



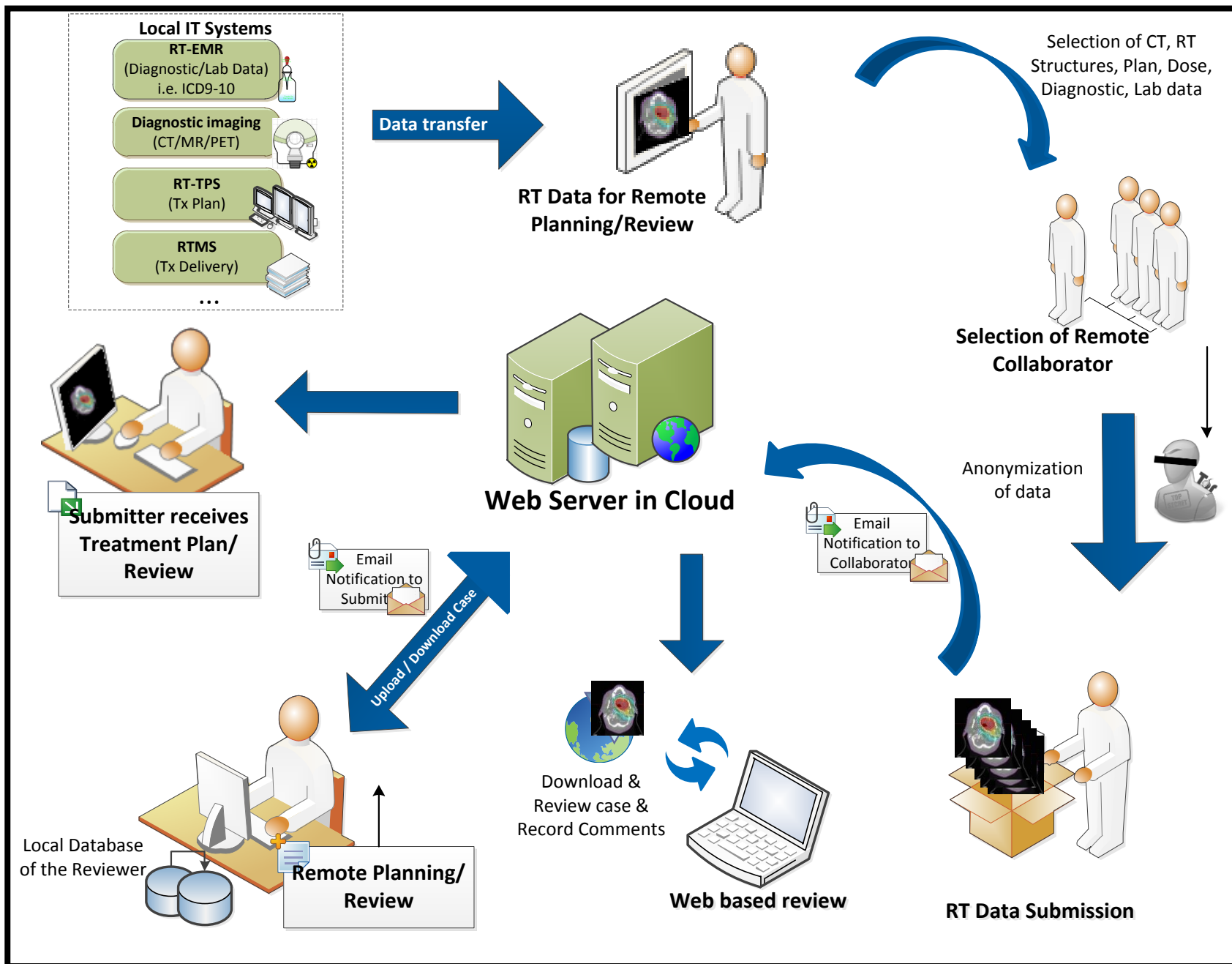
Cloud-based Electronic Infrastructure in Support of Linac-based Radiotherapy in Challenging Environments

