Remote & Collaborative Visualization

Texas Advanced Computing Center
TACC Remote Visualization Systems

- **Longhorn** – Dell XD Visualization Cluster
  - 256 nodes, each with 48 GB (or 144 GB) memory, 8 cores, 2 NVIDIA Quadro FX 5800 GPUs with 4 GB graphics memory each

- **Spur** – Sun Visualization Cluster
  - 8 nodes, each with 128 GB (or 256 GB) memory, 16 cores, 4 NVIDIA Quadro FX 5600 GPUs with 1.5 GB graphics memory each

- Available for use by TACC and XSEDE users
- Both mount Ranger’s filesystems
Remote Visualization Model

- HPC System
- Data Archive
- Large-Scale Visualization Resource
- Pixels
- Mouse
- Display
- Remote Site
- Wide-Area Network
- Local Site
Methods of Remote Access

• SSH
  – Basic command-line interface, useful for managing files, submitting jobs, etc.

• Longhorn Visualization Portal
  – Simplified web-based interface for:
    • Viewing your allocations
    • Submitting jobs
    • Interacting with remote vis sessions (VNC or EnVision)

• Direct VNC connection
SSH Access

• Start the “Secure Shell Client” application
• Click “Quick Connect”
  – Host Name: longhorn.tacc.utexas.edu
  – User Name: <your training account>
  – Click “Connect”
SSH Access

- You’re now on a Longhorn login node
- Can run usual shell utilities
- Manage data, etc.
SSH Access

• For later reference (more details in Longhorn User Guide):
  – Can submit a remote VNC job from here
    • qsub /share/doc/sge/job.vnc
    • tail -f vncserver.out
    • Connect to address in output file with a VNC viewer
Longhorn Visualization Portal

- [http://portal.longhorn.tacc.utexas.edu](http://portal.longhorn.tacc.utexas.edu)
- A web-based interface that lets you:
  - View your allocations
  - Submit jobs
  - Interact with remote VNC or EnVision sessions
- Avoids the hassle and complexity of manually managing your jobs
- For many users this can be the primary method of interacting with Longhorn
- Advanced users may still use SSH
Login as a **TACC** user with your training account (Firefox)
Start a VNC job
First time only: Set a VNC password
First time only: Set a VNC password
Start a VNC job (submit again)
VNC Session
Running Vis Applications through VNC

- To see available applications:
  - `module avail`

- Examples:
  - Run ParaView:
    - `module load python paraview`
    - `vglrun paraview`
  - Run VisIt
    - `module load visit`
    - `vglrun visit`
Accessing your VNC session with a stand-alone viewer

- Navigate to the Jobs tab
- **Copy the server address**
Accessing your VNC session with a stand-alone viewer

- Navigate to the Jobs tab
- Copy the server address
- **Run the “TightVNC Viewer” application**
  - Enter the server address from the Jobs tab
  - Click Connect
  - Enter your VNC password set previously
  - Click Okay
Accessing your VNC session with a stand-alone viewer

- Navigate to the Jobs tab
- Copy the server address
- Run the “TightVNC Viewer” application
  - Enter the server address from the Jobs tab
  - Click Connect
  - Enter your VNC password set previously
  - Click Okay
- You can now interact with your VNC session (and share this session with your collaborators)
Parallel Visualization

- You can specify how many nodes (or slots) to use during job submission
- Run vis applications in the parallel environment

Start a Job

- Resource: Longhorn
- Project: AdminLonghorn
- Session type: VNC
- EnVision guided visualization
- Number of nodes: 16 (128 slots)

Note: increasing the number of nodes will only increase performance for parallel applications (e.g. ParaView or VisIt).

Click here to set your VNC password.
Longhorn Visualization Portal

ParaView 3.4.1 64-HE

Pipeline Browser

cs://localhost:11111
solution_0
ProcessIdScalars1

TACC
THE UNIVERSITY OF TEXAS AT AUSTIN
EnVision Guided Visualization

• An easy-to-use web-based tool for remote scientific visualization
• Available through the Longhorn Vis Portal
• Developed at TACC
  – Funded in part by TeraGrid and the DoD PET program
  – Development team: Greg Johnson, Steve Mock, Brandt Westing, Matthew Hanlon
Run an EnVision session

- Navigate back to the “Jobs” tab
- End your current job
- Select the session type “EnVision guided visualization”
Run an EnVision session

- Load the mummy data in the remote file browser (click the Examples shortcut)
Run an EnVision session

- Load the mummy data in the remote file browser (click the Examples shortcut)
- **Click the Isosurface icon**
Run an EnVision session

• Load the mummy data in the remote file browser (click the Examples shortcut)
• Click the Isosurface icon
• Add an isosurface with default parameters
Run an EnVision session

- Load the mummy data in the remote file browser (click the Examples shortcut)
- Click the Isosurface icon
- Add an isosurface with default parameters
- See the visualization in the Rendering tab
Run an EnVision session

- Click the cutting plane icon in the toolbox
Run an EnVision session

- Click the cutting plane icon in the toolbox
- *Keep the default values; click Add*
Run an EnVision session

- Click the cutting plane icon in the toolbox
- Keep the default values; click Add
- Click the hand next to the cutting plane under Added Algorithms; use the widget to interact
Run an EnVision session

- Click the cutting plane icon in the toolbox
- Keep the default values; click Add
- Click the hand next to the cutting plane under Added Algorithms; use the widget to interact
- Click the hand again
Run an EnVision session

- Click the Eye next to each added vis algorithm to hide
Run an EnVision session

- Click the Eye next to each added vis algorithm to hide
- **Click volume rendering icon in the toolbox**
Run an EnVision session

- Click the Eye next to each added visualization algorithm to hide
- Click volume rendering icon in the toolbox
- Set values as shown and click Add
Run an EnVision session

- Click the Eye next to each added vis algorithm to hide
- Click volume rendering icon in the toolbox
- Set values as shown and click Add
Run an EnVision session

• Click the Eye next to each added vis algorithm to hide

• Click volume rendering icon in the toolbox

• Set values as shown and click Add

• Click volume rendering icon in lower left; change settings as you wish
Run an EnVision session

- Explore the isotropic turbulence example data on your own