

3D Remote Collaboration Framework
for Virtual Cultural Heritage
using Windows Azure Environment

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Background



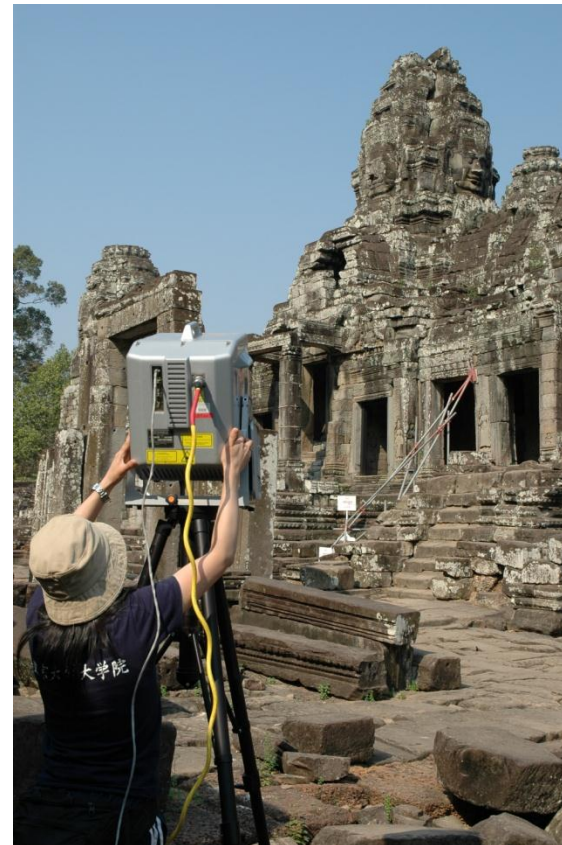
Background

- Digital Archiving Project for Cultural Objects