Dr Ajay Aggarwal MD PhD
STFC-CERN-ICEC meeting

Challenges Identified

- **Specialist manpower shortages**
- **Education and Training of multidisciplinary team**
- **Radiotherapy Quality Assurance**
- **Data collection and research**

Process oriented view of the cloud-based electronic platform: Gen X



Role of Cloud-Based Electronic Infrastructure

- **Specialist manpower shortages**
 - Cloud based peer review
 - Hub and spoke solutions
- **Data collection, audit and research**
 - Audit of service and identify gaps in training
 - Training data bank
 - Enables involvement with international research initiatives

- **Quality Assurance**

- Facilitates standard operating procedures for QA
- Securely backs up data

- **Education and Training of multidisciplinary team**

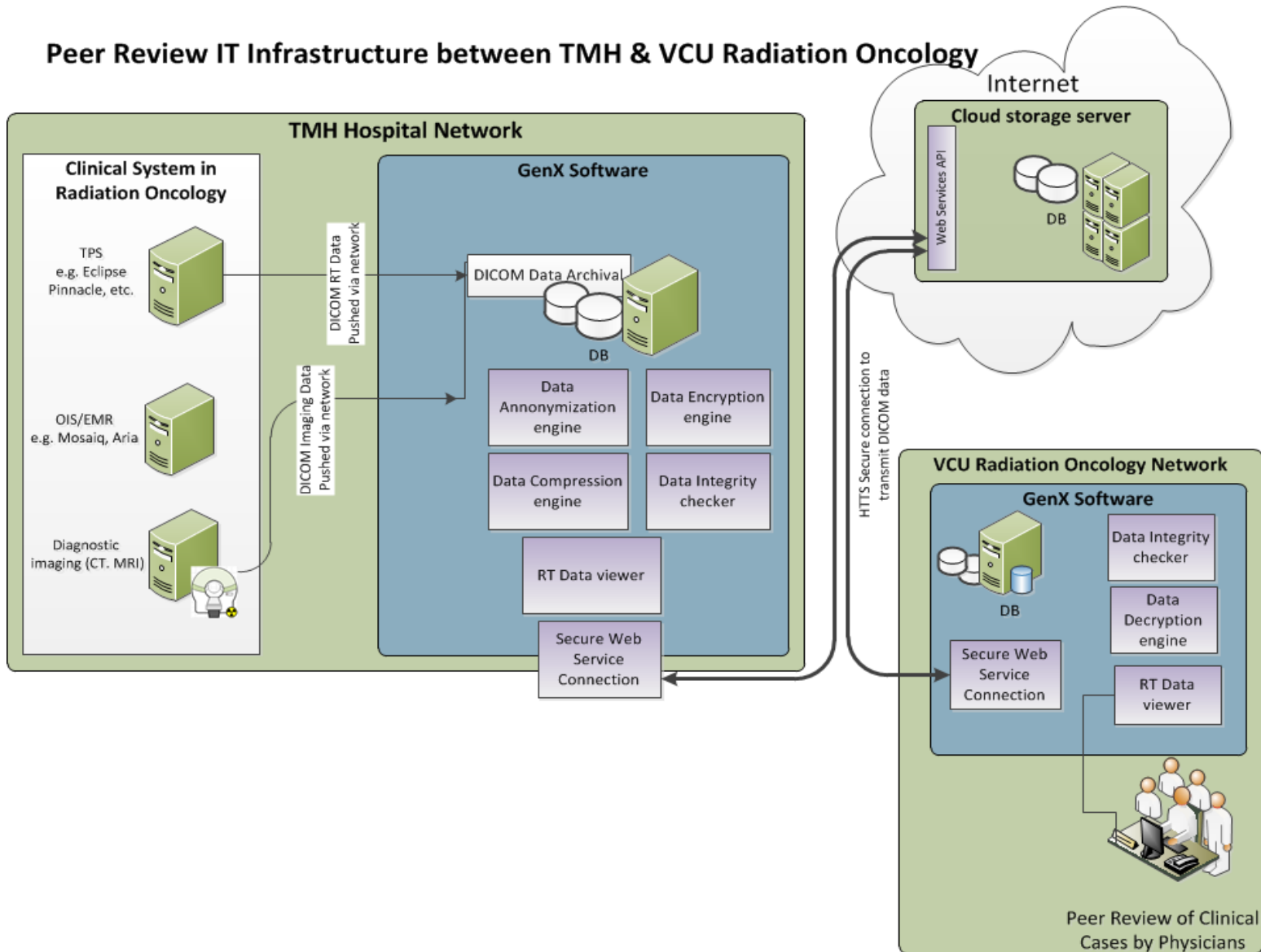
- Training modules in newer RT modalities
- Training partnerships with international partners

