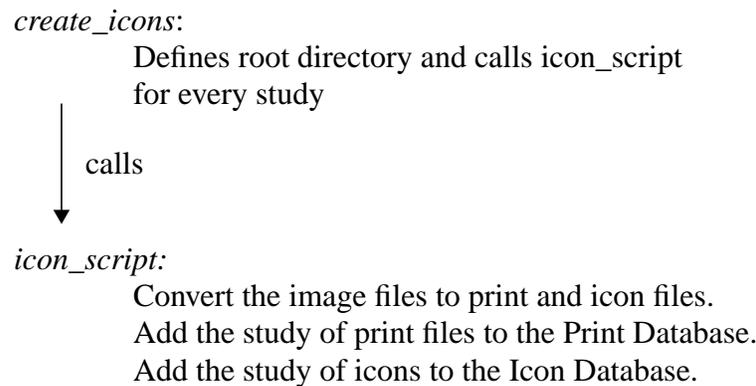


FIGURE 2. Scripts for Creating Print and Icon Files

3.1 `icon_script`

This script provides the foundation for building all the files required by Print Manager. It converts a study of images into information added to the Print database file, Index File and Icon File. The script creates an entry at the patient level and study level for each study in the Print Database. It also creates one entry at the Image Level for every image in the study. Then it adds a new entry into the Index File. Finally, for every image of the study, it adds a new entry to the Icon File.

The print files are the actual files the Print Manager will send to a print server. The Print Manager uses the icons to display representations of the images. Icons are precomputed to save time while the Print Manager is running. The icons are 64 by 64 pixels by 8 bits.

The following describes the general steps the script takes to create a new study:

1. Make new entry in Index File (using *icon_append_index*).
2. Create an 8-bit version of the image (using *dcm_map_to_8*).
3. Create print file from the 8-bit image (using *create_greyscale_module*). Information not part of the grey scale module (such as patient name) is removed.
4. Update the Print database with a new Image Level entry referencing the print file (using *create_print_entry*. This program will also create new Patient , and Study Level entries if they do not exist in the database).
5. Create a 64x64 version of the image (using *dcm_resize*).
6. Create a 64x64 8-bit icon from the 64x64 image (using *dcm_map_to_8*).
7. Put 64x64x8-bit image into Icon File (using *icon_append_file*).
8. Repeat steps 2~7 if there are more images.

3.1.1 Command Line Arguments

There are several arguments to *icon_script*. Since this script is called by another script, it is not anticipated that you will use it directly. The arguments to this script are:

1. Path name to root directory for input images
2. *Absolute* pathname to root directory for print demonstration
3. Directory name for one study. This directory should already exist as a subdirectory of the input image tree and print demonstration tree.
4. (Absolute) pathname for print database
5. (Absolute) pathname for icon index
6. (Absolute) pathname for icon file
7. One or more images that make up one study.

3.2 create_icons

This script calls *icon_script* for every study directory. It has no command line options. This script assumes default directories for the location of the input images (from the set of common images) and print images. The script prompts the user and allows the user to change these defaults.

3.3 Assumptions about image files

All image files belonging to a study must be in the same study directory, and all the study directories have the same parent directory. All image files contain complete DICOM information objects. All image files in the same study directory must have the same Accession Number as they are assumed to be part of the same study.

These scripts were written to create print files for the set of common images distributed by MIR. This assumes that the following image directories exist in the image root area and in the print root area.

- crl
- ctl
- mrl
- xrayl

Should you want to use your own set of images, the script files are not difficult to modify.