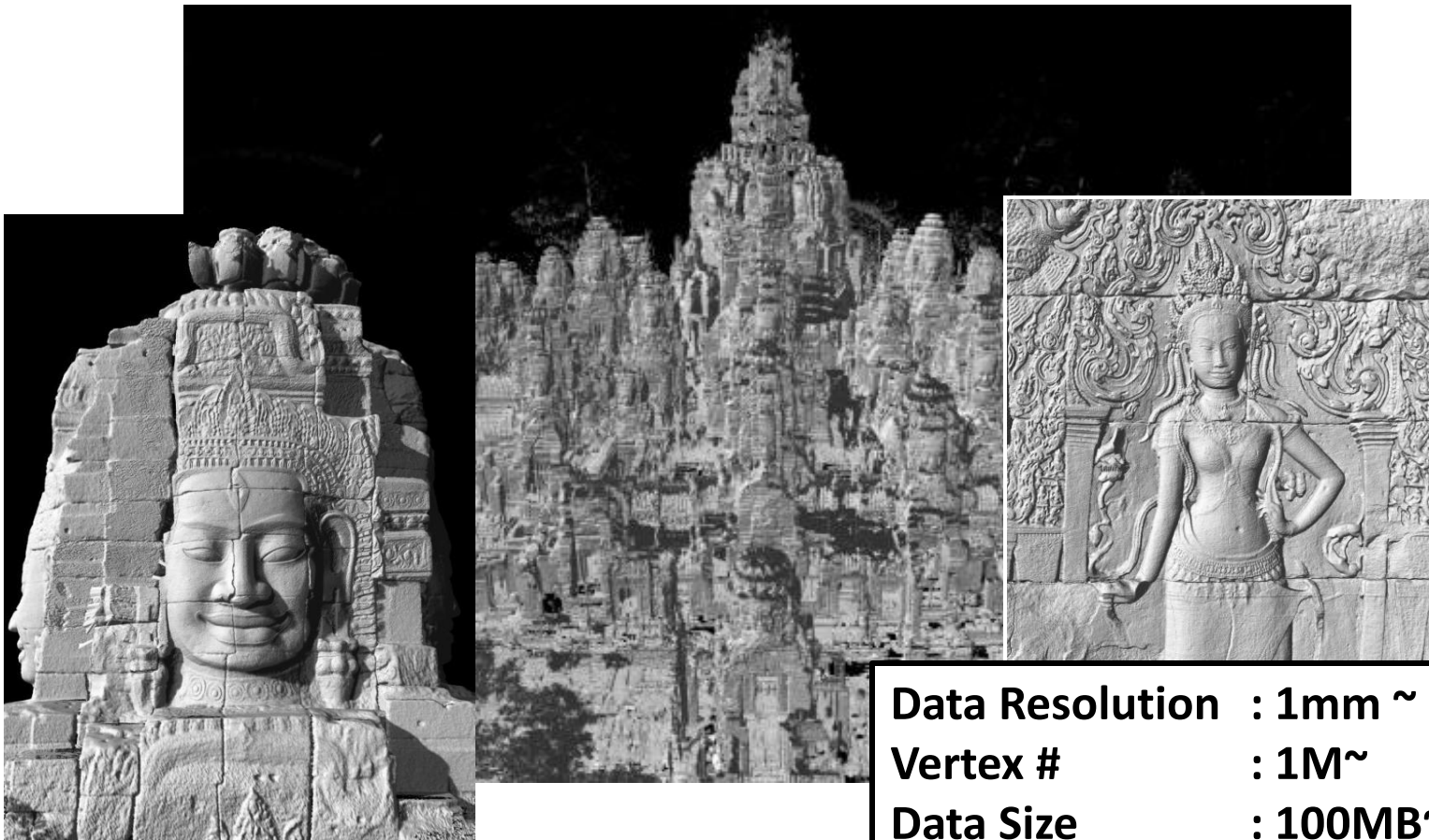
Background

- Digital Archiving Project for Cultural Objects

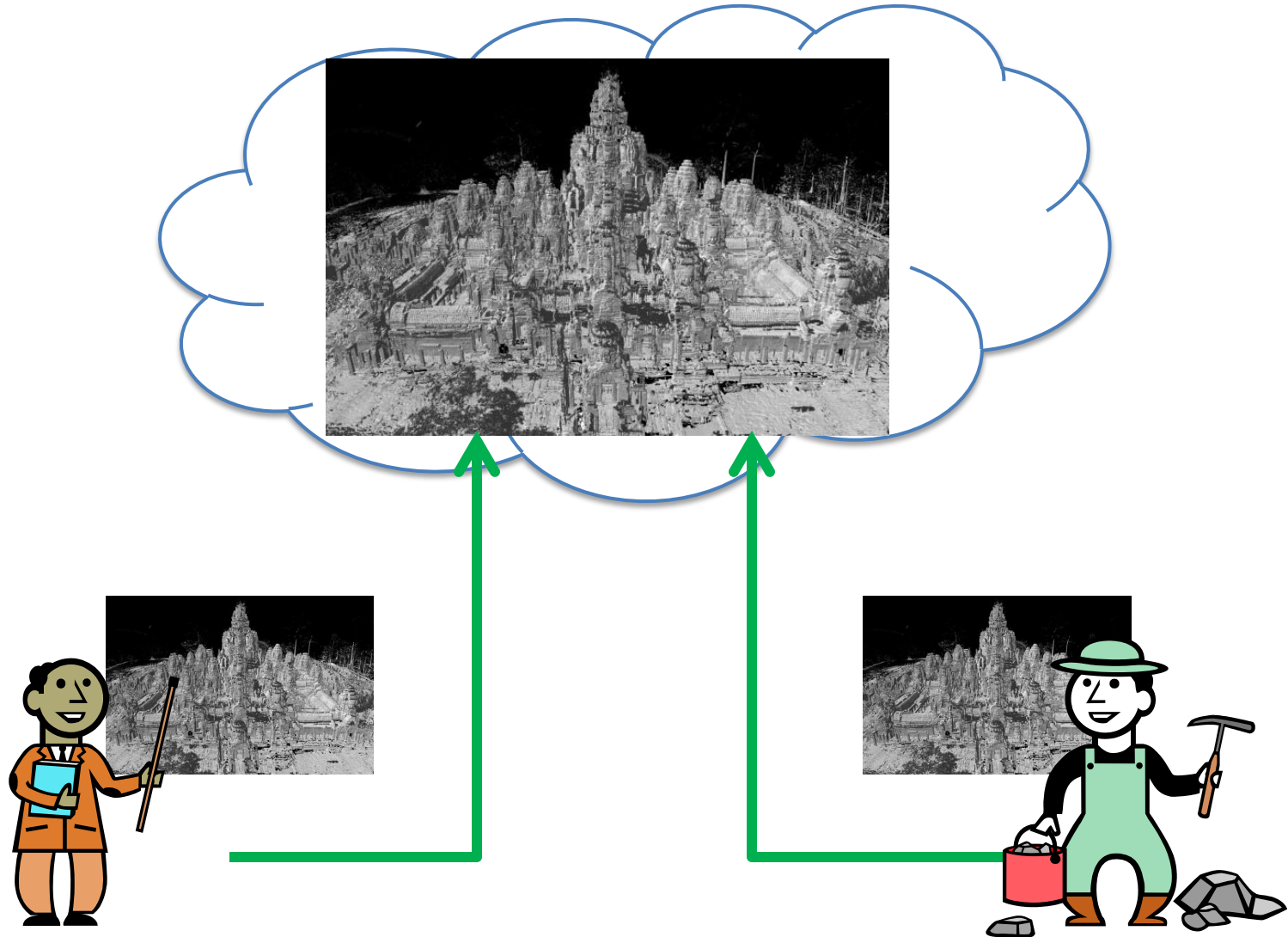


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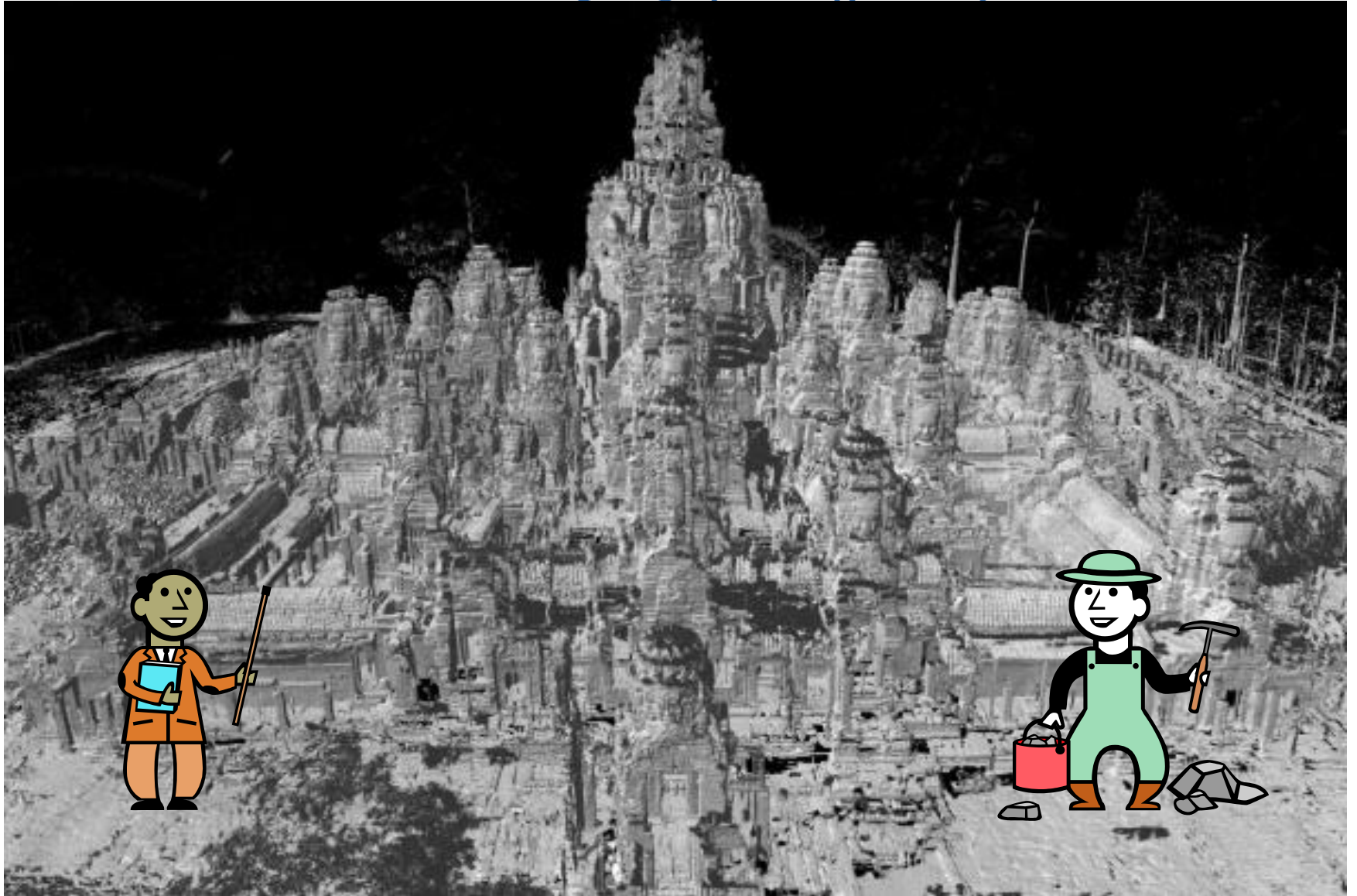
- Digital Archiving Project for Cultural Objects