Infrastructure requirements for the Cloud

- Computer OS: Windows 7 or higher, RAM: 8GB,
- Reasonable speed internet connection
- Client software installed: Microsoft .net framework 4.0
- CEP software downloaded at host and partner site

GenXViewer Architecture

Peer Review IT Infrastructure between TMH & VCU Radiation Oncology



GenXviewer 1.0.0.0

Version: 1.0.0.0
 Institution: Rishabh Laptop
 Logged In: TSG Integrations Admin
 Designation: Application Administrator

Query PACS Add new patient Configuration Log Out

PATIENT DETAILS
 Name: Elekta DCOM14C01EL
 Patient ID: DCOM14C01EL
 Sex: Other
 Date of Birth: 5/6/1963
 Case:
 Physician:
 Includes: \RTPLAN\CT

PLAN DATA SELECTION

DataSet selection based on Image Sets RT Plan

Image Sets

Select	Image Set Name	Descr	Date	Number of Images	Orientation
<input type="radio"/>	CT		09 Nov 2011	1	ORIGINAL\PRIMARY\AXIAL\HE

RT Structure Sets

Select	Structure Set Name	Structure Set Label	Date	Description
<input type="radio"/>	POIandROIandBOLUS	RESCAN2_H_N	10 Apr 2012	

RT Plans

Select	Name	Label	Date	Description	TrePlan	Intent	Treat
<input type="radio"/>	RESCAN2_H_N	RESCAN2_H_N.1	10 Apr 2012	HEAD_&neck			

