

Establishment of e-Science environment for HVEM

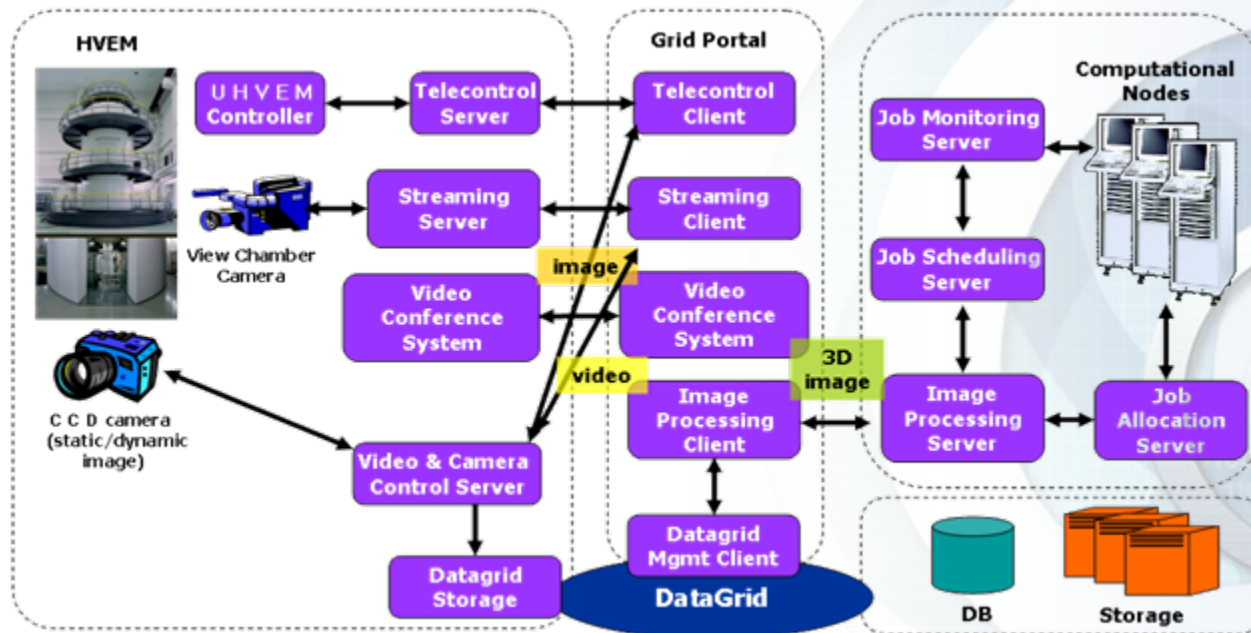
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HVEM Grid System

❖ High Voltage Electron Microscope (HVEM) Grid system is a powerful tool designed upon the concepts of Grid and Web Service

- To control instruments remotely
- To manage and control 3-D processing of images
- To store data automatically



Remote Control

- ❖ The HVEM remote control service allows users to remotely control HVEM hardware (e.g. FastEM, Goniometer, CCD camera) via encapsulated web services
- ❖ Images from the HVEM are streamed to the users through a video server that employs NaradaBrokering

