

Supplement 218 MR Protocol Storage

DICOM WORKING GROUP 16

PUBLIC COMMENT

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Introduction

- This work item proposes to include the Defined and Performed MR Protocol objects in the DICOM standard.
- This will enable protocol portability.
- The protocol will allow users to align protocols between different machines to create consistency by sharing in larger hospitals or hospital groups.
- It will be in line with the CT Protocol objects and the IHE MAP profile.
- Editors of the document will be Khaleel Ahamad Nadaf and Thomas Mangold. Wim Corbijn will be supporting the supplement development. It is expected that the companies will have experts on acquisition, reconstruction and application level available for support. From user point James Reuss is joining the team. Looking to get support from AAPM as they have a group working on the same topic.

Current Challenges

- The current standard has defined the Defined and Performed Protocol only for CT. XA is in the process of starting a work item to add XA Protocols. With this MR would be a major modality not defined by the standard. Without this users are not able to standardize the protocol parts used to allow seamless use of the objects in the hospital for planning, flow and quality reasons.
- Lot of proprietary useful information which is common to many vendors for clinical scanning.
- Standardizing existing vendor specific definitions would be resolved during the course of supplement creation (For example, Effective TE v/s Standard TE).

Requirements

The proposed direction is to use the structure set by the CT Protocol objects.
Find the right balance between private and public information by working with MR application specialists.

Note:

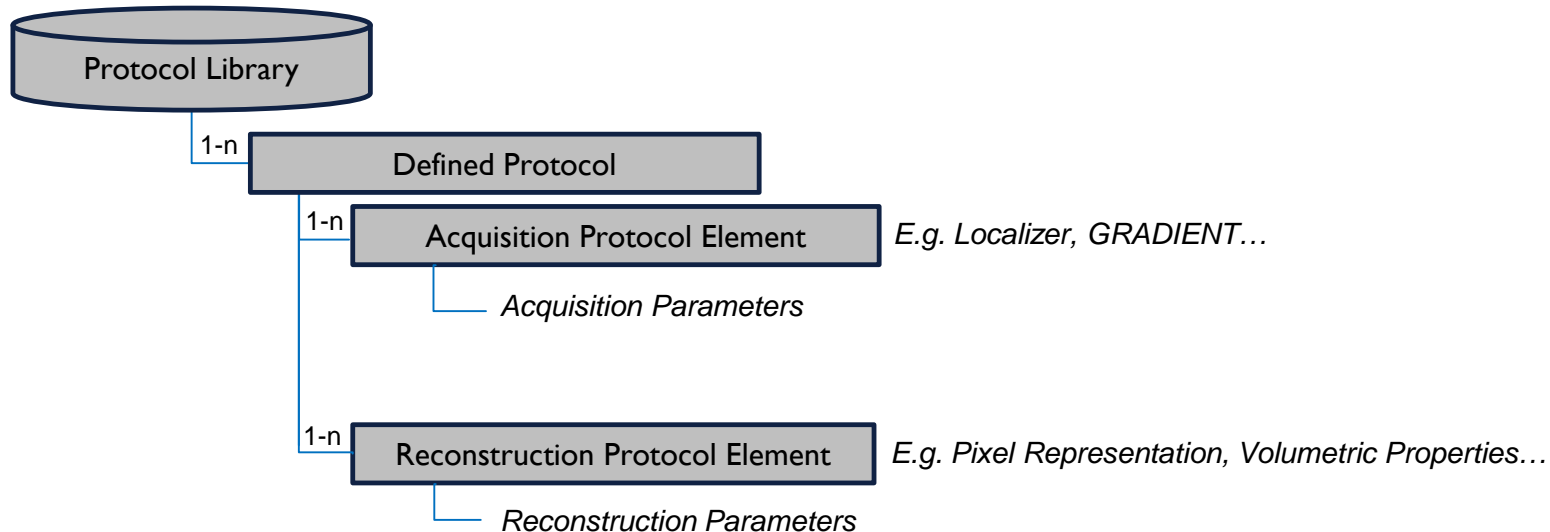
- Do not define 2 different ways to store the same data.
- Defining how the DICOM protocol is used in the system is out of scope for this supplement.

Overview of the Proposal

This Supplement defines a pair of storage SOP Classes:

- *MR Defined Procedure Protocol Storage (NPO object)*
- *MR Performed Procedure Protocol Storage (Study object)*

Example of Defined Procedure Protocol database in the acquisition equipment



Use cases

The primary applications (use cases) considered during the development of the MR Procedure Protocol Storage IODs were the following:

1. Managing protocols within a site for consistency (Using Defined Protocols)
2. Recording protocol details for a performed study so the same or similar values can be used when performing follow-up or repeat studies (Using Performed Protocols)
3. Vendor troubleshooting image quality issues that may be due to poor protocol/technique (Comparing Performed Protocols with Defined Protocols)
4. Distributing departmental, “best practice” or reference protocols to modality systems independent of vendor (Using Defined Protocols)
5. Backing up protocols from a modality to protocol archive (e.g., during system upgrades or replacement). Most vendors have a proprietary method for doing this which would essentially become redundant when Protocol Management is implemented.
(Using Defined Protocols)
6. Making more detailed protocol information available to rendering or processing applications that would allow them to select processing that corresponds to the acquisition protocol, to select parameters appropriate to the acquisition characteristics, and to select the right series to process/display.
(Using Performed Protocols)

Use cases ... continued



6. Improving imaging consistency in terms of repeatable technique, performance, quality and image characteristics. Would benefit from associated image quality metrics and other physics work. (Using Defined Protocols and Performed Protocols)
7. Distributing clinical trial protocols (general purpose or MR scanner model specific) to participating sites (Using Defined Protocols)
8. Recording protocol details for a performed study to submit with clinical trial images for technique validation (Using Performed Protocols)
9. Tracking/extracting details of Performed Protocol such as timestamps, execution sequence and technique for QA, data mining, etc. (Using Performed Protocols)
10. Making more detailed protocol information available to radiologists reviewing a study and priors, or comparing similar studies of different patients (Using Performed Protocols)

Changes to the Standard

Changes to NEMA Standards Publication Part 2: Conformance

Add UID Values to Table A.1-2

Changes to NEMA Standards Publication Part 3: Information Object Definitions

Add MR Performed Procedure Protocol IOD and MR Defined Procedure Protocol IOD to section A.82

Add modules for the two new MR Protocol IODs to section C.34: MR Protocol Series, Defined MR Acquisition, Defined MR Reconstruction, Performed MR Acquisition, Performed MR Reconstruction

Changes to NEMA Standards Publication Part 4: Service Class Specifications

Add new SOP Classes to Table B.5-1

Add new section to describe SCP requirements for MR Performed Procedure Protocol Storage

Add Defined Protocol SOP to GG.3

Add GG.6.4 with SOP-specific details

Changes to the Standard

Changes to NEMA Standards Publication Part 6: Data Dictionary

Add UID Value to Table A-1

Changes to NEMA Standards Publication Part 17: Explanatory Information

Add New Protocol Storage Annex to PS3.17

Conclusion

- The approach is similar to the CT Protocol Storage objects.
- Additions and edits are required in existing DICOM standard to accommodate MR Protocol Storage.