Status of Implementing ATC Method 2 at ITC
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- Current Status of ATC Method 2 at ITC
- ITC Test Data
- Test Methodology
- Testing Time Table
- Test Results

Status of ATC Method 2 Implementation at ITC

- ITC has completed testing of RCET software v. 2.3 (WebSys client/server, Rapid Image Viewer, WebSys Administration Tools).
- The current test cycle has been performed on the production server (POLARIS) by Sean O'Leary at ITC.

ITC Test Data for Method 2 Testing

- The ITC test suite is comprised of DICOM and RTOG data sets representing all commercial TPS, which are *ATC Compliant*. (See list of ATC Compliant TPS at http://atc.wustl.edu/credentialing/atc_compliant_tps.html.)
- Additional DICOM data from *Vendor Complete* TPS, CMS XiO and TomoTherapy Hi-Art, were included in the test suite.
- Each dataset was imported successfully into the RRT database (as for Method 1) and checked to ensure that all objects reviewable by the RRT could be visualized.

ATC Method 2 Testing Methodology

1. Upload test data sets to WebSys server at ITC (POLARIS).
2. Verify that data are registered in server database and viewable using Rapid Image Viewer tool.
3. Download test data sets from ITC WebSys server.
4. Use DICOM dump utility to compare corresponding files (one each of CTs, RT Structure Set, RT Plan, RT Dose, etc.) from original and retrieved copies of data sets.
5. Attempt to import and check downloaded data using RRT.
6. Report discrepancies between original and retrieved files, as well as unexpected behavior in WebSys client and Rapid Image Viewer tool.

ATC Method 2 Testing – Comparing submitted, retrieved data

Differences between submitted (>) and retrieved (<) objects

RD.txt - Notepad

File Edit Format View Help

```
27c25
< (0008,0090) PN []                                          #   2, 1 ReferringPhysiciansName
---
> (0008,0090) PN (no value available)                        #   0, 0 ReferringPhysiciansName
30,31c28
< (0010,0000) UL 112                                         #   4, 1 PatientGroupLength
< (0010,0010) PN [M2_VARIAN_ECLIP_PR_05010601_SO_INIT]       #  36, 1 PatientsName
---
> (0010,0010) PN [VarianˆProstateInitialˆATC04PR02ˆALˆ]      #  36, 1 PatientsName
33,35c30,31
< (0010,0030) DA []                                          #   2, 1 PatientsBirthDate
< (0010,0040) CS []                                          #   2, 1 PatientsSex
< (0012,0000) UL 110                                         #   4, 1 GenericGroupLength
---
> (0010,0030) DA (no value available)                        #   0, 0 PatientsBirthDate
> (0010,0040) CS (no value available)                        #   0, 0 PatientsSex
38,40c34,36
< (0012,0021) LO []                                          #   2, 1 Clinical_Trial_Protocol_Name
< (0012,0030) LO []                                          #   2, 1 Clinical_Trial_Site_ID
< (0012,0031) LO []                                          #   2, 1 Clinical_Trial_Site_Name
---
> (0012,0021) LO (no value available)                        #   0, 0 Clinical_Trial_Protocol_Name
> (0012,0030) LO (no value available)                        #   0, 0 Clinical_Trial_Site_ID
> (0012,0031) LO (no value available)                        #   0, 0 Clinical_Trial_Site_Name
42,45c38,40
< (0012,0050) LO []                                          #   2, 1 Clinical_Trial_Time_Point_ID
< (0012,0060) LO []                                          #   2, 1
Clinical_Trial_Coordinating_Center_Name
< (0018,0000) UL 32                                          #   4, 1 AcquisitionGroupLength
< (0018,0050) DS []                                          #   2, 1 SliceThickness
---
> (0012,0050) LO (no value available)                        #   0, 0 Clinical_Trial_Time_Point_ID
> (0012,0060) LO (no value available)                        #   0, 0
Clinical_Trial_Coordinating_Center_Name
> (0018,0050) DS (no value available)                        #   0, 0 SliceThickness
47d41
< (0020,0000) UL 252                                         #   4, 1 ImageGroupLength
52c46
< (0020,0013) IS []                                          #   2, 1 InstanceNumber
---
> (0020,0013) IS (no value available)                        #   0, 0 InstanceNumber
```

