RSNA® MIRC Teaching Files

The RSNA Medical Imaging Resource Center-Teaching File System (MIRC-TFS): A Secure, Feature-rich Tool for Radiology Teaching Files

The RSNA Radiology Informatics Committee/MIRC Subcommittee

Introduction

What is MIRC-TFS?

The Medical Imaging Resource Center Teaching File System, known as MIRC-TFS, is a teaching file system developed and supported by the Radiological Society of North America (RSNA). MIRC-TFS allows radiologists, residents, and students to create and view educational documents containing de-identified medical images using a Web browser. The system can be used to create teaching files to satisfy the ACGME requirement that an accredited graduate program in radiology education have an actively maintained teaching file.

Why use MIRC-TFS?

Radiologists in all practice settings want to be able to store cases consisting of images and associated clinical information for future education, quality assurance, and follow-up patient care. A recent RSNA survey of practicing radiologists and radiology trainees revealed that most radiologists currently use some method of storing cases. These methods vary widely: cases may be stored on USB drives, on personal laptops, in PowerPoint presentations, in paper notebooks or in online repositories like Dropbox and Google's Picasa. All of these methods potentially compromise protected health information (PHI) and may violate the information security standards outlined by the United States' Federal Health Information Portability and Accountability Act (HIPAA).

MIRC-TFS is a superior alternative to these improvised teaching file solutions. It creates a secure, central repository for radiological cases with robust and automatic removal of PHI, strict network security, and extensive access logging.

In addition to security, the software has a rich feature set. Users can rapidly create cases from a PACS workstation or standalone computer. Cases can include full, scrollable DICOM datasets and selected images. The author can choose to share the case with colleagues or keep it private. Cases can be exported from MIRC-TFS in a variety of formats, including as ready-made PowerPoint presentations for use in educational conferences. The software is free, updated regularly and supported by the RSNA.

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System Details: Software, Hardware, and Networking

Software

MIRC-TFS is an open source program written in Java that is downloaded from the RSNA's website (https://rsna.org/tfs.aspx). It runs on Windows, Linux, Solaris, and Mac OS. It provides user authentication based on its own secure password mechanism or through a network connection to an institution's LDAP server. It can be run in a virtual machine (VM) environment or on dedicated hardware.

In an institutional setting, MIRC-TFS is typically run as a Windows or Linux service, starting automatically when the system starts and shutting down automatically when the system is taken down.

Hardware Requirements

MIRC-TFS hardware requirements are modest. Any Intel-based computer built after 2008 with at least 4GB RAM and a 500 GB hard drive will be sufficient to run MIRC-TFS under Windows XP or later, Linux, Solaris, or Mac OS X.

Networking and PACS Integration

MIRC-TFS cases can be created in several ways. In the method that requires no integration with other clinical systems, users can create cases by uploading image files (JPG, PNG, TIFF) through a Web browser. The optimal method of operation, though, is to enable MIRC-TFS to automatically generate cases using DICOM images sent to it from the PACS. For this, MIRC-TFS needs to be installed on a network that can be accessed by the PACS (either the same network or one to which the PACS can make an outbound connection). MIRC-TFS never initiates a query to the PACS.

MIRC-TFS comes pre-configured to receive image transfers from the PACS. Configuring the PACS to send to MIRC-TFS typically requires defining a DICOM destination on the PACS, specifying the IP address and port of the MIRC-TFS system's DICOM Storage SCP (initially configured as port: 1082) and choosing an AE Title (typically "MIRC", identifying the main library of the MIRC-TFS site). MIRC-TFS accepts all AE Titles. SSL can also be implemented on the MIRC-TFS server to encrypt image and data transfers between the client and MIRC server.

Security

Protecting Patient Information

MIRC-TFS applies a robust de-identification process to all DICOM images it receives. The default de-identification rules implement the DICOM PS 3.15-2011 Basic De-identification Profile, the most stringent one defined by the DICOM standard. After pushing images from PACS and using the default MIRC-TFS settings, users must first securely login to MIRC-TFS to identify their cases by patient name in "DRAFT Mode". Editing and saving the DRAFT case defines the logged-in user as the owner of the case, and creates a final case that contains no

PHI. This makes it a more secure solution for creating teaching files than exporting images containing PHI to a computer, Web location or USB storage device. MIRC-TFS can also be configured to remove PHI burned into images, such as ultrasound or nuclear medicine exams.

Network Security

The servlet container at the core of MIRC-TFS has been successfully tested by the National Cancer Institute's CBIIT Security Team using the IBM Rational AppScan 8.5.0.1 security test suite, and has been approved for deployment in NIH and NCI applications. It defends against cross-site scripting attacks and cross-site request forgery. It also defends against attempts to access resources outside the server's root tree. The program is used extensively in NCI clinical trials and in the National Biomedical Image Archive and Cancer Image Archive, both at archive sites and at image acquisition sites.

Most MIRC-TFS systems are placed on networks protected from the Internet. However, it is also possible to securely share only de-identified documents with other "public" MIRC-TFS sites (including the RSNA's site, http://mirc.rsna.org) by placing the system outside the institutional firewall.

Access Control

MIRC-TFS case documents contain individual permissions controlling who can view, edit, or export a document. Documents can provide specific access permissions both to individual users and to user groups (e.g., staff, resident, department). By default, a document is visible only to its author(s). Documents can be made visible to non-authors only after they have been reviewed and approved. For example, residents might create cases that are visible only after being approved by a faculty member. MIRC-TFS has an optional access log that can record every access to a case document, including date and time, the accessing user's identification, and the patient and study information contained in the accessed document.

Installation, Administration and Support

Installation

Installation of MIRC-TFS requires the installation of Java, the Java ImageIO Tools, and the MIRC-TFS software. On a Windows platform, a single installer provides all three components. On other platforms, installing each component individually is required. A typical installation takes less than half an hour. Guidance is available on the RSNA main site (http://www.rsna.org/tfs.aspx) and the RSNA MIRC-TFS Wiki (http://mircwiki.rsna.org).

Administration and Support

In a radiology practice or department, the hardware hosting a MIRC-TFS site is typically provided and maintained by the IT department. Once installed, MIRC-TFS is typically managed by a radiology user – a radiologist, department administrator or administrative assistant. The MIRC-TFS administrator creates users and assigns roles. Roles confer special privileges to users to manage the system ("admin"), create documents ("author"), and make documents visible to unauthenticated users ("publisher").

MIRC-TFS is typically not clinically mission-critical and does not require local after-hours support. Nonetheless, the teaching file cases it contains are a valuable institutional resource and may be necessary for maintenance of the accreditation of the institution. Thus, many large institutions include the MIRC-TFS system in their backup process. Such a process only has to copy a single directory tree to back up or restore the entire MIRC-TFS site, including all documents and the MIRC-TFS software.

For questions, or to request support, contact RSNA staff at mircsupport@rsna.org.