

DICOM Connectivity Framework - DCF™

The DICOM® Connectivity Framework (DCF) is an advanced, object-oriented collection of native software components implementing the DICOM v3.0 protocol for medical imaging systems. It includes a wide range of tools and utilities that support DICOM software development and testing. The DCF is the only DICOM solution that provides a consistent API to C++, Java and C#.Net in managed code, as well as support for 32 and 64 bit Windows, Linux, and other UNIX platforms.

The DCF also supports the DICONDE, DICOS and veterinary customizations for utilizing DICOM.

Frustrated with your current DICOM Toolkit?

- Struggling because you don't have managed language support for your code development?
- Exasperated because you don't have comprehensive SOP class support?
- Disappointed that you can't select a different configuration for each association?
- Stressed trying to integrate your database with your toolkit?
- Frustrated trying to selectively insert, delete, edit, re-tag or encrypt DICOM attributes?
- Upset that you don't have real-time connection statistics monitoring and reporting capability?
- Overwhelmed trying to customize DICOM servers and clients in the field?
- Irritated that you can't get helpful tech support when you need it?

Solve these frustrations and more. Choose the DCF as your DICOM SDK.

The DCF enables a medical imaging system—modality, printer, scanner, archive, workstation—to communicate with other devices over a network, using the DICOM protocol. It allows an OEM to provide DICOM connectivity for their application or modality with a minimum of effort by providing:

- A robust, portable, high-performance implementation of DICOM protocol services
- A simple yet powerful API for communicating medical imaging information between the OEM's code and the DCF, such that detailed knowledge of the DICOM protocol is not required
- An easily customizable architecture that enables an OEM to fully integrate the DCF into their own software application

DCF Architecture

- Advanced, object-oriented, component-based architecture implemented in managed code
- Pluggable common services, such as logging and configuration management
- Multi-threaded implementation
- Component-based logging, debugging, and configuration

DCF Developer Support

- Example DICOM client and server programs for all major SOP classes
- Component-based framework facilitates rapid application development
- Multi-language support: C#.Net, Java, or C++
- Multi-platform support: Windows, Linux or other Unix platform
- Full built-in DICOM compression support, plus optional integration with Aware's JPEG libraries
- Multiple integration models
- Automatic generation of makefiles, Visual Studio project files, configuration files, and docs
- Online API and application documentation
- Automatically generated debug and trace instrumentation
- Web-based service/diagnostic/configuration interfaces with real-time access and update
- IOD object generation technology – custom Java, C++, or C#.Net wrappers for DICOM data sets are automatically generated

DICONDE - Digital Imaging and Communication in Nondestructive Evaluation
DICOS - Digital Communication in Security
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DCF DICOM SDK Overview

Comprehensive DICOM SOP class support – SCU and SCP support for all SOP classes is provided by library components and pre-built applications.

Chapter-10 media storage support – Read or write DICOM file sets on removable media with DCF libraries and applications in FSC, FSR, or FSU roles.

Support for all DICOM transfer syntaxes – In addition to standard ILE, ELE, EBE encoding, DCF provides JPEG and JPEG2000 support for lossy and lossless image transmission. Transfer syntax can be easily changed on the fly – e.g., receive in one syntax, write to disk in another. Transfer Syntax Codec objects can be installed dynamically, without re-compiling to support future encoding types.

Multiple language support – DCF provides DICOM components in C# .NET, C++, and Java. For Java and C#, components are pure Java and managed C#.

Multiple Platform Support – Released versions exist for following platforms

- Windows XP/Server/Vista (x86 & x64)
- Linux (x86 & x64)
- Mac OS X & other UNIXes (Contact LBS for information about these and other platforms.)

Advanced API and Development Environment – Complements UNIX, MS Visual Studio or Java Eclipse IDE to allow rapid application development. DCF docs can be viewed from any web browser. A powerful yet simple API for accessing DICOM data elements and performing DICOM file and network I/O lets you write enterprise class client (SCU) or server (SCP) applications with ease.

Unique Features

Advanced Dataset/DIMSE Message Filtering – Create custom filters, use DCF provided classes to perform common image manipulations, or field configurable insertion, deletion, editing, re-tagging, or encrypting of DICOM attributes. Perform text substitutions using regular expression syntax. Easily create or modify complex DICOM sequences on the fly. Automatically insert dynamically generated UID's and timestamps (DA, TM, DT). Changes to datasets can be automatically tracked within the datasets. Insert your own implementation of PDUFilter to perform low level monitoring or modification of DICOM Protocol Data Units (PDUs).

Per-association configuration – Dynamically select SCU or SCP settings based on flexible, OEM extensible rules. Configure access control, I/O parameters, filter sets and logging on a per-connection basis.

Pixel Data Streaming – streaming mode transfers allow very large data sets (> 2GB, e.g., multi-slice CT) to be transferred between network and storage devices without allocating large blocks of memory.

Performance Tracking – An extensible set of DICOM connection and I/O statistics is maintained by the DCF and can be easily accessed in real time by performance monitoring applications.

Logging Facilities – The DCF provides advanced logging facilities. Use existing log output classes, or add your own. Troubleshoot low level DICOM connection problems, redirect selected messages to a separate log for HIPAA compliance, or send critical system error messages via email log forwarding, e.g., to a cell phone. Debug or tracing instrumentation is automatically generated for DCF or OEM code.

Configuration Object Data Base – A simple, powerful distributed object database stores configuration information in a hierarchical layout. Observer notifications allow high availability applications to dynamically adapt to configuration changes.

System Manager – Implement your own scheme, or use the dcf_sysmgr and AppControl API's to provide configurable startup and shutdown management for collections of related processes. Run as a normal application or install as a Windows Service.

Web-based service/diagnostic interface – View and manage log files, start and stop applications, adjust debug settings on running processes, or edit filter sets remotely using your web browser.

Extensive scripting support – In addition to our world class C#, Java, C++ API's, users can perform complex tasks quickly using numerous command line applications. Our custom DICOM text file representation allows users to easily create or modify DICOM data sets without writing code.

Numerous example programs – Source code for all example programs, as well as for many DICOM applications, is included and available for user customization.

Tools and Utilities

PowerTools – Each copy of the DCF comes with a rich set of tools and utilities to facilitate your software development efforts. In addition, a copy of PowerTools™ is included with every DCF toolkit.

