iQ-WEBX

USER MANUAL / ADMINISTRATION GUIDE

Version 6.2.3 Release INT EN 002R

Copyright © 2005 – 2010 IMAGE Information Systems Ltd.

Created by:	René Stolzmann, 2010-05-03
Last modification:	Hagen Knieling, 2010-05-06
Verified by:	Hagen Knieling, 2010-05-06
Released by:	Martin Stulz, 2010-05-06

CE 0482

IMAGE Information Systems Ltd.

GLOSSARY

ABBREVIATION	DESCRIPTION
AE	Application Entity
AET	Application Entity Title
PACS	Picture Archive and Communication System
DICOM	Digital Imaging and Communications in Medicine
DMWL	DICOM Modality Worklist
FSC	File Set Creator
FSR	File Set Reader
HIPAA	Health Insurance Portability and Accountability Act
HL7	Health Level Seven
HTML	Hyper-Text Mark-up Language
HTTP	Hyper Text Transfer Protocol
LUT	Look Up Table
PHP	PHP: Hypertext Preprocessor
NEMA	National Electrical Manufacturers Association
NTLM	(NT LanMan) is an authentication process that's used by all members of the Windows NT family of products
SCP	Service Class Provider
SCU	Service Class User
SMTP	Simple Mail Transfer Protocol
SOP	Service-Object Pair
SR	Structured Report
UID	Unique ID
UNC	Universal Naming Convention

TABLE OF CONTENT

GLOSSARY 2
TABLE OF CONTENT 3
LIST OF FIGURES 5
LIST OF TABLES 6
1 REVISION 7
2 REFERENCE DOCUMENTS 8
3 INTRODUCTION 9
4 PLATFORMS 10
5 INSTALLATION 11
6 MANAGING iQ-WEBX USER ACCOUNTS 12
6.1 Privacy Attributes 12
6.2 Creating New User Accounts 14
6.2.1 Creating Group User Accounts 16
6.3 Deleting Existing User Accounts 17
6.4 Modifying Existing User Accounts 17
7 SYSTEM CONFIGURATION 18
8 SMTP SERVER CONFIGURATION 21
9 SYSTEM JOURNAL LOG 22
9.1 Automatic Monthly System Journal Log Emails 22
9.2 Automatic Purging Aged System Journal Log 22
10 APPLICATION ENTITY TABLE 23
10.1 SCU Application Entities 25
10.2 SCP Application Entities 27
10.2.1 Modality Worklist SCP Application Entities 28
10.2.2 Query/Retrieve SCP Application Entities 29
11 HL7 APPLICATIONS (OPTIONAL) 30
12 SEARCHING iQ-WEBX DATABASE 31
13 NAVIGATING iQ-WEBX WEB USER INTERFACE 32
13.1 Login Page 32
13.2 EasyWEB Page 33
13.3 Home Page (Today's Study Page) 35
13.4 Main Menu Bar 35
13.5 Unread Studies Page 36
13.6 Browse Page 36
13.7 Study Page 37
13.8 Series Page 38
13.9 Study Notes Page 39
13.10 Structured Reports 40
13.11 Image Page (Thumbnail) 41
13.12 Image Page (Full Size) 42
13.13 Image Notes Page 43
13.14 Online Image Processing Page 44
13.15 Tools Page 45
13.15.1 Custom Data Element Coercion 45
13.15.2 Exporting Patients/Studies 47
13.15.3 Importing External Patients/Studies 48
13.15.4 Statistics Reports 49
13.15.5 Automatic Purging Archive Directories 50
13.15.6 Check Duplicate Patient IDs 52
13.15.7 Today's Log File 53
13.15.8 Upload DICOM Image 53
13.15.9 Matching ORM Message (Optional) 54
13.15.10 Database Integrity Check 54
13.15.11 Import Worklist 55
13.15.12 Live Monitor (for System Administrator only) 56
13.15.13 Patient Reconciliation 56
13.15.14 Anonymization Templates 57
13.16 Profile Page 58

13.17 Modality Worklist Page 58
13.17.1 Enter New Worklist Page 59
14 FORWARDING IMAGES 60
15 POST-RECEIVE IMAGE COMPRESSION 61
16 AUTOMATIC ROUTING 62
16.1 DICOM Image Routing 62
16.2 HL7 Message Routing (optional) 65
17 PRINTING IMAGES 66
18 JOB STATUS PAGE 67

LIST OF FIGURES

Figure 1 User Accounts Administration 14
Figure 2 Creating New User Account 14
Figure 3 Creating Group User Accounts 16
Figure 4 Modifying Existing User Account 17
Figure 5 System Configuration Page 19
Figure 6 Configuring SMTP Server 21
Figure 7 System Journal Log 22
Figure 8 Adding a New Application Entity 24
Figure 9 Application Entity Table Page 25
Figure 10 Search Remote PACS Database 27
Figure 11 HL7 Applications (optional) 30
Figure 12 Search iQ-WEBX Database 31
Figure 13 Login Page 32
Figure 14 EasyWEB Page 33
Figure 15 Home Page (Today's Study Page) 35
Figure 16 Unread Studies Page 36
Figure 17 Browse Page 36
Figure 18 Study Page 37
Figure 19 Series Page 38
Figure 20 Add Study Notes 39
Figure 21 Study Notes Page 40
Figure 22 Structured Report Page 40
Figure 23 Image Page (Thumbnail) 41
Figure 24 Image Page (Full Size) 42
Figure 25 Add Image Notes 43
Figure 26 Image Notes Page 43
Figure 27 Online Image Processing Page 44
Figure 28 Tools Page 45
Figure 29 Data Element Coercion Page 45
Figure 30 Export Patients/Studies Page 47
Figure 31 Warning Message for Importing without DICOMDIR 48
Figure 32 Statistics Report Page 49
Figure 33 Automatic Purging Archive Directories 50
Figure 34 Automatic Purging By DICOM Data Element Filter 51
Figure 35 Checking Duplicate Patient ID 52
Figure 36 Resolving Duplicate Patient ID 52
Figure 37 Today's Logfile Page 53
Figure 38 Upload DICOM Image Page 53
Figure 39 Matching ORM Message (optional) 54
Figure 40 Database Integrity Check 54
Figure 41 Import Worklist 55
Figure 42 Live Monitor page 56
Figure 43 Patient Reconciliation Page 56
Figure 44 Anonymization Templates 57
Figure 45 User Profile Page 58
Figure 46 Modality Worklist Page 58
Figure 47 Enter New Worklist Page 59
Figure 48 Forwarding Images 60
Figure 49 Compression Setting for JPEG Lossy Transfer Syntax 61
Figure 50 Automatic DICOM Image Routing 63
Figure 51 Automatic HL7 Message Routing (optional) 65
Figure 52 Printing to Remote DICOM Printer 66
Figure 53 Job Status Page 67

LIST OF TABLES

Table 1 Revisions 7
Table 2 Reference Documents 8
Table 3 iQ-WEBX User Privileges 15
Table 4 iQ-WEBX User Categories 15
Table 5 Options Specific for Group Users 16
Table 6 Application Entity Table 24
Table 7 Data Element Coercion Rule Patterns 46

1 REVISION

REVISION	DATE	AUTHOR	DESCRIPTION
001D	2010-05-03	René Stolzmann	Initial document draft
002D	2010-05-06	Hagen Knieling	Minor changes; Document verification

Table 1 Revisions

2 REFERENCE DOCUMENTS

NO.	STANDARDS	DATE	DESCRIPTION
1.	Digital Imaging and Communications in Medicine (DICOM) Version 3.0	2008	Part 1 through Part 16 of the 2008 DICOM 3.0 Standard
2.	iQ-WEBX 6.2.3 Installation Guide	2010	iQ-WEBX 6.2.3 Installation Guide
3.	Version 2.3.1 of the Health Level Seven (HL7) Standard	1999	Version 2.3.1 of HL7 specifications

Table 2 Reference Documents

3 INTRODUCTION

iQ-WEBX is a DICOM 3.0 compliant Picture Archive and Communication System (PACS) application, which consists of the following components:

- A DICOM protocol server for servicing requests for image storage, query and retrieval, forwarding, routing, printing images, and DICOM-formatted media interchange through import and export functions.
- MySQL database for managing image records and related patient, study, series information.
- Apache 2.2 HTTP server and PHP scripting engine for presenting a web-based user interface for browsing and managing database records.
- ImageMagick PHP module for displaying DICOM images through client's web browsers.
- An optional HL7 Message Listener module for receiving and sending HL7 messages via Lower-Level Transport Protocol (LLTP)

4 PLATFORMS

The following platforms are currently supported:

- Windows XP
- Windows 2003/2008 Server

To keep constant the power supply voltage we recommend the use of an uninterruptible power supply (UPS). The interposition of such a device prevents data losses and data inconsistencies that can be produced at the occurrence of fluctuations in the power supply voltage.

Furthermore, we recommend the use of up-to-date anti-virus software on the computer on which iQ-WEBX is run. The virus definitions must be updated regularly (they should not be older than 2 weeks).

5 INSTALLATION

The iQ-WEBX software can be downloaded from the following URL:

http://www.image-systems.biz/products/iq-system-pacs/server-software/iq-webx.html

Refer to the document "iQ-WEBX 6.2.3 Installation Guide" for detailed instructions about how to install/upgrade and set up iQ-WEBX software.

6 MANAGING iQ-WEBX USER ACCOUNTS

After iQ-WEBX software has been installed successfully for the first time, there are only two (2) default user accounts created for iQ-WEBX:

- The super-user ('**root**' for MySQL databases), which is the Administrator account required to administrate user accounts and set up privilege levels for all users.
- The **built-in** system user account which you have created during iQ-WEBX installation. This account is strictly for iQ-WEBX internal use, and it is not recommended to use this account to access the iQ-WEBX web user interface since it does not have any associated privilege levels.

6.1 Privacy Attributes

In order to be more compliant with Health Insurance Portability and Accountability Act (HIPAA), all patients and studies stored in the iQ-WEBX database have one of the two (2) privacy attributes below:

- Public: If a patient's privacy attribute is Public, then all studies of this patient and all images within the studies of this patient can be accessed by any iQ-WEBX user account, without any user privilege requirements. If a study's privacy attribute is Public, then all subsequent series of this study and all images within the series of this study can be accessed by any iQ-WEBX user account, without any user privilege requirements.
- Private (Default): If a patient's privacy attribute is Private, then all studies of this patient and all images within the studies of this patient can be accessed by only those iQ-WEBX user account (s) with the '**View**' privilege, or those user accounts whose Last Name and First Name stored in the user profile match with either the Referring Physician Name or the Reading Physician Name, or those group users whose Group Description matches with the Institution Name of this patient.
- iQ-WEBX users without the '**View**' privilege will not be able to access a Private patient or any study or images of the Private patient, unless the user's Last Name and First Name stored in the user profile match with either the Referring Physician Name or Reading Physician Name, or the user belongs to a User Group whose Group Description matches with the Institution Name of the patient.
- If a study's privacy attribute is Private, then all subsequent series of this study and all images within the series of this study can be accessed by only the iQ-WEBX user account (s) with the '**View**' privilege, or those user accounts whose Last Name and First Name stored in the user profile match with either the Referring Physician Name or the Reading Physician Name, or those Group Users whose Group Description matches with the Institution Name of this patient
- iQ-WEBX users without the '**View**' privilege will not be able to access this Private study or any series or images of this study, unless the user's Last Name and First Name stored in the user profile match with either the Referring Physician Name or Reading Physician Name, or the user belongs to a User Group whose Group Description matches with the Institution Name of this study.
- All patients and studies are stored as Private when they are received by iQ-WEBX. Only iQ-WEBX users with '**Modify'** privilege can change the privacy attribute of a patient or study from Private to Public or vice versa.
- Changing a patient from Private to Public will implicitly change all studies of the patient to Public, regardless of their previous settings.
- Changing a patient from Public to Private will implicitly change all studies of the patient to Private, regardless of their previous settings.

- Changing a study from Private to Public does not affect the privacy setting of the patient who this study belongs to, except when this study is the only study of the patient. The patient will also be changed from Private to Public if and only if the study being changed is the only study of that patient.
- Changing a study from Public to Private does not affect the privacy setting of the patient who this study belongs to, except when this study is the only study of the patient. The patient will also be changed from Public to Private if and only if the study being changed is the only study of that patient.

6.2 Creating New User Accounts

Only the Administrator/Super-user ('**root**' for MySQL databases) can create new user accounts, after logging into iQ-WEBX by accessing the following URL:

http://{HOSTNAME}/pacs/home.php

Where: {HOSTNAME} is the name of the machine where iQ-WEBX is installed, e.g., localhost, or the IP address of this computer. After logging into iQ-WEBX successfully, the Administrator ('**root**' for MySQL databases) can click on the 'User Administration' link from the menu bar to enter the User Administration page as illustrated below:

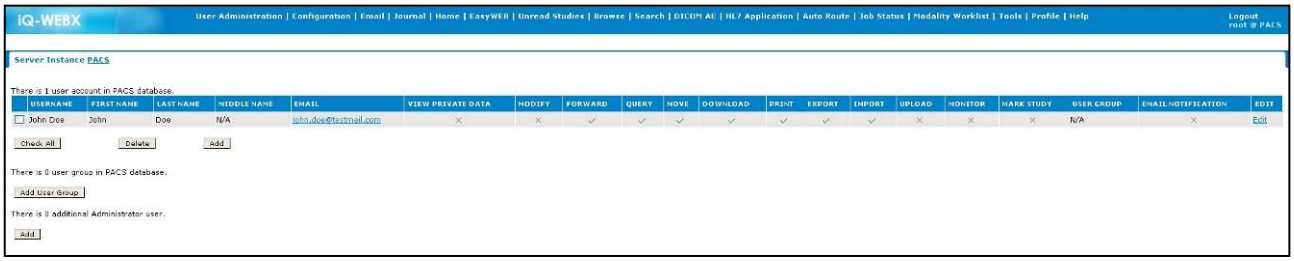

Figure 1 User Accounts Administration

Clicking on the '**Add**' button will display the "Add New User" page as illustrated below:

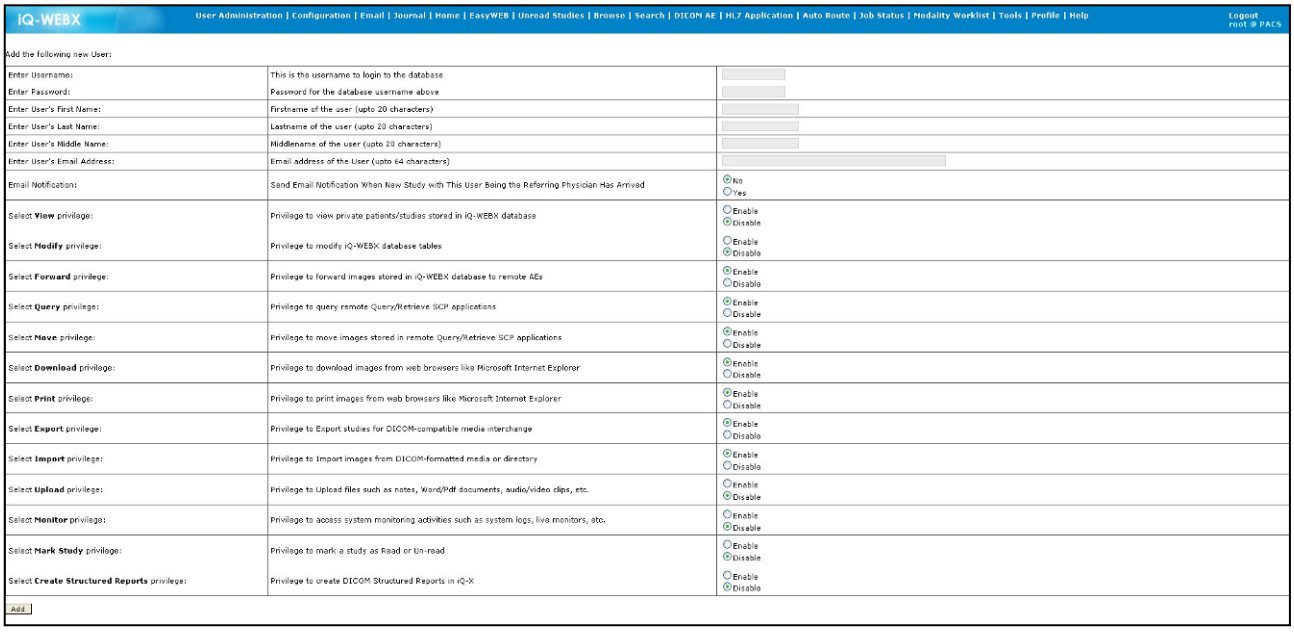

Figure 2 Creating New User Account

For each user, there're 12 privileges that can be administrated separately by the super-user/Administrator ('**root**' for MySQL databases):

PRIVILEGE	DESCRIPTION	DEFAULT
View	Required to view private patients/studies	Disabled
Modify	Required to change database attributes	Disabled
Forward	Required to forward images stored in iQ-WEBX to a remote SCP	Enabled
Query	Required to query remote Query/Retrieve SCP application entities	Enabled
Move	Required to move images on remote Query/Retrieve SCP application entities	Enabled
Download	Required to download iQ-WEBX images from a web browser	Enabled
Print	Required to print images to DICOM printers	Enabled
Export	Required to export images stored in local iQ-WEBX database to DICOM Standard Part 10 formatted directory and files with DICOMDIR directory information	Enabled
Import	Required to import external DICOM formatted directory and/or raw image files into iQ-WEBX database	Enabled
Upload	Required to upload text files, PDF/Word documents, audio/video clips, etc. into iQ-WEBX database	Disabled
Monitor	Required to access system monitoring activities such as system logs, live monitors, etc.	Disabled
Mark Study	Required to mark a study as either Read or Un-read	Disabled

Table 3 iQ-WEBX User Privileges

NOTE: The Super-user/Administrator ('**root**' for MySQL databases) has all of the above privileges.

With the above privilege levels, there are three (3) categories of users that can be defined for iQ-WEBX:

CATEGORY	DESCRIPTION
Administrator	This is the pre-defined user account '**root**'. There can be multiple Administrator accounts and they are required to perform all user administration tasks.
Power Users	These are the user accounts with the '**Modify**' and '**View**' privileges Enabled by the Administrator. These users can access all Public and Private patients/studies in the database, and they can also modify and delete existing database records.
Regular Users	These accounts are usually created for the referring physicians or reading physicians. They do not have the '**View**' privilege and can only access the Public patients/studies, or the Private patients/studies whose Referring/Reading Physician Name matches with the Last Name and First Name of the user profile.