Share 3D Data



Proposed Sharing Style



Similar Style



Second life

Previous Project

- Cyber-Archaeology on Tele-Immersion



Proposed System

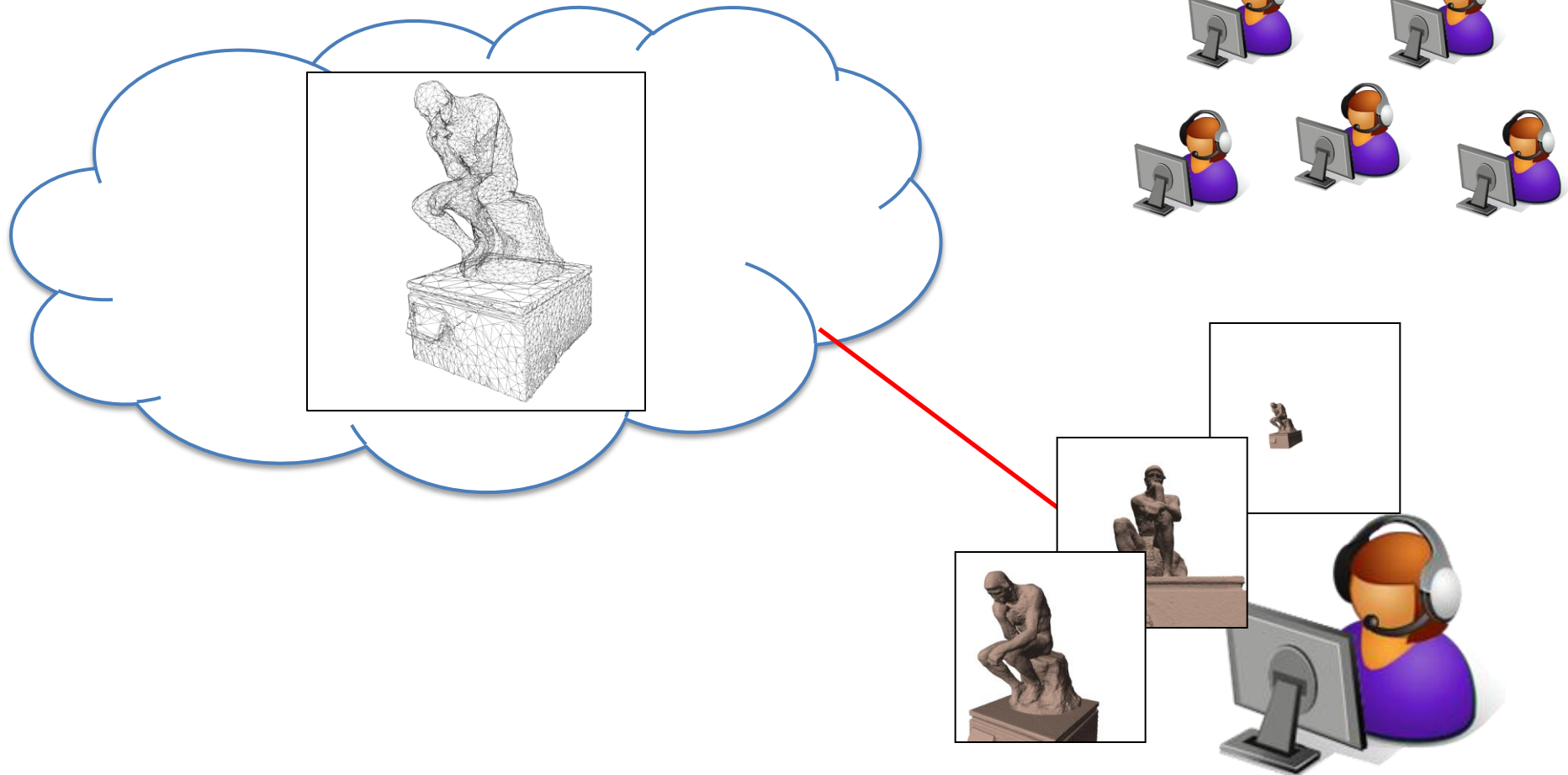


Core functions

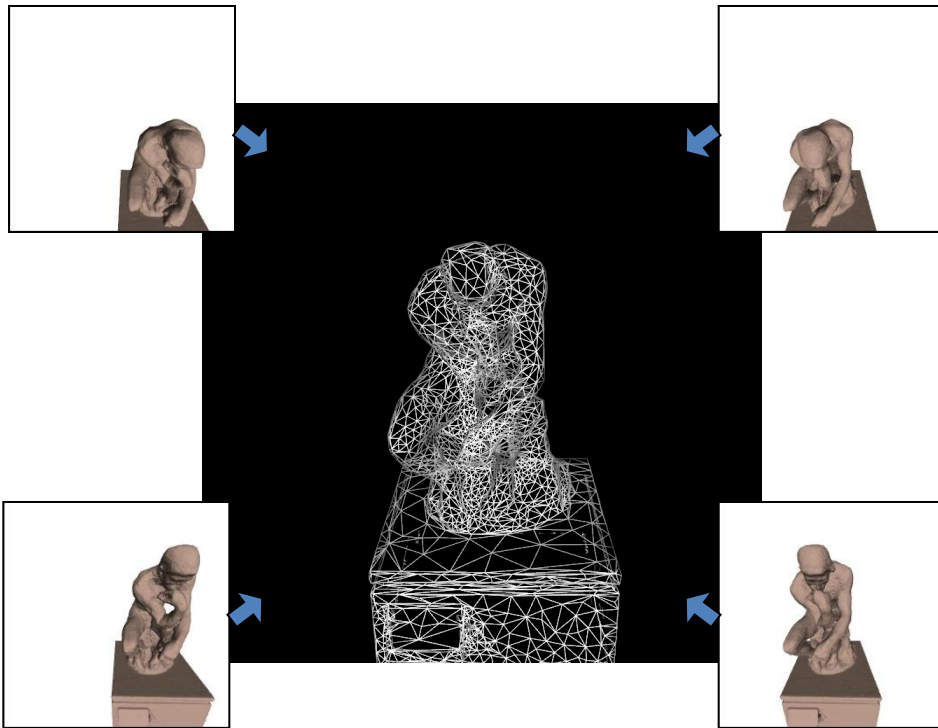
- Display for Huge Cultural 3D Models
 - Real-Time
 - Large Datasets
- Collaborative Framework
 - Sharing User's Avatar
 - Manipulation by Remote Users

