THE DICOM 2013 INTERNATIONAL CONFERENCE & SEMINAR
March 14-16 Bangalore, India

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Digital Imaging and Communications in Medicine

DICOM Medical Image Management the Challenges and Solutions – Cloud as a Service

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Introduction

- **“Now days, in connected world, we think instant, convenient and highly secured communication.**
- **Why should healthcare IT be an exception, when the inability to quickly obtain vital medical DICOM images and patient study information and reports can have life-threatening consequences?” asks to any PACS/RIS service providers**
- **Healthcare IT-driven revolution Organization – Like Hospitals, Radiology Centers, Workstations, PACS Systems etc.**
  - Investing in the modest Healthcare IT systems and technologies
  - With the clear goals of reducing operating costs with Improving healthcare outcomes and deliveries
  - Focusing on Healthcare Quality Managements
- **DICOM Images management and Solutions – Cloud as a Services**

Challenges

DICOM Imaging Challenges in India Scenarios:

1. **Radiology Department in Hospitals and Clinical Imaging Centers are not connected on same DICOM Network**
   - Collecting DICOM from Modalities
   - Non-DICOM data from other medical Devices
     - Ex. ECG Medical Devices or to use and installed Analog Imaging Devices
2. **PACS and RIS system administrators continuously challenged with interoperability issues**
   - Installed Modalities are old refurbished and with No/Digital DICOM compliance supports and limited DICOM services features
3. **Teleradiology Center**
   - DICOM Networking and Diagnostics Imaging Data Access system problems due to lack of IT Infrastructures at Remote Location
   - In rural area there is Network speed and its Availability issue and Language Barrier Problems in India

Challenges

4. **Expanding Radiology and Modalities Imaging systems, but the lack of entire DICOM network workflow**
   - Investing on Highly Cost - Installing new Hardware and Software with latest updated technology and advance features
   - In India referral physicians or doctors don't have Computer, so they examine on Paper-Film that brings by technicians and takes more time compare to Digital Imaging Systems
5. **Lack of DICOM/IHE/HL7 Standards awareness and its importance**
   - Doctors, Technicians, PACS Administrator , Hospital IT staffs
6. **Any disaster of PACS/Digital Imaging systems**
   - Severe power loss in the Natural Disaster-affected area
   - Complete collapse of the public utility infrastructure locally or centrally digital image management systems
7. **Adherence to appropriate DICOM Imaging Security policies and system**

