DICOM Beyond 2000: Introduction to DICOM RT Extensions

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Overview of DICOM in General

- Data format for enhancing connectivity and interoperability.
- Network protocol component (based on TCP/IP) most widely used.
- Also media, workflow, other services (e.g. printing).
- Specific object definitions developed for each modality.

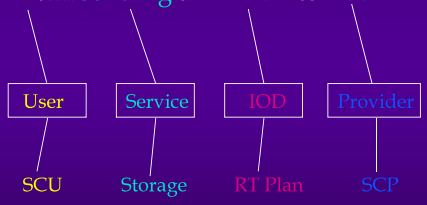
DICOM Networking Support

- Conformance as a Storage Class User
- Conformance as a Storage Class Provider

DICOM Networking Support

A Service/Role Example

"I am sending a RT Plan to You"



The DICOM Conformance Statement

- A means to assess if two implementations can inter-operate
- A document which follows a strict format (see DICOM Part 2)
- A document for implementors, integrators and end-users
- *Mandatory* for DICOM implementations

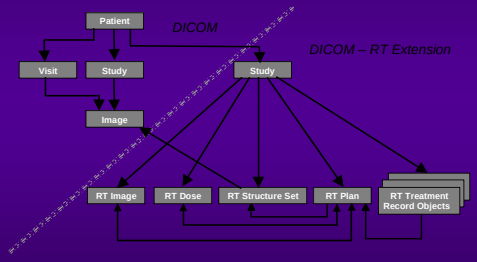
DICOM in Radiotherapy: History

- Application of DICOM to RT first considered in 1994, to model RT data exchange.
- DICOM WG7 formed in following year.
- RT specific DICOM objects ratified (formerly supp. 11) in 1997 (RT Structure Set, RT Plan, RT Dose, RT Image).
- Treatment Records (formerly supp. 29), added in 1999.

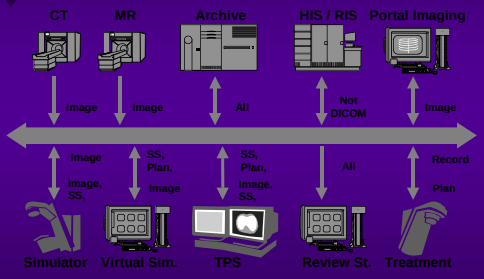
Radiotherapy Objects Summary

- RT Structure Set: Patient anatomy (ROIs etc) linked to CT image coordinate system.
- RT Plan: External beam and/or brachytherapy data linked to structure set.
- RT Image: Conical-geometry image (sim film, DRR, portal film, EPID).
- RT Dose: 3D dose matrices, isodoses, DVH's
- RT Treatment Records (3): Record of treatment delivery session(s).

Radiotherapy Object Relationships



RT Devices using DICOM



DICOM RT Current Work

- Maintenance of radiotherapy objects (change proposals, implementation discussions and recommendations).
- Application of DICOM to model workflow in radiotherapy department.