Display for Huge Cultural 3D Models

Display system



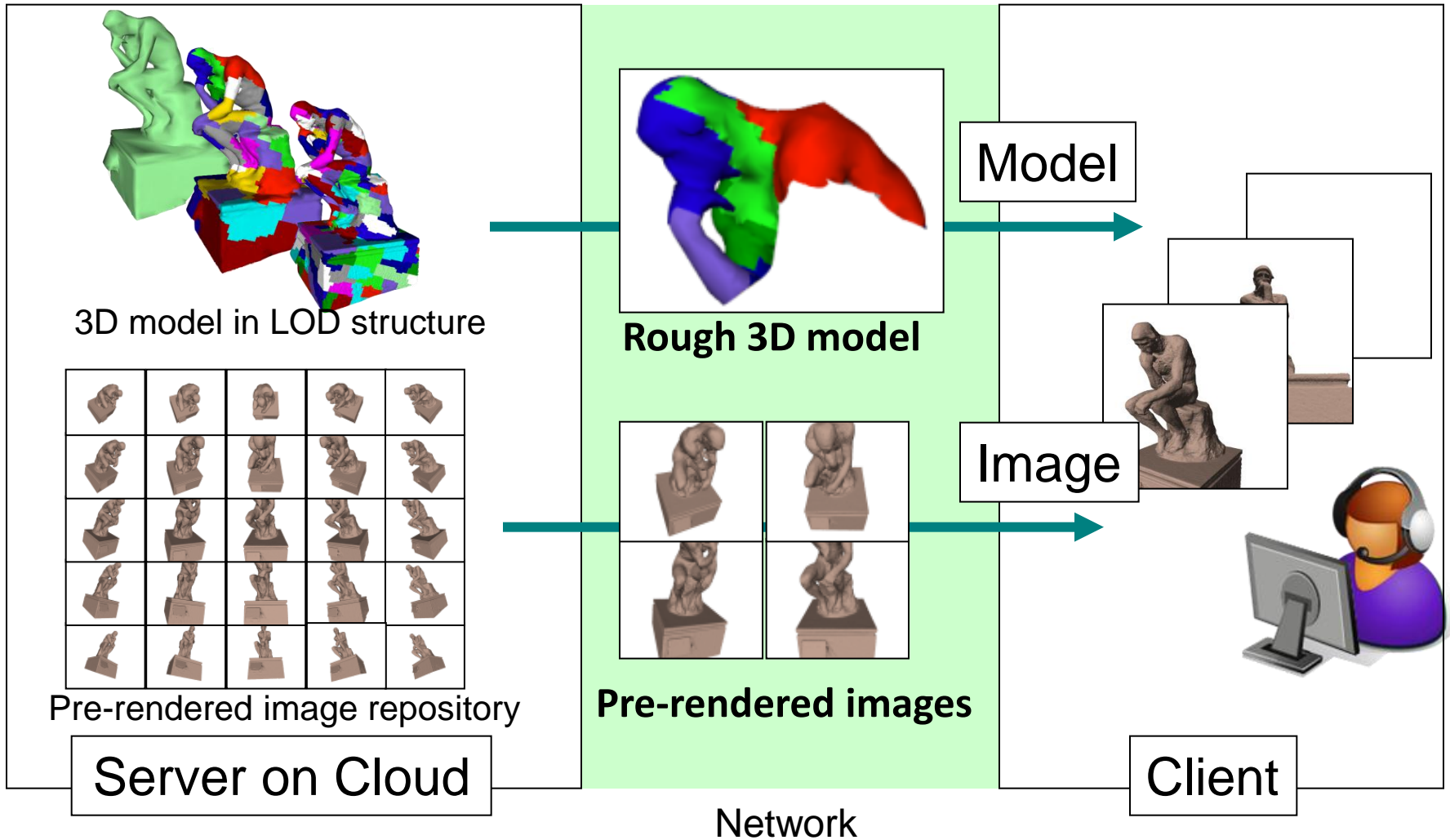
Model and Image based Display



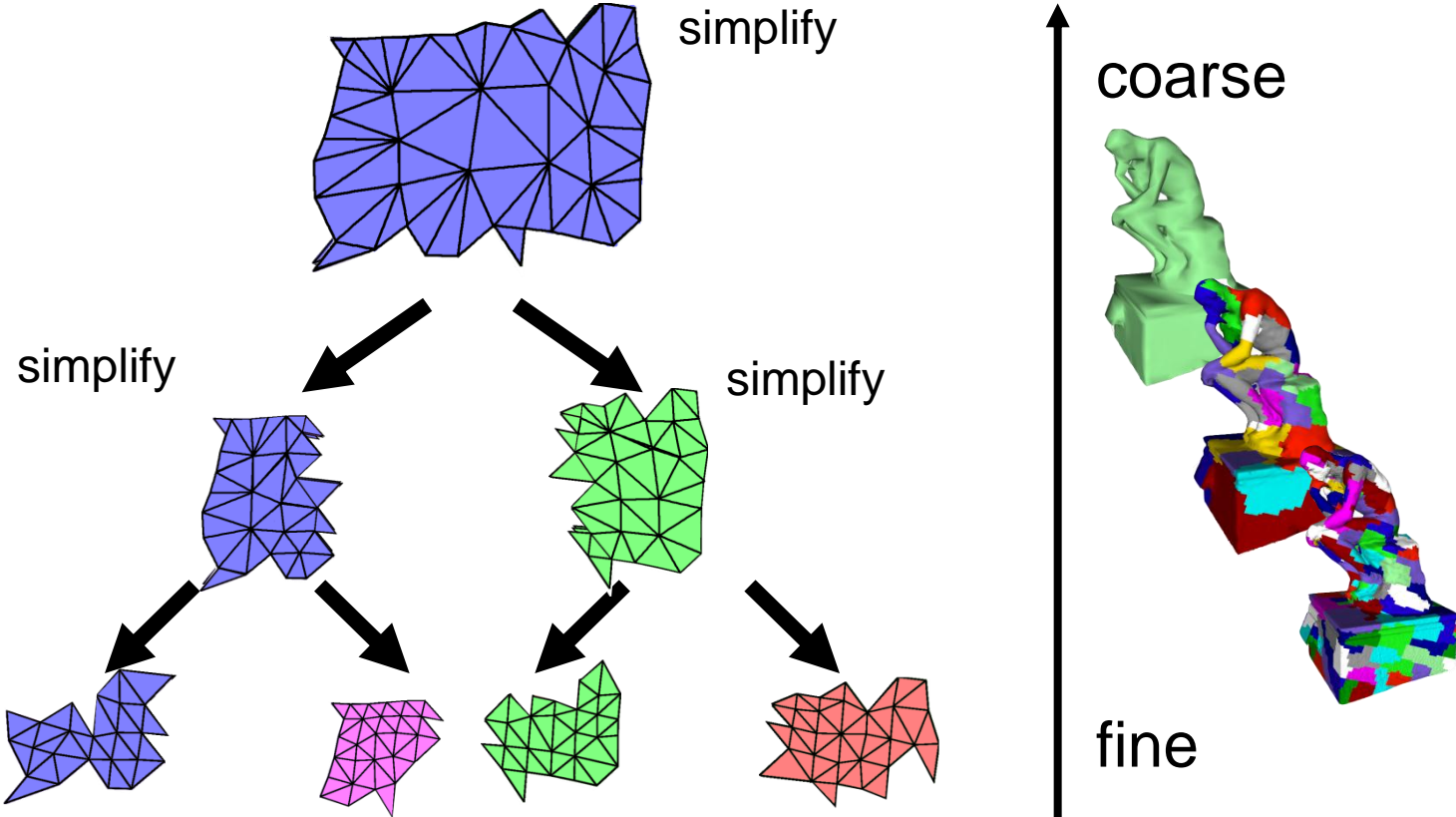
Final Image



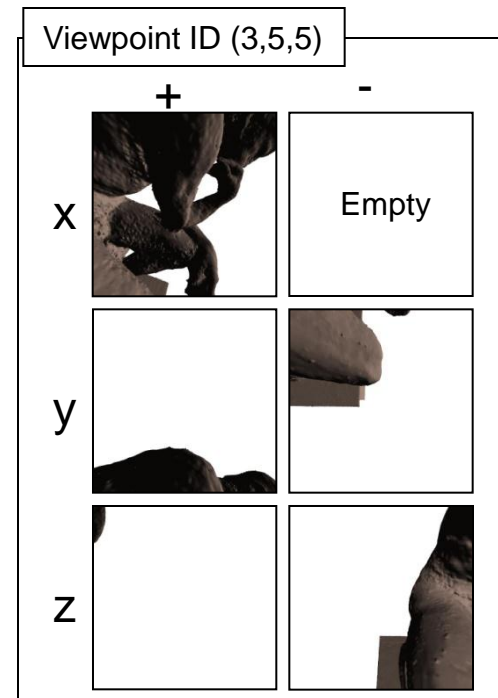
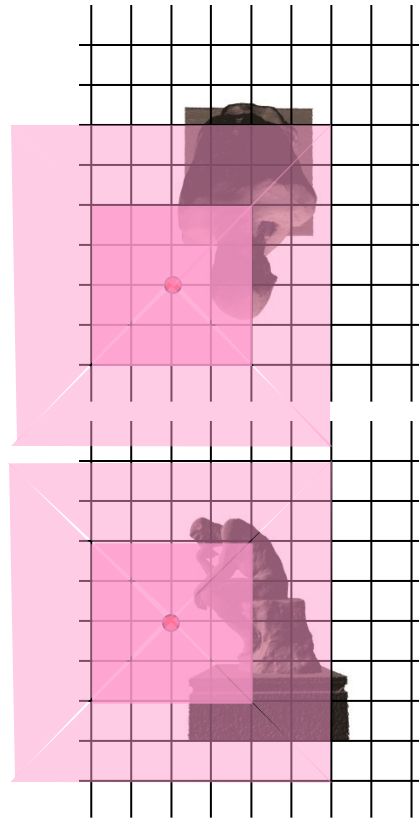
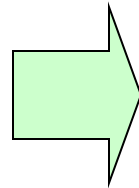
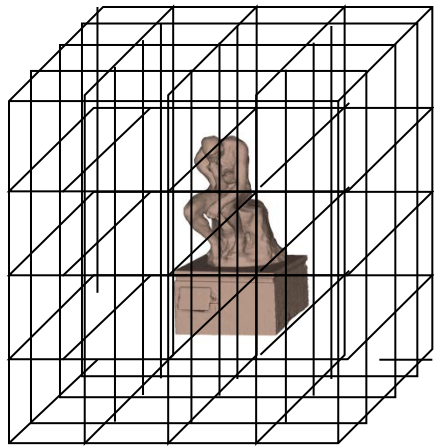
Overview