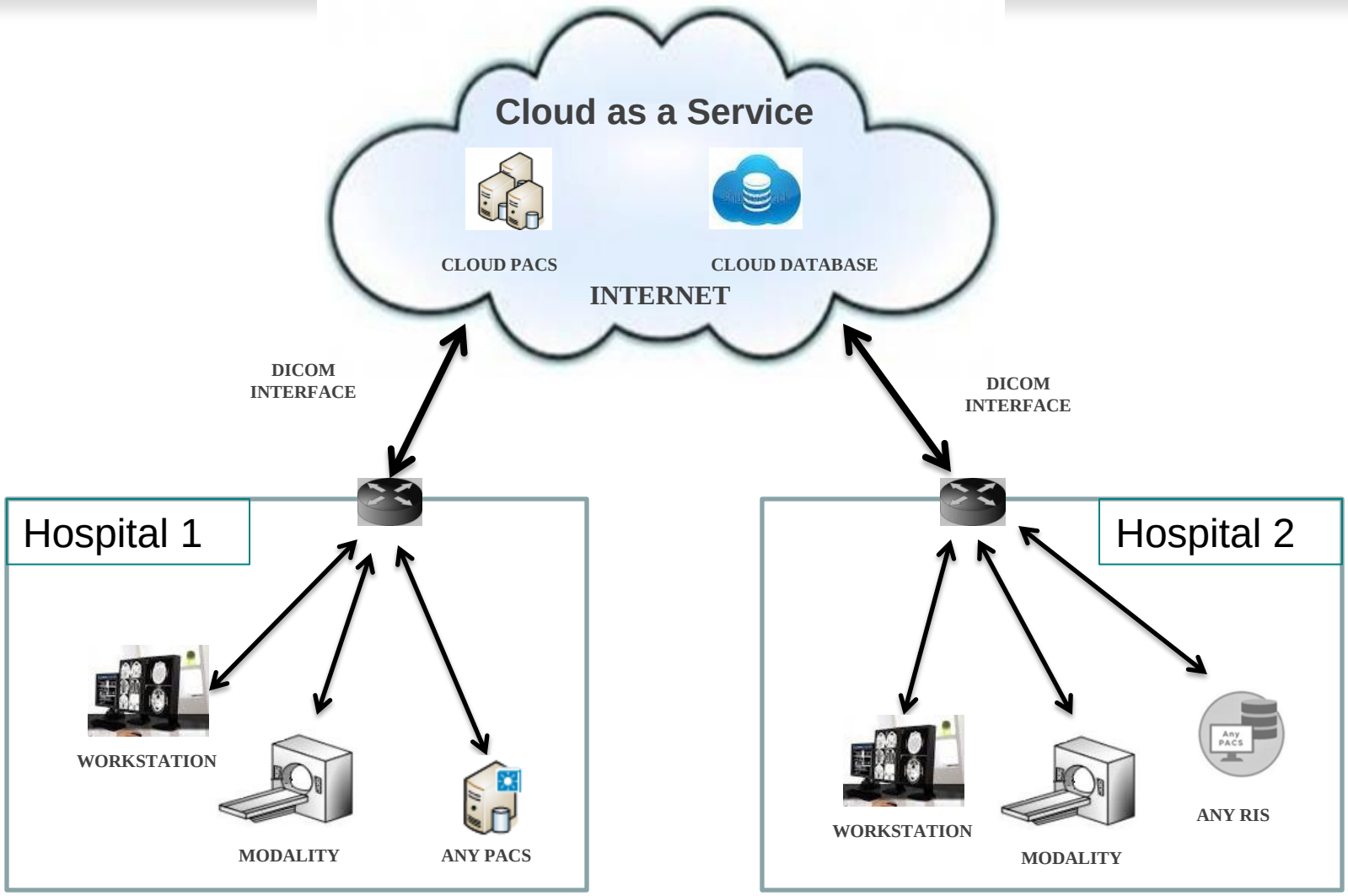
Solutions

- **Distributed computing is coming in the new forms as Cloud computing and all component model services are accessed via internet browsers.**
- **It allows consumers and providers to use applications without installation and access their medical images files, application development and maintenance at any computer with internet access.**
- **Moreover, Cloud computing technology will solve this situation**
  - DICOM Medical Imaging Management
  - DICOM NEMA standards compliance and services support

