RCET Report

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RCET Scope of Work

- Develop a secure auto-anonymizing web-based upload and auto-archiving patient database resources to allow efficient and secure archiving of diagnostic images, treatment planning images, radiotherapy plan data, and demographic information.

  - Rationale -
    - use web-based technology to provide word-wide access to radiotherapy data
    - allow QA Centers control and access to their own data and QA process
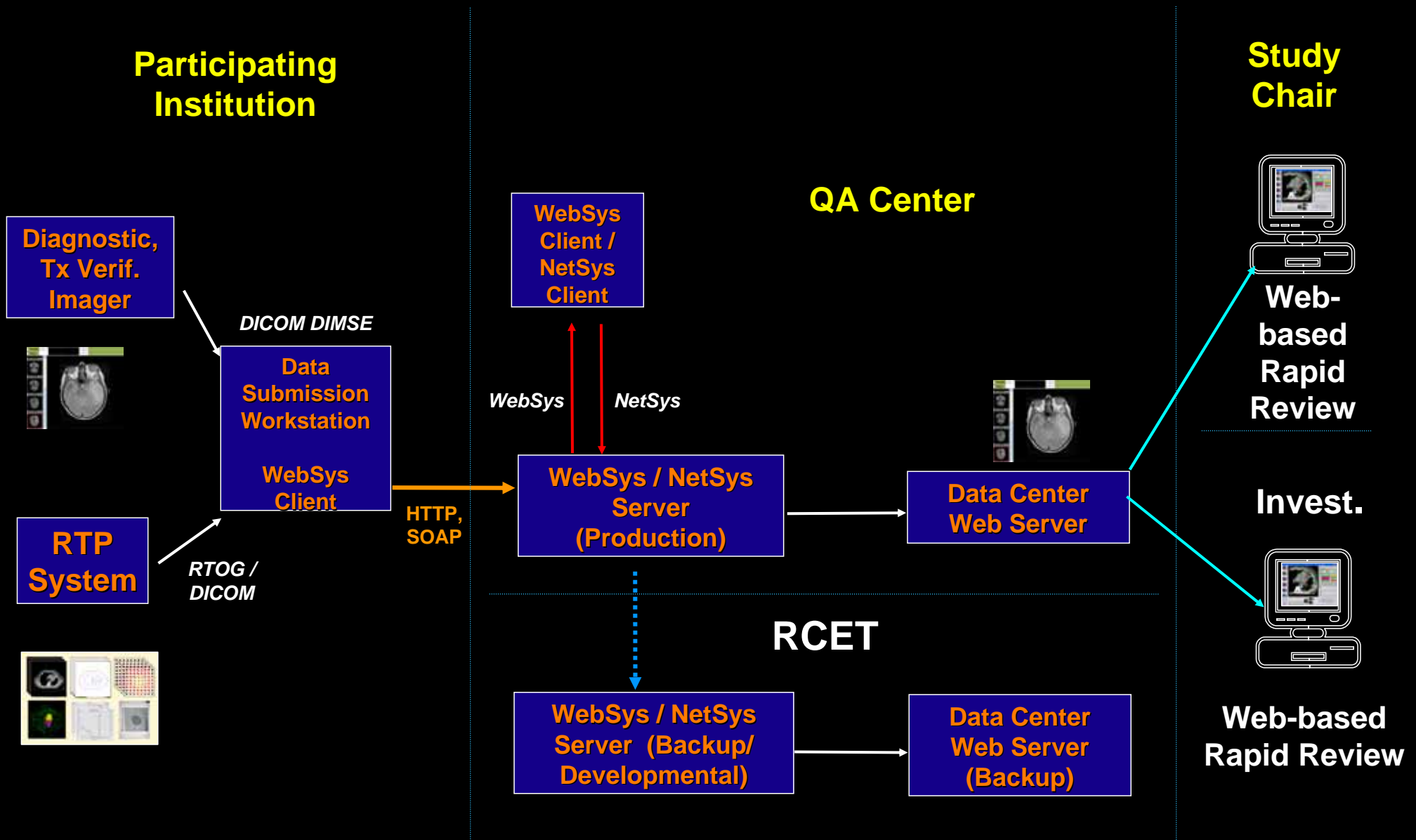
WebSys

RCET Scope of Work

- Provide the advanced technical resources necessary to improve radiotherapy patient outcomes. The RCET has built a foundation of advanced medical informatics infrastructure to facilitate education, collaboration, and peer review, as well as provide an environment in which clinical investigators can receive, share, and analyze voluminous multi-modality clinical trials data.

