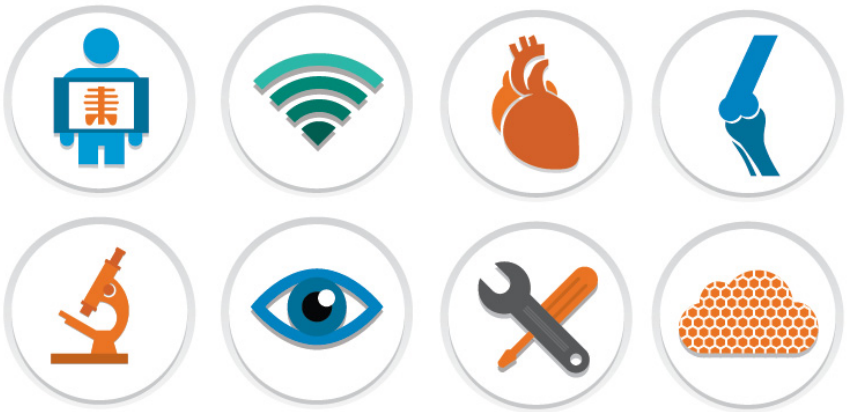

Merge DICOM Toolkit™ V 5.4.0

RELEASE NOTES

Merge Healthcare
900 Walnut Ridge Drive,
Hartland, WI 53029
USA

For assistance, please contact Merge Healthcare Customer Support.

- In North America, call toll free 1-800-668-7990, then select option 2.
- International, call Merge Healthcare (in Canada) +1-905-672-7990, then select option 2.
- Email: **MDTsupport@merge.com**

Part	Date	Revision	Description
COM-2524	January 2017	1.0	Updated bi-annually

Contents

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 V5.3.0	32-Bit Windows - Visual C++
	64-Bit Windows - Visual C++
	32-Bit Windows - Borland
	32-Bit - Linux on x86
	64-Bit - Linux on x86
	32-Bit - Linux on ARMv7
	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 V5.3.0	32-Bit Windows
	64-Bit Windows
Merge DICOM Toolkit - Java Toolkit V5.3.0	Windows, Solaris, Linux, Android, Mac OS X

This release also includes the following:

- **“Enhancements” on page 6**
- **“Fixed Issues” on page 10**
- **“Known Issues” on page 13**

Chapter 2 Enhancements

NOTE: Supplements and change proposals apply to all toolkits.

This release adds support for the following DICOM supplement:

Supplement	Title
121	CT Protocol Storage

This release also contains updates to the DICOM standard. It addresses the following correction items:

Item	Issue
CP1013	RT Ion Beams Recording Clarifications
CP1361	Correct ParticipantObjectDescription in DICOM audit message
CP1362	Correct AuditSourceIdentification in DICOM audit message
CP1418	Add UDI (Universal Device ID) to objects
CP1433	RT-specific KOS CIDs
CP1503	Extension of the Selector Attribute Macro
CP1509	Refactor media type description for web services
CP1539	Add Equivalent Purpose Code
CP1541	Template Content Sequence not required when template created through refactoring
CP1542	Specify units for positioner angles in image library
CP1543	PET image library corrections
CP1544	Value Representation corrections related to OL, UC and UR
CP1545	Make use of DateTime consistent in concept names
CP1546	Incorrect LOINC code for Estimated Fetal Weight Percentile for Hadlock

Item	Issue
CP1547	Add syringe to device CID
CP1548	Remove explicit mention of Bacus patent related to whole slide images
CP1549	Remove description of retired Big Endian Transfer syntax
CP1550	Refactor SOP Class specs for non-Patient IODs
CP1553	Resolve discrepancy in Real World Entities for ATNA messages for Data Export & Import
CP1556	Add Scheduled Workitem Code Sets for Reading
CP1557	Add UPS Assigned Notification Event Type
CP1559	Reuse reference mechanisms from General Image Module in other contexts
CP1560	Add missing language of content item and descendants to RDSR
CP1561	Replace Retrieve URL with URI
CP1562	Correct conditions in Referenced and Derivation Image Macros when legacy converted
CP1563	Correct text describing non-zero Image and Frame Type values
CP1564	Copying unrecognized VRs
CP1565	Clarify Photometric Interpretation after decompression of compressed Transfer Syntaxes
CP1566	Explicit Value Representations are encoded as bytes not characters
CP1567	Update language code RFC
CP1568	Remove arbitrary default value for limit in QIDO result set
CP1569	Define CT Reconstruction Diameter more precisely and correct Enhanced CT illustration
CP1573	Add definition of Code String
CP1574	Streamline Number of Control Points Conditions
CP1575	Add Purpose of Reference for Source Instance Sequence