Data Structure – Model-based Data – (Offline Process)

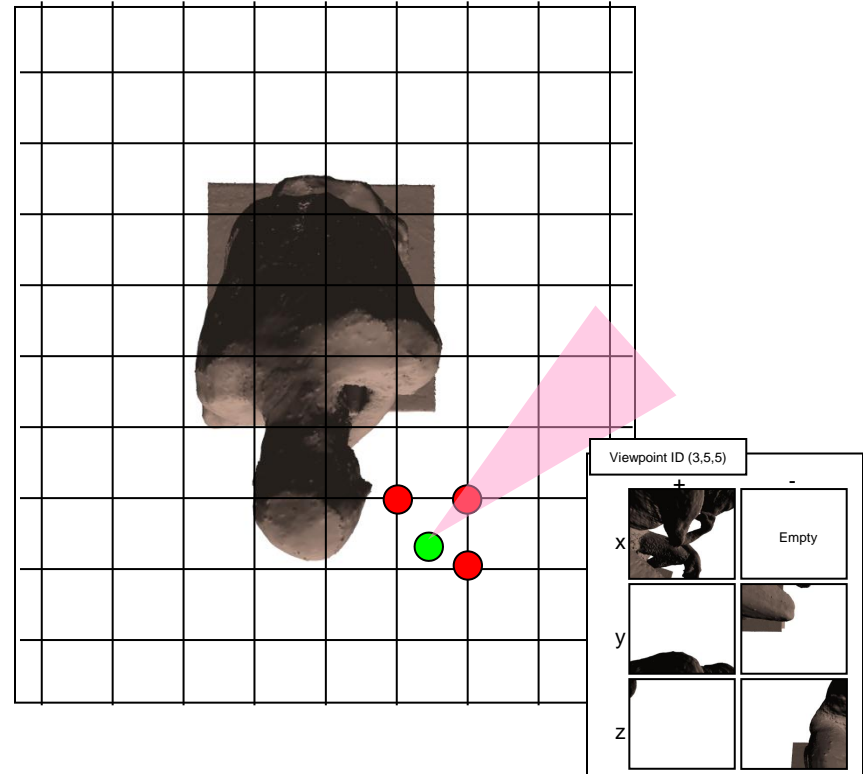
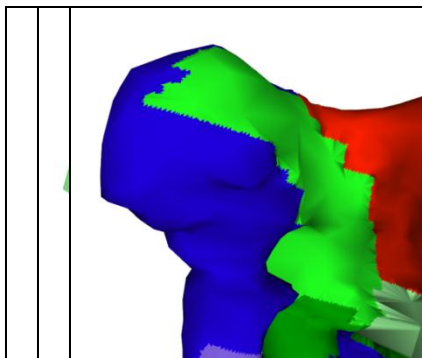
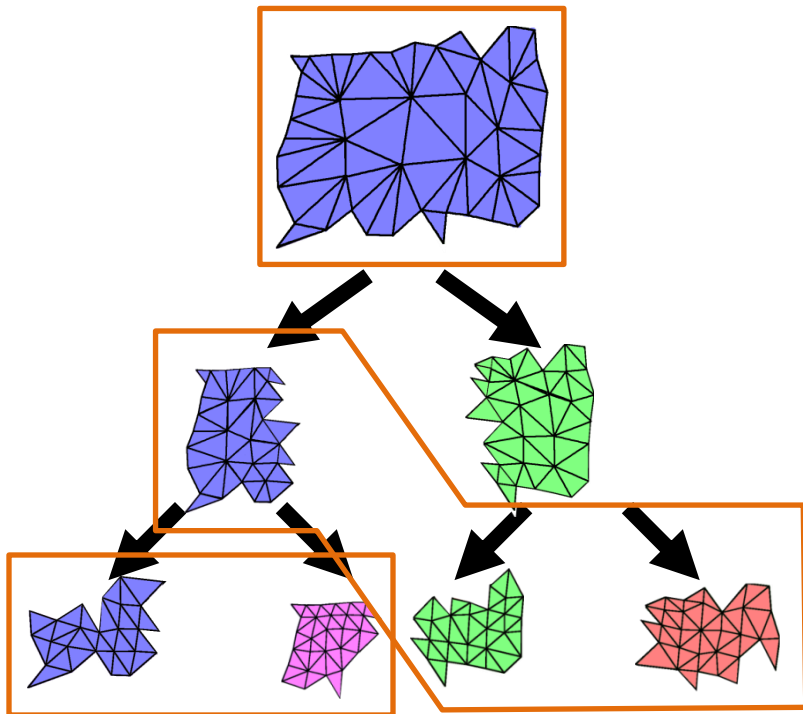


Data Structure – Image-based Data – (Offline Process)



