



# DICOM Educational Conference Brisbane, Australia

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## TRENDS AND FUTURE DIRECTIONS IN DICOM

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# Future

“Making predictions is hard, especially when they are about the future”

## Contents

- DICOM SWOT analysis
- Trends and DICOM
- DICOM future and engagement

# DICOM SWOT Analysis

## Strengths of DICOM

1. Sustainable standard (stable and yet evolving; we don't break it; it's a safe investment)
2. Semantic interoperability with stable information model
3. Mature development and maintenance process
4. Responsive to needs of stakeholders; 'fast' development, maintenance and publication
5. Web-ready (RESTful Interfaces)

Actions to maintain, build and leverage

- WG-29 ('Marketing') to communicate 5 strengths
- WG-27 (Web Services) to list and prioritize additional services as needed

# Opportunities for DICOM

1. Applications of DICOM XML Edition; e.g. Value Sets Web Service (RadLex, etc)
2. Popularity of cloud; web-based image sharing; RESTful Services for API
3. Machine learning / AI buzz
4. Interest in conformance
5. Radiologist/ACR focus on “value”

Actions to prioritize and exploit

- WG-06 to improve and utilize XML
- WG 20 & 27 to look into cloud
- Engage Imaging 3.0 agenda at ACR/SIIM, show how DICOM helps
- WG-14 to consider whitepaper on Security

## Weaknesses of DICOM

1. Lack of marketing/communication plan
2. “Greying” leadership; loss of influence in companies/professional societies
3. Hard to learn (complex, lack training materials, SDO-speak, # pages, ESL-gap)
4. Validation / verification / conformance is challenging
5. Less emphasis on vision / long term roadmap / goals

### Actions to remedy

- Propose three direction messages for discussion; DSC select; to WG29
- Use participation as education; make business case for DICOM/participation; encourage mentoring supplements / change proposals; have committee alternates

- COPYRIGHT DICOM® 2018 Members of DSC and WG-10 to present at professional society meetings

# Threats for DICOM

1. EHR lacks DICOM support/understanding; bottleneck to clinician imaging use
2. Alternatives: JPEGs with XDS or FHIR metadata
3. Local profiling that is dysfunctional / divergent
4. No / Slow vendor adoption of some new features (SOP Classes)
5. Reliance on libraries / toolkits and those have gaps

## Actions to evaluate and counter

- Address by DICOMweb / FHIR activity. Clarify linkages / synergy
- Modify NWIP to require more tangible vendor interest and significant value
- **WG-31 (Conformance)** may help lead / inform 'good' approaches

# Trends and DICOM



## Trends – 3D Manufacturing

Encapsulate 3D model data (WG-17)

- Need to store the 3D model data with the other patient data in the PACS
- First result: Encapsulated STL file for creation, review, update, and printing (manufacturing)
- Several more formats are in progress



## Trends – Live medical video

### Real Time Video (WG-13)

- OR-oriented – use cases include:
  - duplicating video on additional monitors
  - post review by senior
  - automatic display in operating room
  - augmented reality
- In the DICOM metadata, a flow corresponds to a SOP instance (having an UID) with a particular transfer syntax
- (more in later presentation)



# Trends – Conformance

## Format of Conformance Statement (WG-31)

- To be improved to address user needs; based on results of user survey
- Machine-readable, possibly transferred between (and analyzed) by systems

## Conformity Assessment (WG-31)

- To define DICOM's direction, before others do
- Define hierarchy of conformance clauses, for implementation and conformance statement



# Trends – Machine Learning

## DICOM data interface (WG-23)

- Based on the trends of data analysis, big data, deep learning, cloud
  - Does a PACS need new data interfaces to support these use cases?
- What does DICOM need to do to address the requirements for the above?
  - For instance, bulk download of metadata of studies that match the search criteria



# DICOM Future and Engagement

## DICOM and the Future

All near future items that have been mentioned before are not certain, that's for certain

However, for imaging systems e.g. new kinds of modalities, it is expected for them to go to DICOM, as it is ubiquitous

Will there be disruptive developments?



# DICOM Engagement

DICOM has been, is, and always will be, listening to the needs of the field

- DICOM never wants to be a theoretical / paper standard; it lives on the input

So (new) stakeholders can and should engage:

- Ask questions
- Point out flaws
- Propose new things

DICOM listens, and acts by evolving



## Presenter's Contact Information

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***Thank you for your attention!***