Table 4 iQ-WEBX User Categories

6.2.1 Creating Group User Accounts

Clicking on the '**Add User Group**' button will display the "Add New User Group" page as illustrated below:

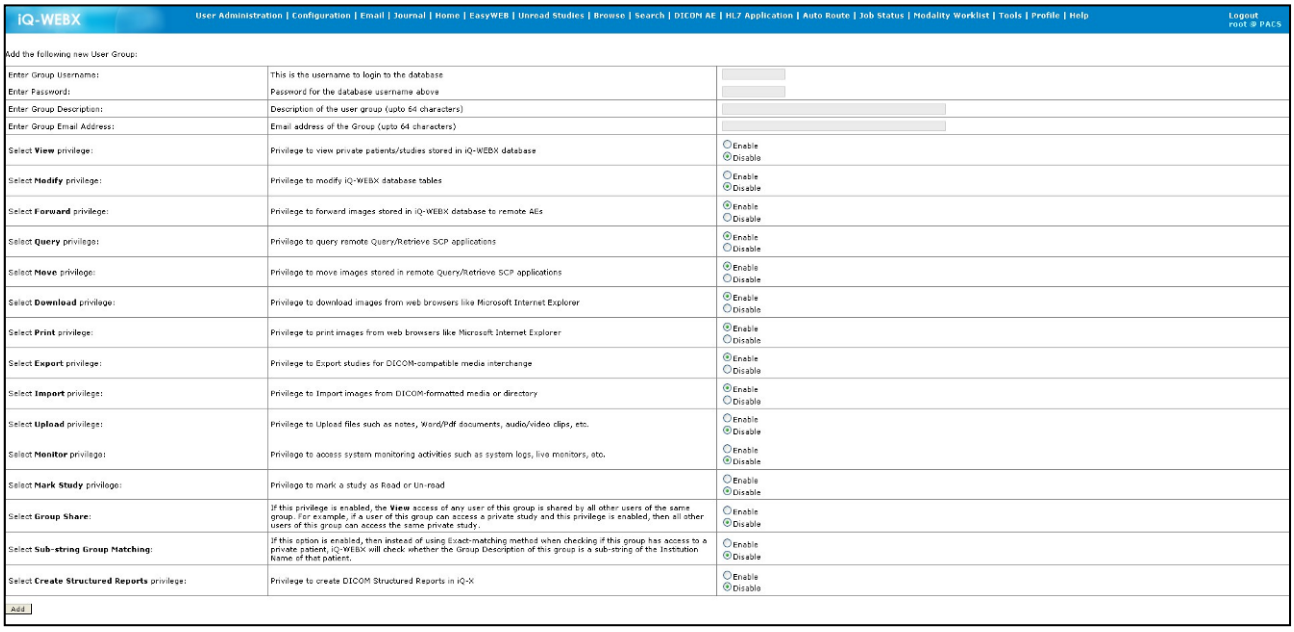

Figure 3 Creating Group User Accounts

A Group User account has almost the same attributes as a normal user account, e.g., username/password, email address, privileges, etc., except that the Group Description of a Group User account is used by iQ-WEBX to match against the Institution Name of a private patient/study, when determining if the Group User can access that private patient/study. In addition to all the privileges of a regular user account, a Group User has the following configurable options that can be administered only for Group Users:

OPTION	DESCRIPTION	DEFAULT
Group Share	If this privilege is enabled, the **View** access of any user of this group is shared by all other users of the same group. For example, if a user of this group can access a private study and this privilege is enabled, then all other users of this group can access the same private study.	Disabled
Sub-String Group Matching	If this option is enabled, then instead of using **Exact-Matching** method when checking if this group has access to a private patient, iQ-WEBX will check whether the **Group Description** of this group is a sub-string of the **Institution Name** of that patient.	Disabled

Table 5 Options Specific for Group Users

6.3 Deleting Existing User Accounts

Only the Administrator/Super-user ('**root**' for MySQL databases) or other Administrator users can delete existing iQ-WEBX user accounts from the User Administration page, by clicking the individual checkbox before the iQ-WEBX username (or click the '**Check All**' button to delete all existing users) followed by the '**Delete**' button.

6.4 Modifying Existing User Accounts

Only the Administrator/Super-user ('**root**' for MySQL databases) or other Administrator users can modify existing iQ-WEBX user accounts from the User Administration page, by clicking the '**Edit**' link for the particular user account that needs to be modified.

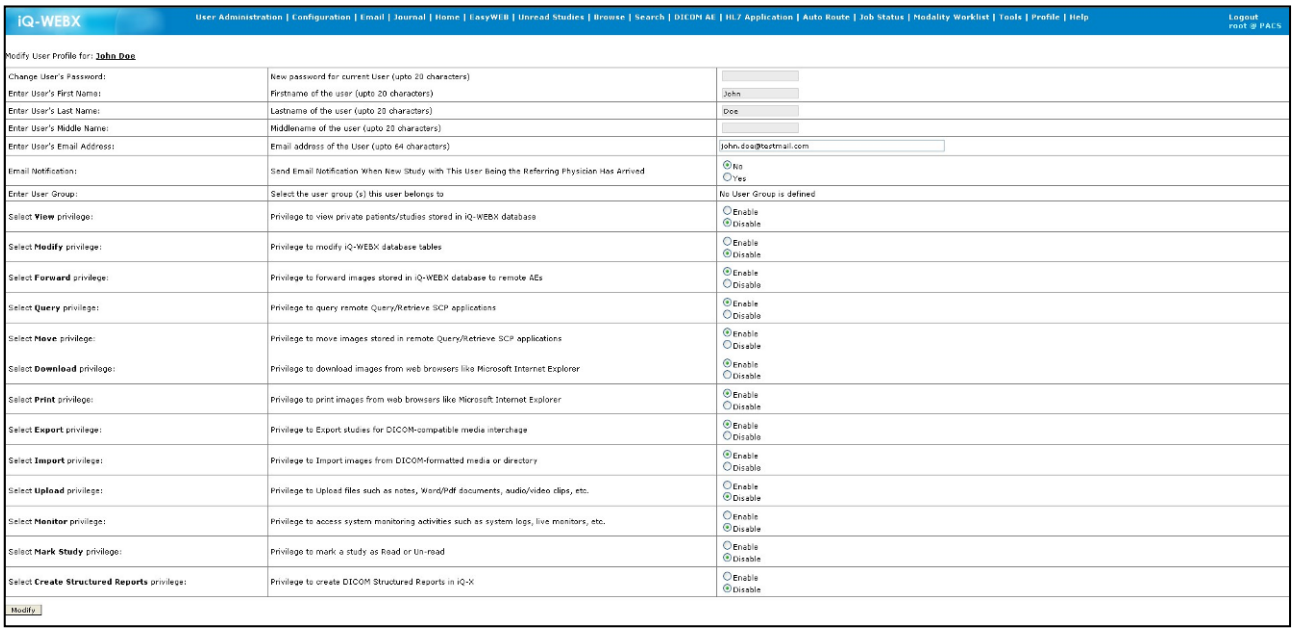

Figure 4 Modifying Existing User Account

The user's password, first name, last name, middle name can be modified, and all of the twelve (12) privileges can be independently Enabled or Disabled for this user account.

7 SYSTEM CONFIGURATION

The Administrator ('**root**' for MySQL databases) of iQ-WEBX can configure the following system parameters by clicking on the **Configuration** link from the **Main Menu** bar:

- Default Short-term Archive Directory – This is the directory where the received images will be stored if there is no specific short-term archive directory defined for the source AE
- Default Archive Directory Format – This parameter controls the directory hierarchy under the designated archive directory. There are two (2) options:
    - Flat - Received images are stored under **%Assigned Directory%/YYYY-MM-DD-WEEKDAY/** sub-folders
    - Hierarchical - Received images are stored under **%Assigned Directory%/YYYY/MM/DD/** sub-folders
- Automatically Age From Default Short-Term Archive Directory To Default Long-Term Archive Directory – If this option is enabled, iQ-WEBX will automatically move images stored under the default short-term archive directory that were received more than **N** days ago, to the default long-term directory specified by the Administrator ('**root**' for MySQL databases)
- Date and Time Schedule for Automatic Aging from Short-term to Long-term Archive Directory – This parameter controls the schedule when iQ-WEBX will perform the automatic aging to move images from short-term to long-term directories. The default schedule is every Sunday morning at 01:00 a.m. local time.
- Browser Automatic Logout Period – This parameter controls the timeout/idle period (in minutes) for automatic logging out client browsers. The default value is 10 minutes
- User Password Expiration Period – This parameter controls the time period for automatic user password expiration, users need to select a new password when their passwords expire. The default value is 60 days
- Maximum Upload File Size – This parameter controls the maximum file size limit when users upload files. The default value is 2 MB. The smaller value of this parameter and the **upload_max_filesize** variable in your '**PHP.INI**' file controls the maximum file size limit when users upload files
- Upload Directory – This is the local directory used to store user-uploaded attachments and DICOM Part-10 formatted raw images. The default value is the **'upload'** sub-folder where iQ-WEBX is installed
- Upload Attachment – Whether iQ-WEBX should store uploaded attachment into the database table directly, or store them as regular files under the above **'Upload Directory'**. The default is to store attachment into the database table directly
- Directory for Storing Thumbnail JPEG/GIF Images – This is the directory used to store the cached thumbnail .jpg/.gif images displayed to the browsers. The default is to store the .jpg/.gif images under the "**php/thumbnails**" sub-folder where iQ-WEBX is installed
- Directory for Storing Full-Size JPEG/GIF Images – This is the directory used to store the cached full-size .jpg/.gif images displayed to the browsers. The default is to store the .jpg/.gif images under the "**php/images**" sub-folder where iQ-WEBX is installed
- Auto-Scan Directory – The Administrator ('**root**' for MySQL databases) can enable or disable this feature, and if enabled, iQ-WEBX will automatically scan the configured **Source Directory**, using the configured scan interval:
    - Source Directory – If enabled, iQ-WEBX will automatically scan this local directory for any DICOM Part-10 formatted images with the "***.dcm**" filename extension. If the image are

indeed DICOM Part-10 formatted but the image files do not end with the "***.dcm**" filename extension, you can force iQ-WEBX to scan all files under this source directory, by adding the following Registry value:

HKEY_LOCAL_MACHINE\Software\IMAGE Information Systems Ltd.\iQ-WEBX\${AeTitle}\AutoScanAnyFile

And set the DWORD value to 1.

- Destination Folder – If iQ-WEBX has found and scanned any DICOM Part-10 formatted image in the **Source Directory**, it will move the image to this **Destination Folder** and parse it into the iQ-WEBX database
- Scan Interval – Time interval (in seconds) for the period scan of the above **Source Directory**. The default value is 60 seconds and the Administrator ('**root**' for MySQL databases) can set it to any value larger than 60 seconds

This Auto-Scan feature is by default **Disabled** and can only be enabled by the Administrator ('**root**' for MySQL databases).

- Administrator's Email Address – This is the email address where the automatically-generated emails (e.g., Statistics Reports, System Journal Logs, etc.) will be delivered to. Multiple email addresses can be entered by using the coma (',') as the separator in between the addresses.
- Path to PHP Runtime Executable – Full path to the PHP runtime executable program ('**php.exe**'). Default is "**INSTALLDIR\PHP\php.exe**", where "**INSTALLDIR**" is the installation directory of iQ-WEBX. This is required because iQ-WEBX uses PHP internally to send outgoing emails.
- Email Notify Users About Failed Jobs – If enabled, iQ-WEBX will send email notifications to registered user's email address (if defined) about any failed job submitted by that user.

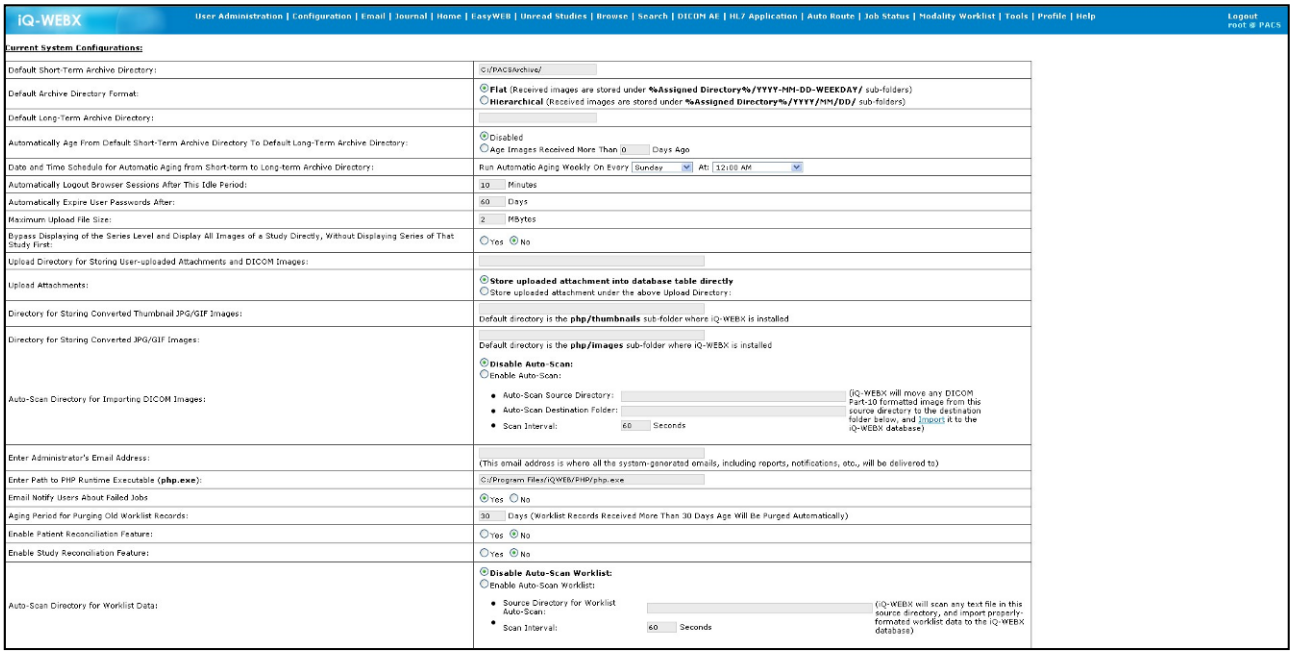

Figure 5 System Configuration Page

- Automatic Patient Reconciliation – If enabled, iQ-WEBX will use the patient demographics information (Patient ID, Patient Name and Date of Birth) from the DICOM Modality Worklist (DMWL) data to match

with the same information contained in the received DICOM studies, and will automatically correct the Patient Name if there is any discrepancy found in the received DICOM studies.

For example, if the scheduled DMWL data has a patient with the Patient ID of "12345", Patient Name of "Doe^John" and DOB of "2007-10-18", then a DICOM study is received with the same Patient ID and DOB, but different Patient Name of "Doe^Johnny".

In this case, if the **Automatic Patient Reconciliation** feature is enabled, iQ-WEBX will automatically correct the Patient Name in this received DICOM study to "Doe^John" to match with the Patient Name in the DMWL data, and log this event to the **Patient Reconciliation** table described in Section 13.15.13.

- Automatic Study Reconciliation – If enabled, iQ-WEBX will use the study related information (Referring Physician's Name, Requesting Physician's Name) from the DICOM Modality Worklist (DMWL) data to match with the same information contained in the received DICOM studies, and will automatically correct the Referring Physician's Name and/or Requesting Physician's Name if there is any discrepancy found in the received DICOM studies.

  For example, if the DMWL data has a procedure scheduled with the Referring Physician's Name of "Doe^John", then a DICOM study is received with the same Study Instance UID but different Referring Physician's Name of "Doe^Johnny".

  In this case, if the **Automatic Study Reconciliation** feature is enabled, iQ-WEBX will automatically correct the Referring Physician's Name in this received DICOM study to "Doe^John" to match with the Referring Physician's Name from the DMWL data
- Auto-Scan Directory for Worklist Data – The Administrator ('**root**' for MySQL databases) can enable or disable this feature, and if enabled, iQ-WEBX will automatically scan the configured **Source Directory**, using the configured scan interval:

  - Source Directory – If enabled, iQ-WEBX will automatically scan this local directory for any text files that may contain the DICOM Modality Worklist (DMWL) data. The format of the worklist text file is specified in Section 13.15.11.
  - Scan Interval – Time interval (in seconds) for the period scan of the above **Source Directory**. The default value is 60 seconds and the Administrator ('**root**' for MySQL databases) can set it to any value larger than 60 seconds

  This Auto-Scan Worklist feature is by default **Disabled** and can only be enabled by the Administrator ('**root**' for MySQL databases).

- Enable Statistics Report Emails – The Administrator ('**root**' for MySQL databases) can enable or disable the checkboxes for the daily, weekly, or monthly statistics report emails, as well as the monthly journal report emails, that are sent to the Administrator's email address.
- Enable Automatic Conversion of Received DICOM Images into Thumbnail/Full-size JPEG/GIF images – If enabled by the Administrator ('**root**' for MySQL databases), iQ-WEBX will automatically convert received DICOM images into the thumbnail/full-size JPEG/GIF images upon reception, so that the converted JPEG/GIF images can be loaded much faster by the web browsers when comparing to the case where the JPEG/GIF images must be converted on-demand.

8 SMTP SERVER CONFIGURATION

The Administrator ('**root**' for MySQL databases) of iQ-WEBX can configure a SMTP server for sending outgoing emails, by clicking on the **Email** link from the Main Menu, and enter the following information:

- SMTP Server Hostname or IP Address – This is the hostname or IP address of the SMTP server, which can be either the same server (localhost) or a remote host
- Port Number – The TCP port number the SMTP server listens to. Default is 25
- Description – Text description of this SMTP server
- From: Email Address – This is the email address used in the **From:** field in outgoing email messages
- Authentication Type **–** SMTP authentication type. Can be set to one of the following:
    - None – No other configuration is required
    - LOGIN, CRAM-MD5, or PLAIN – A valid username/password pair is required
    - NTLM - A valid username/password pair, and the hostname of the NTLM Workstation are required

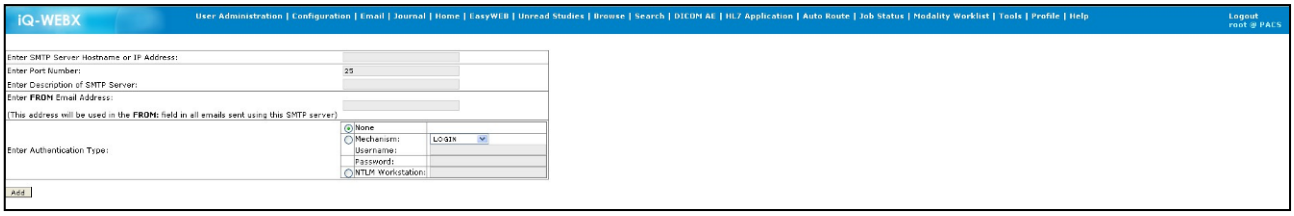

Figure 6 Configuring SMTP Server

9 SYSTEM JOURNAL LOG

To support HIPAA Auditing requirements, iQ-WEBX automatically logs all user activities into the **System Journal Log** table, and only the Administrator ('**root**' for MySQL databases) can access this table by clicking on the **System Journal** link from the Main Menu. The following information will be displayed from the **System Journal Log**:

- When – The date and time when the event took place
- Username – The username for which the event was logged
- Operation – The operation this user performed for which the event was logged
- Level – The subject level of this event, e.g., Patient, Study, Series, Image, etc.
- UID – The unique ID identifying this event, e.g., Patient ID, Study/Series/Instance UID, etc.
- Details – The details of this event

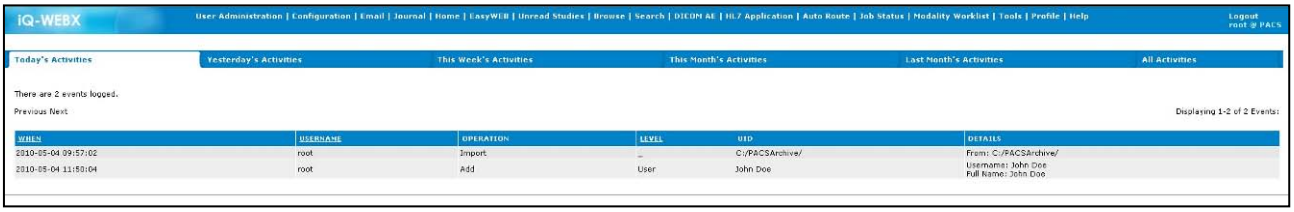

Figure 7 System Journal Log

The Administrator ('**root**' for MySQL databases) can choose from the following time-based views of the events logged in the **System Journal Log**:

- Today's Activities
- Yesterday's Activities
- This Week's Activities
- This Month's Activities
- Last Month's Activities
- All Activities

9.1 Automatic Monthly System Journal Log Emails

If a valid SMTP server and the Administrator ('**root**' for MySQL databases)'s email address have been configured (See **Section 7** above), then on the first day of every month, iQ-WEBX will automatically send an email with all events in the **System Journal Log** during the previous month to the configured Administrator's email address.