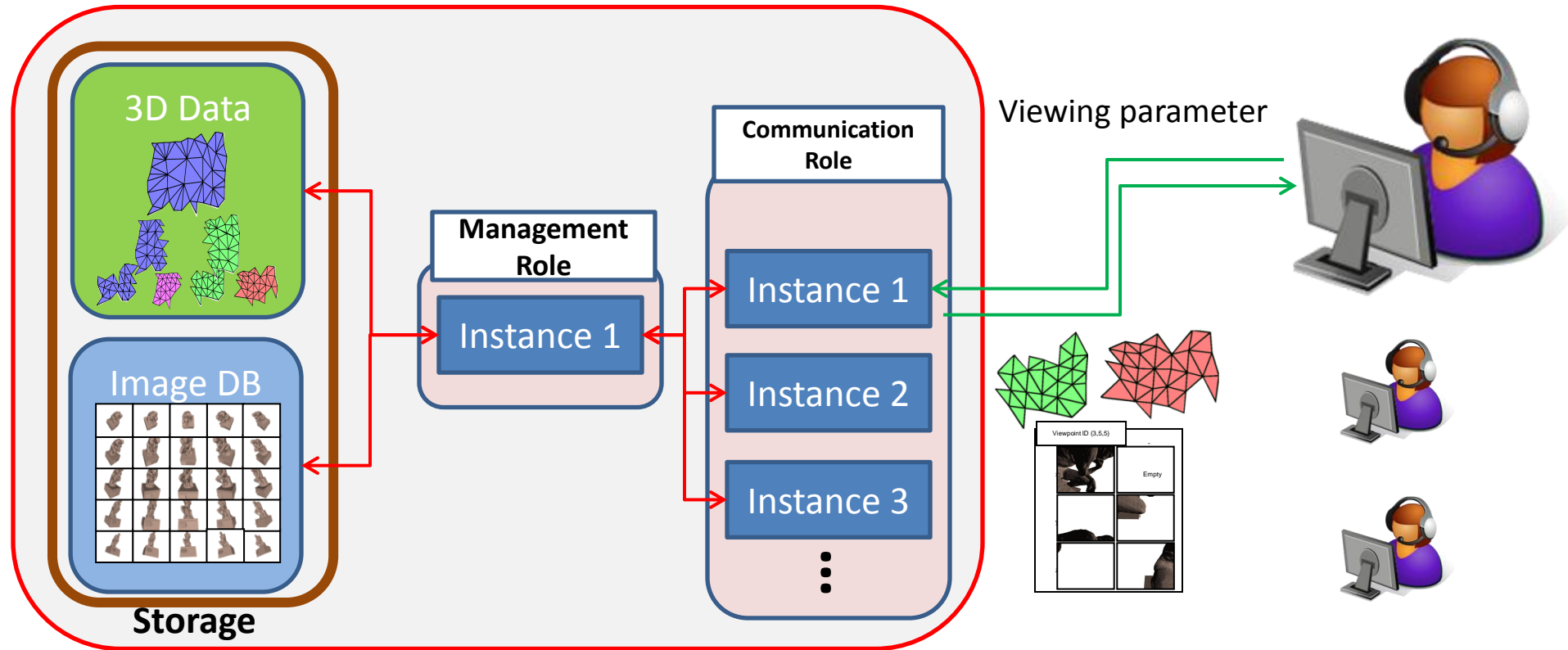
grid space split regularly

Selective Data transfer



On Windows Azure

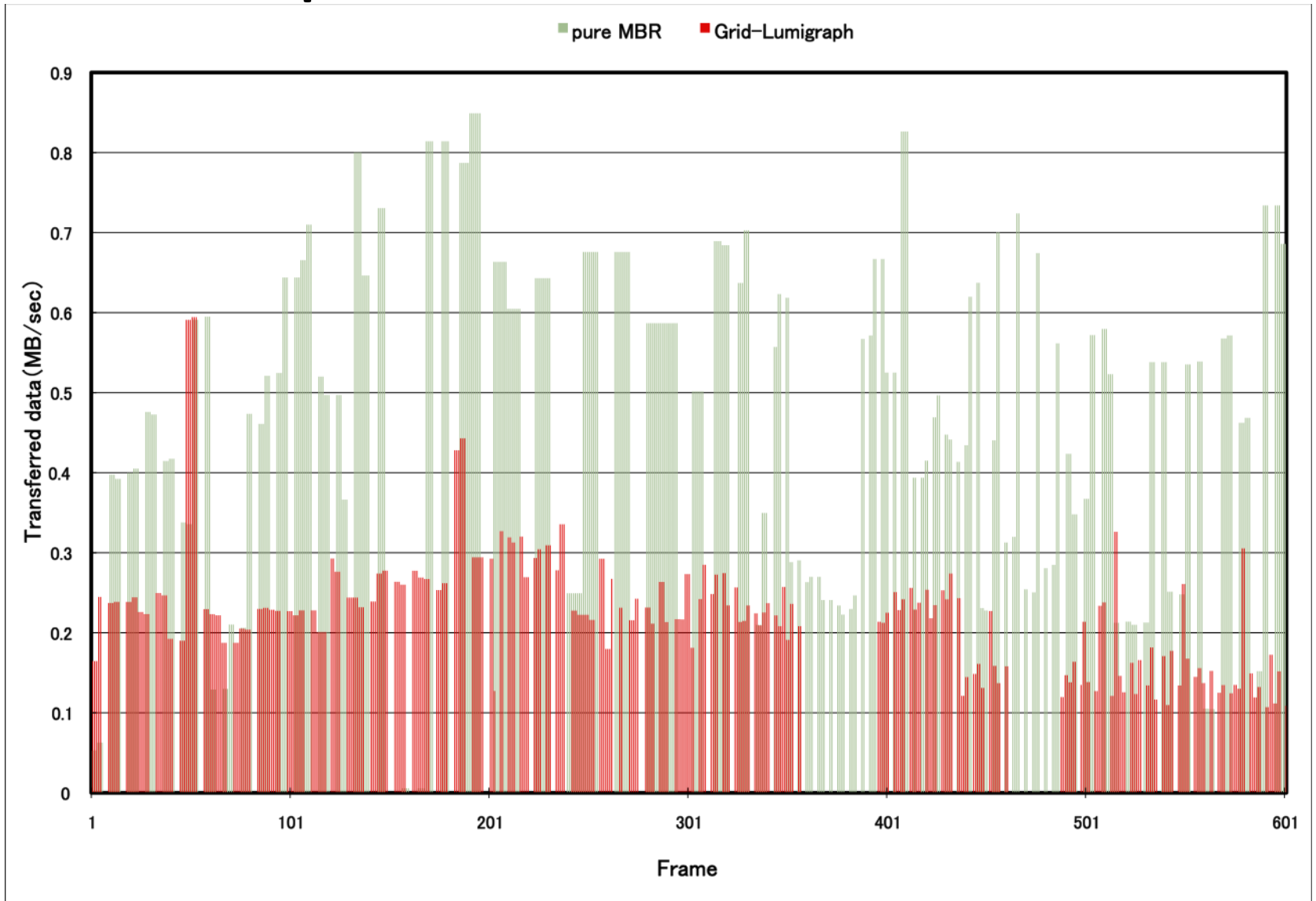
Windows Azure



Results



Comparison of Data Transfer



Collaborative Framework

3D Collaborative Sharing

- Sharing user's avatar in 3D space
- Manipulation of 3D model by human motion



User's Avatar captured by Kinect



Color



Depth

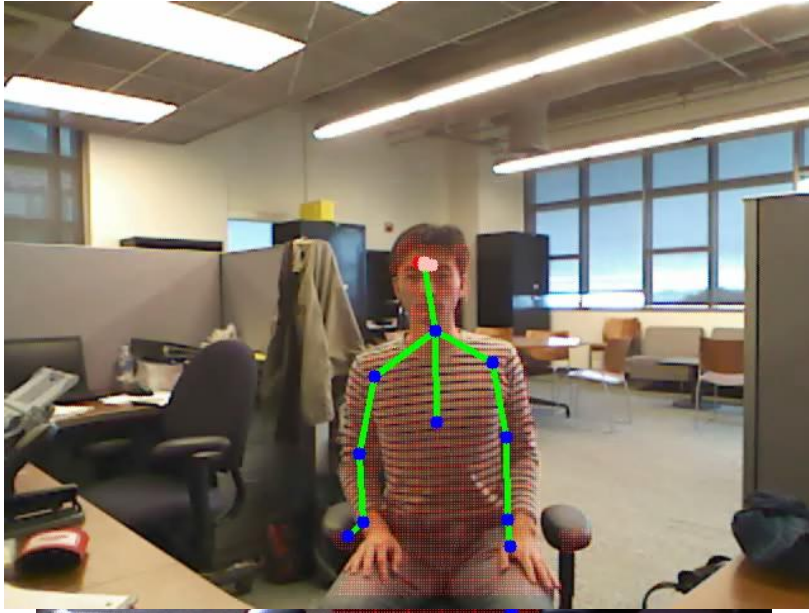


3D User's Avatar

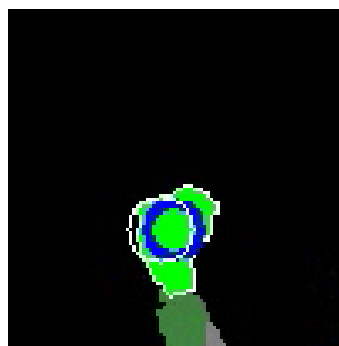
User's Avatar captured by Kinect



