



Merge DICOM Toolkit™

V 5.6.0

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.



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Part	Date	Revision	Description
COM-3054	January 2018	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.

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.

This release includes the following toolkits:

Merge DICOM Toolkits	Target Development Environment
Merge DICOM Toolkit - C/C++ Toolkit V5.6.0	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 V5.6.0	32-Bit Windows
	64-Bit Windows
Merge DICOM Toolkit - Java Toolkit V5.6.0	Windows, Solaris, Linux, Android, Mac OS X

This release also includes the following:

- [“Enhancements” on page 6](#)
- [“Fixed Issues” on page 11](#)
- [“Known Issues” on page 14](#)

Chapter 2 Enhancements

NOTE: Supplements and change proposals apply to all toolkits.

This release adds support for the following DICOM supplements:

Supplement	Title
189	Advanced Blending Presentation State Storage
190	Volume Rendering Volumetric Presentation States
191	Patient Radiation Dose Structured Report (P-RDSR)
192	Instance Approval Storage SOP Class
197	Ophthalmic Tomography Angiographic (OCT-A) Image Storage SOP Classes
198	Retirement of WADO-WS
201	Retirement of Radiation Dose Module from Modality Performed Procedure Step

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

CP#	Issue
1323	Clarify Audit Code Meanings
1513	Clarification of meaning of entrance dose
1581	Define Errors for Rendering
1583	Define Errors for URI and RS Query Parameters
1590	Add more PET Radiotracers
1603	Enhance Coding Schemes Table
1604	Fix Type of Dimension Organization UID (within the Dimension Index Sequence)

CP#	Issue
1615	Add Note to TID1210/1211 Equivalent Concept
1616	Remove RFC-3881 references and integrate context
1625	Define Conformance for an All-SOP-Class Storage Server
1627	Add tracking ID to Presentation State
1628	Note on limitations of Presentation States
1629	Add Identical Documents Sequence to the Encapsulated Document Module
1630	Clarify Changes in Control Point Meterset Values
1631	Clarify Definitions for Types of Context Group References
1633	Enhance Specification of Range Matching
1635	Add Isocenter Reference System to RDSR
1638	Unify encoding of code values in DICOM audit message
1642	Change multiplicity for Ophthalmic Axial Length Measurements Segmental Length Sequence
1643	Change type of Signal Noise Ratio for Ophthalmic Axial Measurements Related Information Macro
1644	Correct conditions for Selected Segmental Ophthalmic Axial Length Sequence
1645	Add Unassigned Shared and Per-Frame Converted Attributes functional groups to Parametric Map
1646	Add repeat flag and reason to RDSR to help with outlier analysis
1647	Correct SNOMED lesion codes and synonyms
1648	Correct requirement for conversion source in legacy converted images and tractography results
1649	Clarify use of Other Patient IDs Sequence with Issuer and related Attributes as Query keys
1651	Update DICOM to reflect changes in IHTSDO SNOMED CT-DICOM Subset for JUL 2016 INT Release
1652	Update DICOM to reflect changes in IHTSDO SNOMED CT-DICOM Subset for JAN 2017 INT Release
1653	Clarify Photometric Interpretations Permitted for Decompressed and Compressed Transfer Syntaxes
1654	Clarify that RLE encoding covers all bits allocated

CP#	Issue
1656	Add Content Date and Time to RT Dose Module
1657	Consolidate Brachytherapy Applicator Geometry Definitions
1658	Dose Reference Beam Dose Verification
1659	Add Dose Reference UID To Fraction Scheme
1660	Dose Measurement Type in RTSTRUCT
1661	Correct Code in CID 9250
1662	Define the encoding order for OPT Attribute Reference Coordinates (0022,0032)
1664	Add Progress Parameters in UPS Progress Module
1665	Add MR Diffusion Model Quantities and Parameters for Parametric Maps and ROI Measurements
1666	Add Observation DateTime to Acquisition Context
1672	More safe private data elements
1673	Remove Version-specific UIDs from Confidentiality Profile Attributes
1675	Add Retain Institution Identity option to Basic Application Level Confidentiality Profile
1676	Remove duplicate anatomy information in irradiation event data in RDSR
1677	Do not include Modifying Device Manufacturer in Confidentiality Profile
1678	Use of JPEG Family Transfer Syntaxes rather than RLE for YBR_FULL
1679	Add compression pressure to mammography, breast tomosynthesis and projection objects
1680	Add teaching file export related codes
1681	Reference to real world value map used during segmentation
1682	Defined PET Units Defined terms by reference to UCUM used in Context Group
1685	Add session, authentication, authorization audit codes
1686	Add UDI code for use in templates
1687	Allow Segmented Color LUT in Color Palette IOD
1688	Correct Note of Table C.7.6.18-1 Cardiac Synchronization Module Attributes
1689	Correct codes and meanings

CP#	Issue
1690	Query Key for Anatomic Regions in Study
1691	Add more standard Body Part Examined Defined Terms
1692	Add more statistical multidimensional image component semantics
1693	Add study longitudinal temporal offset from event for clinical trials
1694	Match Segmentation Property Categories with specific Context Group
1695	Add laterality requirement information to anatomical concepts
1696	Clarify condition for Repetition Time (0018,0080)
1697	More structure of rather than entire SNOMED anatomical concepts

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-586	Augmented the Storage SCP/SCU samples with code showing how to implement storage commitment. This enhancement applies to the Merge DICOM Java Toolkit.
COM-2415	Added WADO support of multipart STOW-RS requests with metadata and bulkdata This enhancement applies to the Merge DICOM .NET and Java Toolkits.
COM-2848	Added Structured Report sample. This enhancement applies to the Merge DICOM C/C++ Toolkit.
COM-2888	A configuration setting (MC.AllowNonASCIIEncoding) was introduced to allow application entities in non-English locales that do not support the Specific Character Set (0008,0005) attribute to choose between encoding string values in the default encoding of the locale or the ASCII encoding. This enhancement applies to the Merge DICOM .NET Toolkit.