9.2 Automatic Purging Aged System Journal Log

On the first day of every month, iQ-WEBX will automatically purge older events logged in the **System Journal Log** that occurred before the first day of the previous month.
To change the purge interval for system journal logs from the default 60 days, users can add or modify the following Registry value:

HKEY_LOCAL_MACHINE\Software\IMAGE Information Systems Ltd.\iQ-WEBX\{AETITLE}\JournalPurgeInterval

Set or change the DWORD value to the Number of Days in which the older system journal logs will be purged.

10 APPLICATION ENTITY TABLE

Before iQ-WEBX can communicate with other DICOM compliant application entities, they need to be configured properly in the Application Entity table as described below:

COLUMN	DESCRIPTION	SCU OR SCP ROLE	DEFAULT
Title	Application Entity (AE) Title. This is the key of this table.	Both	N/A
Hostname	Hostname of the remote AE. This is used to lookup the IP address of the remote AE if the IP address is not defined.	Both	None
IP Address	IP address of the remote AE.	Both	None
Port	TCP port number of the remote AE.	SCP	None
Database Access	'Enable' or 'Disable' access to iQ-WEBX database for this remote application entity. If set to 'Disable', iQ-WEBX will reject any association requests with the specified application entity title.	Both	Disabled
Allow DICOM Commands	Enable or Disable the following individual DICOM commands sent from the remote AE: ▪ C-FIND ▪ C-MOVE ▪ C-STORE ▪ Modality Worklist - FIND Data element or key-based filters can be defined for each of the above enabled commands. Please refer to Section 10.1 below about how to configure command filters for SCU application entities.	SCU	Allow **C-FIND**, **C-STORE**, **C-MOVE** and **Modality Worklist - FIND** with no filters
Short-Term Archive Directory	Short-term archive directory path for this AE. This field is required for C-STORE SCU clients. iQ-WEBX will store received images under this directory based on the **Archive Directory Format** for this AE.	SCU	None
Archive Directory Format	Either **Flat** or **Hierarchical** format for storing images received from this AE. Please refer to Section 10.1 below for more details.	SCU	Flat format
Long-Term Archive Directory	Long-term archive directory path for this AE. If this field is defined and **Automatic Aging** is enabled for this AE, iQ-WEBX will automatically age/move images stored in the Short-Term Archive Directory to this Long-Term Archive Directory.	SCU	None
Send Email Notification	Send email notification to the user registered as the Referring Physician when a new DICOM study from this AE is received.	SCU	No
Compress Received Images	Compress images received from this AE via the selected DICOM compression transfer. Please refer to Section 16 below for more details	SCU	Disabled
Query SCP	Boolean flag indicating whether this remote AE is a DICOM Query/Retrieve SCP or not.	SCP	False
Worklist SCP	Boolean flag indicating whether this remote AE is a DICOM Modality Worklist Management SCP or not.	SCP	False

Print SCP	Boolean flag indicating whether this remote AE is a DICOM Printer or not.	SCP	False
Maximum Outgoing Sessions	The maximum number of simultaneous outgoing connections iQ-WEBX will establish with the remote AE.	SCP	10
Preferred Transfer Syntax	Users can define a preferred transfer syntax for this AE, so that iQ-WEBX will prefer to use this defined transfer syntax when sending images to this remote AE.	SCP	Use original transfer syntax when image was received
Mark Retrieved Studies as Read	Mark studies retrieved to this AE as **Read** with the AE Title of this AE.	SCP	No
Job Queue Priority	Job queue priority when processing database jobs with this destination AE (default priority is 0 - Normal. Database jobs with higher priority destination AEs will be processed before those jobs with lower priority destination AEs).	SCP	0

Table 6 Application Entity Table

For security purposes, only those users with '**Modify**' privilege can create, modify or delete entries in the Application Entity table. Click on the 'Application Entity' link from the Main Menu bar to view, add, modify or delete entries in the Application Entity table, which is illustrated below:

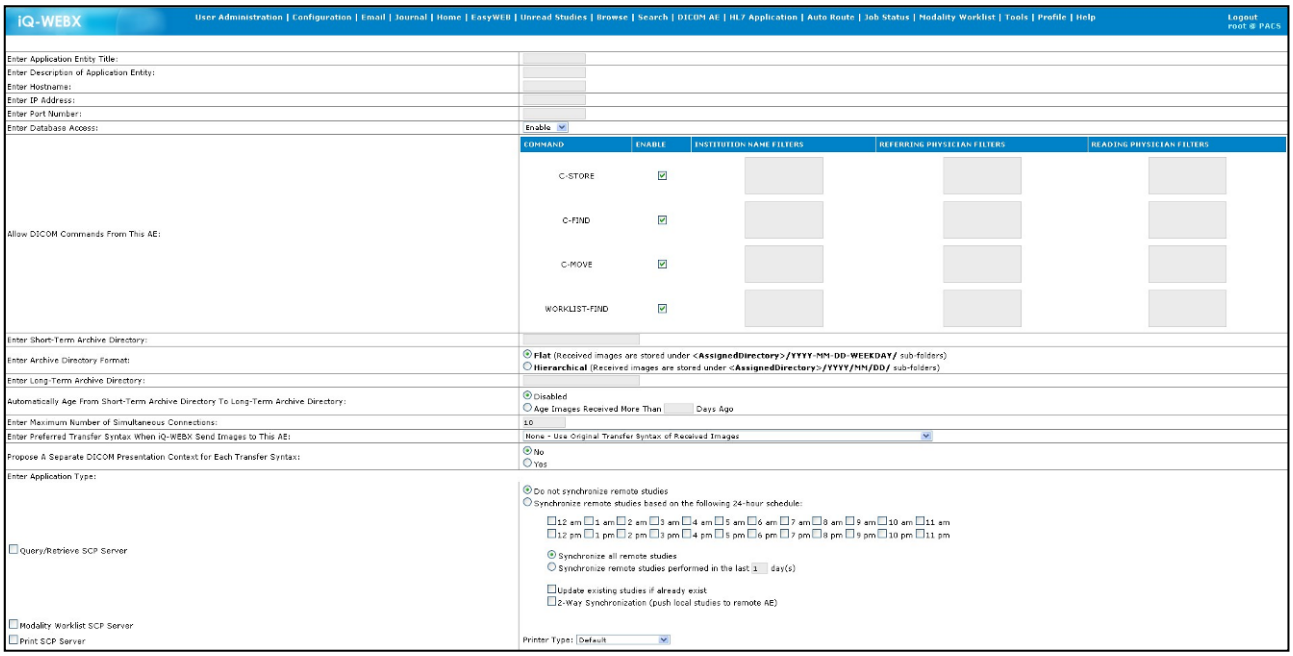

Figure 8 Adding a New Application Entity

The following attributes are common among all DICOM SCU or SCP applications:

- AE Title – DICOM Application Entity (AE) Title string. Maximum of 16 characters with no white-space characters
- Description – Text description of this DICOM AE
- Hostname – Name of the host where this DICOM AE is located
- IP Address – IP address of the host where this DICOM AE is located

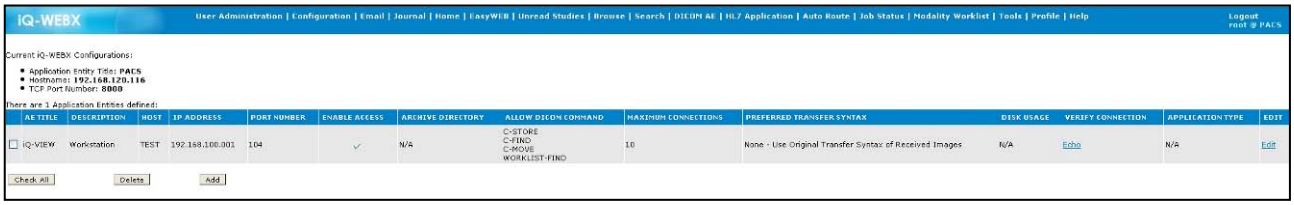

Figure 9 Application Entity Table Page

10.1 SCU Application Entities

In addition to the columns common to the Application Entity table, i.e., AE Title, Hostname, IP Address, the following SCU specific values will be displayed in the Application Entity Table page if the AE is a SCU:

- Allow Access – Whether to enable or disable access for this AE
- Allow DICOM Commands – Whether to enable or disable DICOM commands (C-STORE, C-FIND, C-MOVE, and Modality Worklist - FIND) sent from this SCU. Additionally for each enabled command, the following data element or key-based filters can be defined to further match the enabled DICOM command:

  - Institution Name – (0008,0080)
  - Referring Physician's Name – (0008,0090)
  - Reading Physician's Name – (0008,1060)

  For each of the above filters, a string pattern (including wild-card characters '*' and '?') can be specified to match against the received image or DICOM command messages. For example:

  - If the DICOM C-FIND command is enabled for a source AE, and a filter for Institution Name is defined with the string pattern of "Springfield General", then iQ-WEBX will allow DICOM Queries (C-FIND) from this source AE, but will only return matching results for those patients with the matching Institution Name of "Springfield General".
  - If multiple filters are defined for an enabled command, then the filters will be combined with logical OR ('**||**') operators.
    For example, if both a filter for Institution Name pattern of "Springfield*", and a filter for Referring Physician's Name pattern of "Dr. Hibbert" are defined for the DICOM C-STORE command, then iQ-WEBX will allow DICOM C-STORE command sent from this source AE, but will only accept images that either pattern match with the Institution Name of "Springfield*", or the Referring Physician's Name of "Dr. Hibbert".
  - For the same filtering key or data element, multiple string patterns can be specified by using the semicolon ('**;**') as the delimiter.
    For example, for the same Institution Name filter, if the string pattern of "Springfield* ; Capital City*" is defined for the DICOM C-STORE command, then iQ-WEBX will only accept images that either pattern match with the Institution Name of "Springfield*", or the Institution Name of "Capital City*".

- If a DICOM command is enabled for a source AE, but no filter is defined for that command, then iQ-WEBX will always accept that DICOM command sent from the source AE without any filtering.

- Short-Term Archive Dir – Short-Term Archive directory for this AE if this AE is a C-STORE SCU.

  - This directory path can be set to a folder on a local disk, e.g., **C:\Images\CT**, or it can be set to a network-shared path in Windows Universal Naming Convention (UNC) format, e.g., **\\Hostname\Dir\SubDir**. NOTE: When using network-shared path as archive directories, users must make sure that the Windows local user account (default is '**SYSTEM**') iQ-WEBX is using has **Full** access to the network-shared path

- Archive Directory Format – Users can choose from the following directory layouts:

  - Flat – Received images are stored under current-date based (**YYYY-MM-DD-WEEKDAY/**) sub-folders under the assigned archive directory.
    For example, if today is January 15, 2006, then all images received today are stored under **$AssignedDirectory/2006-01-15-SUN/**.
  - Hierarchical – Received images are stored under current-date based (**YYYY/MM/DD/**) sub-folders under the assigned archive directory.
    For example, if today is January 15, 2006, then all images received today are stored under **$AssignedDirectory/2006/01/15/**.

- Long-Term Archive Directory – Long-Term Archive directory for this AE. See the **Automatic Aging** option below.
- Automatically Age From Short-Term Archive Directory To Long-Term Archive Directory – If this option is enabled, and the **Long-Term Archive Directory** above is defined, then iQ-WEBX will automatically age images stored in the Short-Term Archive Directory to the defined Long-Term Archive Directory, by moving all images stored under the Short-Term Archive Directory that were received prior to the user-defined **Aging Period** (in days) to the defined Long-Term Archive Directory. iQ-WEBX performs the Automatic Aging on a weekly schedule every Sunday morning at 12:00 am local time for all AEs with this option enabled.
- Directory Usage – Current disk space usage of the Archive Directory if this AE is a C-STORE SCU
- Send Email Notifications When New Study From this AE is received – If this feature is enabled, and a new DICOM study is received from this AE with the Referring Physician's Name matching with one of the web user's first and last names, iQ-WEBX will send a notification email to that user's email address (if defined) about the newly received study.
- Compress images received from this AE – If a DICOM compression transfer syntax is defined for this AE, iQ-WEBX will automatically compress any uncompressed DICOM images received from this AE using the defined DICOM compression transfer syntax, so that the compressed DICOM images can be delivered to the web viewers than the uncompressed images (Please see Section 16 for more details about this feature).
- Anonymize studies received from this AE – If this option is enabled, iQ-WEBX will anonymize studies received from this source AE by the syntax rules pre-defined in a template selected by the user (Please see Section 13.15.14 for more details about this feature).

10.2 SCP Application Entities

In addition to the columns common to the Application Entity table, i.e., AE Title, Hostname, IP Address, the following SCU specific values will be displayed in the Application Entity Table page if the AE is a SCP:

- Verify Connection – Clicking on the **Ping** link will verify if the remote SCP can accept DICOM association requests by sending a C-ECHO request to the specified TCP port number. If the C-ECHO is accepted successfully, a pop-up message box will be displayed to indicate confirmation for the C-ECHO request. Otherwise, an error page will follow with any possible source or reason for the failure.
- Remote Exams – Clicking on the **Query/Retrieve** link will display the Search Remote PACS Database page as illustrated below:

Figure 10 Search Remote PACS Database

Where you can search by using the following criteria:

- List All Patients – Selecting this option will send a Patient-Root Information Model C-FIND request with **Universal Matching** for the Patient ID attribute to the remote Query/Retrieve SCP.
- Search By Patient Attributes – You can search either by Patient ID or Patient Name attribute, wild-card characters '*****' (one or more characters) and '**?**' (Any single character) are supported. If wild-card characters are used, then a C-FIND request with **Wild-Card Matching** for either the Patient ID or Patient Name attribute will be sent to the remote Query/Retrieve SCP. Otherwise**, Single Value Matching** will be used instead.
- List All Studies – Selecting this option will send a Study-Root Informational Model C-FIND request with **Universal Matching** for the Study UID attribute to the remote Query/Retrieve SCP.
- Search By Study Attributes – You can search by Study ID, Accession Number, Referring Physician's Name or Study Date. Wild-Card characters are supported for searching by Study ID, Accession Number or Referring Physician's Name. **Wild-Card Matching** will be used in the C-FIND request if wild-card characters are used when searching for Study ID, Accession Number or Referring Physician's Name, **Single Value Matching** will be used otherwise. **Single Value Matching** will be used when

searching by Study Date for Today, Yesterday or a particular fixed date; **Range Matching** will be used otherwise when searching by Study Date.

- Search By Series Attributes – You can search by Modality or Series Date. Wild-Card characters are supported for searching by Modality. **Wild-Card Matching** will be used in the C-FIND request if wild-card characters are used when searching for Modality, **Single Value Matching** will be used otherwise. **Single Value Matching** will be used when searching by Series Date for Today, Yesterday or a particular fixed date; **Range Matching** will be used otherwise when searching by Series Date.
- Modality Worklist – Clicking on the **Get Worklist** link will initiate a DICOM Worklist-FIND command to the remote Worklist SCP and display any worklist item(s) retrieved from the remote AE.
- Printer Properties – Clicking on the **Printer Properties** link will initiate a DICOM N-GET command to the remote DICOM printer and retrieve the properties and current status information of the remote printer.

10.2.1 Modality Worklist SCP Application Entities

If the '***WorklistScp***' attribute is set to '***True***' for a specified AE in the Application Entity table, iQ-WEBX will poll the corresponding Worklist SCP periodically to retrieve worklist items using a pre-defined interval. The default polling interval is 10 minutes, and this interval is configurable by modifying the following Windows Registry value:

HKEY_LOCAL_MACHINE\Software\IMAGE Information Systems Ltd.\iQ-WEBX\{AETITLE}\WorklistPollInterval

Where:

{AETITLE} is the Application Entity Title you have assigned for iQ-WEBX during installation.

Additionally, if iQ-WEBX receives DICOM N-EVENT-REPORT **Study Scheduled** event notifications from remote Detached Study Management SCP applications, iQ-WEBX will query any defined Modality Worklist SCP application entity (s) for the relevant study information contained in the **Study Scheduled** event report notification.

By default, iQ-WEBX queries the remote Worklist SCP with the **Scheduled Procedure Start Date** filter of **Today's Date**, i.e., iQ-WEBX will query the remote Worklist SCP for all procedures that are scheduled to start today or later. If you want iQ-WEBX to also query for procedures scheduled for the last N days as well, you can add or set the following Windows Registry value:

HKEY_LOCAL_MACHINE\Software\IMAGE Information Systems Ltd.\iQ-WEBX\{AETITLE}\WorklistPollPeriod

Where:

{AETITLE} is the Application Entity Title you have assigned for iQ-WEBX during installation.

Set the DWORD value to N if you want iQ-WEBX to include the procedures scheduled in the last N days when it queries the remote Worklist SCP. If you want iQ-WEBX to query for all scheduled worklist data from the remote Worklist SCP, you can set this DWORD value to 0xFFFFFFFF (-1).

10.2.1.1 Pre-Fetching of DICOM Studies for Scheduled AE Station

When iQ-WEBX retrieves worklist information for a scheduled patient, and the scheduled AE station is defined in the Application Entity table of iQ-WEBX, then iQ-WEBX will automatically push any pre-existing studies of this patient of the same modality information to the scheduled AE station, so that the scheduled AE station won't have to fetch them manually from iQ-WEBX if it wants to access prior studies of the scheduled patient.
This Pre-Fetching feature is enabled by default. To disable it, the following Registry DWORD value must be defined:

HKEY_LOCAL_MACHINE\Software\IMAGE Information Systems Ltd.\iQ-WEBX\{AETITLE}\PrefetchStudiesFromWorklist

Where:

{AETITLE} is the Application Entity Title you have assigned for iQ-WEBX during installation. The above DWORD value must be explicitly set to 0 in order to disable the Pre-Fetching feature.

10.2.2 Query/Retrieve SCP Application Entities

If the '***Query/Retrieve SCP***' attribute is set to '***True***' for a specified AE in the Application Entity table, users can optionally enable the Remote Study Synchronization feature by choosing from one of the following option boxes:

- Do Not Synchronize Remote Studies – This feature will be disabled.
- Synchronize Remote Studies On the Following 24 Hour Schedule – Users can choose up to 24 hourly schedules for iQ-WEBX to synchronize remote studies stored on this remote AE. Users can further choose from the following synchronization methods:

    - Synchronize All Remote Studies – iQ-WEBX will query (**C-FIND**) this remote AE and find all studies that are not currently in the local iQ-WEBX database, iQ-WEBX will then fetch (**C-MOVE**) those studies from this remote AE.
    - Synchronize Remote Studies Received within the Last [N] Days – iQ-WEBX will query (**C-FIND**) this remote AE and find all studies that were recently received within the last N days, iQ-WEBX will then fetch (**C-MOVE**) those studies from this remote AE.
    - Update Existing Studies If Already Exist – If this checkbox is selected, iQ-WEBX will retrieve studies stored in this remote AE, even if they already exist in the current iQ-WEBX database.

  Users can visit the '**Job Status**' page to check the status of these scheduled remote synchronizations on a daily basis.
- Mark Retrieved Studies as Read – If this feature is enabled, iQ-WEBX will mark a study as **Read** after it has been retrieved or moved to this destination AE.
- Job Queue Priority – This is the priority when processing database jobs for this destination AE. The default value is 0 which means **Normal** priority. Database jobs with higher priority destination AEs will be processed before those jobs with lower priority destination AEs.