RT Doses

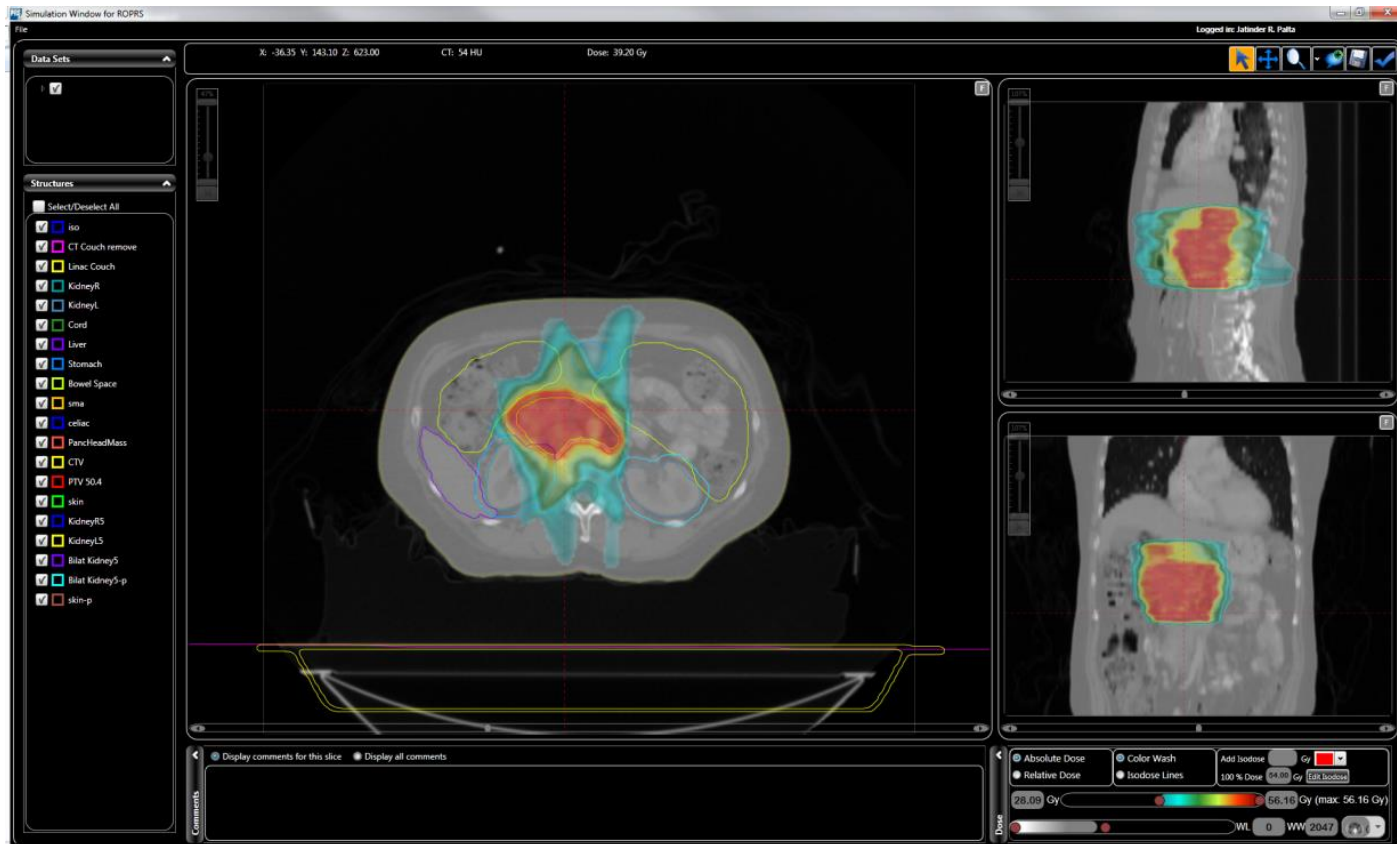
RT Images

Other Data

9:46 AM
4/30/2014

Screenshots of the DICOM RT data selection window.

