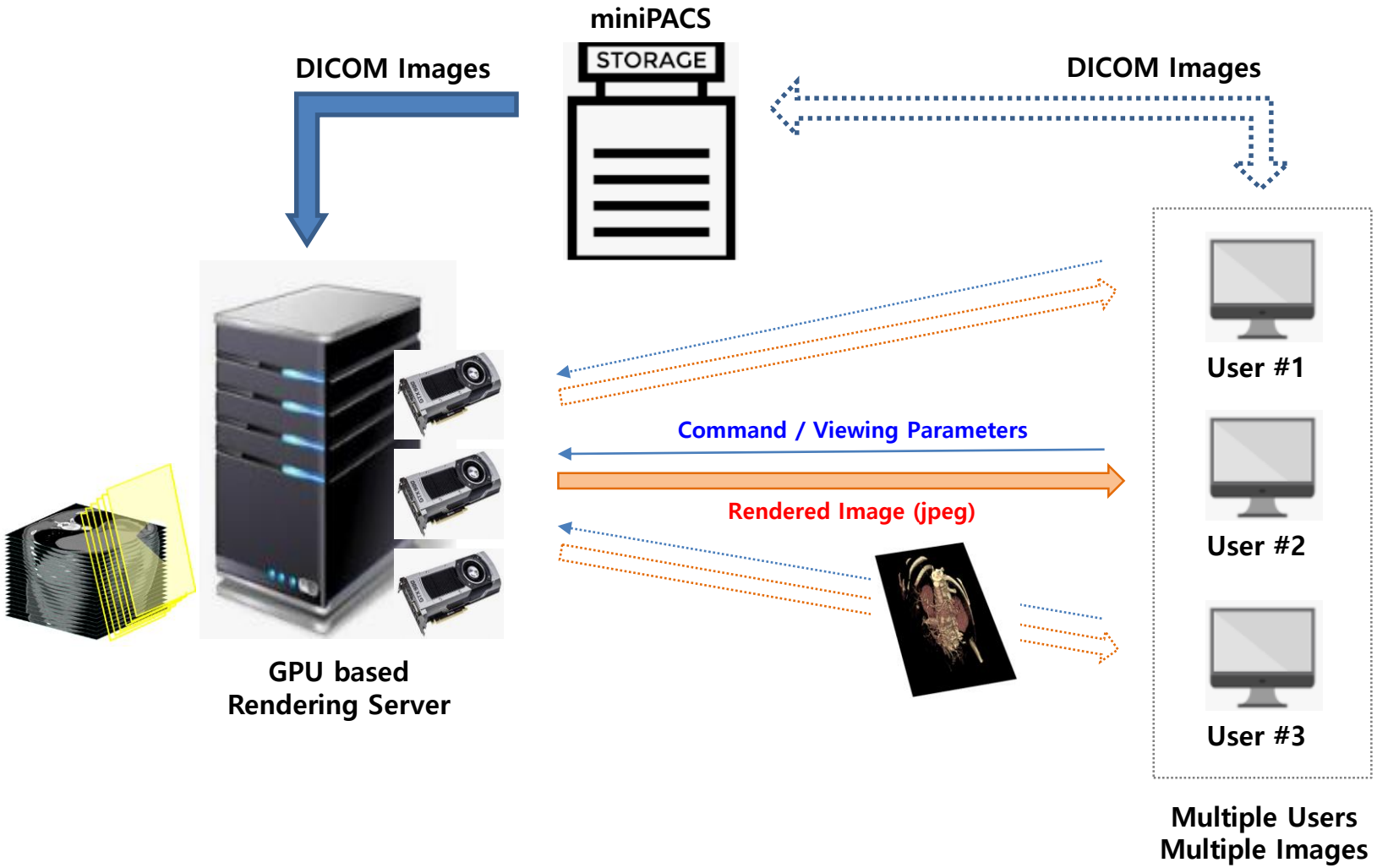
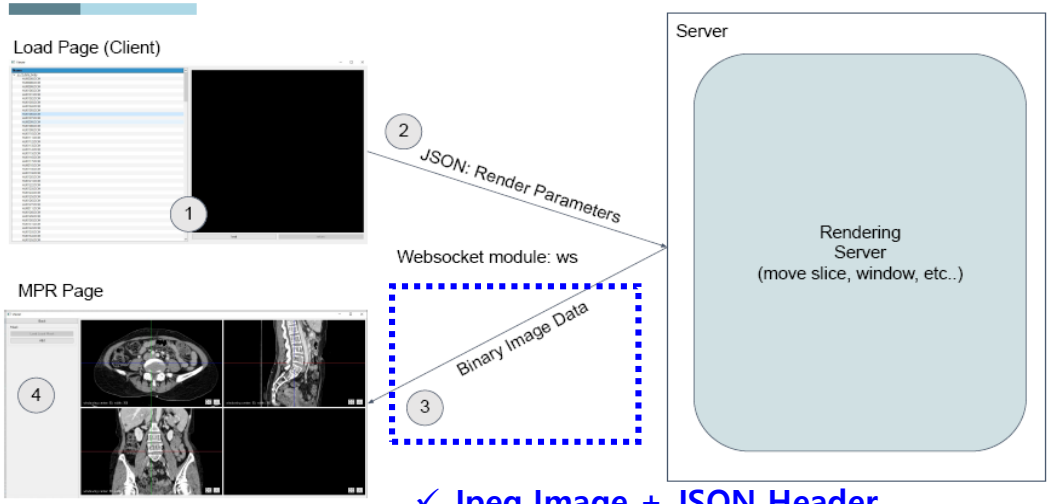
Server-side Rendering : SNU Project