11 HL7 APPLICATIONS (OPTIONAL)

This page will be displayed if the optional HL7 Message Listener module is installed along with iQ-WEBX, where the users can add, modify or delete defined HL7 applications:

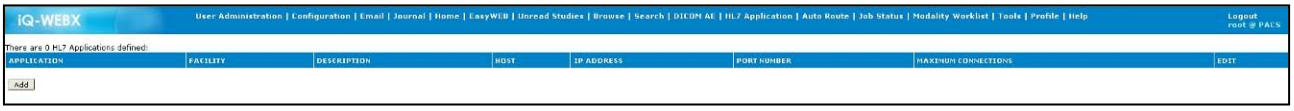

Figure 11 HL7 Applications (optional)

12 SEARCHING iQ-WEBX DATABASE

Clicking on the '**Search**' link from the Main Menu bar will display the 'Search Local iQ-WEBX Database' page, which is similar to the 'Search Remote PACS Database' page above, where users can search by patient, study, series, image or worklist attributes.

Figure 12 Search iQ-WEBX Database

13 NAVIGATING iQ-WEBX WEB USER INTERFACE

After a iQ-WEBX user account has been created successfully by the Administrator/Super-user ('**root**' for MySQL databases) in Section 6.2, the user can access the iQ-WEBX web user interface from any web browser, by logging into iQ-WEBX from the URL below:

http://{HOSTNAME}/pacs/home.php

NOTE: {HOSTNAME} is the name of the machine where iQ-WEBX is installed.

13.1 Login Page

Before any of the iQ-WEBX web user interface pages can be accessed, the user needs to be authenticated through the Login Page below, where a valid MySQL username and password must be specified:

Figure 13 Login Page

13.2 EasyWEB Page

After the user has been authenticated by the Login Page, the EasyWEB Page will be displayed below which contains a list of accessible studies:

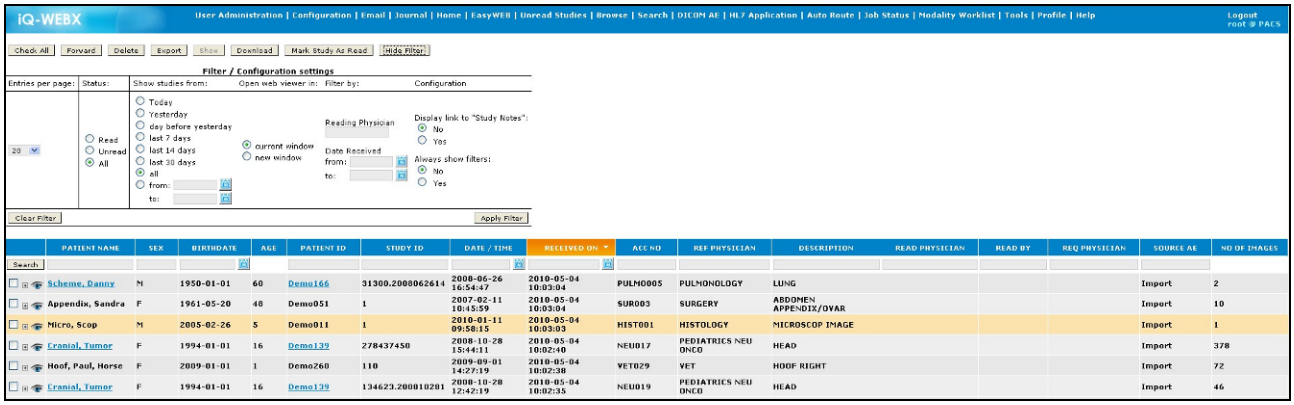

Figure 14 EasyWEB Page

The "Filter" section, which is hidden by default, contains the following filter and configuration settings:

- Entries per page – Specifies the number of studies that will be displayed on the EasyWEB page (10, 20, 50, 100, all).
- Status – Filters the studies according to their status (Read, Unread, All).
- Show studies from – Displays studies where the Study Date is within the specified period (Today, Yesterday, Day before yesterday, last 7 days, last 14 days, last 30 days, all or a custom period defined by a [**From, To**] period). The custom date range also allows only a [**From**] or a [**To**] value and the calendar can be used for entering the date(s).
- Open iQ-X in – Controls whether iQ-X will load in a new window or in the current window.
- Filter by – Allows the additional filtering by the name of the Reading Physician and/or the date when studies have been received. The "Date Received" can be entered in the form [**From, To**], [**From**] or [**To**].
- Display link to "Study Notes" – If enabled, a new icon enables the user to enter study notes for the respective study.
- Always show filters – Can be activated to always display the "Filter" section.

NOTE: The filter and configuration settings will be stored in browser cookies per computer for each (Windows) user and will be remembered, even after several days when logging in again to the web interface using the same Windows user account and computer.
However, when deleting the browser cookies, the filter and configuration settings are reset to their defaults.

The main page allows the following actions:

- Checkbox – The user can either use the checkbox in order to select multiple studies or simply click into the respective line, which will highlight it.
- ⊞ (plus sign) – By clicking on this image, iQ-WEBX will switch to the series level and displays all series of the respective study.

- (show image) – The user can use this icon in order to load all selected studies into iQ-X. Additionally, a double-click into a line will also load the selected studies into iQ-X.
- (Study Notes) – This icon can be used open the “Study Notes” page in a new window or tab, depending on the browser, and the user may enter new study notes or modify existing ones.
- Table header – Almost all headers of the main table can be used in order to sort the list of studies ascending and descending.
- Search fields – The fields under the table headers can be used in order to search for studies by the respective criteria.

  All search fields, except date fields, are supporting the wildcard character “*” and “?”. For detailed searches by the Patient Name, each part (last name, first name, middle name) can be separated by a comma (“,”).
- Links – iQ-WEBX will check for each displayed study whether additional studies from the same patient are available. If one or more items have been found, iQ-WEBX will display the Patient Name and the Patient ID as links. By clicking on these links, iQ-WEBX will perform a search for this Patient Name or Patient ID.

13.3 Home Page (Today's Study Page)

The Home Page, which will be displayed below, contains a list of accessible studies received today or, in case no studies have been received today, the 10 most-recently received studies will be displayed:

Figure 15 Home Page (Today's Study Page)

13.4 Main Menu Bar

This navigation menu bar is displayed at the top of every iQ-WEBX user interface, with the left side displaying the current logged-in user and right side displaying the following navigational links:

- User Administration – This link is displayed only if the current user is the Administrator/Super-user ('**root**' for MySQL databases), clicking on this page will display the main User Administration page described in Section 6 above.
- Configuration – This link is displayed only if the current user is the Administrator/Super-user ('**root**' for MySQL databases), clicking on this page will display the main System Configuration page described in Section 7 above.
- Email – This link is displayed only if the current user is the Administrator/Super-user ('**root**' for MySQL databases), clicking on this page will display the main SMTP Server Configuration page described in Section 8 above.
- Journal – This link is displayed only if the current user is the Administrator/Super-user ('**root**' for MySQL databases), clicking on this page will display the main System Journal Log page described in Section 9 above.
- Home – Clicking on this link will display the Today's Study page described in Section 13.3 above.
- EasyWEB – Clicking on this link will display the EasyWEB page described in Section 13.2 above.
- Browse – Clicking on this link will display a list of all accessible patients in the database. See Section 13.5 below.
- Search – Clicking on this link will display the Search Local iQ-WEBX Database page described in Section 12 - Searching iQ-WEBX Database above.
- DICOM AE – Clicking on this link will display the Application Entity Table page described in Section 10 above.
- HL7 Applications (optional) – Clicking on this link will display the HL7 Application Table page described in Section 11 above.
- Auto Route – Clicking on this link will display the Automatic Routing page described in Section 15 below.

- Job Status – Clicking on this link will display the current scheduled database job status for the current user, which is described in Section 17 below.
- Modality Worklist – Clicking on this link will display the Modality Worklist Table described in Section 10.2 above.
- Tools – Clicking on this link will display the Tools page described in Section 13.15 above.
- Profile – Clicking on this link will display the User Profile page described in Section 13.16 above.
- Help – Clicking on this link will display this document.
- Logout – Clicking on this link will logout current user and go back to the iQ-WEBX Login page.

13.5 Unread Studies Page

This page displays the current list of unread studies in the iQ-WEBX database.

Figure 16 Unread Studies Page

13.6 Browse Page

This page displays a list of accessible patients for the current user, with the following patient-specific information depending on the privilege level of the current user:

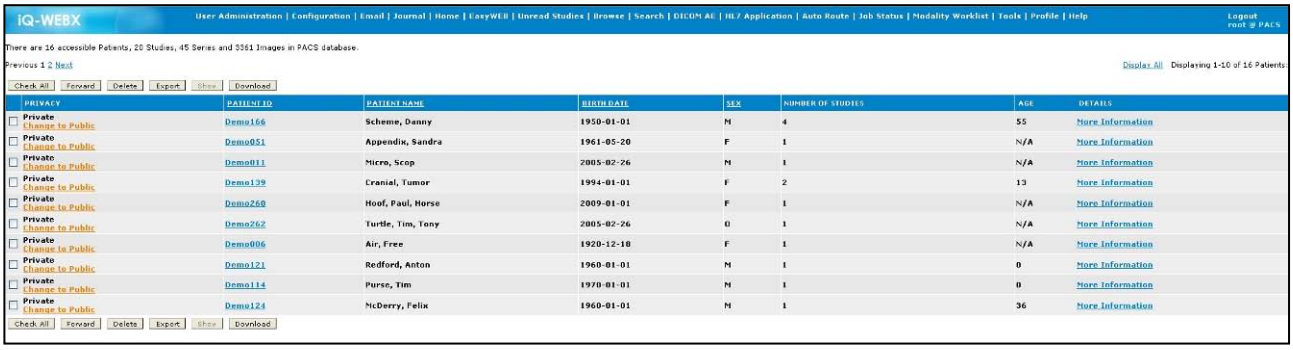

Figure 17 Browse Page

- Public/Private – This is the privacy attribute of the patient (s). This column is displayed only if the current user has the '**Modify**' privilege 'Enabled'. Clicking on the 'Change to Public' or 'Change to Private' will toggle the privacy setting for the patient.
- PatientID – Patient ID. Clicking on this link will display the Study page described below in Section 9.3, for all studies belong to this patient.
- PatientName – Name of the patient.

- BirthDate – Patient's Birth Date.
- Sex – Patient's sex.
- Age – Patient's age.
- Details – Clicking on the 'Display' link will display further detailed information about this patient.
- Download – This link is 'Enabled' only if the current user has the '**Download**' privilege is 'Enabled'. Clicking on this link will download all images of this patient compressed into a ZIP file to the web browser.
- Check All/Uncheck All – This button is displayed only if the current user has the '**Modify**' privilege 'Enabled'. Clicking on the 'Check All' or 'Uncheck All' button toggles between selecting all patients and un-selecting all patients.
- Forward – This button is displayed only if the current user has the '**Modify**' privilege is 'Enabled'. Clicking on this button will display the 'Forward Images' page, which is described in Section 10 below for forwarding all images of the selected patient (s) to a remote SCP.
- Delete – This button is displayed only if the current user has the '**Modify**' privilege is 'Enabled'. Clicking on this button will pop-up a message box asking for confirmation to delete the selected patient (s) from the iQ-WEBX database. If confirmed, the selected patient (s) will be removed from the iQ-WEBX database.
- Show – This button will load the selected patients into the iQ-X viewing plug-in in case it is available.
- Print – This button is displayed only if the current user has the '**Print**' privilege is 'Enabled'. Clicking on this button will print the selected patients to the destination printer and printing format selected by the user.
- Export – This button is displayed only if the current user has the '**Export**' privilege is 'Enabled'. Clicking on this button will export the selected patients into a destination folder specified by the user, using the DICOM standard Part 10 directory format (**DICOMDIR**) for media interchange.
- Email JPEGs – This link is 'Enabled' only if the current user has the '**Download**' privilege is 'Enabled'. Clicking on this link will email all images of this patient as JPEG images compressed into a ZIP file specified recipients.

13.7 Study Page

Figure 18 Study Page

This page displays a list of accessible studies of a patient for the current user, with the following study-specific information depending on the privilege level of the current user:

- Public/Private – This is the privacy attribute of the study (s). This column is displayed only if the current user has the '**Modify**' privilege 'Enabled'. Clicking on the 'Change to Public' or 'Change to Private' will toggle the privacy setting for the study.
- ID – Study ID. Clicking on this link will display the Series page described below in Section 9.4, for all series belong to this patient.
- Date – Study date.
- Time – Study time.
- Accession Number – Accession Number.
- Modalities – A list of modalities in the study.

- Referring Physician – Name of the referring physician.
- Description – Study description.
- Reading Physician – Name of physician reading the study.
- Admitting Diagnoses – Admitting diagnoses.
- Interpretation Author – Name of the interpretation author.
- Download – This link is 'Enabled' only if the current user has the '**Download**' privilege is 'Enabled'. Clicking on this link will download all images of this study compressed into a ZIP file to the web browser.
- Check All/Uncheck All – This button is displayed only if the current user has the '**Modify**' privilege 'Enabled'. Clicking on the '**Check All**' or '**Uncheck All**' button toggles between selecting all studies and un-selecting all studies.
- Forward – This button is displayed only if the current user has the '**Modify**' privilege is 'Enabled'. Clicking on this button will display the 'Forward Images' page, which is described in Section 10 below for forwarding all images of the selected study (s) to a remote SCP.
- Delete – This button is displayed only if the current user has the '**Modify**' privilege is 'Enabled'. Clicking on this button will pop-up a message box asking for confirmation to delete the selected study (s) from iQ-WEBX database. If confirmed, the selected patient (s) will be removed from the iQ-WEBX database.
- Show – This button will load the selected studies into the iQ-X viewing plug-in in case it is available.
- Print – This button is displayed only if the current user has the '**Print**' privilege is 'Enabled'. Clicking on this button will print the selected studies to the destination printer and printing format selected by the user.
- Export – This button is displayed only if the current user has the '**Export**' privilege is 'Enabled'. Clicking on this button will export the selected studies into a destination folder specified by the user, using the DICOM standard Part 10 directory format (**DICOMDIR**) for media interchange.
- Email JPEGs – This link is 'Enabled' only if the current user has the '**Download**' privilege is 'Enabled'. Clicking on this link will email all images of this study as JPEG images compressed into a ZIP file specified recipients.

13.8 Series Page

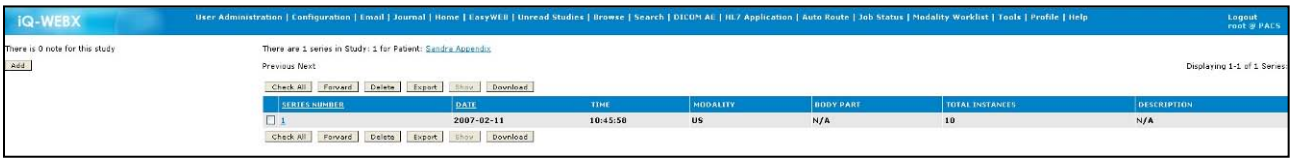

Figure 19 Series Page

This page displays a list of series of the selected study for the current user, with the following series-specific information depending on the privilege level of the current user:

- Series Number – Series Number. Clicking on this link will display the Image page described below in Section 9.5, for all images belong to this series.
- Date – Series date.
- Time – Series time.
- Modality – Modality of the series.
- Body Part – Body part.
- Total Instances – Total number of images in this series.
- Description – Series description.
- Download – This link is 'Enabled' only if the current user has the '**Download**' privilege is 'Enabled'. Clicking on this link will download all images of this series compressed into a ZIP file to the web browser.

- Check All/Uncheck All – This button is displayed only if the current user has the '**Modify**' privilege 'Enabled'. Clicking on the '**Check All**' or '**Uncheck All**' button toggles between selecting all series and un-selecting all series.
- Forward – This button is displayed only if the current user has the '**Modify**' privilege is 'Enabled'. Clicking on this button will display the 'Forward Images' page, which is described in Section 10 below for forwarding all images of the selected series to a remote SCP.
- Delete – This button is displayed only if the current user has the '**Modify**' privilege is 'Enabled'. Clicking on this button will pop-up a message box asking for confirmation to delete the selected series from iQ-WEBX database. If confirmed, the selected series will be removed from the iQ-WEBX database.
- Show – This button will load the selected series into the iQ-X viewing plug-in in case it is available.
- Print – This button is displayed only if the current user has the '**Print**' privilege is 'Enabled'. Clicking on this button will print the selected series to the destination printer and printing format selected by the user.
- Export – This button is displayed only if the current user has the '**Export**' privilege is 'Enabled'. Clicking on this button will export the selected series into a destination folder specified by the user, using the DICOM standard Part 10 directory format (**DICOMDIR**) for media interchange.
- Email JPEGs – This link is 'Enabled' only if the current user has the '**Download**' privilege is 'Enabled'. Clicking on this link will email all images of this series as JPEG images compressed into a ZIP file specified recipients.

This page also displays a list of user notes about the subject study on the Left Panel, where the logged-in user can add discussion notes about this study by clicking on the '**Add**' button.

13.9 Study Notes Page

This page is used for registered users to exchange discussion notes about a subject study. Users can add, modify or delete notes with a subject headline and detailed text notes as bulletin-board style discussions about the subject study. Users with '**Upload**' privilege can also upload text files, zip files, PDF/Word documents, as well as audio/video clips as attachments to the related study notes.

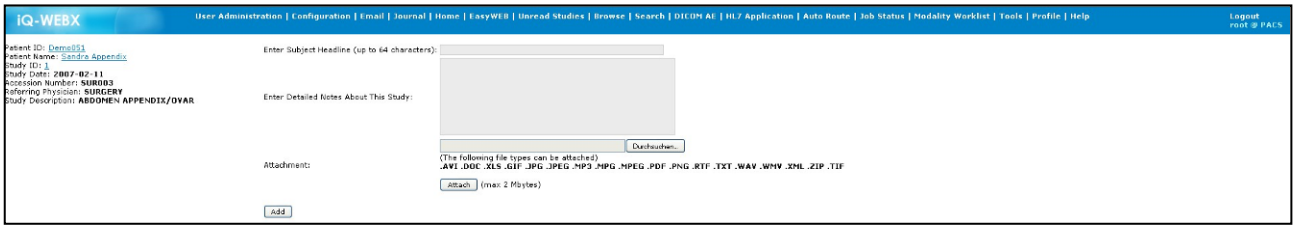

Figure 20 Add Study Notes

From the "Add Study Notes" page above, users can enter discussion notes about this study, and each note consists of the following information:

- Subject Headline – Any text of up to 64 characters
- Details Notes – Any text of up to 512 characters
- Attachments – If the logged-in user has the '**Upload**' privilege enabled, users can upload additional files such as text files, PDF/Word documents, zip files, audio/video clips, etc. of maximum file size allowed for file uploads. This limit is controlled by the smaller value of the following two variable:

- **$MAX_UPLOAD_LIMIT** system configuration variable described in Section 7 - System Configuration
- **upload_max_filesize** variable in your '**PHP.INI**' file

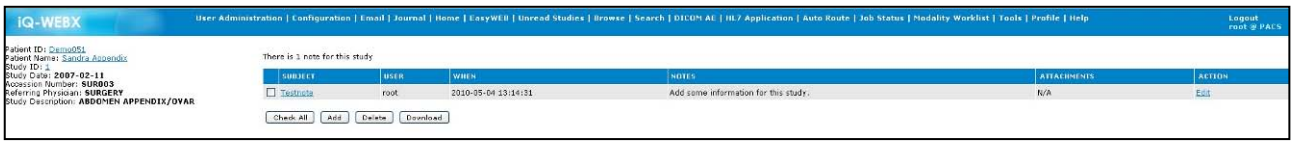

Figure 21 Study Notes Page

This page is the where all the discussion notes about this subject study are listed. If the logged-in user has the '**Modify**' privilege enabled, the user can delete any notes on this page. Otherwise, the user can only delete those notes entered by the user himself/herself. The user can also modify any note which was previously entered by himself/herself by clicking on the '**Edit**' link.