    - Rationale -

        - Paradigm shift from QA centers of "experts" to decentralized peer review of clinical data by the trial PIs
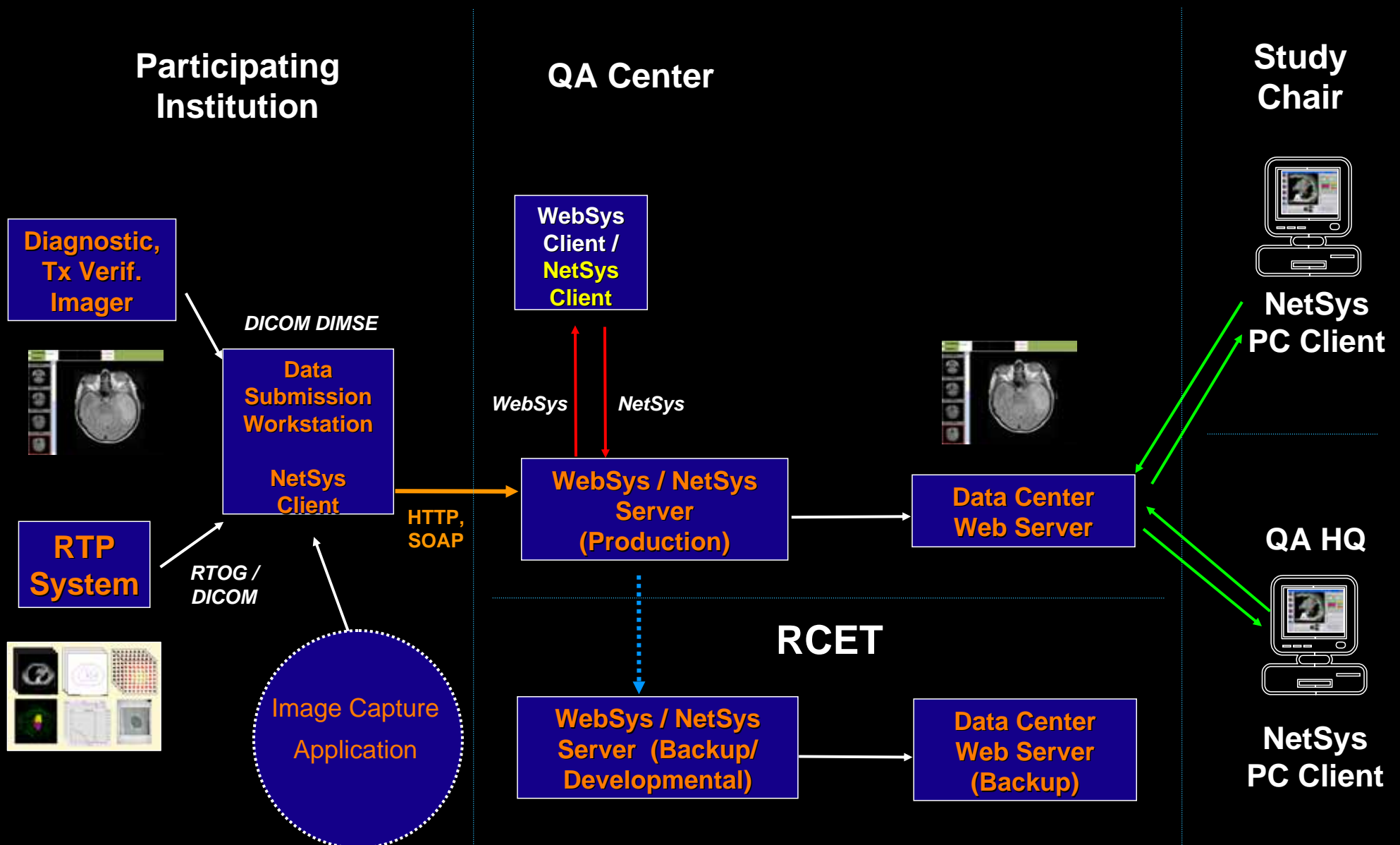
NetSys

