



# Merge DICOM Toolkit™

## V 5.5.0

### RELEASE NOTES

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The symbols glossary is provided electronically at <http://www.merge.com/Support/Resources.aspx>.

**CAUTION: U.S. federal law restricts this device to sale by, or on the order of, a physician.**



#### Manufacturer's Address

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For assistance, please contact Merge Healthcare Customer Support.

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Part	Date	Revision	Description
COM-2705	June 2017	1.0	Updated bi-annually

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# Chapter 1 About the Application

The Merge DICOM Toolkit provides a powerful and simplified interface to DICOM. It allows you to focus on the important details of your application, and the immediate needs of your end users, rather than the complex details of the DICOM standard.

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**WARNING:** If using the log feature to log information to a file, Personal Health Information (PHI) may be exposed. Client application and system should be aware of this risk and take necessary procedures to prevent and identify unauthorized use or access to PHI.

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This release includes the following toolkits:

Merge DICOM Toolkits	Target Development Environment
Merge DICOM Toolkit - C/C++ Toolkit V5.5.0	32-Bit Windows - Visual C++
	64-Bit Windows - Visual C++
	32-Bit Windows - Borland
	32-Bit - Linux on x86
	64-Bit - Linux on x86
	64-Bit - Linux on ARMv8
	32-Bit - Solaris 10 Intel - GCC Compiler
	64-Bit - Solaris 10 Intel - GCC Compiler
	32-Bit - Solaris 8 Sparc - Sun Compiler
	32-Bit - Solaris 8 Sparc - GCC Compiler
	32-Bit - MAC OS (Intel and Power PC)
	64-Bit - MAC OS (Intel)
	32-Bit Android on Armv7
	64-Bit Android on Armv8
	64-Bit iOS
Merge DICOM Toolkit - .NET/C# Toolkit V5.5.0	32-Bit Windows
	64-Bit Windows
Merge DICOM Toolkit - Java Toolkit V5.5.0	Windows, Solaris, Linux, Android, Mac OS X

This release also includes the following:

- [“Enhancements” on page 6](#)
- [“Fixed Issues” on page 9](#)
- [“Known Issues” on page 12](#)

## Chapter 2 Enhancements

**NOTE:** Supplements and change proposals apply to all toolkits.

This release adds support for the following DICOM supplements:

Supplement	Title
169	Simplified Adult Echocardiographic Report
194	RESTful Services for Non-Patient Instances
195	HEVC/H.265 Transfer Syntax

This release also contains updates to the DICOM standard. It addresses the following correction proposals (CP):

CP#	Issue
1455	Add Dose Area Product to CT Image IOD
1527	Correction of X-Ray Frame Acquisition Sequence Attributes Description
1578	Correct Pulse Sequence Name in MR Image Library
1579	Clarify explanation of heading conditions in Measurement template
1584	Allow Palette Color in Parametric Map
1587	Add Tmax perfusion parameter
1588	Inconsistent Person Participant Relationship in Radiopharmaceutical RDSR
1591	Allow multiple finding sites for single regions of interest in measurement templates and segmentations
1592	Add codes for prostatic sector anatomy
1593	Add Magnetic Susceptibility to Image Model Component Semantics for Quantitative Susceptibility Parametric Maps
1594	Add SOP Class requirements for Raw Data

CP#	Issue
1595	Add Content Labels for Raw Data
1597	Clarify Segmentation Algorithm Parameters
1598	Clarify Fractional Segmentation
1599	Add IEC References for MR
1600	Clarify Graphic Annotation in Volumetric Presentation States
1601	Add Graphic Group Module in Planar MPR VPS
1602	Fix incorrect term in RS Rendered Retrieve table
1608	Clarification for Scan Spot Position Map
1609	RT Ion Beams Scan Spot Time Indicator
1611	Add Selected Value To RT Treatment Overrides
1612	Clarify incorrect multiplier for male James SUV lean body mass formula
1619	Add source mouse strain and genetic modifications for homograft to exogenous substances, and add allele to patient
1620	Clarify that conformance reference requirements do not serve in lieu of a form conformance statement
1621	Add more exogenous substance administration sites
1622	Add caDSR coding scheme
1624	Convention for reference to Private Data Elements
1641	ParticipantObjectContainsStudy shall not be mandatory in DICOM audit message

In addition to updating the toolkit to reflect changes to the DICOM standard, this release also contains the following enhancements:

**NOTE:** Issue numbers can be used to request additional information from your account representative.

Issue #	Description
COM-2013	Added support for legacy Big Endian Transfer Syntax in DICOM XML Native and JSON conversions. This enhancement applies to the Merge DICOM .NET Toolkit.
COM-2361	Added support for WADO DICOM RS Capabilities Service. This enhancement applies to the Merge DICOM .NET Toolkit.
COM-2362	Added support for WADO DICOM RS Capabilities Service. This enhancement applies to the Merge DICOM Java Toolkit.
COM-2571	Create SSL/TLS samples in .NET and include into auto tests. This enhancement applies to the Merge DICOM .NET Toolkit.
COM-2667	Added support for RESTful Non-Patient Instance Storage. This enhancement applies to the Merge DICOM .NET Toolkit.
COM-2693	SCU to support KEEPALIVE socket option. This enhancement applies to the Merge DICOM C/C++ and .NET Toolkits.



## Chapter 3 Fixed Issues

The following table lists the issues that have been fixed in this release.

**NOTE:** Issue numbers can be used to request additional information from your account representative.

Issue	Description
COM-1667	Fixed issue where a presentation context with a supported abstract syntax but unsupported transfer syntax was rejected with the wrong reason - '3 - abstract-syntax-not-supported (provider rejection)' instead of the correct one '4 - transfer-syntaxes-not-supported (provider rejection)'.  This update applies to the Merge DICOM C/C++ Toolkit.
COM-1898	Fixed issue where internal toolkit macro treated groups 0001, 0003, 0005, 0007 as non-private and returning MC_INVALID_GROUP. Although these groups are illegal as private groups in terms of the DICOM Standard, they are now tolerated so that the element values are retrievable (with a warning being logged).  This update applies to the Merge DICOM C/C++ and Java Toolkits.
COM-1909	Fixed issue where encoding multiple string values caused an invalid character warning.  This update applies to the Merge DICOM .NET Toolkit.
COM-2448	Fixed issue where MC_Open_File_Upto_Tag_Bypass_Value() returned MC_OUT_OF_ORDER_TAG when reading a file with icon image sequence.  This update applies to the Merge DICOM C/C++ Toolkit.
COM-2486	Fixed issue where the query to the JPEG header for image parameters (rows, columns, etc.) failed if pixel data had multiple fragments per frame and the entire JPEG header was not contained in the first fragment.  This update applies to the Merge DICOM C/C++ Toolkit.

Issue	Description
COM-2487	<p>Fixed issue where the encapsulated icon image sequence pixel data was written back with defined length, which contravened the DICOM Standard in that it may have prevented further users to discern whether the pixel data was encapsulated or native.</p> <p>This update applies to the Merge DICOM C/C++ Toolkit.</p>
COM-2619	<p>Fixed issue where, due to the relation between the PDV length and the length of the internal toolkit buffers, the last PDV to be sent might have been of zero length, which contravened the DICOM Standard.</p> <p>This update applies to the Merge DICOM C/C++ Toolkit.</p>
COM-2620	<p>Fixed issue where MC_Get_Stream_Length() failed to calculate the correct stream length if a callback function was registered for the pixel data AND the pixel data had an undefined length AND the undefined length (0xffffffff or -1) was passed to the callback function AND then returned by the callback to the toolkit when requested.</p> <p>This update applies to the Merge DICOM C/C++ Toolkit.</p>
COM-2642	<p>Fixed issue where attribute keywords generated for the Native DICOM XML conversion did not strictly follow the rules of the DICOM Standard (they were being calculated by simply taking the attribute name and stripping off the spaces).</p> <p>This update applies to the Merge DICOM Java &amp; .NET Toolkits.</p>
COM-2656	<p>Built-in ICU4C (C/C++), .NET or Java encoders may have encoding capabilities that extend beyond the range of the character set for which they are used in the toolkit. As a result, they may be able to encode some Unicode characters that don't have a counterpart in the character set, which would result in an invalid encoding. This issue has been fixed by introducing range check on the characters returned by the encoder.</p> <p>This update applies to all Merge DICOM Toolkits.</p>
COM-2663	<p>Fixed issue where each time the offset table would be recalculated as a result of a new encapsulated frame being added to the attribute, the changing size of the offset table was added fully and not incrementally to the data length given to the registered callback function, resulting in an incorrect total value length for the attribute.</p> <p>This update applies to the Merge DICOM C/C++ Toolkit.</p>
COM-2691	<p>Fixed issue where the toolkit attempted to correct an invalid private tag rather than tolerate it as-is, which caused the altered tag to no longer be recognized by the native toolkit.</p> <p>This update applies to the Merge DICOM Java Toolkit.</p>