Interactive Browsing by Hand Motion



palm

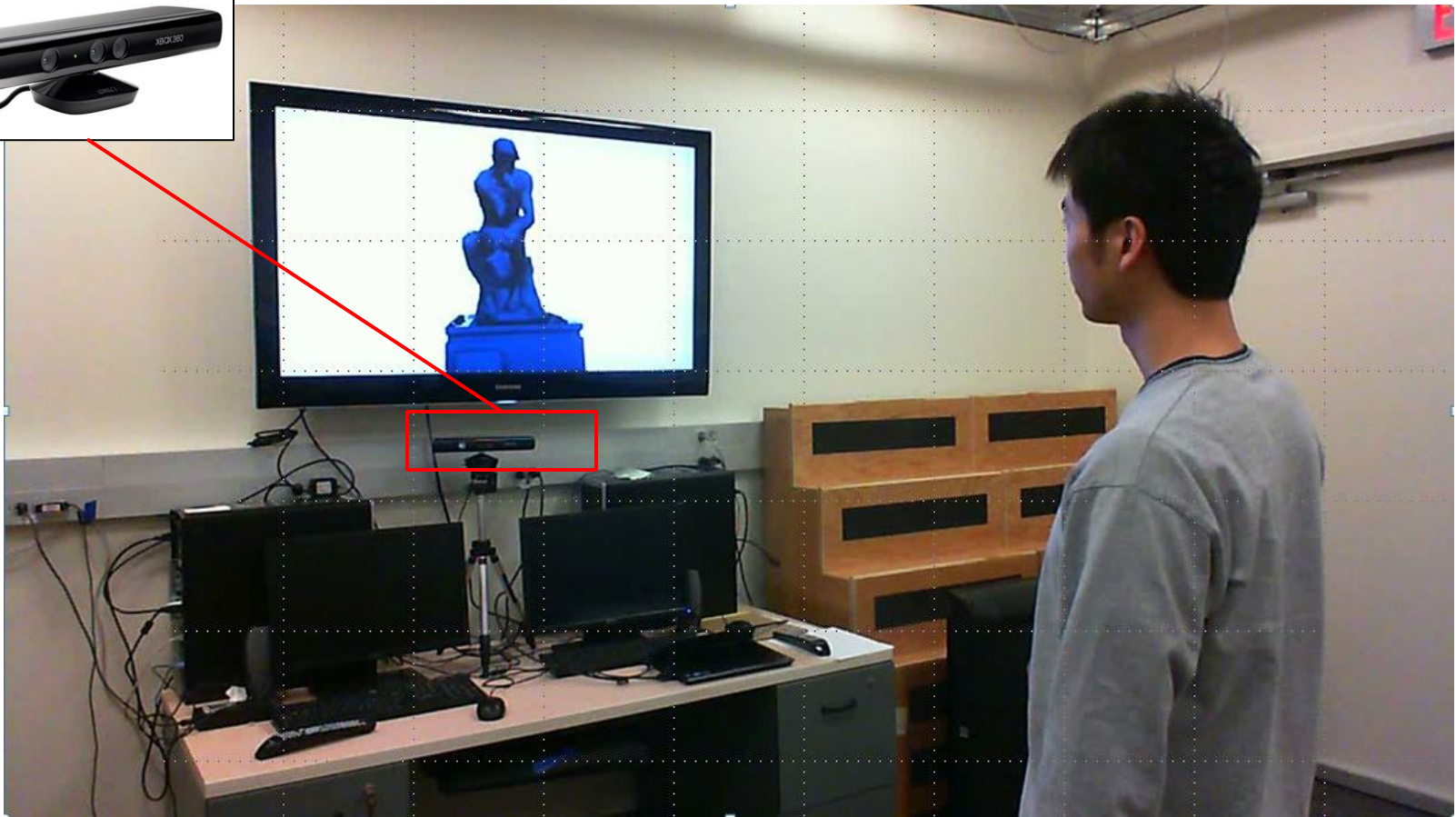


grasp

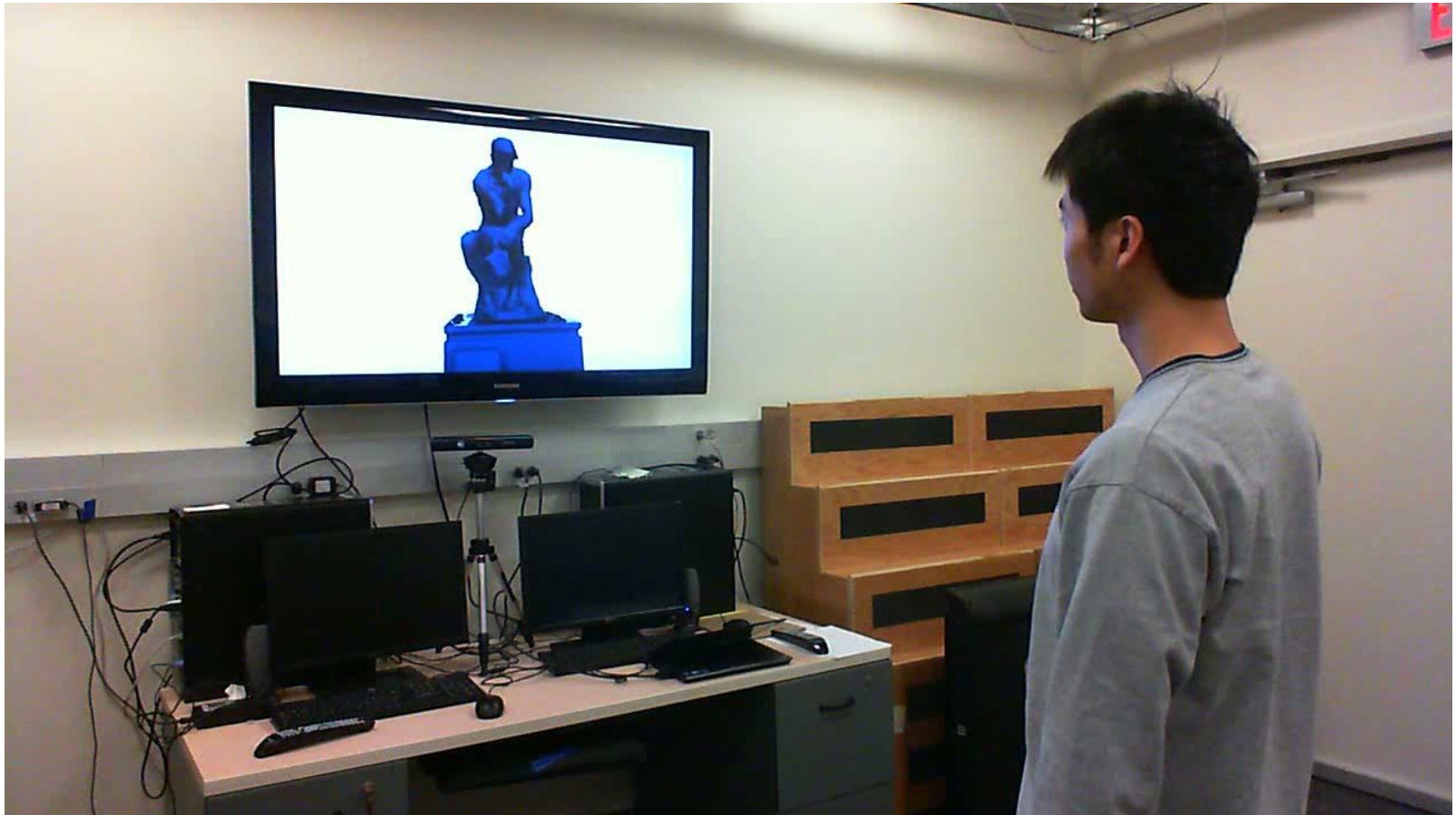


Setup

Kinect



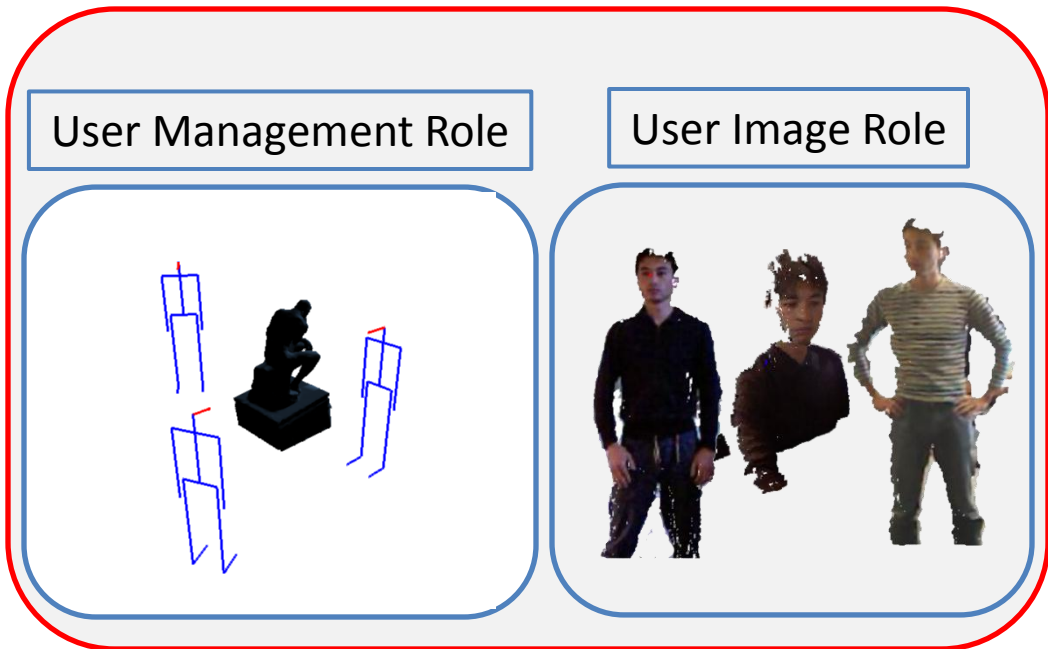
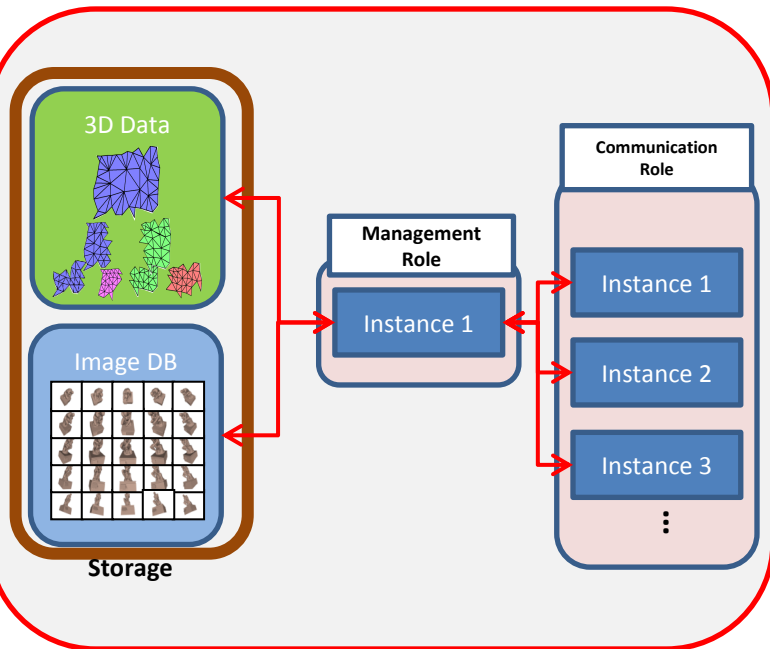
Interactive Browsing



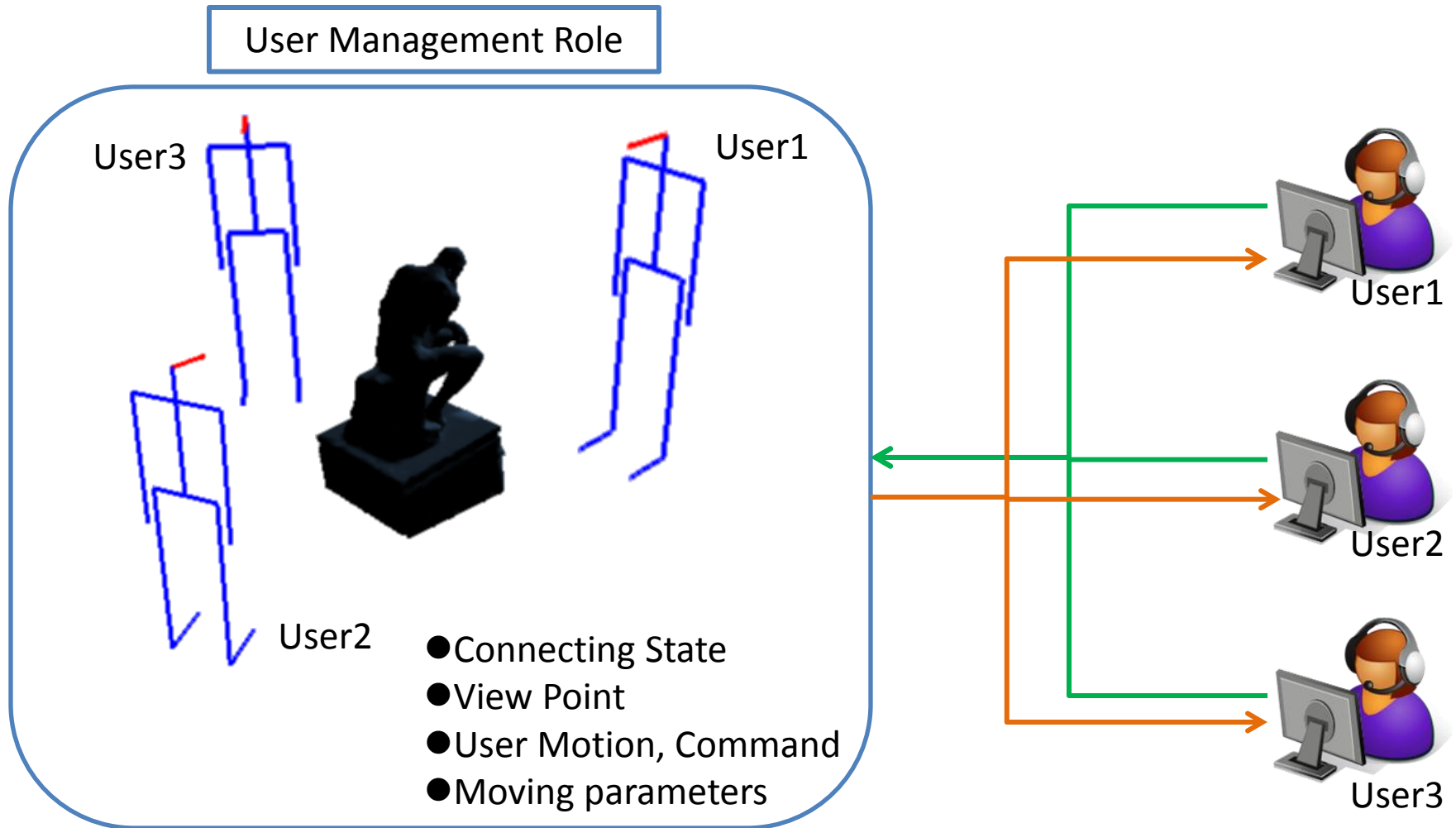
on Windows Azure

3D Model Server

User Server



User Management Role



User Image Role (1)

User Image Role

User 1

Color Data



Depth Data



User 2

Color Data

Depth Data



User Image Role (2)

User Image Role

User 1

Color Data



Depth Data



User 2

Color Data



Depth Data



User 3

Color Data

Depth Data



Collaborative Browsing



Summary

- 3D collaboration system for cultural models on Windows Azure
 - Real-time display for large models
 - Model and Image based method
 - Collaborative browsing framework
 - Sharing 3D space and real avatar
 - Interactive manipulation

Future work

- Collaborative application
 - Attach and share information on the 3D model
 - Navigation in 3D buildings
- Image quality of User's avatar
- Fast communication

Thank you for your attention.