

Why Choose the DICOM Connectivity Framework?

The DCF's next-generation framework provides reliable, high-level components to help speed your DICOM interface development and reduce software costs on your platform of choice. Handling all the nuances of DICOM, the DCF allows your programmers to concentrate their efforts on your domain specific application rather than on learning the nuances of DICOM.

Connectivity – The DCF provides trouble-free, reliable connectivity in diverse environments. It has been tested and proven in and against a wide variety of OEM devices from leading manufacturers. Today the DCF runs in thousands of devices around the world.

Flexibility – We balance the opposing requirements of abstracting or encapsulating complexity, while still providing access to lower level elements, allowing the OEM developer to choose the appropriate level at which to integrate DICOM services.

Reliability – Using our proprietary automated testing software, publicly available DICOM validation tools, memory leak/corruption test tools, and a large automated test suite, the DCF is rigorously tested daily.

Performance – The DCF was designed from the start to provide a high performance DICOM interface in a multi-threaded, OO design, capable of handling numerous associations in a single process.

Support – Web-based problem tracking assures that no issue or problem slips through the cracks. Customers receive prompt telephone and e-mail support, and have access to senior developers when appropriate.

Documentation – Most DCF documentation is generated directly from source code, so that low-level interface (API) and class documentation is always up-to-date and available. User, service, design, and higher-level architectural documentation is also provided.

Configurability – The DCF supports configuration on a per-association basis and allows for dynamic reconfiguration of running applications.

Utilities – A rich set of utilities is provided, including web-based test and troubleshooting tools, test image generation, command-line driven clients and servers, data set dump, along with access to a large suite of validation test scripts.

Applications – Other DICOM applications and tools, based on DCF libraries, are available, including tools to support the following functions: message filter, protocol analyzer, store router, and migration controller.

Cost

The DCF development tools and run-time licenses are in a variety of forms and are competitively priced. The ease of integration of the DCF components using modern OO programming practices provides significant reduction in time-to-market and software development costs, lowering the total cost of ownership and making the DCF the clear choice for new development efforts, as well as for retrofits of existing products.

About Laurel Bridge Software

Engineers from Laurel Bridge Software, Inc. and our sister company, Blair Computing Systems, Inc., have been developing technical software since 1986 and medical imaging systems since 1989.

We have a wealth of experience developing modalities, workstations/viewers, archives, PACS networks, and protocol or image converter boxes of all shapes and sizes. We have worked with a variety of companies including AGFA, Cardiac Sciences, Codonics, the Department of Veterans Affairs, Dexela, DuPont, DR Systems, Faxitron, F & S Apex Radiology, Hologic, LORAD, MedQuest Associates, Nighthawk Radiology, Siemens, and Virtual Radiologic, to name a few. The DCF software and related tools capitalize on this broad experience.

In addition to the medical market, we are experienced with many technical software application areas, including electronic imaging for the printing and publishing industry, real-time and embedded systems, inter-networking, and device control.

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DICOM[®] CONNECTIVITY FRAMEWORK

A DICOM TOOLKIT FOR OEM SOFTWARE DEVELOPERS

*Allows rapid development of
high performance
DICOM applications for
C#.NET, Java, and C++
programmers*



LAUREL BRIDGE

DICOM SOFTWARE & CONNECTIVITY FOR THE MEDICAL COMMUNITY

Next-Generation DICOM Implementation

The DICOM Connectivity Framework (DCF) is an advanced collection of high-performance, object-oriented software components. A next-generation implementation of the DICOM v3.0 protocol, it is the only comprehensive DICOM solution that provides programmers a consistent API for C#.NET, C++, and Java®, and support for multiple 32 and 64-bit Windows and Linux/UNIX platforms.

The DCF Provides

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 2003 (x86 & x64)**
- **Linux (x86 & x64)**
- **Solaris (SPARC)**

(Contact LBS for information about 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 most DICOM applications, is included and available for user customization. Source code for most of the following utility applications is available in C#, Java, and C++.

Selected DICOM utilities

dcf_echo_scu – Verification client.

dcf_echo_scp – Verification server.

dcf_store_scu – Store client.

dcf_store_scp – Store server.

dcf_qr_scu – Query/Retrieve client.

dcf_qr_scp – Query/Retrieve server.

dcf_print_scu – Print client.

dcf_print_scp – Print Server.

dcf_mwl_scu – Modality Worklist client.

dcf_mpps_scu – Modality Performed Procedure Step client.

dcf_mwl_scp – Modality Worklist/MPPS server.

dcf_storecommit_scu – Storage Commitment client.

dcf_dump – Prints the contents of a DICOM file to the console - automatically detects file encoding.

dcf_filter – Applies filtering operations to a DICOM file, creating a modified file.

dcf_pg – DICOM Test Pattern Generator – creates images or other DICOM file types.

dcf_analyze – Displays DICOM file information – creates pixel data value histogram and provides other statistics.