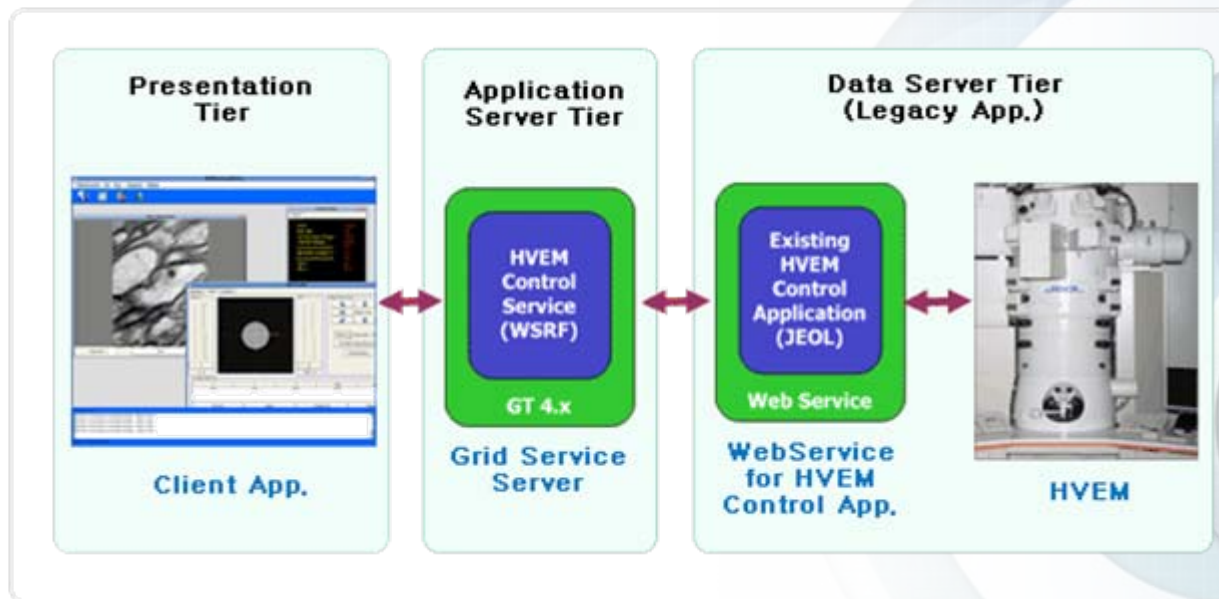
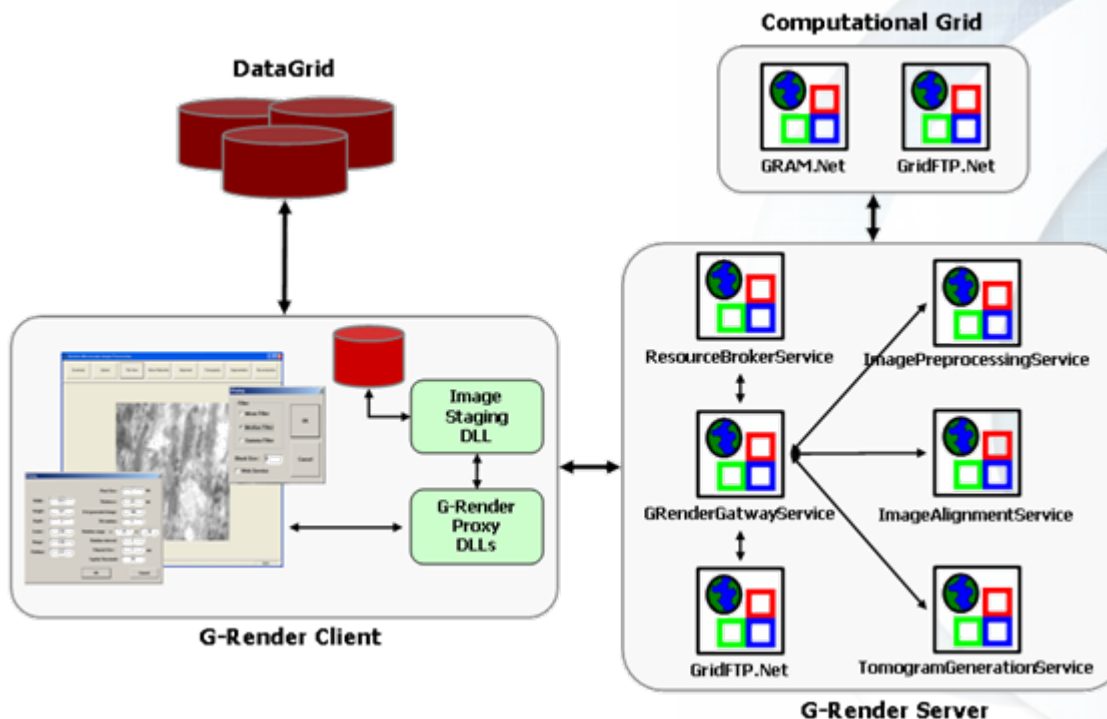




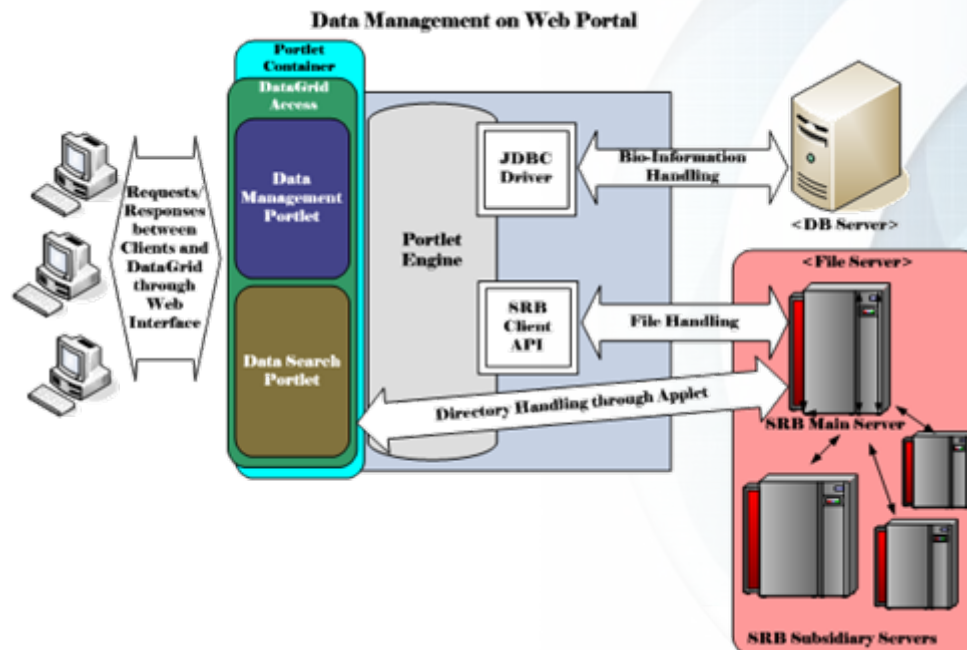
Image Processing (G-Render)