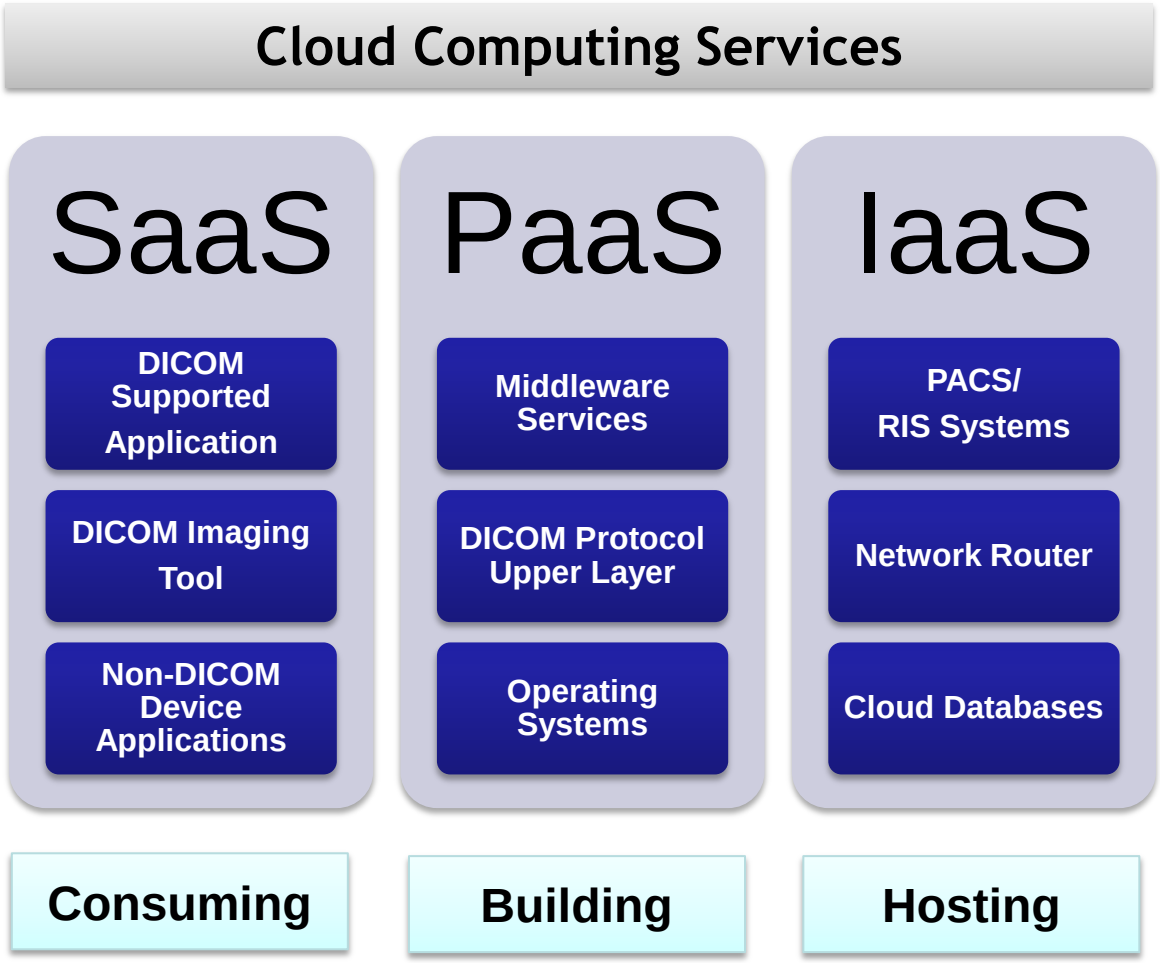
Cloud Computing

- **The NIST organization Defined: "Cloud computing is a model for enabling everywhere, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."**
- **Types of Cloud Computing Models:**
  - SaaS (Software as a Service)
  - PaaS (Platform as a Service)
  - IaaS (Infrastructure as a Service)
- **Cloud Computing model "customers" plug into the "cloud" to access IT resources which is provided "on-demand"**
  - Internet based computing where virtual shared resource provides software, infrastructure, platform, device and other resources
  - Services to customers on a pay-as-you-go basis.
  - It focuses on as a lower cost delivery model for Healthcare IT services

Architecture for the Solutions



Cloud Computing Services



Cloud-as-a-Services for Solutions

- **It offers meaningful use healthcare IT solution, Helping to hospitals and Radiology Imaging Service providers on same DICOM connected network protocol**
- **Medical Images are managed by centralized administration system in virtually shared Cloud PACS or Cloud Images Database server and balanced client supply needs**
- **No need for the individual access points to maintain any of the DICOM standards services**
- **DICOM Services are enabled Universal and On-Demand supply**
  - Network Access to a shared pool of rapid flexibility
  - DICOM Configurable computing services and Images resources

Summary

- **DICOM on cloud computing is bringing the on-demand software model to desktop or mobile and tablets, in a single login environment w/o installing additional Hardware or Software**
  - Based on your specific needs, you can turn on new functionality
  - Sharing studies with a colleague is just one click away.
  - No need of USB/CDs, VPNs and Paper Filmless images
- **DICOM Cloud Computing promises and Meaningful Use**
  - Provides Robust cloud computing based DICOM Imaging Storage Solutions at Low Cost and High Measurable - ***"Pay-as-you-Go"***
  - Enables Instant Retrieval of DICOM images and reports on Demand Anytime and Anywhere through virtually shared Cloud PACS or Cloud Imaging Server Database
  - Disaster recoverability which can be a natural solution some of the problems we faced for long-term medical image archive

References

DICOM
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http://dicom.nema.org/

IHE changing the way healthcare connects
www.ihe.net

http://www.IHE.net/

NIST National Institute of Standards and Technology
U.S. Department of Commerce

http://www.nist.gov

ACR American College of Radiology

http://www.acr.org/

Thank you for your attention !

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