Issue #	Description
COM-2890	Introduced new MCstorageService.sendStoreRequest() method overloads for C-MOVE that take as argument an MCdimseMessage object for the DICOM data set that is to be moved. This enhancement applies to the Merge DICOM .NET Toolkit.
COM-2902	Added MPPS sample. This enhancement applies to the Merge DICOM .NET Toolkit.

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-2468	Fixed return values for <code>MC_Get(_Next)_Value_To_UnicodeString()</code> to be consistent with <code>MC_Get(_Next)_Value_To_String</code> : <code>MC_EMPTY_VALUE</code> for empty value, <code>MC_NULL_VALUE</code> for null value. This update applies to the Merge DICOM C/C++ Toolkit.
COM-2728	Fixed <code>mc3dcomb</code> tool to be more robust in the face of slight variations in input file format, e.g. an empty line or a comment line should not result in a crash or a hang. This update applies to all Merge DICOM Toolkits.
COM-2779	Fixed issue where <code>System.ArgumentException</code> was thrown when setting again the value at index 0 of an <code>MCAttribute</code> that had a unique, null value, i.e. the value at index 0 was null and the value count was 1. This update applies to the Merge DICOM .NET Toolkit.
COM-2825	Fixed issue where trailing white space in the Specific Character Set (0008,0005) attribute value would cause runtime exception when writing out the data set. This update applies to the Merge DICOM Java & .NET Toolkits.
COM-2827	Fixed issue where the called application title was not matched properly and was incorrectly accepted based on incomplete (truncated) string comparison. This update applies to all Merge DICOM Toolkits.

Issue	Description
COM-2839	Fixed issue where the wrong type of exception was being thrown (MCInvalidEncodingException instead of MCNotFoundException). This update applies to the Merge DICOM .NET Toolkit.
COM-2843	Fixed issue where the Q/R SCU sample would forget the service name between (C-STORE) request and response, which would result in a warning. This update applies to the Merge DICOM C/C++ Toolkit.
COM-2854	Fixed issue where in the absence of the Specific Character Set (0008,0005) attribute, the toolkit would encode string values using the locale default encoding rather than the required ASCII encoding. This update applies to the Merge DICOM .NET Toolkit.
COM-2862	Fixed issue where replacing a data set's compressed pixel data with uncompressed would result in a crash. This update applies to the Merge DICOM C/C++ Toolkit.
COM-2882	Fixed issue where one replacement character would be returned in the encoded string for each byte of an out-of-range character in the input string, instead of one replacement character for each out-of-range character in the input string. This update applies to all Merge DICOM Toolkits.
COM-2884	Fixed issue where attempting to call MC_Get_Value_To_UnicodeString() for an empty value would result in a crash. This update applies to the Merge DICOM C/C++ Toolkit.
COM-2893	Fixed issue where the toolkit would do exact AE Title match, including in the comparison leading and trailing white space that is supposed to be insignificant. This update applies to the Merge DICOM C/C++ Toolkit.
COM-2920	Fixed issue where an empty private tag with value representation UN would not be written out to file. This update applies to the Merge DICOM .NET Toolkit.
COM-2924	Fixed issue where in A-ASSOCIATE-RQ, the PDU maximum length field with length shorter than the minimum length would cause buffer-overflow and result in a crash. Fixed issue where P-DATA-TF PDU of length shorter than the minimum length would cause buffer-overflow and result in a crash. This update applies to the Merge DICOM C/C++ Toolkit.

Issue	Description
COM-2956	Fixed issue where value limit checks for configuration parameters of type 'long integer' were missed when loading the configuration. This update applies to the Merge DICOM C/C++ Toolkit.
COM-2983	Fixed issue where the log file being not accessible for writing would prevent callbacks to the registered log handling functions to be invoked. This update applies to the Merge DICOM C/C++ and .NETToolkits.
COM-3006	Fixed issue where the toolkit would inadvertently encapsulate the pixel data upon conversion to Deflated Explicit VR Little Endian transfer syntax. This update applies to the Merge DICOM C/C++ Toolkit.
COM-3016	Fixed issue where the values of the Specific Character Set (0008,0005) attribute were not considered when writing out nested items of Structured Report. This update applies to the Merge DICOM Java Toolkit.

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-2452	DICOM C/C++: After calling MC_Duplicate_Message() with a certain transfer syntax, one should not have to call MC_Set_Message_Transfer_Syntax()	This defect applies to the Merge DICOM C/C++ Toolkit. The impact is minimal, the user has recourse.	The workaround is for the user to make the extra call.
COM-2668	DICOM C/C++: Offset table context is linked to the MsgObj although it should be tag specific.	This defect applies to all Merge DICOM Toolkits. The impact is non existent, as the scenario of having offset tables for attributes other than pixel data is practically unheard of.	Invisible to the user, no workaround is necessary.

Issue #	Description	Impact	Workaround
COM-2694	Crash in the RLE compressor if pixel data is 1 column wide.	<p>This defect applies to all Merge DICOM C/C++ Toolkit.</p> <p>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.</p>	Scenario extremely unlikely in real life operation, no workaround needed.
COM-2732	MC_Get_Encapsulated_Value_To_Function () returns the entire pixel data rather than the first frame when no decompression is requested.	<p>This defect applies to the Merge DICOM C/C++ Toolkit.</p> <p>The first call retrieves the entire (raw) pixel data and there is nothing left to retrieve for subsequent calls.</p>	MC_Get_Frame_To_Function() can be successfully used as a substitute.