13.10 Structured Reports

If the selected study contains any DICOM Structured Report (**SR**), they will also be displayed as separate series along with the regular imaging series of the selected study.

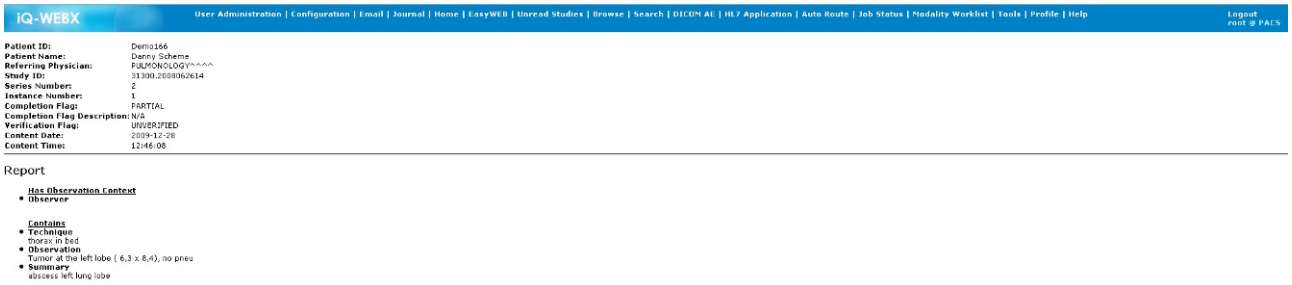

Figure 22 Structured Report Page

If the structured report document contains reference(s) to any image instances and they are accessible in the iQ-WEBX database, a URL link to each referenced image instance will be displayed instead of the plain instance UID string.

13.11 Image Page (Thumbnail)

NOTE: The software is not calibrated with the respective hardware a user is using and JPEG lossy compression is used for the images. Due to these facts a diagnostic quality of the images can not be guaranteed.

Figure 23 Image Page (Thumbnail)

This page displays a list of images of a selected series for the current user, with the following image-specific information depending on the privilege level of the current user:

- Thumbnail Image – Clicking on the thumbnail image will display the 'Full Size Image' page which is described in Section 9.6 below, instead of the thumbnail image displayed in the current page.
- Instance # – Clicking on this link will display all the DICOM attributes (tags) encoded in the raw image file.
- Check All/Uncheck All – This button is displayed only if the current user has the '**Modify**' privilege 'Enabled'. Clicking on the '**Check All**' or '**Uncheck All**' button toggles between selecting all images and un-selecting all images.
- Delete – This button is displayed only if the current user has the '**Modify**' privilege is 'Enabled'. Clicking on this button will pop-up a message box asking for confirmation to delete the selected image(s) from iQ-WEBX database. If confirmed, the selected image(s) will be removed from the iQ-WEBX database.
- Download – This button is 'Enabled' only if the current user has the '**Download**' privilege is 'Enabled'. Clicking on this button will download the selected images compressed into a ZIP file to the web browser.
- Show – This button will load the selected images into the iQ-X viewing plug-in case it is available.
- Tag/Un-Tag – Clicking on the '**Tag**' button will mark the selected images as key images, while clicking on the '**Un-Tag**' button will un-mark the selected images as key images.
- Print – This button is 'Enabled' only if the current user has the '**Print**' privilege is 'Enabled'. Clicking on this button will download print the selected images to a DICOM printer
- Export – This button is 'Enabled' only if the current user has the '**Export**' privilege is 'Enabled'. Clicking on this button will export the selected images into a DICOM Part-10 formatted destination folder.

13.12 Image Page (Full Size)

NOTE: The software is not calibrated with the respective hardware a user is using and JPEG lossy compression is used for the images. Due to these facts a diagnostic quality of the images can not be guaranteed.

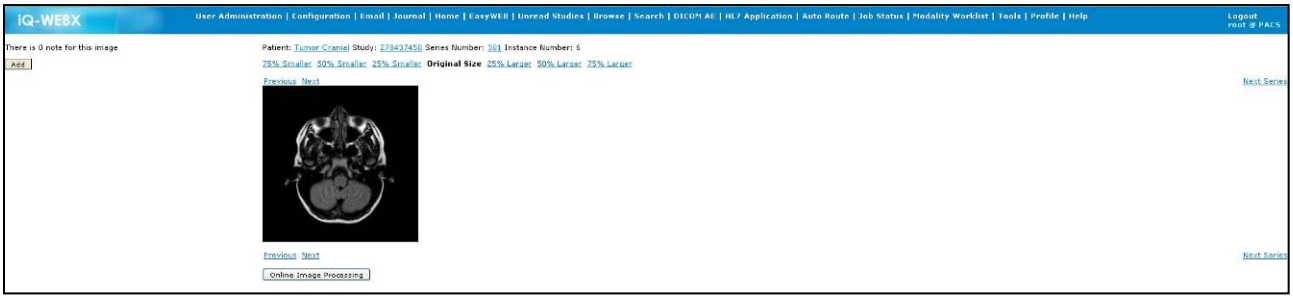

Figure 24 Image Page (Full Size)

This page displays the selected image in its original size, with the following navigation links:

- Previous – This link will be displayed if there is an image within the same series with a smaller instance number than the currently displayed image. Clicking on this link will scroll **backward** to display the image with the largest instance number lower than the current instance.
- Next – This link will be displayed if there is an image within the same series with a bigger instance number than the currently displayed image. Clicking on this link will scroll **forward** to display the image with the smallest instance number higher than the current instance.
- Previous Series – This link will be displayed if there is another series within the same study with a smaller series number than the currently displayed series. Clicking on this link will scroll **backward** to display the series with the largest series number lower than the current series.
- Next Series – This link will be displayed if there is another series within the same study with a bigger series number than the currently displayed series. Clicking on this link will scroll **forward** to display the series with the smallest series number higher than the current series.
- Online Image Processing – Clicking on this button will display the 'Online Image Processing' page, which is described in **Section 11.12 - Online Image Processing Page** below.
- Email JPEG Image – Clicking on this button will send the converted JPEG or GIF image being displayed to the registered email address of the current user. Users can also enter the destination email address in the "**To:**" field, and multiple email addressed can be entered by using the coma ("**,**") as the separator.

This page also displays a list of user notes about the subject image on the left panel, where the logged-in user can add discussion notes about this image by clicking on the '**Add**' button.

13.13 Image Notes Page

This page is used for registered users to exchange discussion notes about a subject image. Users can add, modify or delete notes with a subject headline and detailed text notes as bulletin-board style discussions about the subject image. Users with '**Upload**' privilege can also upload text files, PDF/Word documents, as well as audio/video clips as attachments to the related image notes.

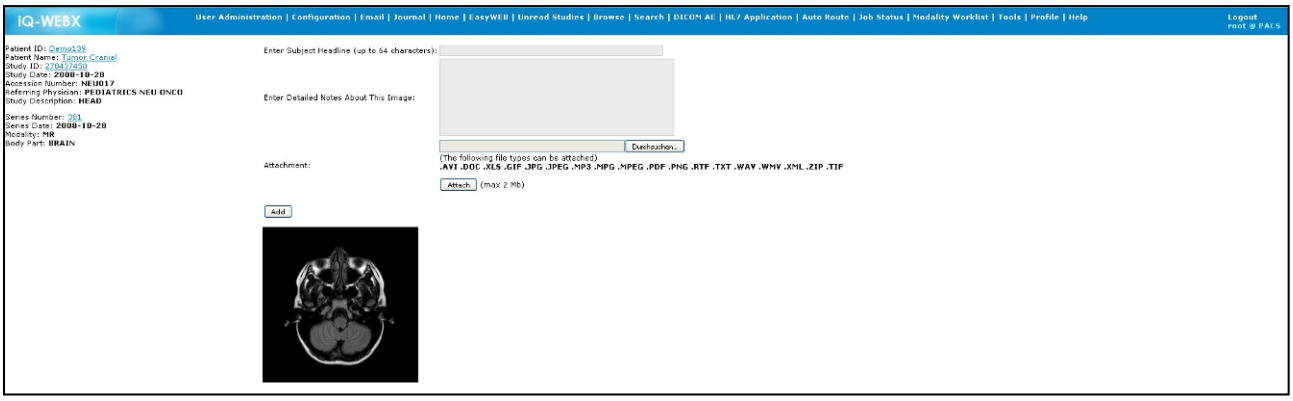

Figure 25 Add Image Notes

From the "Add Image Notes" page above, users can enter discussion notes about this image, and each note consists of the following information:

- Subject Headline – Any text of up to 64 characters
- Details Notes – Any text of up to 512 characters
- Attachments – If the logged-in user has the '**Upload**' privilege enabled, users can upload additional files such as text files, PDF/Word documents, zip files, audio/video clips, etc. of maximum file size allowed for file uploads. This limit is controlled by the smaller value of the following two variable:
    - **$MAX_UPLOAD_LIMIT** system configuration variable described in Section 7 - System Configuration
    - **upload_max_filesize** variable in your '**PHP.INI**' file

Figure 26 Image Notes Page

This page is the where all the discussion notes about this subject image are listed. If the logged-in user has the '**Modify**' privilege enabled, the user can delete any notes on this page. Otherwise, the user can only delete those notes entered by the user himself/herself. The user can also modify any note which was previously entered by himself/herself by clicking on the '**Edit**' link.

13.14 Online Image Processing Page

NOTE: The software is not calibrated with the respective hardware a user is using and JPEG lossy compression is used for the images. Due to these facts a diagnostic quality of the images can not be guaranteed.

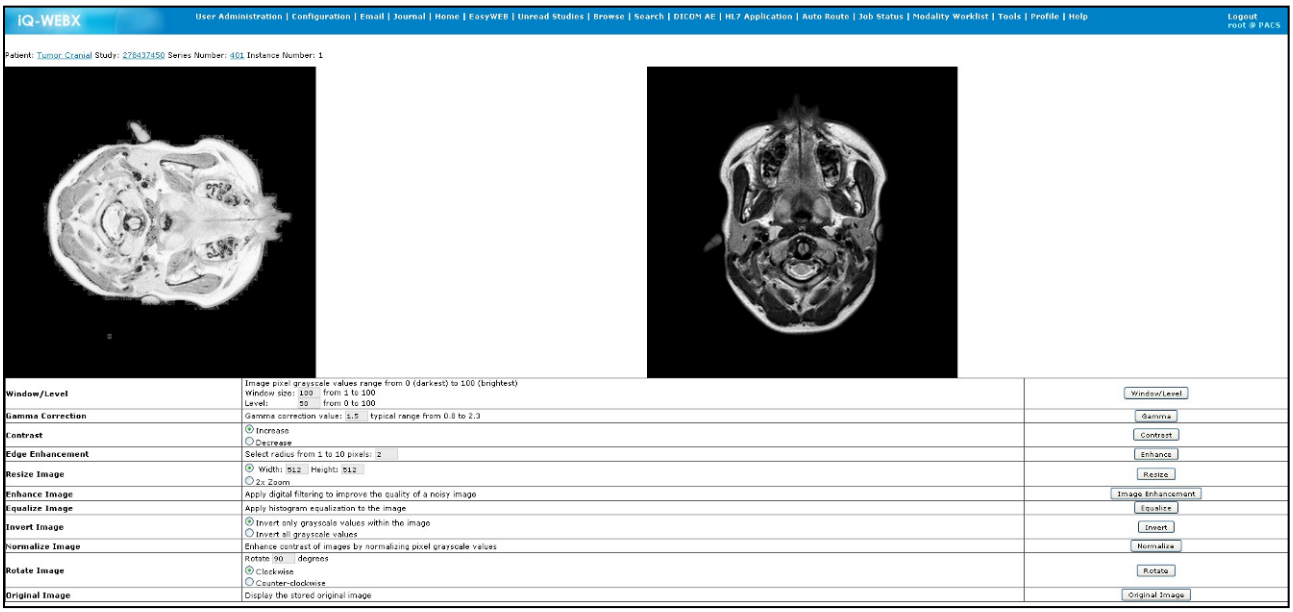

Figure 27 Online Image Processing Page

This page offers the following set of image processing tools, with the processed image displayed on the left and a reference image (original) displayed on the right:

- Window/Level
- Gamma Correction
- Contrast
- Edge Enhancement
- Resize Image – Resize image in absolute pixels or simple 2x zoom
- Enhance Image – Remove image noise
- Equalize Image – Apply histogram equalization to the image
- Invert Image
- Normalize Image – Normalize grayscale values of image pixels
- Rotate Image
- Original Image – Switch back to the original image

13.15 Tools Page

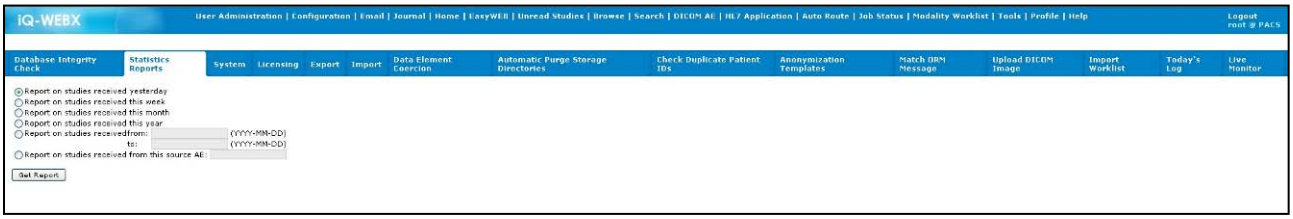

Figure 28 Tools Page

This page contains the following useful utilities that enhance the functionalities of iQ-WEBX:

13.15.1 Custom Data Element Coercion

This tool allows iQ-WEBX users to define a custom data element coercion pattern for images received from a source AE. The following data elements can be coerced based on the specified coercion pattern:

- Patient ID (0x00100020)
- Issuer of Patient ID (0x00100021)
- Modality (0x00080060)
- Institution Name (0x00080080)
- Accession Number (0x00080050)
- Station Name (0x00081010)
- Study Description (0x00081030)
- Ethnic Group (0x00102160)
- Plate ID (0x00181004)
- Acquisition Matrix (0x00181310)
- Station Name (0x00731003)

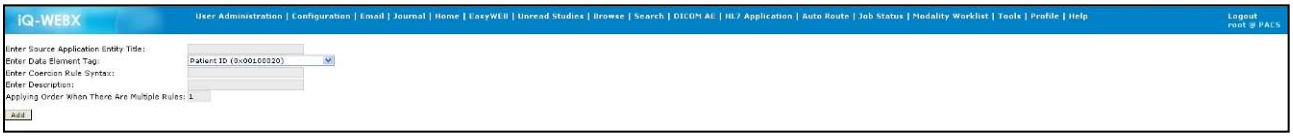

Figure 29 Data Element Coercion Page

The coercion pattern syntax specifies the pattern string to be coerced into, and wild-card characters '*****' and '**?**' are supported.

For example, if users want to have a prefix string "ABC" inserted to the Patient ID data element for images received from a source AE "XYZ", before the images are stored in the iQ-WEBX database. They can add a data element coercion rule with the following fields:

- Source Application Entity Title - It will be set to "XYZ" in this example
- Data Element Tag - Select Patient ID from the Drop-down list box
- Coercion Rule Syntax - It will be set to "ABC*" in this example meaning to insert the prefix "ABC" before the received Patient ID string
- Description - This field is for display purpose only and can be set to any text string

With the above example coercion rule, an image received from source AE "XYZ" with the Patient ID of "12345" will be received and stored in iQ-WEBX database with the Patient ID of "ABC12345".

To delete a specific data element, you can define a Data Element Coercion rule with the corresponding data element tag, and the coercion rule syntax of "***->**", so that iQ-WEBX will remove the defined data element from the received images from that source AE. Here are some details examples about the coercion rules:

PATTERN	MEANING	EXAMPLE
123-*	Add prefix "123-" to the existing/received value	With the "123-*" pattern defined as Patient ID coercion rule, the received Patient ID "ABCDE" becomes "123-ABCDE"
*-123	Add suffix "-123" to the existing/received value	With the "*-123" pattern defined as Patient ID coercion rule, the received Patient ID "ABCDE" becomes "ABCDE-123"
*->12345	Replace existing/received value with the fixed string "12345"	With the "*->12345" pattern defined as Patient ID coercion rule, the received Patient ID "ABCDE" becomes "12345"
*->	Delete the existing value	With the "*->" pattern defined as Accession Number coercion rule, the received Accession Number "ABCDE" will be deleted
*->{0-9}	Keep only the numbers (0-9) within the received value string	With the "*->{0-9}" pattern defined as Accession Number coercion rule, the received Accession Number "ABCDE12345" becomes "12345"
*->{A-Z}	Keep only the alphabetic characters ('A'-'Z') within the received value string	With the "*->{A-Z}" pattern defined as Accession Number coercion rule, the received Accession Number "ABCDE12345" becomes "ABCDE"

Table 7 Data Element Coercion Rule Patterns

13.15.2 Exporting Patients/Studies

This utility allows users to export patients/studies stored in iQ-WEBX database to a local directory, using DICOM Media Storage Format (with DICOMDIR directory record). The content of the directory can later be burned into a CD-R/RW, DVD-R/RW/RAM or DVD+R/RW for media interchange.

Users need to enter the following information to export patients/studies:

- Export Media Type – Users can choose from CD, DVD or Dual-Layer DVD as media type for export destination. This field is used to determine the sub-directory name for the local export directory, as well as the media storage capacity (650 MB CD, 4.7 GB DVD, 8.5 GB Dual-Layer DVD or unlimited) when the exported studies need to be split into multiple volumes.
- Export Directory – This filed defaults to the '**export**' sub-directory where iQ-WEBX is installed.
- Media Label – This field is limited to 16 characters and is the media label applied to the DICOMDIR directory record when it is written to the final destination media. In case the exported studies require multiple volumes, the volume number will automatically be appended to the media label for each volume. For example, if the specified media label is "LABEL", the selected media type is CD, and the total exported studies span across three volumes, there will be three sub-directories named '**vol1**' through '**vol3**' under the specified destination export directory, with the media label set to "**LABEL-1**" through "**LABEL-3**" accordingly.
- Compress exported content into ZIP file – Clicking on this checkbox will compress the exported content into ZIP files, which can be downloaded directly from the **Job Status** page when the Export job is completed.
- Include External Viewer Program Files From Folder – Selecting this checkbox will make iQ-WEBX include all files as well as sub-directories from the specified folder as part of the export to the destination directory.

  NOTE: Use caution when selecting this option and be sure not to include the wrong external viewer directory that contains too many files and/or sub-folders, since iQ-WEBX will copy **recursively** all files and sub-directories under this viewer directory to the destination folder.

