

PACS Efficiency Improvements Using Communication Standards

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How Can Standards Improve PACS Performance?

- DICOM dominant for image transfer
- Need also Modality Worklist: identifiers to match up with requests (mismatches account for 20-30% of problems)
- Also needs feedback for status from modality: Performed Procedure Step
- What services are needed? To be addressed by IHE to define profiles
- Scheduled Workflow profile provides Worklist, Performed Procedure Step and Storage Commitment for taking responsibility

DICOM Support in PACS

- Storage Commitment is potential eliminating steps for System administrators
- Image quality standards are important: Both quality and consistency
- Images need to look same on workstation, print, and physician workstation
- Standardizing GSDF curve for calibration
- Communicate intention for presentation: Softcopy Presentation State

Print Issues

- True size printing: measurements etc.
- Display true size: scaled to fit monitor size or print scaled to fit
- Either print everything or for measurements:
 - Needs to request true size
 - Needs to support true size on printer

Future of DICOM to Facilitate PACS Admin.

- Standardize workflow:
 - General Purpose Worklist
 - Structured reports
- Changing technology (CT, MR):
 - New objects for CT, MR, XA planned, new acquisition parameters
 - Encode dimensions (space, time, cycle) AND instruct workstations hanging protocols

DICOM Future (cont)

- Hanging protocols are to be standardized by DICOM, independence of location, and vendors
- Hanging protocols can be exchanged
- Note: CT and MR standards are already approved, multi-vendor demonstration projects planned

Other New Technologies

- Associated image information: Screen captures is state-of-the-art
- DICOM Structured reporting captures measurements and analysis:
 - Evidence documents produced by acquisition modalities using templates to be stored as DICOM objects
 - CAD for mammography and lung nodules
 - Analysis is stored as well to compare priors

Other Document Support

- Film-less and paperless are not the same!
- Document imaging might be good intermediate step: DICOM Secondary Capture

Storing Information in Archive

- DICOM does not standardize archive formats, rather communication and exchange media
- When images stored proprietary: need to maintain and/or convert information
- End-of-life issues are critical, even within same vendor
- **When buying a PACS, plan for its retirement!**

Migration (cont)

- Use standards inside equipment:
 - Media
 - File system storage
 - File format (DICOM)
 - Compression
- Database migration is potential issue (demographics)
- Moving information across network is an issue

Web-based PACS Standards Issues

- PACS consumers need to distinguish between business and technology requirements
- Off the shelf PC's might be desired
- Web browsers are limited; provides portal (tool) for distribution using applet or plug-in
- Integration can be done using CCOW for multiple applications to run on a desktop
- Distribution via web is basically proprietary
- Eventually, standards for workstations will become reality depending on user demand

Nuclear Medicine Issues

- Requires processing at PACS workstations
- Might need NM workstation components
- PACS standards are a challenge

What Will DICOM 4.0 be?

- New technologies (64 slices for CT!)
- When to switch to a different architecture?
- Installed base will be a challenge as well as limit to rate of change
- For now, DICOM gets the job done!