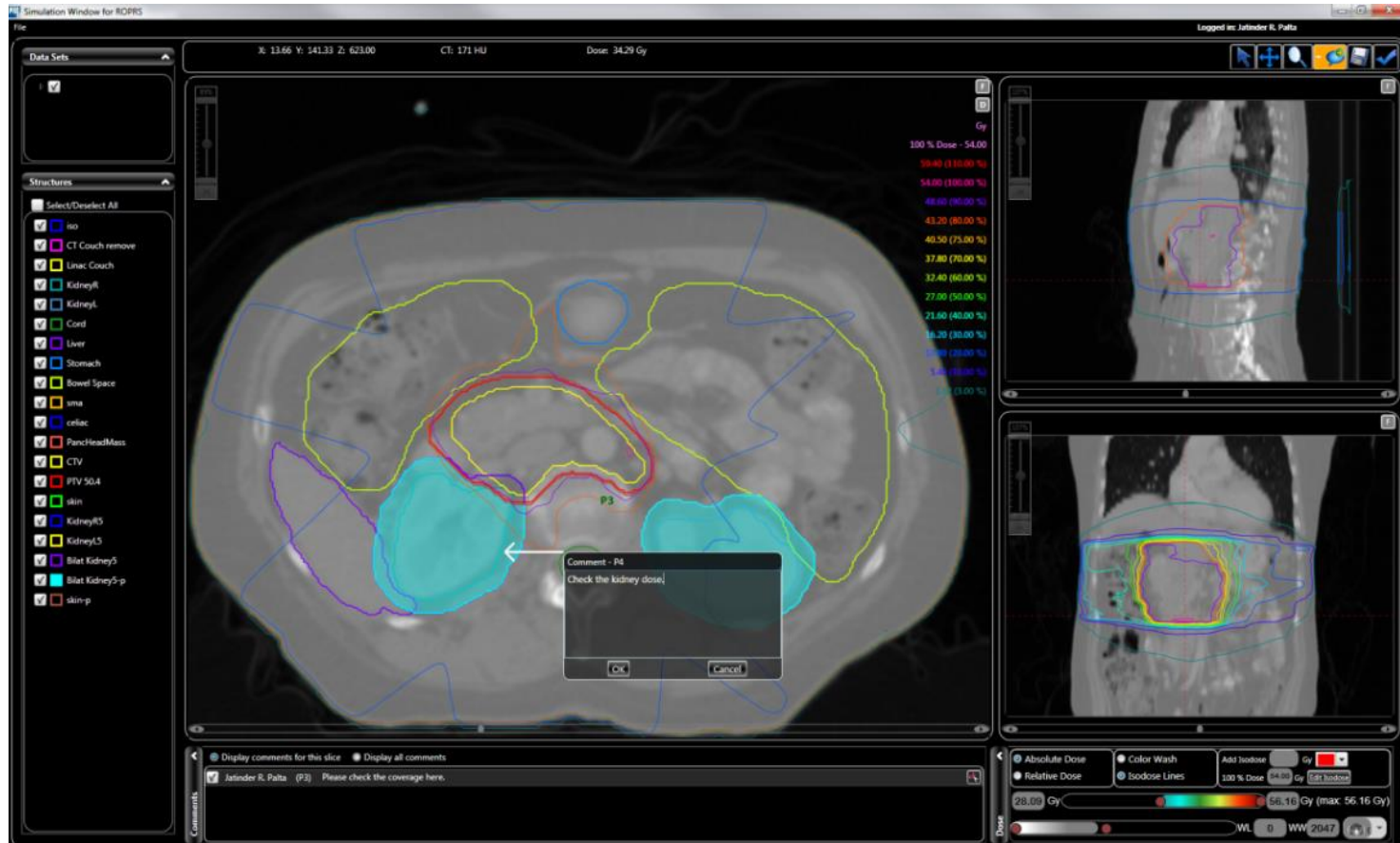
Review Process



Visualize the case

- Transverse, coronal and sagittal views of images (CT)
- Dose display on images - color wash, isodose levels, absolute / relative dose.
- Point dose display
- DVH computed and displayed

Review Process



Record Comments

- Comments can be recorded via:
 - sticky notes system (comments any length)
 - annotating a point or free-hand drawing.
- Comment text can be of any length
- Comments are automatically transferred to the submitter's local database.

Phase 1 of Study

- Perform feasibility study for using the “Cloud”
 - Needs assessment to understand better the specific requirements and uses for a CEP
 - To assess the local informatics infrastructure that is currently available to support CEP platforms.
- Visits in June 2018 – Kumasi and Dar es Salaam
- Preceded by detailed questionnaire regarding informatics capability

Outcome

- Tanzania

- Software downloaded
- Cases uploaded
- 2 New Linacs installed on arrival
- Starting transition to 3D conformal planning
- Rad oncs being trained
- Future plan for transition to IMRT

- Ghana

- Long time lag for plan upload with local broadband
- Old planning software not compatible
- Diagnostic CT difficult to upload
- LINAC not operational for over 3 years
- Conformal planned patients sent to Accra





Ciris



Current Activities

- Continue feasibility study
 - New site in Ghana – Sweden Ghana Medical Centre (Accra)
 - Ocean Road Cancer Centre
- Systematic review of peer review processes underway led by Dr Pippa Lewis
- Understand how can peer review be done in a way that improves quality over time

Next few months...

- Audit of RT plans for head and neck, cervical and prostate cancer in each collaborating centre
- Evaluate training and education needs and how these can be incorporated into peer review process
- Develop workflow for incorporating peer review in clinical practice
- Audit of impact of peer review processes after implementation

Thank You!