RD010010.dcm.txt - Notepad

File Edit Format View Help

```
# Dicom-File-Format

# Dicom-Meta-Information-Header
# Used TransferSyntax: LittleEndianExplicit
(0002,0000) UL 186
(0002,0001) OB 00\01
(0002,0002) UI =RTDoseStorage
(0002,0003) UI [1.2.246.352.71.7.231.2109.20040622
(0002,0010) UI =LittleEndianImplicit
(0002,0012) UI [1.2.276.0.7230010.3.0.3.4.2]
(0002,0013) SH [OFFIS_DCMTK_342]

# Dicom-Data-Set
# Used TransferSyntax: LittleEndianImplicit
(0008,0012) DA [20040730]
(0008,0013) TM [161821]
(0008,0016) UI =RTDoseStorage
(0008,0018) UI [1.2.246.352.71.7.231.2109.20040622
(0008,0020) DA [20040416]
(0008,0030) TM [160828]
(0008,0050) SH (no value available)
(0008,0060) CS [RTDOSE]
(0008,0070) LO [VARIAN Medical Systems]
(0008,0090) PN (no value available)
(0008,1010) SH [ALANGENE-L]
(0008,1090) LO [Vision 7.2 - External Beam Planning
(0010,0010) PN [VarianˆProstateInitialˆATC04PR02ˆAL
(0010,0020) LO [VarianˆProstateInitialˆATC04PR02ˆAL
(0010,0030) DA (no value available)
(0010,0040) CS (no value available)
(0012,0010) LO [Varian]
(0012,0020) LO [ProstateInitial]
(0012,0021) LO (no value available)
(0012,0030) LO (no value available)
(0012,0031) LO (no value available)
(0012,0040) LO [ATC04PR02]
(0012,0050) LO (no value available)
```

```
                                                             #   0, 0 Clinical_Trial_Protocol_Name
                                                             #   0, 0 Clinical_Trial_Site_ID
                                                             #   0, 0 Clinical_Trial_Site_Name
                                                             #  10, 1 Clinical_Trial_Subject_ID
                                                             #   0, 0 Clinical_Trial_Time_Point_ID
```

DICOM "Dump"

Server Test Modes

- Two modes of server operation are defined for testing:
  - UPDATE MODE – Internet access to POLARIS server is enabled to permit RCET to update and configure the server.
  - TEST MODE – No internet access to POLARIS server; access is limited to ITC intranet during testing.

ATC Method 2 Testing Time Table

	Step		Dates
1	a	RCET installs software on POLARIS server in UPDATE MODE.	4/20/05-5/19/05
	b	RCET/ITC T-con to review updated software features; switch server to TEST MODE	5/19/05
	c	ITC performs functional tests of WebSys user interface	5/19/05-5/26/05
	d	ITC performs upload/download/comparison/RRT import tests using DICOM and RTOG test datasets	5/26/05-6/16/05
	e	ITC tests Rapid Image Viewer applet 3.0	6/9/05-6/16/05
	f	ITC test WebSys Administrative Tools	6/9/05-6/16/05
	g	ITC to report findings in (c, d, e, f) at ATC meeting	6/23/05
	h	RCET to evaluate test results, correct problems found, and prepare new version for testing; repeat step (1) until software is ready for external testing.	

ATC Method 2 Test Results

- Improved Features in this Version
  1. Case selector sorts cases by CaseId, Institution, Date, Description
  2. Limit of six protocols per user has been removed.
  3. Faster DICOM file scanner
  4. Web-based Administration Tools

ATC Method 2 Test Results (2)

- Suggested Areas For Improvement
  1. Specificity and helpfulness of error messages.
  2. Placement of frequently used tabs on the Electronic Folder page.
  3. A count of the total number of objects in each series would be helpful on the Electronic Folder page.
  4. Submission controls should be locked until the user has logged in to the server.
  5. Rapid Image Viewer review of RTOG format CT, MR studies and treatment verification images.

ATC Method 2 Test Results (3)

- Specific Findings
  1. The DICOM file scanner fails to recognize (some) DICOM objects in the selected directory.
  2. WebSys client fails to create a new case when a existing case (in a different protocol) has the same CaseID.
  3. Under certain circumstances (Explicit-VR data objects containing sequences), DICOM files downloaded from WebSys were improperly encoded.
  4. WebSys client crashes when attempting to scan RTOG files with file extensions.

ATC Method 2 Test Results (4)

- Specific Findings (continued)
  5. Several usability issues remain in the Rapid Image Viewer tool:
     - Some CT images could not be displayed with usable grayscale
     - Center/width settings are difficult to use; no presets provided.
     - UI state is not applied consistently to the display (e.g. “Equalize”)
     - Grayscale control for multiple images is inoperable.

ATC Method 2 Test Results (5)

- Specific Findings (continued)
  6. Web-based server administration tools are generally functional and helpful. Attempts to delete a case record using these tools, however, failed.
  7. All data sets were successfully retrieved from WebSys and imported into the RRT, except
     - Those that could not be uploaded due to failure of the DICOM file scanner (#1, above), and
     - DICOM data, which were improperly encoded upon export from WebSys (#3, above).