Radiology Image Sharing

Seminar with private hospitals / radiology facilities

DICOM Image Transmission

1st September,2010

醫健通
ehealth
香港特別行政區政府 HKSAR GOVT

Overview

- HA DICOM Image Gateway (Conformance Statement)
  - DICOM Basic
  - Implementation Model
  - Application Entity (AE) Specification
  - Communication Profile

- DICOM Image Data Requirement
  - Patient and Image Identification
    - 4 Major Keys
    - Accession number format
  - No. of images Policy

HA DICOM Image Gateway (Conformance Statement)

HA DICOM Image Gateway
DICOM Basic

- DICOM is……

  - stand for **D**igital **I**maging and **Co**mmunications in **M**edicine

    - standard for handling, storing, printing, and transmitting information in medical imaging

    - include a file format definition and a communications protocol

    - uses TCP/IP to communicate between systems

  - the 3rd version developed by American College of Radiology (ACR) and National Electrical Manufacturers Association (NEMA).

  - governed by DICOM Standard (NEMA)

    - DICOM conformance statement is required if you claimed the facility is DICOM compliance.

醫健通
ehealth

HA DICOM Image Gateway Implementation Model (I)

- Application Data Flow
    - DICOM Gateway is a temporary medical storage/forwarder facility

    - As Service Class Provider (SCP)
        - Remote AE initiates an association from the DICOM Storage Service Class to the DICOM Gateway. (*Listen to service request*)
        - On *acceptance*, remote AE transmits the DICOM Information Objects, to the DICOM Gateway.
        - The DICOM Gateway *store it into local file system*.

    - As Service Class User (SCU)
        - The DICOM Gateway *initiates an association* for Storage Service Class to remote AE.
        - The whole study, whole series or individual image selected is *sent to the remote AE*.

HA DICOM Image Gateway Implementation Model (II)

- Application Data Flow Diagram
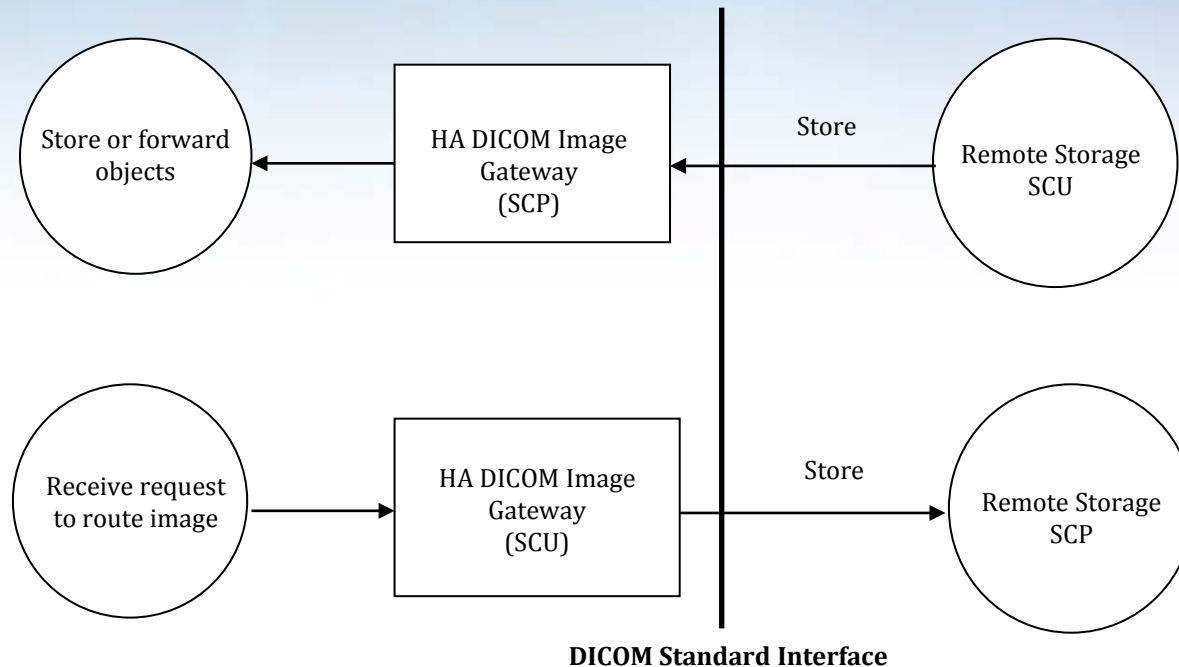
HA DICOM Image Gateway Application Entity Specifications