- Update – This button is used to update the current page with the calculated total number of selected studies and the total file storage space required to export the selected studies.
- Export Studies – After users have entered the destination directory for selected media type and the media label, they can click on this button to select from a list of patients/studies to export:

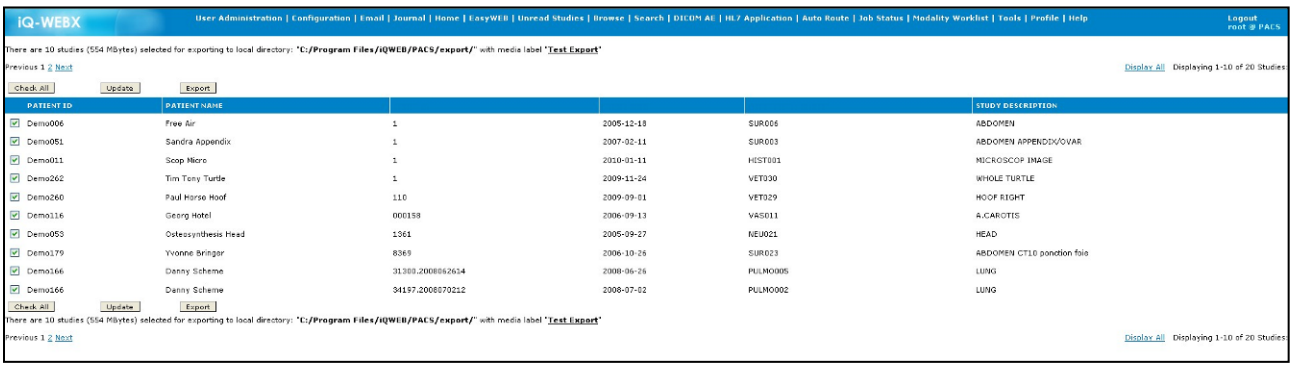

Figure 30 Export Patients/Studies Page

Users can select the interested patients/studies by clicking the checkbox at the beginning of each listed study, and click on the '**Update**' button to obtain the total number of studies selected and the total storage space required for exporting the selected studies. After selecting the interested patients/studies for export, the users can click on the '**Export**' button to start the export, iQ-WEBX will assign a database job to perform the export in the background so that it will not tie up the user interface. Users can check the progress of the export job at any time by visiting the 'Job Status' page, using the assigned job ID.

13.15.3 Importing External Patients/Studies

This utility allows users to import external patients/studies stored in DICOM Media Storage Format compliant (with or without **DICOMDIR** directory record) CD/DVD media into the iQ-WEBX database.

Users need to enter the following information to import external patients/studies into the iQ-WEBX database:

- Source Media Type – This can either be a Local Directory written in the DICOM Media Storage Format (with or without **DICOMDIR** directory record), or a local CD/DVD media drive.
    - If the source media type is a DICOM Media Storage Formatted local directory, iQ-WEBX will read the **DICOMDIR** directory record if it is present, parse any raw image file(s) encoded in DICOM Part 10 format recursively under the specified directory into the iQ-WEBX database. The database records are linked to the raw image files in the specified directory, so the raw image files do not need to be copied.
    - If the source media type is a local CD/DVD media drive, iQ-WEBX will read the DICOMDIR directory record, parse the directory into the iQ-WEBX database, and copy the raw image files on the removable media into a destination local directory specified by the user.
- Destination Directory – If the specified source media type is a local CD/DVD drive, users will also need to specify a local destination directory to copy the raw images files on the local media to.
- Import Studies – After user has entered the information above, user can click on this button to start the import.

When importing external images from a local directory but there is no **DICOMDIR** directory record present in the specified directory, iQ-WEBX will display a warning message below before trying to parse recursively any DICOM Part 10 encoded image files stored in the directory into the iQ-WEBX database.

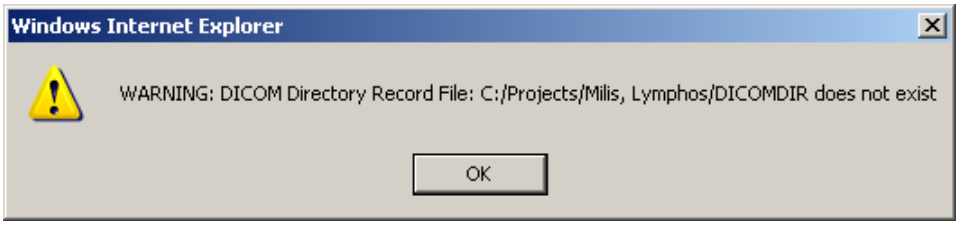

Figure 31 Warning Message for Importing without DICOMDIR

iQ-WEBX will assign a database job to perform the import in the background so that it will not tie up the user interface. Users can check the progress of the import job at any time by visiting the 'Job Status' page, using the assigned job ID.

13.15.4 Statistics Reports

This feature allows the Administrator ('**root**' for MySQL databases) or users with '**View**' privilege to query statistics reports for studies received during different time periods:

- Studies Received Yesterday
- Studies Received This Week
- Studies Received This Month
- Studies Received This Year
- Studies Received During a [**From, To**] date window

The Statistics Report page will be displayed after user clicks on the Get Report button. In addition to the study information displayed, the following attributes will be displayed for each study:

- The date the study was received
- The total number of images currently in this study
- The total size of the raw images file currently in this study

Figure 32 Statistics Report Page

13.15.4.1 Automatic Statistics Reports via Email

If a valid SMTP server and the Administrator's ('**root**' for MySQL databases) email address have been configured (See **Section 7** above), then iQ-WEBX will send statistics report emails to the Administrator's email address based on the following schedule:

- Daily Reports – iQ-WEBX will send statistics report for studies received during the previous day at 12:00 am local time every day
- Weekly Reports - iQ-WEBX will send statistics report for studies received during the previous week at 12:00 am local time on every Sunday
- Monthly Reports - iQ-WEBX will send statistics report for studies received during the previous month at 12:00 am local time on the first day of every month

13.15.5 Automatic Purging Archive Directories

This feature is useful when the storage resources are limited on the server where iQ-WEBX is installed, and the Administrators want to have iQ-WEBX automatically purge older studies stored in the iQ-WEBX database, by pre-defining a set of rules or parameters for automatic purging.

For Administrators (Users with '**Modify**' privilege), they can click on the **Automatic Purge Storage Directories** link from the **Tools** page to define the following set of parameters iQ-WEBX:

- Low Water Mark – This field is defined in terms of disk free space percentage ranging from 0 to 100. For each defined archive directory, iQ-WEBX will examine the disk usage information for the disk where the archive directory is located. If the disk free space percentage is lower than this defined **Low Water Mark**, iQ-WEBX will start purging older studies stored on this disk.
- High Water Mark - This field is defined in terms of disk free space percentage ranging from 0 to 100. This field must be greater than the value defined for the **Low Water Mark** above. When the disk free space percentage drops below the **Low Water Mark** defined above, iQ-WEBX will start to purge older studies stored in the corresponding archive directory. iQ-WEBX will sort the list of studies stored in this archive directory by the **Date** the studies were received, with the oldest study being the top of the list. iQ-WEBX will purge studies in the sorted list (removing the oldest study first) one at a time, until the disk free space percentage rises above the defined **High Water Mark**, at which point the automatic purging operation is then complete.
- Purge by Study Received Date (when study was received) – If this option is selected, iQ-WEBX will purge all older studies that were received more than N days ago.
- Purge by Study Date (when study was acquired or created) – If this option is selected, iQ-WEBX will purge all older studies with Study Date of more than N days ago.
- Purge by Source AE Title – If this option is selected, iQ-WEBX will purge all studies received from the specified Source AE Title.
- Schedule – Automatic purging schedule defined in terms of the 24-hour interval. iQ-WEBX will perform automatic purging **only** on this scheduled hour of the day, and will not perform another automatic purging for the same rule until the next 24-hour schedule.

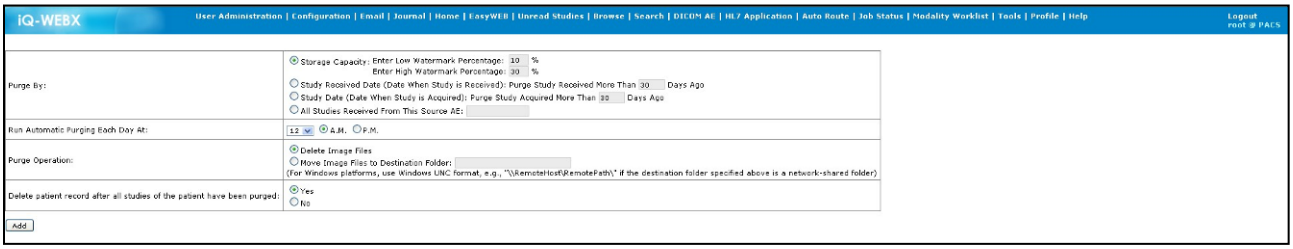

Figure 33 Automatic Purging Archive Directories

- Purge Option – When purging aged studies, user can select whether to:
  - Permanently delete the aged studies
  - Move them to a user-defined destination folder, for example: a shared network drive, so that they are still accessible but do not consume any more online storage resources.
    For Windows platforms, any shared network path must be entered in the Windows UNC format as \\RemoteHost\RemotePath\, instead of the mapped drive path such as Z:\LocalPath

NOTE: Caution must be taken when defining the Low/High Water Marks for the automatic purging operation, as iQ-WEBX will remove all series and images of the purged study. Make sure a reasonable set of numbers is chosen for the Low/High Water Marks. By default, the Low Water Mark is set to 5 (percent) and High Water Mark set to 10 (percent). It is recommended to disable this feature if there are enough storage resources available.

13.15.5.1 Automatic Purging By DICOM Data Element Filters

Users can also define individual DICOM data element filter with wild-card patterns, so that iQ-WEBX will automatically purge the matching DICOM studies based on the user-defined aging period and schedule.

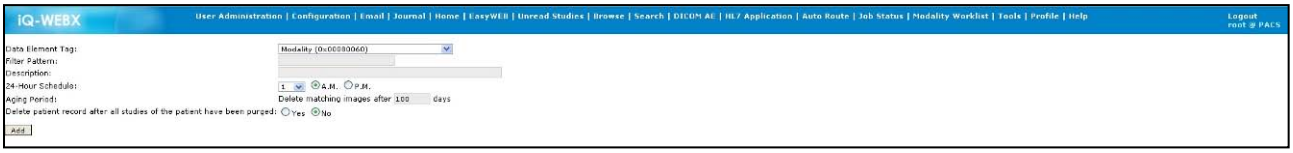

Figure 34 Automatic Purging By DICOM Data Element Filter

Data Element Tag – Currently the following DICOM data elements are supported:

- Modality (0008,0060)
- Institution Name (0008,0080)
- Referring Physician's Name (0008,0090)
- Study Description (0008,1030)
- Reading Physician's Name (0008,1060)
- Patient Name (0010,0010)

- Filter Pattern – This is the filtering pattern that will be used to match against the DICOM studies stored in the iQ-WEBX database. Wild-card characters '*' and '?' are supported.
- Description – Brief description which described the defined filtering pattern.
- 24-Hour Schedule – The schedule when iQ-WEBX should run the Automatic Purging by the defined DICOM data element filtering rule.
- Aging Period – The time period in number of days. iQ-WEBX will purge any matching DICOM study if the study was received before the defined aging period. The default value is 100 days.

For example, users can define the following Automatic Purging By DICOM Data Element rule:

- Data Element Tag – Modality (0008,0060)
- Filter Pattern – CT
- Description – Purge all CT studies received more than 100 days ago
- 24-Hour Schedule – 1:00 AM
- Aging Period – 100 Days

With the above Automatic Purging rule, iQ-WEBX will purge all CT studies stored in the database received more than 100 days ago every night at 1:00 AM local time.

13.15.6 Check Duplicate Patient IDs

Clicking on this URL link will display a list of duplicate patient IDs which have conflicts with existing patient IDs. All duplicate patient IDs will have the string format of **"$ID[$SourceAeTitle-$TimeStamp]",** where:

- $ID – The existing patient ID which has a different patient name from the duplicate
- $SourceAeTitle – The AE Title from which the images were received from
- $TimeStamp – The Date and Time stamp (in 'YYYYMMDDhhmmss' format) of when the duplicate patient ID was received

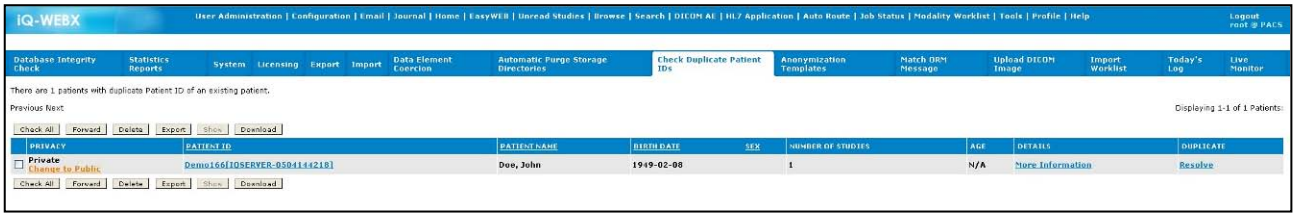

Figure 35 Checking Duplicate Patient ID

For example, there is an existing patient: "Danny Scheme", with an empty patient ID string. A new study is sent by the AE 'DICOM_TEST' to iQ-WEBX with the same empty string as the patient ID, but with a different patient name: "John Doe". In this example, iQ-WEBX will save the new study under a duplicate patient ID: '[DICOM_TEST-1106164654]' and flag this as a duplicate patient ID. The user can resolve this duplicate patient ID by clicking the '**Resolve**' link and select one of the following options:

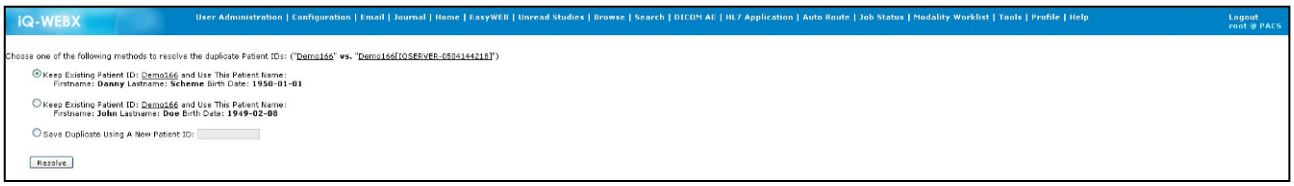

Figure 36 Resolving Duplicate Patient ID

- Keep Existing Patient ID and Use the Existing Patient Name – If this option is selected, the images labeled with the duplicate patient ID will be saved under the existing patient ID, and the existing patient name will be used. In the above example, the new study will be saved under the existing patient name of "Danny Scheme".
- Keep Existing Patient ID and Use the New Patient Name – If this option is selected, the images received with the duplicate patient ID will be saved under the existing patient ID, and the new patient name will be used. In the above example, the new study will be saved under the new patient name of "John Doe".
- Save Duplicate Using a New Patient ID – If this option is selected, the images labeled with the duplicate patient ID will be saved under the newly assigned patient ID, and the new patient name will be used. In the above example, the new study will be saved under the new name of 'John Doe' but with a newly assigned patient ID.
- Use Patient Names From Modality Worklist Record – If iQ-WEBX finds a Modality Worklist Record with the existing Patient ID, this option will be displayed to let users choose the Patient Names from the Modality Worklist Record, iQ-WEBX will then save both the existing and duplicate Patient IDs with the Patient Names from the Modality Worklist Record.

In most cases, the duplicates are created by human input error when entering patient names. For example, “John Doe” vs. “Jane Doe”, and these duplicates can be resolved by selecting either the existing patient name or the new patient name and keep the same patient ID. However, in rare cases, the duplicate patient IDs do belong to two distinct patients with truly different identities. In this case, assigning a new patient ID may help temporarily, but the ultimate solution is to fix the problem at the source, which is where the patient ID gets assigned at the local RIS/HIS systems.

13.15.7 Today’s Log File

Clicking on this link will display the iQ-WEBX log file from today to the browser.

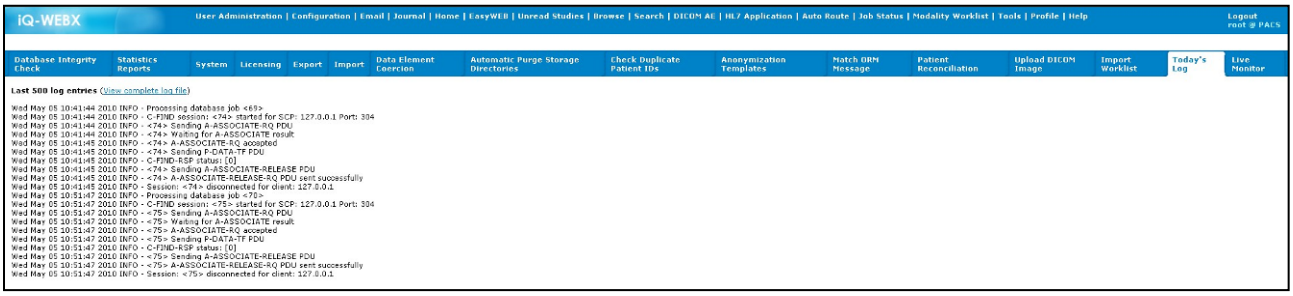

Figure 37 Today's Logfile Page

By default, only the last 500 lines of the current log file will be displayed. For viewing the full log file, please click on the link “View complete log file”.

13.15.8 Upload DICOM Image

Users with **‘Upload’** privilege enabled can click on this tab to upload DICOM Part-10 formatted raw images into the iQ-WEBX database:

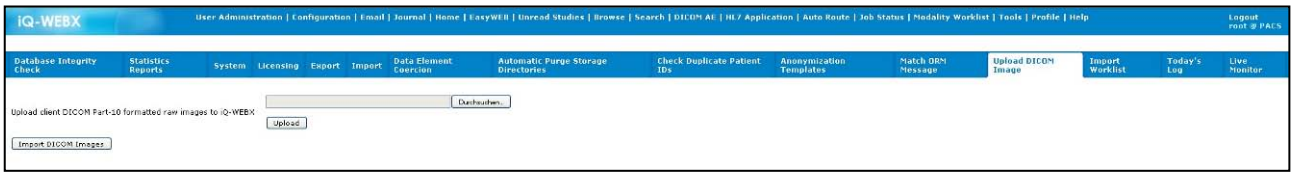

Figure 38 Upload DICOM Image Page

13.15.9 Matching ORM Message (Optional)

This feature is available to users who have purchased the optional HL7 Message Listener module to enable iQ-WEBX to receive and send HL7 messages. This tool can be used to select one of the received ORM (General Order) messages and match it with one or more received DICOM studies.

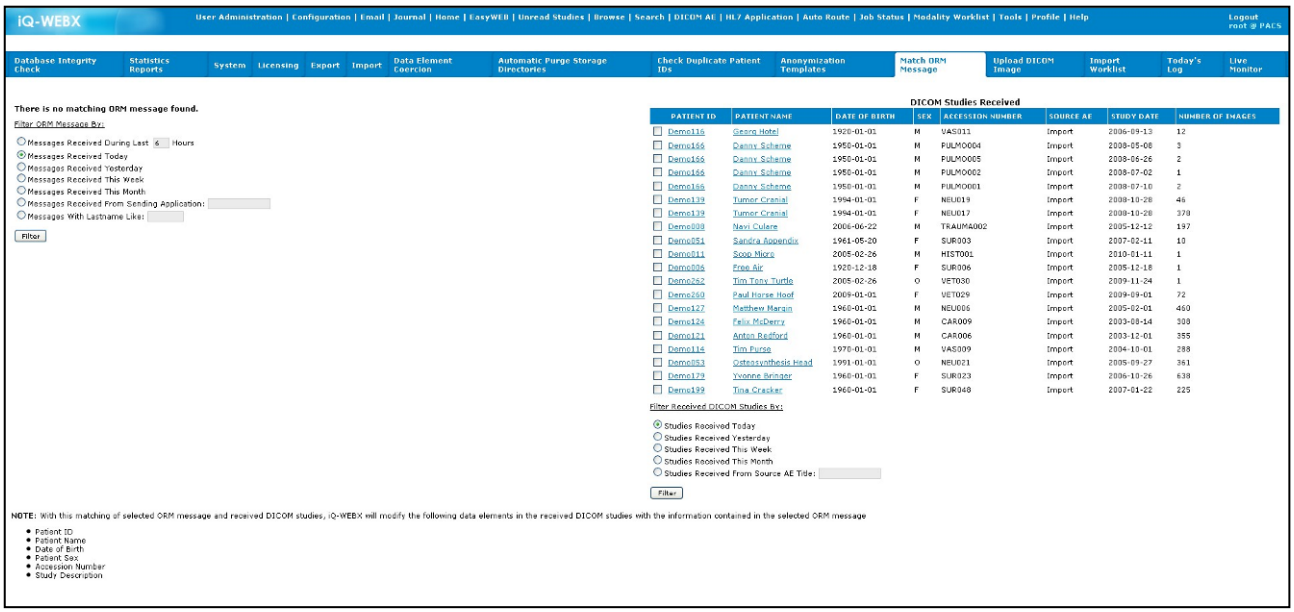

Figure 39 Matching ORM Message (optional)

After the user has matched the ORM message with one of more received DICOM studies, iQ-WEBX will modify the **Patient ID**, **Patient Name**, **Date of Birth**, **Patient Sex**, **Accession Number** and **Study Description** of the matching DICOM studies, with the information contained in the matching ORM message. Users can also optionally select a destination DICOM AE for iQ-WEBX to send the modified DICOM studies, by selecting the destination AE from the drop-down list and checking the '**Forward modified DICOM studies to this destination AE**' checkbox.