The RCET System

- It is a Radiotherapy data submission, archive, and review infrastructure
  - Auto-archiving database
  - Web-based Secure Object Archiving Network System (SOANS)
    - Secure Wide Area Network DICOM-RT PACS
  - Integrated client tools for upload and review
    - WebSys, NetSys and Rapid Review tools

Resource Center for Emerging Technologies

Product Requirement Specification Document
made in collaboration with the NCIC

1. Data Content

•The following radiotherapy data objects will be collected by the user:

•✓Support for RTOG formatted files must also be provided

•✓CT, ✓MR, PET, and MRS studies

- • ✓with support for non-uniform slice spacing

•✓Structures

- • ✓with support for bifurcated structures

•✓Plan

- • with support for ✓MLC, ✓block, ✓EDW, ✓physical wedges, ✓IMRT fields, ✓photon, and ✓electron fields

•✓DRRs

- • ✓with support for overlaying field shape

•✓3D dose distributions

- • ✓support for both 2D and 3D dose data

2. Data Transfer

- ✓The data is anonymized and transmitted by encrypted and secure techniques using open source web technology.

  - ✓The data elements to be anonymized include: patient name, birthdate, ID#, institution, referrering physician.

- ✓The submitted data is stored in its original format on the DB server before being modified for storage on the system.

- ✓All data will be stored in a secure computing environment on dedicated database.

- The procedure for the submission and the user interface will be simple and robust.

- ✓The DICOM data will also be formatted for use by a Rapid Review software. Note: this is not absolutely essential.

- ✓Rapid Review software can be used to immediately confirm the correct submission of data.

- ✓Transfer must be HIPPA, 21CFR Part 11

3. Storage

- ✓The day-to-day support, maintenance and backup responsibilities of this system must be under the control of the QA Center support group.

  - ✓Standard query-able database

  - ✓On-site and off-site backup procedures

  - ✓User account creation and access control

  - ✓Data authoring and versioning control

Data Review

- ✓Specific patient data selected by the user from the database will be downloaded to the user's local computer for passive review. This downloading will be performed using secure network transmission.

- ✓View and quickly page through transverse, sagittal, and coronal CT images, with the ability to optionally display structures, dose distribution and beam information on each slice.

  - Beam edges should be shown graphically on a slice by slice basis

- ✓Color coded structure contours with color legend defining structures. ✓The user can select whether or not to display the structure color legend

- User selectable dose normalization (absolute, % of max dose, % of isocentre dose, % of user specified reference dose, …)

- ✓User selectable display of specific isodose levels. ✓Dose can be displayed as either isodose contour lines or color wash.

- ✓Point dose display & ✓CT pixel value display

- ✓Measurement tools, ✓zoom/pan, and ✓level/window tools should be available on ✓transverse, ✓sagittal and ✓coronal views.

- ✓Display DRRs with ✓window/level, and ✓zoom/pan tools. ✓Measurement tools reporting distances at reference distance.

- ✓Display DVHs with user selection of specific structures. ✓Display of absolute and relative volumes and doses.

Data Review

- Generation of arbitrary image plane

- ✓A 3D distance measurement

- Ability to generate Beams-Eye-View display

- Ability to display point values from a DVH.

- Contour editing

- ✓Exporting of DICOM structure set

- Recalculation of DVHs

- Support for Multi-modality image fusion

- Transfer of DICOM data sets to treatment planning system

- ✓3D graphics

- QA of 4D datasets using Active Review and Data Mining

- ✓Links to outcome database

- Follow-up ✓MR, PET, MRS.

- ✓Data mining tools

- 4D tools: MIP and loop views