Remote Visualization

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Remote visualization

- Motivation: Large data
  - Limited local storage
  - Lengthy data transfer time
  - Slow local graphics system
- Data rendered where calculated
- Challenges: Bandwidth
  - 1280 x 1024 pixels of 24 bits at 30 frames a second = 118 MBps
- Latency of network and GPU
What is remote visualization at MSI?

- Available on Jay and Koronis
- Several ways to access
- Experimental
# Systems

**Jay**
- Nvidia Quadro FX5800
- 64G memory

**Koronis** (SGI Altix UV Constellation); NIH

<table>
<thead>
<tr>
<th>graphics1</th>
<th>graphics[2-4]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Nvidia Quadro FX1800</td>
<td>• Nvidia Quadro FX5800</td>
</tr>
<tr>
<td>• 256G memory</td>
<td>• 48G memory</td>
</tr>
</tbody>
</table>
Access to Systems

Jay
- Reservation
- `qsub -l -q jay`
- `www.msi.umn.edu/hardware/itasca/jay.html`

Koronis
- NIH
- `www.msi.umn.edu/hardware/koronis`
## Systems

<table>
<thead>
<tr>
<th>System</th>
<th>Location of temporary storage</th>
<th>Single Read/Write speed</th>
<th>Aggregate Read/Write speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jay</td>
<td>/lustre</td>
<td>~400MB/s</td>
<td>~10GB/s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>~400MB/s</td>
<td>~13.5GB/s</td>
</tr>
<tr>
<td>Koronis</td>
<td>/scratch</td>
<td>~1.5GB/s</td>
<td>~4 - 14GB/s</td>
</tr>
<tr>
<td></td>
<td></td>
<td>~1.5GB/s</td>
<td>~7- 16GB/s (highly variable)</td>
</tr>
</tbody>
</table>
Ways to access

• KVM
• Teradici
• VirtualGL
• Client/Server
KVM

- **Keyboard, Video and Mouse**
- Directly runs software
- Installed in SDVL 575
Teradici card

- PColIP
- Host rendering
- Just sends pixels
- Installed in SDVL 575
VirtualGL (VGL)

• Open source
• OpenGL
• Linux server
• Requires local client — Linux, Windows, Mac
• Images rendered on remote computer
• 2D graphics done locally
• Applications not vendor supported
Software

• Avizo
• Ensight
• Custom software
Avizo

• General purpose visualizer
• VGL
• Scripting
Ensight

• Engineering data
• VGL
• Client/Server
VirtualGL Installation

• Browse to the download page:

• Pick an appropriate installation package
  – Architecture: i386 / amd64
  – OS: .exe / .rpm / .deb / .dmg

• Follow the OS specific installation instructions:
Jay
Login to Jay

(ucap)chityala@13 [~] % vglconnect -s jay

VirtualGL Client 64-bit v2.2.1 (Build 20110406)
Listening for unencrypted connections on port 4242
Redirecting output to /home/msi/chityala/.vgl/vglconnect-13-:0.0.1.log

Making preliminary SSH connection to find a free port on the server ...
Making final SSH connection ...
chityala@jay:~>
Copy files from project space to Lustre

chityala@jay:~> cp /project/huisk/luke/images/Balbc/Mouse_15-1/numbered/*.dcm /lustre/chityala/
Starting Avizo

chityala@jay:~> module load avizo/6.1.1
chityala@jay:~> vglrun start &
File open

[Image of a file open window]

`File name: file_000000.dcm`

`File type: All files (*)`
Data read mode
Data read complete
Ortho-slice
Iso-surface
Starting Ensight

chityala@jay:~> module load ensight
chityala@jay:~> vglrun ensight &
Koronis and Graphics[1-4]
Login to Koronis

%(ucap)chityala@16 [-] % vglconnect -s koronis

VirtualGL Client 64-bit v2.2.1 (Build 20110406)
vglclient is already running on this X display and accepting unencrypted
    connections on port 4242.

Making preliminary SSH connection to find a free port on the server ... 
Password:
Making final SSH connection ...
Password:
chityala@Login1:/nfs/home/koronis/chityala>
Login to Graphics1

%(cacp)chityala@16 [-] % vglconnect -s koronis

VirtualGL Client 64-bit v2.2.1 (Build 20110406)
vglclient is already running on this X display and accepting unencrypted connections on port 4242.

Making preliminary SSh connection to find a free port on the server ...
Password:
Making final SSh connection ...
Password:
chityala@Login1:/nfs/home/koronis/chityala> vglconnect -s graphics1
Making preliminary SSh connection to find a free port on the server ...
Password:
Making final SSh connection ...
Password:
chityala@Graphics1:/nfs/home/koronis/chityala>
Copy file from project space to scratch

chityala@Graphics1:/> cp /project/huisk/luke/images/Balbc/Mouse_15-1/numbered/*/*.dcm /scratch/chityala
Starting Avizo

chityala@Graphics1:/nfs/home/koronis/chityala> module load avizo
chityala@Graphics1:/nfs/home/koronis/chityala> vgrun start &
Starting Ensight

chityala@Graphics1:/nfs/home/koronis/chityala> module load ensight
chityala@Graphics1:/nfs/home/koronis/chityala> vglrun ensight
Contact Information

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