- Supported Service Object Pairs (SOP) Classes (For SCU/SCP)

SOP Class Name	SOP Class UID
Verification SOP Class	1.2.840.10008.1.1
Storage Commitment Push Model SOP Class	1.2.840.10008.1.20.1
Hardcopy Grayscale Image Storage SOP Class	1.2.840.10008.5.1.1.29
Hardcopy Color Image Storage SOP Class	1.2.840.10008.5.1.1.30
Computed Radiography Image Storage	1.2.840.10008.5.1.4.1.1.1
Digital X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.1
Digital X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.1.1
Digital Mammography X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.2
Digital Mammography X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.2.1
Digital Intra-oral X-Ray Image Storage - For Presentation	1.2.840.10008.5.1.4.1.1.1.3
Digital Intra-oral X-Ray Image Storage - For Processing	1.2.840.10008.5.1.4.1.1.1.3.1
CT Image Storage	1.2.840.10008.5.1.4.1.1.2
MR Image Storage	1.2.840.10008.5.1.4.1.1.4
Enhanced MR Image Storage	1.2.840.10008.5.1.4.1.1.4.1
Ultrasound Image Storage	1.2.840.10008.5.1.4.1.1.6.1
……	……

General supported image type

醫健通
eHealth

HA DICOM Image Gateway Communication Profile

- Communication Profile
  - Application Entity Title (AET)
  - IP Address + Port (TCP/IP Stack)

Private institute's AE

1. P_GW1
2. 190.x.x.x: 23456

DICOM Image Gateway
(Private)

DICOM Ping ✔

HA's AE

1. HADICOMGW1
2. 160.x.x.x: 1234

DICOM Image Gateway
(HA)

DICOM Image Data Requirement

DICOM Image Data Requirement Patient & Image Identification (I)
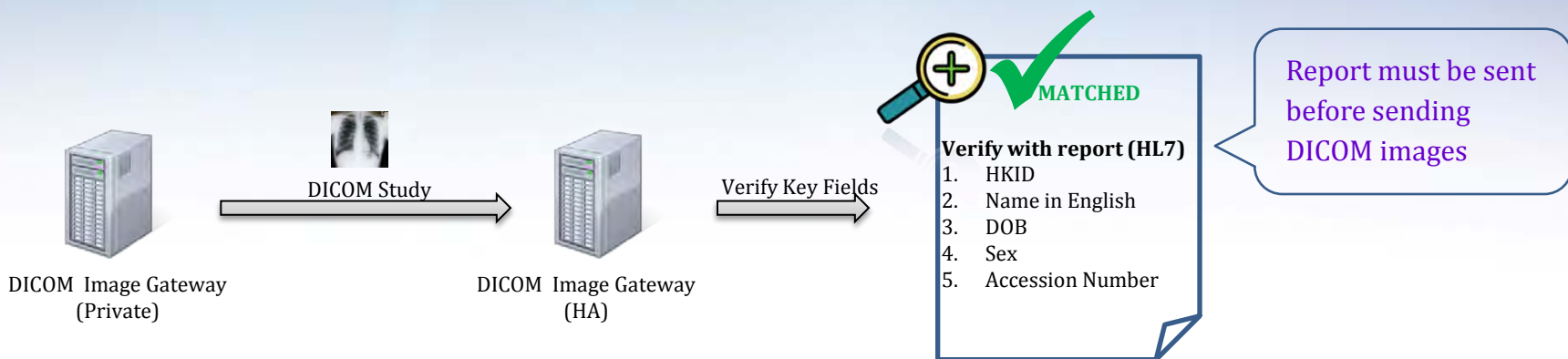
- Patient Identification

  - 4 Major Keys Verification

    - HKID
    - Name in English
    - Date of Birth
    - Sex

- Image Identification

  - Accession Number

    - Unique for each study (same as the one in HL7)
    - 16-characters string

	{Hospital Code}	{Department Code}	{Year}	{Running Number}	{Check Digit}
Length	3	2	2	8	1
e.g.	XXX	XR	07	00000101	H

醫健通
ehealth

DICOM Image Data Requirement Patient & Image Identification (II)