13.15.10 Database Integrity Check

This feature will make iQ-WEBX run an internal database integrity check where it will scan the IMAGE table of the iQ-WEBX database, and verifies that for each record in the IMAGE table, the corresponding raw DICOM image file does exist and is not empty. iQ-WEBX will report any missing or empty raw DICOM image file found from the integrity check.

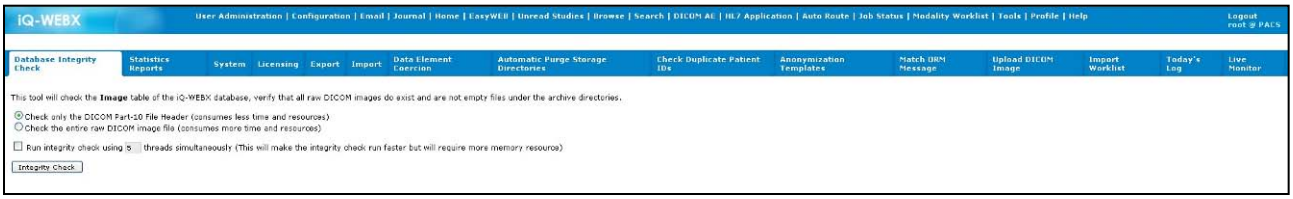

Figure 40 Database Integrity Check

13.15.11 Import Worklist

This feature will make iQ-WEBX import worklist records from a text file encoded in the Windows .INI format, and the imported worklist records will be inserted into the **WorkList** table in the iQ-WEBX database. Then any DICOM Modality Worklist (DMWL) client can query iQ-WEBX for the worklist data stored in the database.

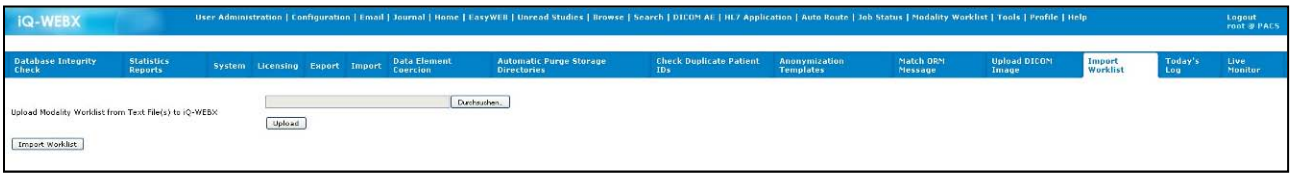

Figure 41 Import Worklist

The worklist text file should be formatted according to the following Windows .INI styles:

```
[RecordNum1]

Patient Name = Maximum 64 characters
Patient ID = Maximum 64 characters
Date of Birth = YYYY-MM-DD
Sex = Maximum 16 characters
Accession Number = Maximum 16 characters
Referring Physician = Lastname^Firstname^Middlename^Prefix^Suffix (Maximum 64 characters)
Requesting Physician = Lastname^Firstname^Middlename^Prefix^Suffix (Maximum 64 characters)

Requested Procedure ID = Maximum 16 characters
Requested Procedure Description = Maximum 64 characters
Requested Procedure Priority = Maximum 16 characters

Scheduled AE Station = Maximum 16 characters
Modality = Maximum 16 characters
Scheduled Start Date = YYYY-MM-DD
Scheduled Start Time = HH:mm
Performing Physician = Lastname^Firstname^Middlename^Prefix^Suffix (Maximum 64 characters)
Scheduled Procedure ID = Maximum 16 characters
Scheduled Procedure Description = Maximum 64 characters
Scheduled Procedure Location = Maximum 16 characters
Scheduled Procedure Pre-Medication = Maximum 64 characters
Scheduled Procedure Contrast Agent = Maximum 64 characters

Procedure Code Value = Maximum 16 characters
Procedure Code Meaning = Maximum 64 characters
Procedure Code Scheme = Maximum 16 characters
Procedure Code Scheme Version = Maximum 16 characters

Protocol Code Value = Maximum 16 characters
Protocol Code Meaning = Maximum 64 characters
Protocol Code Scheme = Maximum 16 characters
Protocol Code Scheme Version = Maximum 16 characters
```

13.15.12 Live Monitor (for System Administrator only)

When logged-in as the Administrator ('**root**' for MySQL databases), clicking on this tool will display a list of active DICOM connections (both incoming and outgoing) with iQ-WEBX:

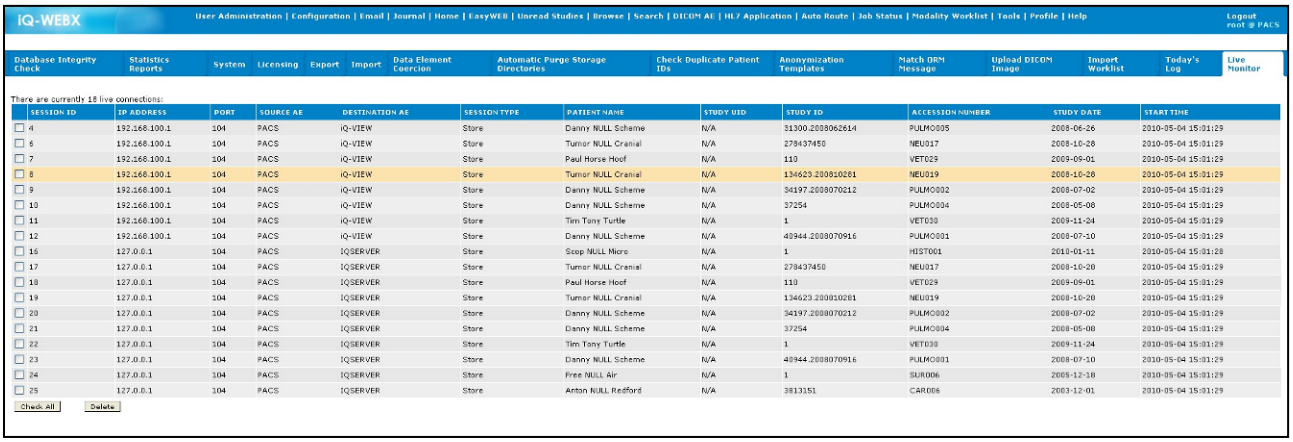

Figure 42 Live Monitor page

13.15.13 Patient Reconciliation

If the **Automatic Patient Reconciliation** feature is enabled by the Administrator ('**root**' for MySQL databases) (described in Section 7), iQ-WEBX will log automatic patient reconciliation events in the table shown below, which contains the following information for each event:

- When – Date and time of when the event took place
- Patient ID – Patient ID of the subject patient
- Date of Birth – DOB of the subject patient
- Original Patient Name – Original patient name before the event took place
- Modified Patient Name – Modified patient name after the event took place

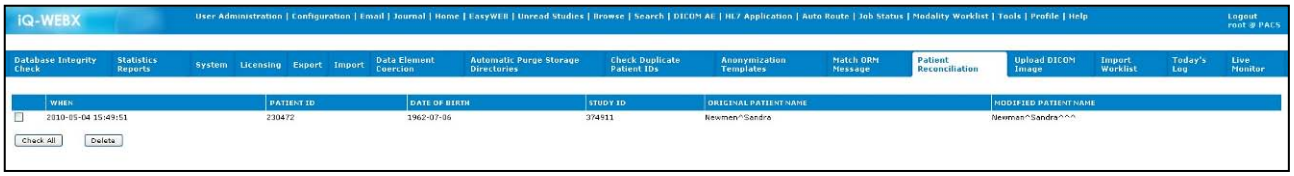

Figure 43 Patient Reconciliation Page

13.15.14 Anonymization Templates

For some client sites, e.g., clinical trials, users may want to anonymize all the patient demographics information, e.g., Patient Name, Patient ID, Date of Birth, etc., to meet the HIPAA Patient Privacy requirements. In such cases, users can pre-define a template with a set of specific syntax rules for iQ-WEBX to anonymize the corresponding DICOM data elements in the received studies, by clicking on the "Tools" → "Anonymization Templates" page from the Main Menu to add or modify a template for anonymization of the received DICOM studies.

The following DICOM data elements can be defined in the Anonymization Template:

- **Patient Name** (0x00100010)
- **Patient ID** (0x00100020)
- **Date of Birth** (0x00100030)
- **Gender** (0x00100040)
- **Patient's Age** (0x00101010)
- **Study ID** (0x00200010)
- **Referring Physician's Name** (0x00080090)
- **Study Description** (0x00081030)
- **Series Description** (0x0008103E)

The following macros can be used to define the anonymization syntax for the DICOM **Patient ID** (0x00100020) data element:

- **$MD5$ -** iQ-WEBX will anonymize the DICOM Patient ID data element with the MD-5 hash string of the original value. The resulting new Patient ID will be a fixed 32-char hex number string.
- **$STUDYUID$ -** iQ-WEBX will replace the value of the DICOM Patient ID data element with the current value of the **Study Instance UID** (0020,000D) data element.

NOTE: This anonymization implies that every anonymized study will be stored under a different Patient ID, which is the same as the Study Instance UID of that study.

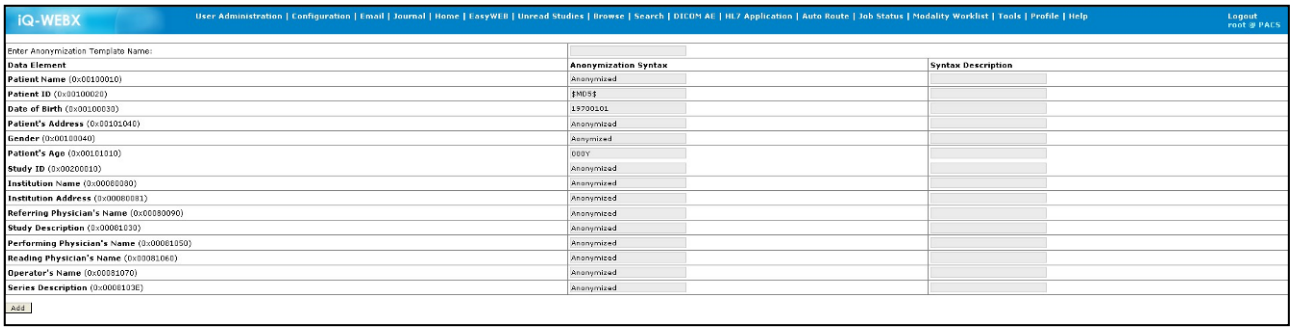

Figure 44 Anonymization Templates

Once the anonymization templates are defined, the users can select which template to use for anonymizing DICOM studies received from a source AE from the "**Edit**" menu of the Application Entity page (see Section 10.1 for more details).

13.16 Profile Page

This page allows users to modify their profile information, which include user's names, password and email address information.

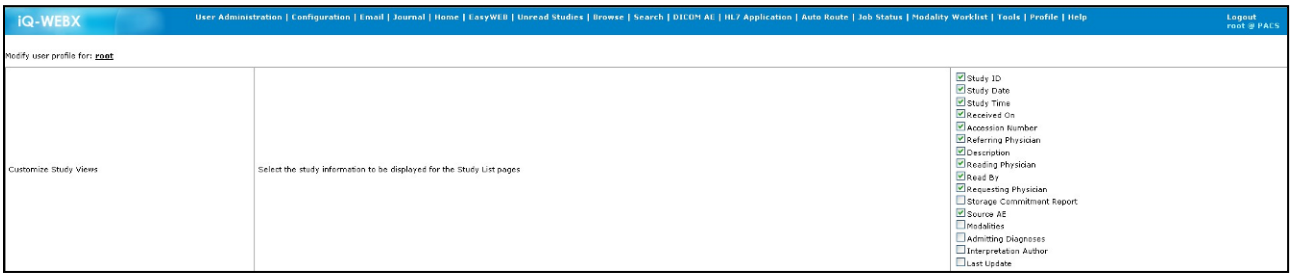

Figure 45 User Profile Page

13.17 Modality Worklist Page

This page displays the DICOM Modality Worklist (DMWL) data that is currently stored in the iQ-WEBX database, which contains the following tabbed pages:

- Today's Worklist – This page displays the worklist data for all procedures scheduled today
- Yesterday's Worklist – This page displays the worklist data for all procedures that were scheduled yesterday
- This Week's Worklist – This page displays the worklist data for all procedures scheduled this week
- This Month's Worklist – This page displays the worklist data for all procedures scheduled this month
- Last Month's Worklist – This page displays the worklist data for all procedures that were scheduled last month
- Enter New Worklist – This page allows the user to enter the DICOM Modality Worklist data manually into the database

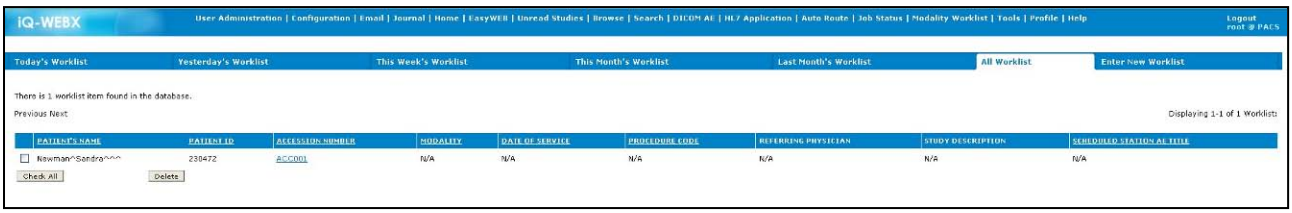

Figure 46 Modality Worklist Page

13.17.1 Enter New Worklist Page

This page allows the user to enter the DICOM Modality Worklist (DMWL) data manually into the database, so that they can be served by iQ-WEBX to the DMWL querying clients such as the input modalities.

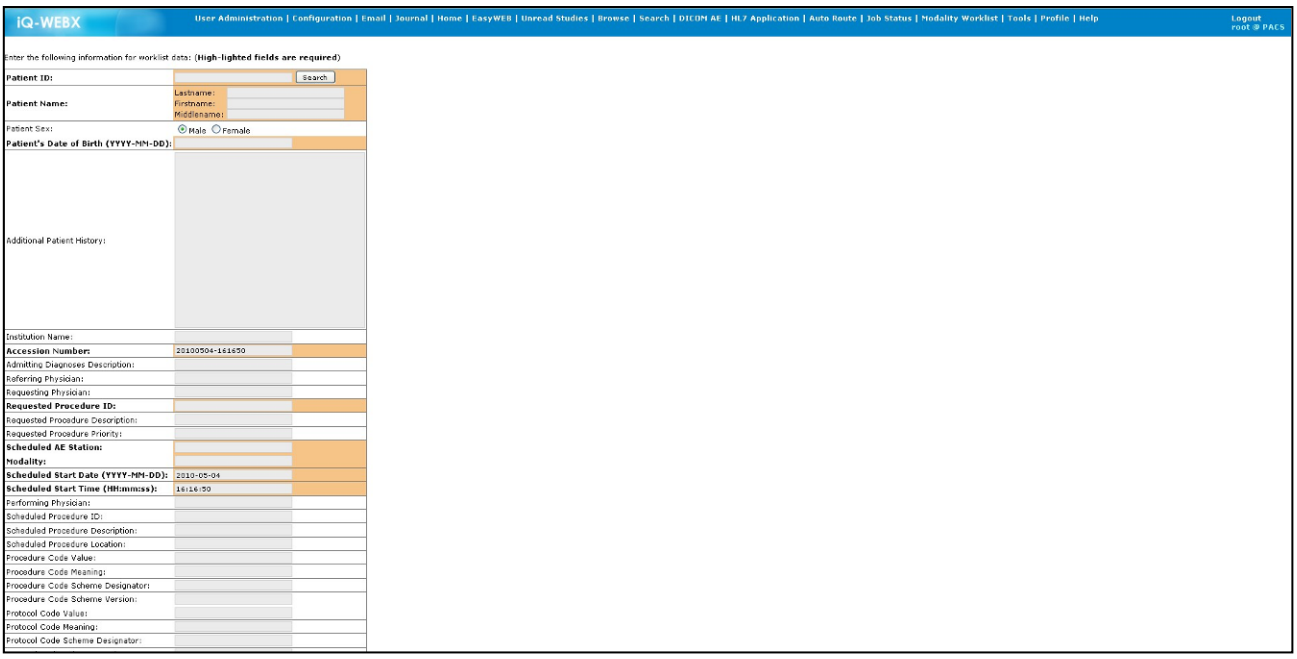

Figure 47 Enter New Worklist Page

14 FORWARDING IMAGES

When navigating through the patients, studies, series and images stored in the iQ-WEBX database, if the current user has the '**Forward**' privilege enabled, a '**Forward**' button will be displayed to allow current user to forward the selected patients, studies or series to a remote destination C-STORE SCP application entity (AE):

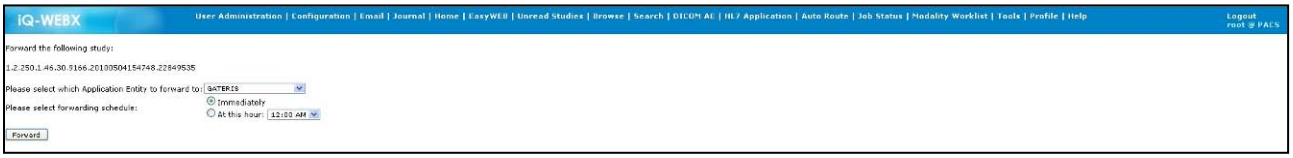

Figure 48 Forwarding Images

Users can select the destination AE from the drop-down list of remote SCP's., which are defined in the Application Entity Table described in Section 7 above. Clicking on the '**Forward**' button will schedule a database job to forward the selected patient(s), study(s) or series to the selected destination AE. The scheduled database job will then be processed by the iQ-WEBX DICOM Server component, where all stored images of the selected patient(s), study(s) or series are transmitted to the destination AE.

To find out if the selected patient(s), study(s) or series have been successfully forwarded to the destination AE, the user can click on the 'Job Status' link in the Main Menu bar, which is described in detail in the **Job Status Section** below.