Issue	Description
COM-2696	<p>Fixed issue where, if the application created very large numbers of MCattribute and MCattributeSet objects, a race condition may have developed between MC.mcLibraryRelease() and the delayed garbage collection, causing MC.mcLibraryRelease() to hang.</p> <p>This update applies to the Merge DICOM .NET Toolkit.</p>
COM-2698	<p>Fixed issue where MC_Open_File_Upto_Tag_Bypass_Value() would stop on pixel data in icon image sequence rather than the pixel data in the main data set.</p> <p>This update applies to the Merge DICOM C/C++Toolkit.</p>
COM-2727	<p>Fixed issue where an invalid encoding exception was being thrown for invalid encoding when accessing bulk data for private attribute and the value of Specific Character Set (0008,0005) was invalid.</p> <p>This update applies to the Merge DICOM Java &amp; .NET Toolkits.</p>
COM-2742	<p>Fixed issue where MC_Get_Frame_To_Function() would fail for multi-frame image with bits allocated 1.</p> <p>This update applies to the Merge DICOM C/C++ Toolkit.</p>
COM-2746	<p>Fixed issue where MC_Get_Frame_To_Function() would not retrieve fragments of data beyond the number of frames in the image. When pixel data are encapsulated as fragments rather than whole frames, it means that the data contain more fragments than there are frames. When there is no offset table and no decompression is used, MC_Get_Frame_To_Function() will return a fragment and must be able to retrieve any fragment in the data.</p> <p>This update applies to the Merge DICOM C/C++ Toolkit.</p>

## Chapter 4 Known Issues

The following table lists the issues that have been identified but not fixed in this release:

**NOTE:** Issue numbers can be used to request additional information from your account representative.

Issue #	Description	Impact	Workaround
COM-1372	Incomplete support of Registered Callback mechanism for TagInfo object.	This defect applies to the C/C++ <i>Merge DICOM Toolkit</i> .  The toolkit does not handle properly the extremely rare scenario of bi-directional transfer <code>MC_Set_Value_From_Buffer()/MC_Get_Value_To_Buffer()</code> with registered callback.	Wrap the write/read buffers in a function and use <code>MC_Set_Value_From_Function()/MC_Get_Value_To_Function()</code> instead.
COM-2452	After calling <code>MC_Duplicate_Message()</code> with a certain transfer syntax, one should not have to call <code>MC_Set_Message_Transfer_Syntax()</code> .	This defect applies to the Merge DICOM C/C++ Toolkit.  The impact is minimal; the second call is redundant as the transfer syntax for the destination message is passed as an argument to the first call.	This is no more than an inconvenience. No workaround is necessary.
COM-2468	<code>MC_Get_Value_To_String()</code> and <code>MC_Get_Value_To_UnicodeString()</code> return different status for empty value.	This defect applies to the Merge DICOM C/C++ Toolkit.  The impact is minor; the two functions return inconsistent status codes ( <code>MC_NULL_VALUE</code> and <code>MC_NORMAL_COMPLETION</code> , respectively).	The user should be aware of the differences and write their code accordingly.

Issue #	Description	Impact	Workaround
COM-2673	The toolkit encodes non-ASCII strings in ISO IR 6 using replacement character, no warning issued	This defect applies to all Merge DICOM C/C++ Toolkit.  The impact is minor, the encoding should proceed all the same with the replacement characters. A logged warning would be somewhat useful.	No workaround necessary.
COM-2694	Crash in the RLE compressor if pixel data is 1 column wide.	This defect applies to all Merge DICOM C/C++ Toolkit.  The practical impact is minimal, it was only observed with extreme test data. In real operation, it is unreasonable to have one column wide pixel data RLE encoded.	Scenario extremely unlikely in real life operation. No workaround needed.
COM-2728	Minimal changes in input file can cause mc3dcomb tool to crash or hang.	This defect applies to all Merge DICOM Toolkits.  The user may have to put some effort in fine tuning the configuration file as the tool is extremely sensitive to minor format changes.	This is no more than an inconvenience. No workaround is necessary.
COM-2732	MC_Get_Encapsulated_Value_To_Function () returns the entire pixel data rather than the first frame when no decompression is requested.	This defect applies to the Merge DICOM C/C++ Toolkit.  The first call retrieves the entire (raw) pixel data and there is nothing left to retrieve for subsequent calls.	MC_Get_Frame_To_Function() can be successfully used as a substitute.