- "MATCHED" case

MATCHED

Report must be sent before sending DICOM images

Verify with report (HL7)
1. HKID
2. Name in English
3. DOB
4. Sex
5. Accession Number

DICOM Study

Verify Key Fields

DICOM Image Gateway (Private)

DICOM Image Gateway (HA)

Save (**LOSSY compressed images**)
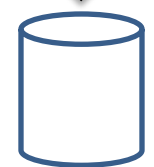
HA Central Archive

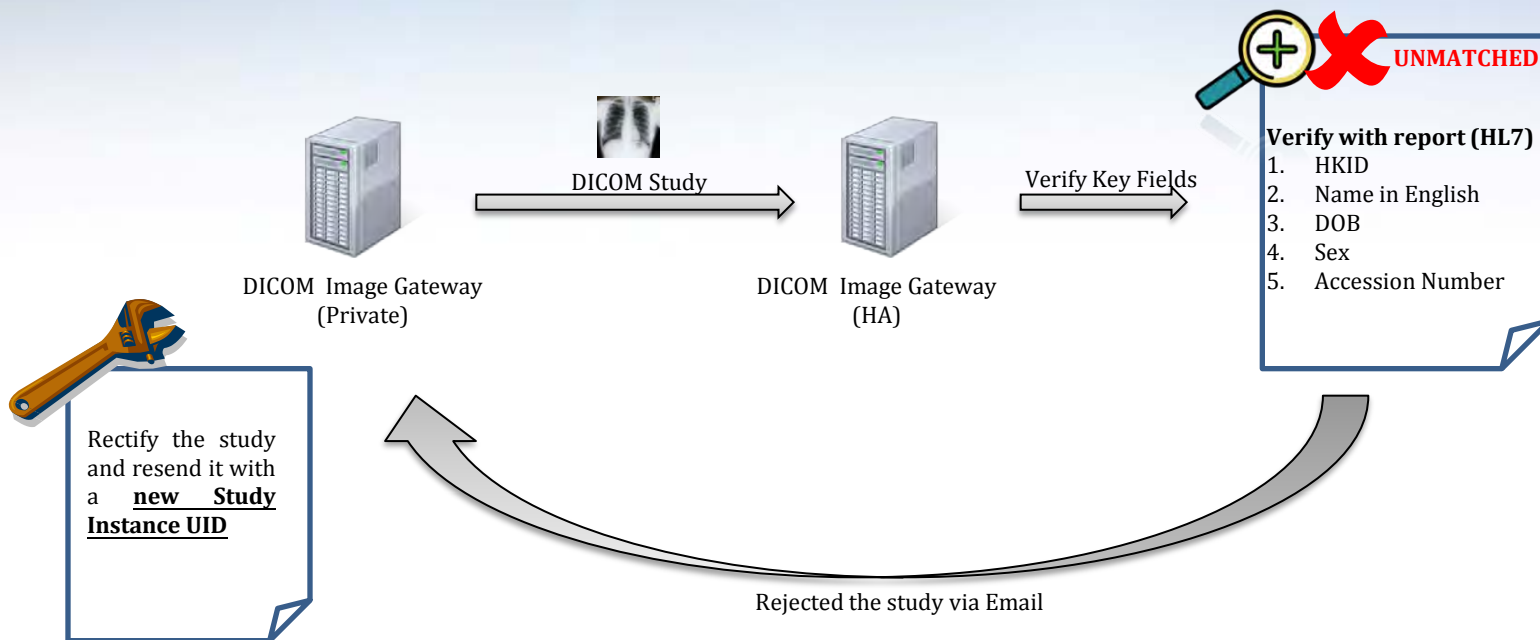| Modality	Compression	QF
CR		10
CT		90
DX	LOSSY	10
DR		80
MR		30
Others	LOSSSLESS	N/A

Notes
- Raw images are compressed into LOSSY/LOSSLESS and **view within HA**
- Image Quality Test will be included to ensure DICOM file integrity

醫健通
ehealth

DICOM Image Data Requirement Patient & Image Identification (III)

- "UNMATCHED" case

DICOM Image Data Requirement No. of Image Policy

- No. of Image/Study
  - Recommend 1000 images/study
  - Rule will be applied to reject no. of images > 1000 in coming future

DICOM Image Transmission

Thank you