Item	Issue
CP1582	Extend STOW to populate Pixel Data or Encapsulated Document Module and encapsulate non-DICOM media types into standard Transfer Syntaxes
CP1585	Add Category And Type Codes to Fiducials, Surface Scan Mesh and Point Cloud IODs
CP1586	Add Segmented Property Type Modifier Code Sequence to RT ROI Observations Module
CP1618	Replace incorrect SNOMED codes - Median/Middle

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-1267	Introduced support for SSL/TLS secure associations. This enhancement applies to the Merge DICOM .NET Toolkit.
COM-1858	Added WADO-WS sample. This enhancement applies to the Merge DICOM .NET Toolkit.
COM-2148	Port the Merge Java Toolkit to Linux for ARMv7/ARMv8. This enhancement applies to the Merge DICOM Java Toolkit.
COM-2149	Updated validation of WADO-URI request parameters to conform to restrictions introduced in CP 1507. This enhancement applies to the Merge DICOM Java and .NET Toolkits.
COM-2255	Updated Storage SCU/SCP samples to handle the new meta file attributes introduced by CP 1297 (Sending Application Entity Title, Receiving Application Entity Title). This enhancement applies to the Merge DICOM Java and .NET Toolkits.
COM-2305	Simplified Storage SCU/SCP samples to use the same AE title for stream save mode as for Part 10 save mode. This enhancement applies to the Merge DICOM .NET Toolkit.

Issue #	Description
COM-2350	Refactored media type description for Web Services as per CP 1509 specifications. This enhancement applies to the Merge DICOM Java and .NET Toolkits.
COM-2439	Extended MCinvalidEncodingWarning exception class to identify more precisely the invalid trait (invalid length, invalid character or invalid format). This enhancement applies to the Merge DICOM .NET Toolkit.
COM-2445	Port the Merge Java WS (Web Services) Toolkit to OS X. This enhancement applies to the Merge DICOM Java 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-1374	Relaxed condition for escape sequence between specific character sets to allow escaping back not only to the G0, but also to the G1 code element of value 1 of the Specific Character Set (0008,0005) attribute. This update applies to the Merge DICOM C/C++ Toolkit.
COM-2197	Fixed issue where the toolkit corrupts encapsulated DICOM file on storage if pixel data is of an odd length. This update applies to the Merge DICOM C/C++ Toolkit.
COM-2246	Fixed issue where nested attribute set loses weakly referenced host and therefore the ability to find the applicable Specific Character Set (0008,0005) attribute. This update applies to the Merge DICOM .NET Toolkit.
COM-2312	Fixed issue where mc3valid utility would issue warnings about duplicated DICOM Directory Structuring Elements (group 0004 tags) in DICOMDIR file. This update applies to all Merge DICOM Toolkits.
COM-2330	Fixed issue where the toolkit would issue a 'Missing Delimiter' error when retrieving frames from DICOM file if the frame end and the internal buffer boundary coincided. This update applies to all Merge DICOM Toolkits.

Issue	Description
COM-2331	Fixed issue where a null 'Filename' parameter to any of the MC_Send_Request, MC_Send_Request_For_Service or MC_Send_Response functions would result in an MC_NULL_POINTER_PARM error despite the documentation claiming that a null value is allowed. This update applies to the Merge DICOM C/C++Toolkit.
COM-2333	Fixed a number of usability issues in the compression sample (comp.c): • specifying a default input file is ineffective • inaccurate/incomplete error messages • input file location restricted to the current directory • status codes returned by some functions are not checked consistently This update applies to the Merge DICOM C/C++ Toolkit.
COM-2337	Fixed issue where an exception was being thrown when data read from a file was of uneven size. This update applies to the Merge DICOM .NET Toolkit.
COM-2346	Fixed issue where the UserInfo argument to MC_Get_(Next_)Encapsulated_Value_To_Function was being misused in certain cases. This update applies to the Merge DICOM C/C++ Toolkit.
COM-2352	Fixed issue in attribute value validation where one of the character range segments for the GB18030 character set was incorrect. This update applies to the C/C++ and Java Merge DICOM Toolkits.
COM-2372	Fixed regression in MCtime class where the 4 argument constructor MCtime(int hours, int minutes, int seconds, double fraction) would throw an exception if the decimal separator of the current culture was a comma. This update applies to the Merge DICOM .NET Toolkit.