Server-Side Rendering Architecture

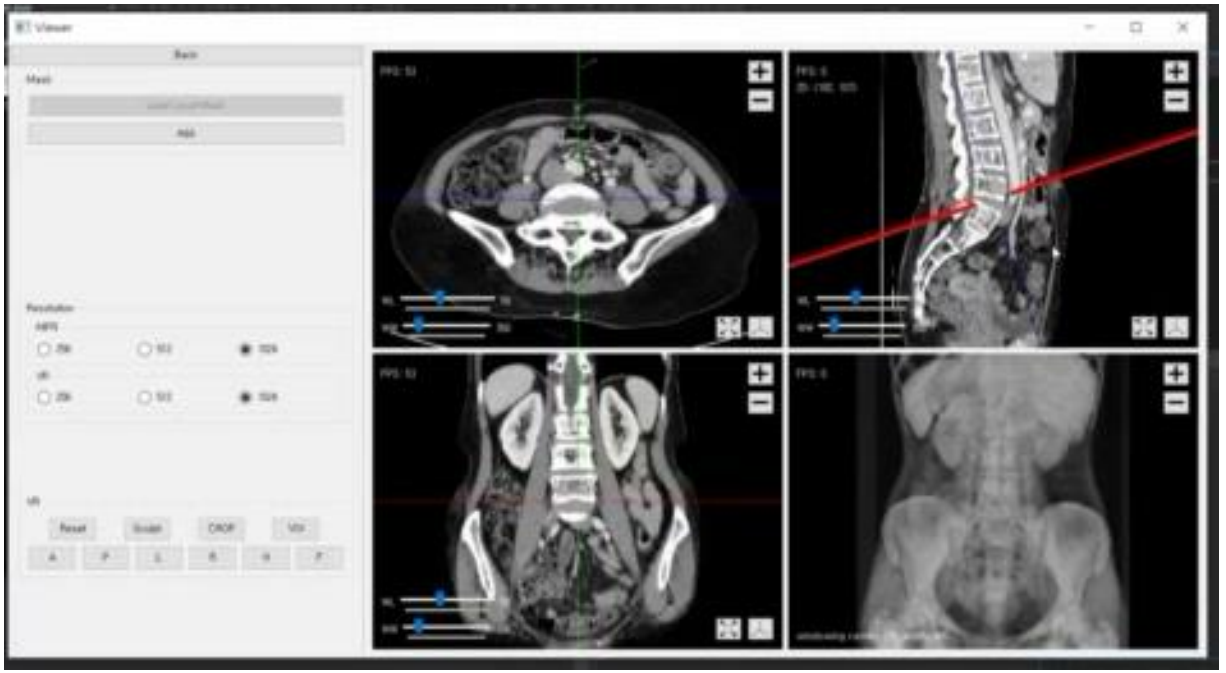


✓ **Jpeg Image + JSON Header**

- <u>Improve the rendering/transfer speed</u>
  1. Modified to transmit down-sampling rendering image while mouse moving
  2. Modified to send the rendering image compressed using IJG LibJpeg

Progress (2021-05-13)

- Implemented Function Lists
  - Server
    - Support multiple users
    - Websockets
    - VS 2017
  - MPR
    - Axial / Coronal / Sagittal
    - Pan / Zoom
    - Window
    - Reset
    - Oblique
    - Slab MPR: thickness
    - Inverse
    - QoS Control
  - VR
    - DVR (Pan / Zoom / Reset / Rotate)
    - **Crop**
    - **VOI**
    - **Sculpt**
    - **Orientation Preset (A/P/L/R/H/F)**



✓ **Improve Rendering, Transmission Speed**

Demo

❖ **H/W Spec. of Test Server in SNU**

- CPU : i9-7940X 3.10GHz
- RAM : 128GB
- GPU : NVIDIA TITAN XP 12GB ($2,500~$3,000)
- OS : Win Server 2019?
- HDD/SSD?

❖ **Server-side Rendering Engine Performance**

- Expected to support 15~20 concurrent users
  - Require at least 2~3 times the amount of memory of CT volume data
    - Full Volume + Half Volume + Segmentation Mask + Etc...

    ex) CT 512x512 300slice images : 150MB x 3 = 450MB
  - Consider the server farm design later

➔ Accurate Performance Spec. will be confirmed through experiments

(비기능) 성능목표

1) 영상 로딩 후 첫 렌더링 영상 출력 시간 : 5sec 이내
   → 영상 로딩 속도 향상은 인피니트와 협력해서 개선
2) VR, MIP rotation : 10fps 이상
3) MPR translating/rotating/windowing : 20fps 이상

❖ **실험환경**

- ❖ 512x512 CT 영상 500장 기준 (200장, 500장, 1,000장 비교 테스트)
- ❖ Rendered image size : 1024x1024 (mouse 조작 시에는 256x256)
- ❖ Jpeg lossless 전송 (Raw 전송도 비교 테스트)
- ❖ 100Mbps (10Mbps, 1Gbps 네트워크 환경 비교 테스트)
- ❖ Concurrent users : 5 (최대 20 users)
- ❖ On-premise Server (Cloud 환경 구축 비교 테스트)
- ❖ Server Farm 구성은 추후 고려