- ❖ G-Render enables high-performance image processing by utilizing the Grid to acquire unlimited computing power
- ❖ 3-step image processing service
 - Image preprocessing
 - Image alignment
 - Tomogram generation
- ❖ Each service is based on WSRF.Net



Data Grid

- ❖ Data are stored in a Storage Resource Broker (SRB) and a database
- ❖ SRB stores
 - 2-D images from the CCD camera
 - 3-D images processed from 2-D images and related documents
- ❖ DB stores
 - Bio-information and meta-data of the images stored in SRB
- ❖ The DataGrid can be accessed through a Web Portal





On the Web

- ❖ For more information on HVEM and our project, visit our homepage at <http://e-science.kbsi.re.kr>.

The screenshot displays the homepage of the KBSI e-Science Grid WebPortal Service. At the top, the KBSI logo is accompanied by the text 'National Equipment e-Science Global Collaboration'. A language selector shows 'KOR' and 'English'. Below this is a navigation bar with 'Welcome', 'e-HVEM', and 'Download' tabs. The main banner features a large image of a laboratory building with the text 'Welcome to e-Laboratory in KBSI'. To the left, there is a 'Document' section with a list of downloadable manuals: 'Tele-HVEM Manual', 'Nano-Bio DB Manual', 'Test Scenario', '공개외전서', 'Download', and 'Nano-Bio DB'. The central area is titled 'e-Science Grid WebPortal Service' and contains six thumbnails for different equipment: HVEM(ARM13005), FE-TEM(JEM-2100F), EF-TEM(EM912), NMR, MRI, and ICS(Internet-based Collaboratory System) for remote experiment. On the right, there is a 'Login' section with fields for 'User Name' and 'Password', a 'Remember my login' checkbox, a 'Login' button, and a link for 'Forget your password?'. Below the login section is a 'Site Information' box with an image of a large scientific instrument and a detailed paragraph about KBSI's research facilities and goals. At the bottom, there are logos for '초고전압 투과 전자원미경' (www.hvem.kbsi.re.kr), 'KBSI 한국기초과학지원연구원' (Korea Basic Science Institute), 'KISTI Korea Institute of Science and Technology Information', '서울대학교' (Seoul National University), and 'KBSI 과학기술부' (Ministry of Science & Technology).

Issues



❖ For remote operation,

- The biggest hurdle is the network latency !
- QoS

❖ G-render

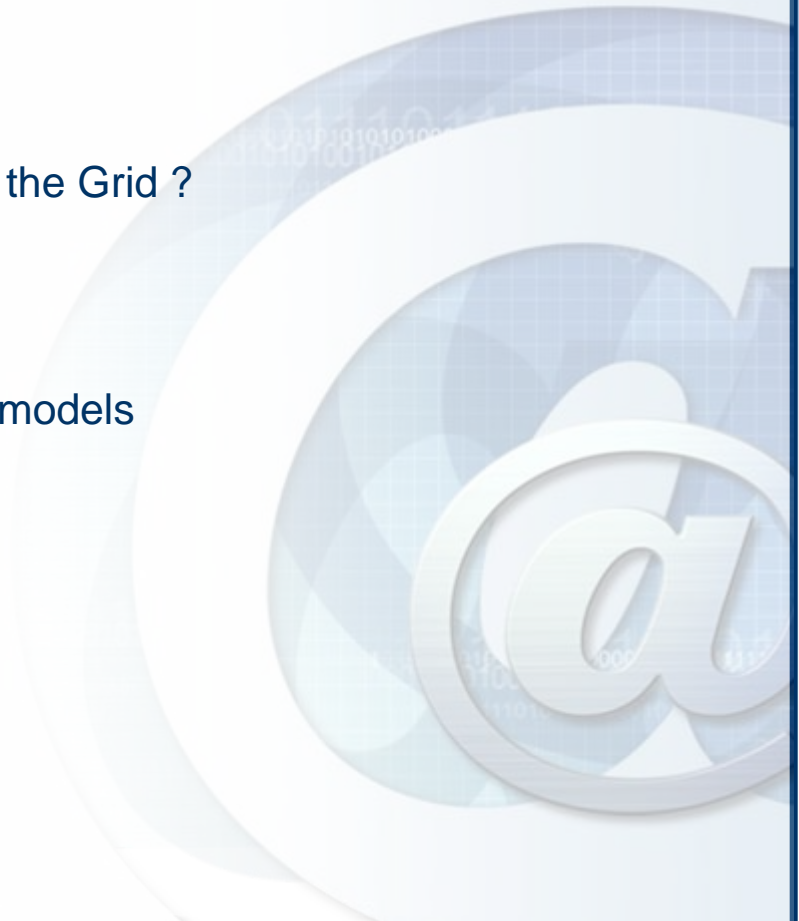
- Most graphics libraries are on Windows !
- How to work with Windows workstations in the Grid ?
- WSRF.net is immature

❖ Data Management

- Standard needs to be established for data models

❖ Common infrastructure

- Security (authentication/authorization)
- How to's
- Portals
- Streaming





Thank you