Issue	Description
COM-2374	Java: Fixed inconsistency regarding the flag that controls how the toolkit deals with invalid attribute values (MC.[get|set]reportInvalidEncoding) where the flag constructs as 'true' but the toolkit initialization (MC.initialize) sets it back to 'false'. After the fix, the flag constructs as 'false' and the initialization does not change it. .NET: Fixed inconsistency regarding the flag that controls how the toolkit deals with invalid attribute values (MC ReportInvalidEncodingWarning property) where the flag constructs as 'false' but the toolkit initialization (MC.mcInitialization) sets it back to 'true'. After the fix, the flag constructs as 'true' and the initialization does not change it. This update applies to the Merge DICOM Java & .NET Toolkits.
COM-2378	Fixed gaps in data type conversions in MCattribute.setValue(). Missing conversions between certain numeric (integer and floating point) types were added. This update applies to the Merge DICOM .NET Toolkit.
COM-2459	Fixed issue where invalid printf-like format in logging operation would cause MC_Open_Association to crash (on timeout) if the remote node was not available. This update applies to the Merge DICOM C/C++Toolkit.
COM-2461	Fixed issue where the last byte of a frame of odd length was being dropped when retrieving the decompressed frame. This update applies to the Merge DICOM C/C++Toolkit.
COM-2470	Fixed issue where the XML conversion would throw an exception if a value of Value Representation PN had more than 5 components in a group. This update applies to the Merge DICOM Java & .NET Toolkits.

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++ *Merge DICOM Toolkit.* The toolkit does not handle properly the extremely rare scenario of bi-directional transfer MC_Set_Value_From_Buffer ()/ MC_Get_Value_To_Buffer() with registered callback.	Wrap the write/read buffers in a function and use MC_Set_Value_From_ Function()/ MC_Get_Value_To_Fu nction() instead.
COM-1909	Decoding multiple string values in private attribute causes invalid character warning.	This defect applies to the .NET Merge DICOM Toolkit. The extent of the impact is limited to the warning itself. It does not affect the correctness of the output DICOM data sets.	Not Applicable.
COM-2448	MC_Open_File_U pto_Tag_Bypass_ Value returns MC_OUT_OF_OR DER_TAG when reading file with icon image sequence.	This defect applies to the Merge DICOM C/C++ Toolkit. It has been observed only for the file in the attachment. It is presumed that it is the effect of an internal buffer boundary condition.	The user can slightly modify the size of the work data buffer in the configuration file.

Issue #	Description	Impact	Workaround
COM-2452	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 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	MC_Get_Value_To_String() and MC_Get_Value_To_UnicodeString() 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 (MC_NULL_VALUE and MC_NORMAL_COMPLETION, respectively).	The user should be aware of the differences and write their code accordingly.
COM-2473	Calling MC_Duplicate_Message repeatedly for the same file and transfer syntax results in the destination files being different.	This defect applies to the Merge DICOM C/C++ Toolkit. In real application scenarios it would be very uncommon for MC_Duplicate_Message to be called twice for the same file and transfer syntax.	The user should not call the API repeatedly for the same file and transfer syntax.
COM-2486	MCI_QueryEncapsulatedData fails if pixel data has multiple fragments per frame.	This defect applies to the Merge DICOM C/C++ Toolkit. The function fails to produce the correct values and as a result, incorrect values may be passed to the Pegasus compression/decompression libraries, which will return an error.	The user can set the COMPRESSION_USE_HEADER_QUERY configuration value to 'False' or 'No' and the incorrect behavior is avoided.

Issue #	Description	Impact	Workaround
COM-2487	Compressed icon image pixel data is written back with a defined length.	This defect applies to the Merge DICOM C/C++ Toolkit. The defined length of the compressed icon image pixel data would make the toolkit believe that the data is uncompressed, resulting in an error.	The scenario is very rare, as the pixel data of the icon image is normally written uncompressed. No definitive workaround is available.
COM-2547	The toolkit incorrectly accepts both underscores and spaces in name (defined term) for specific character set.	This defect applies to all Merge DICOM Toolkits. The values for the specific character names will end up in the DICOM message, potentially causing non compliance.	The user should stick with the defined terms prescribed by the DICOM Standard.