15 POST-RECEIVE IMAGE COMPRESSION

When delivering DICOM images to remote web browser (iQ-X ActiveX plug-in), especially via a WAN connection, users often find the need for speeding up the image transfer between the iQ-WEBX and the remote browsers. If this is the case, the Administrator can enable the Post-Receive Image Compression feature of iQ-WEBX for each source AE, by selecting one of the DICOM compression transfer syntaxes from the list below:

- JPEG Lossless Transfer Syntax – If this value is selected, iQ-WEBX will compress any received image using the DICOM JPEG Lossless Compression (Selection Value 1, Process 14) transfer syntax (UID 1.2.840.10008.1.2.4.70), and will save the compression image with the ".ls" filename extension.
- JPEG Lossy Transfer Syntax – If this value is selected, iQ-WEBX will compress any received image using the DICOM JPEG Baseline Lossy Compression transfer syntax (UID 1.2.840.10008.1.2.4.50) for 8-bit images, and the DICOM JPEG Extended Lossy Compression transfer syntax (UID 1.2.840.10008.1.2.4.51) for 12-bit images. Both types of compressed images will be saved with the ".ly" filename extension.
  The image quality of the lossy compression is controlled by the following setting for each source AE if this transfer syntax is selected:

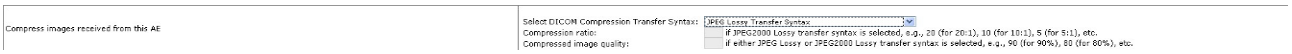

Figure 49 Compression Setting for JPEG Lossy Transfer Syntax

  The quality can be set to 1 (worst quality, best compression ratio) to 100 (best quality, least compression ratio). The default value of 90 (percent) will be used if the above setting is absent.
- Runtime Length Encoding (RLE) Transfer Syntax – If this value is selected, iQ-WEBX will compress any received image using the DICOM RLE compression transfer syntax (UID 1.2.840.10008.1.2.5), and will save the compression image with the ".rle" filename extension.
- JPEG2000 Part-1 Lossless Only Transfer Syntax – If this value is selected, iQ-WEBX will compress any received image using the DICOM JPEG2000 Part-1 Lossless Only transfer syntax (UID 1.2.840.10008.1.2.4.90), and will save the compression image with the ".j2k" filename extension.
- JPEG2000 Part-1 Lossless Or Lossy Transfer Syntax – If this value is selected, iQ-WEBX will compress any received image using the DICOM JPEG2000 Part-1 Lossless Or Lossy transfer syntax (UID 1.2.840.10008.1.2.4.91), and will save the compression image with the ".j2k" filename extension.
  The compression ratio or image quality of the JPEG2000 lossy compression is controlled for each source AE if this transfer syntax is selected.

  The compression ratio can be set to 20 (20:1), 10 (10:1), 5 (5:1), etc. with higher compression ratio generally leading to lesser image quality. The image quality can be set to 1 (worst quality, best compression ratio) to 100 (best quality, least compression ratio), and the default quality is 90 (percent).

With the above Post-Receive Image Compression feature enabled, iQ-WEBX will first check if any of the compressed images is available when delivering DICOM images to the web browsers, and will prefer the compressed images over the original images when transferring the images to the remote browsers. By default, iQ-WEBX uses the Lossless mode of the JPEG2000 Lossless or Lossy compression if both of the above settings are absent.

16 AUTOMATIC ROUTING

16.1 DICOM Image Routing

In addition to forwarding patient(s), study(s) or series manually from the iQ-WEBX web user interface, users can define automatic routing table entries to forward images automatically based on the following criteria:

- Source AE Title – This is the AE title from where the images are received. If the **Route By Source AE Title** option is selected and an image is received from the matching source AE title, iQ-WEBX will route the received image to the defined destination AE automatically, according to the routing schedule defined below.
- Key Attribute Tag – Currently the following list of DICOM attributes are supported:

  - Institution Name - (0008,0080)
  - Referring Physician Name - (0008,0090)
  - Patient ID - (0010,0020)
  - Protocol Name - (0018,1030)
  - Performing Physician's Name (0008,1050)
  - Reading Physician's Name (0008,1060)
  - Operator's Name (0008,1070)
  - Study Description (0008,1030)
  - Series Description (0008,103E)
  - Accession Number (0008,0050)
  - Modality (0008,0060)
  - Modalities In Study (0008,0061)

  If the **Route By Key Attribute** option is selected, users can define a **Key Matching Pattern** string (may include wild-card characters including '*' and '?') to match against received image attribute tags. If the key attribute tag in the received image matches with the specified matching pattern string, iQ-WEBX will route the received image to the defined destination AE automatically, according to the routing schedule defined below.
  - By Applying the Logical AND Operator (&&) to Both Criteria Above – If this option is selected, iQ-WEBX will apply both the Source AE Title and Key Attribute Tag criteria using the logical AND (&&) operator, i.e., the received images must match both the defined Source AE Title and Key Attribute Tag pattern before they can be forwarded to the defined Destination AE.
  - Destination AE Title – This is the AE title where the images will be sent.
  - Copy To Destination Folder – If this option is selected, iQ-WEBX will copy received images into the specified destination folder, instead of forwarding them to a destination AE.

- Hourly Schedule – Automatic forwarding schedule by the 24-hour clock, which can be either '**Immediately'**, a **[From,To]** spread window, a specified 24-hour clock interval, or a **[From,To]** immediate-filter window.
- Weekly Schedule – Automatic forwarding schedule by the 7-weekday daily schedule. The weekly schedule is combined with the hourly schedule above to determine when or if iQ-WEBX should forward the received images.
- Purge After Routing – Whether or not iQ-WEBX should purge the received images automatically after they have been routed successfully to the destination AE.

- Forward Existing [n] Oldest Studies To Destination AE – If this checkbox is selected, iQ-WEBX will also forward the [**n**] existing oldest studies to the destination AE, in addition to the newly received study.
- Wait [n] minutes for all instances of the study to be received, and forward the entire study instead of individual images – If this checkbox is selected, iQ-WEBX will wait the specified **[n]** minutes for all images of the study to be received, then forward the entire study via a single DICOM association to the destination AE and transfer all images of the study.
- Do not use the AE Title assigned to iQ-WEBX – If this checkbox is selected, iQ-WEBX will use either the Original/Source AE Title from the source AE, or the User-specified AE Title (instead of using the AE Title configured for iQ-WEBX) when sending images to the destination AE.

When specifying the AE titles for automatic routing entries, the source and destination AE titles are used as keys to the routing table, which implies that one source AE can have one (uni-cast) or more (multi-cast) destination AE (s) associated with the routing entry. In other words, received images from the same source AE can be forwarded to multiple destinations AEs if there are more than one destination AE defined for the source AE.

- If '**Immediately**' is specified as the schedule for the automatic routing table, then images will be forwarded to the destination AE (s) as soon as they are received.
- If a '**From**' and '**To**' Spread Window is specified as the schedule for the automatic routing table, then iQ-WEBX will forward any received images to the destination AE (s), by choosing an hourly schedule that is evenly distributed across the specified [**From**, **To**] Spread Window. This scheduling option is useful when users want to spread the automatic routing jobs evenly across the [**From**, **To**] window, thus avoid making any hour particularly busy with too many routing jobs.
- If a fixed 24-hour clock interval is used, then the received images will be forwarded at the specified hour. For example, if the schedule is set to 9:00 P.M., then the received images will not be forwarded to the destination AE (s) until the local time is 9:00 P.M. If there are any images received between 9:00 P.M. and 9:59 P.M., they will be forwarded immediately, and images received after 9:59 P.M. will be forwarded the next day at 9:00 P.M.
- If a '**From**' and '**To**' Immediate-Filter Window is specified as the schedule for the automatic routing table, then images will be forwarded to the destination AE (s) immediately if the local time is within the specified [**From**, **To**] Immediate-Filter Window.

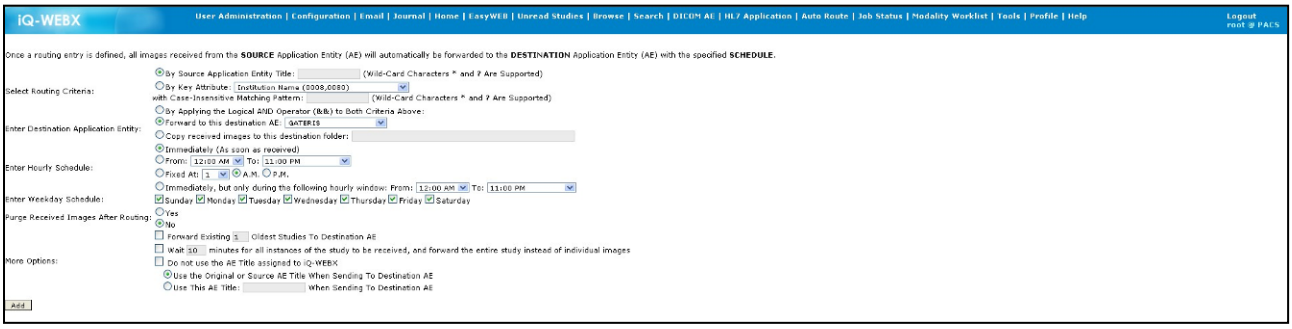

Figure 50 Automatic DICOM Image Routing

Example routing rules:

- Route By Source AE Title – Users can click on the **By Source Application Entity** option and enter the following parameters:

Source AE Title	-	Scanner
Destination AE Title	-	IQSERVER
Hourly Schedule	-	Immediately
Weekly Schedule	-	Any day
Auto Purge	-	No

With the above routing rule, all images received from the AE "Scanner" will be automatically routed to AE "IQSERVER" as soon as they are received. The received images will be kept in iQ-WEBX database after they are routed to the destination AE "IQSERVER".

- Route By Key Attribute – Users can click on the **By Key Attribute** option and enter the following parameters:

Key Attribute Tag	-	Referring Physician's Name (0008,0090)
Matching Pattern	-	John D*
Destination AE Title	-	DCMTK
Hourly Schedule	-	1:00 A.M.
Weekly Schedule	-	Tuesday
Auto Purge	-	Yes

With the above routing rule, all images received with the referring physician name such as "John Doe" or "John David" will be automatically routed to AE "DCMTK" at 1:00 A.M local time on Tuesdays. (However, received images with referring physician name such as "Dr. John Doe" or "Mr. John David" do not match with the defined routing pattern string and therefore will not be routed.) The received images will be purged after they have been routed successfully to the destination AE "DCMTK".

To find out if the statuses of the automatically routed images and check whether they have been successfully sent to the destination AE(s), the user must login as the Administrator/Super-user account ('**root**' for MySQL databases) and click on the 'Job Status' link in the Main Menu bar. This is because the automatic routing jobs are internal System level properties and do not belong to any particular user, therefore they should be maintained only by the system administrator.

If for any reason (e.g., no receiving application is accepting images at the destination AE) the automatically routed images cannot be delivered successfully, iQ-WEBX will retry up to a maximum of three (default) attempts to deliver the failed images to the destination AE. This **Maximum Retries** parameter is configurable by modifying the following Windows Registry value:

HKEY_LOCAL_MACHINE\SOFTWARE\IMAGE Information Systems Ltd.\iQ-WEBX\{AETITLE}\MaximumRetries

Where:

{AETITLE} is the Application Entity Title you have assigned for iQ-WEBX during installation.

16.2 HL7 Message Routing (optional)

If the HL7 Message Listener option is installed, users can define automatic routing table entries to forward received HL7 messages automatically based on the following criteria:

- Source Application Name – This is the HL7 application from where the messages are received. If the **Route By Source Application Name** option is selected and a message is received with the matching "**Sending Application**" field in the **MSH** Message Header, iQ-WEBX will route the received messages to the defined destination HL7 application automatically, based to the routing schedule defined below.
- Key in Message Header – Currently the following keys are supported:

    - **Message Type**
    - **Receiving Application**
    - **Receiving Facility**
    - **Sending Facility**

    If this option is selected, users can define a **Key Matching Pattern** string (may include wild-card characters such as '*' or '?') to match against the **MSH** message header in the received HL7 messages. If the key attribute in the received messages matches with the specified matching pattern, iQ-WEBX will route the received messages to the defined destination HL7 application automatically, according to the routing schedule defined below.

- Destination Application – This is the destination HL7 application where the received messages will be sent.
- Schedule – Automatic forwarding schedule, which can be either '**Immediately'**, a **[From,To]** 24-hour clock window, or a specified 24-hour clock interval:

    - Immediately - Messages will be forwarded to the destination HL7 application (s) as soon as they are received.
    - '**From**' and '**To**' Schedule Window - Messages will be forwarded to the destination HL7 application (s) when the current time is within the specified [**From**, **To**] Schedule Window.
    - Fixed 24-hour clock interval - Messages will be forwarded at the specified hour. For example, if the schedule is set to 9:00 P.M., then the received messages will not be forwarded to the destination HL7 application (s) until the local time is 9:00 P.M. If there are any messages received between 9:00 P.M. and 9:59 P.M., they will be forwarded immediately, and messages received after 9:59 P.M. will be forwarded the next day at 9:00 P.M.

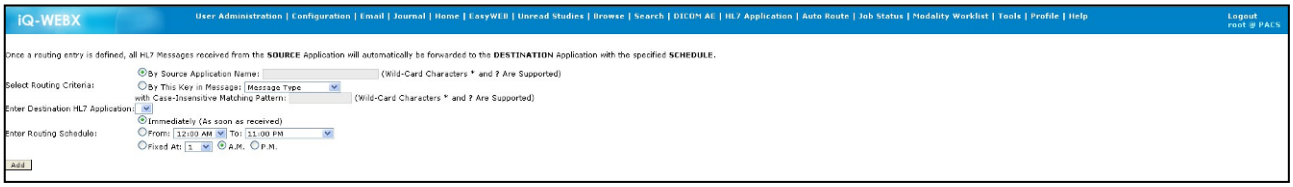

Figure 51 Automatic HL7 Message Routing (optional)

17 PRINTING IMAGES

When navigating through the patients, studies, series and images stored in the iQ-WEBX database, if the current user has the '**Print**' privilege enabled, a '**Print**' button will be displayed to allow current user to print the selected patients, studies or series to a remote destination DICOM Printer/Print SCP:

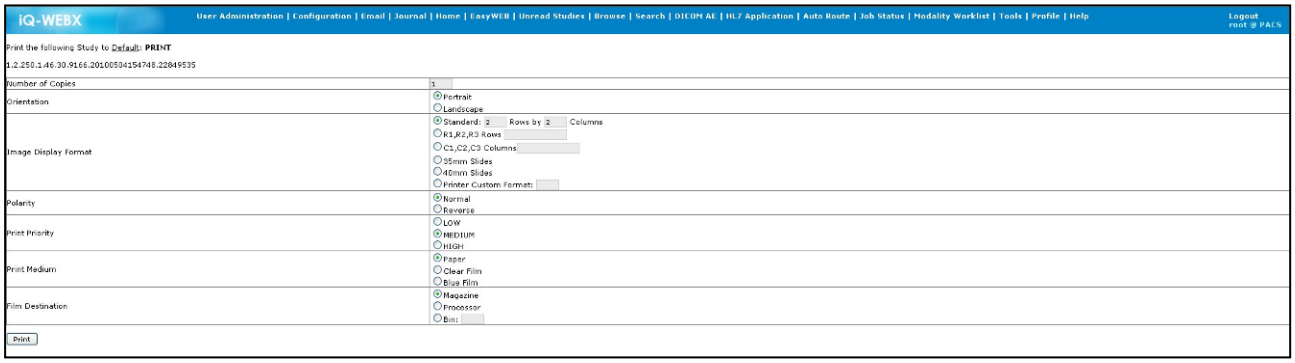

Figure 52 Printing to Remote DICOM Printer

From the above **Print** menu page, users can select the destination DICOM printer and choose the following printing parameters:

- Number of copies
- Film orientation
- Image display format (can be printer specific)
- Print priority (if supported by remote printer)
- Print medium
- Film destination
- Convert color images to grayscale (if applicable) – If the images being printed are a mixture of both color and grayscale images, users can choose whether or not to convert all color images to grayscale before sending them to the DICOM printer which may not support printing color images

18 JOB STATUS PAGE

The current status of all database jobs submitted by the current user are displayed by clicking on the 'Job Status' link of the Main Menu bar in the Job Status page, with the 'Completed' jobs displayed first followed by 'Failed' database jobs.

If the current logged-in user has the '**Modify**' privilege, then there will be a '**Retry**' button as well as a '**Delete**' button displayed in this page if there is any failed job. User can select the job (s) to delete or retry by clicking on the checkbox in front of the job ID column and pressing either the '**Delete**' button or the '**Retry**' button.

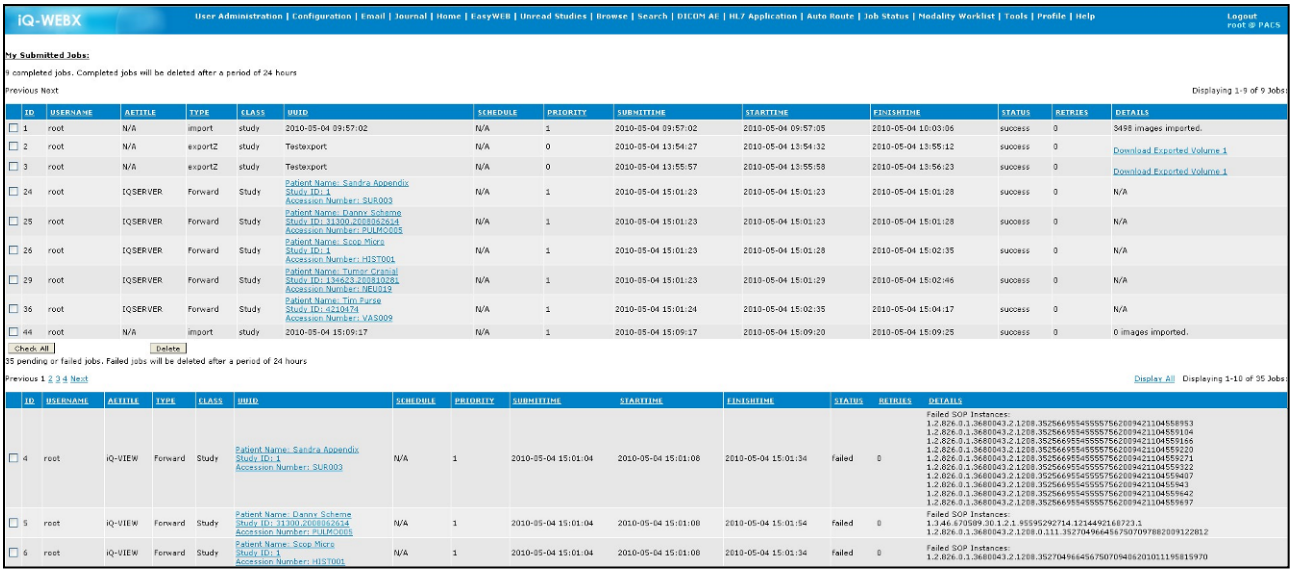

Figure 53 Job Status Page

- Id – Job ID which is generated automatically by the MySQL database
- User – The username which created the database job
- AeTitle – Destination AE title
- Type – Job type, e.g., 'Forward', 'Print', etc.
- Level – Hierarchy level, e.g., 'Patient', 'Study', 'Series', etc.
- UID – Unique ID in the hierarchy level, e.g., patient ID, study UID, series UID, etc.
- SubmitTime – Timestamp on when the database job is submitted
- StartTime – Timestamp on when the database job starts processing
- FinishTime – Timestamp on when the database job finishes processing
- Status – Success or Failure
- Details – Any detailed errors if the database job has failed

IMAGE INFORMATION SYSTEMS LTD.
OFFICE 404, 4TH FLOOR | ALBANY HOUSE | 324/326 REGENT STREET | LONDON W1B 3HH | UNITED KINGDOM
TEL. IK: +44 207 193 06 20 | TEL. GER: +49 381 660 80 43 | TEL. US: +1 213 985 35 20
FAX UK: +44 207 976 48 97 | FAX GER: +49 381 203 38 59 | FAX US: +1 213 325 26 30
WWW.IMAGE-SYSTEMS.BIZ | INFO@IMAGE-SYSTEMS.BIZ