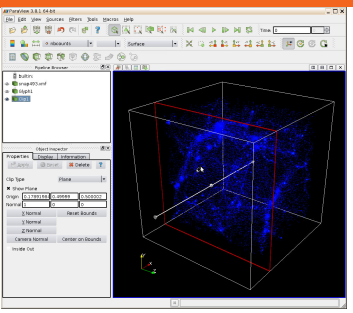
High-resolution remote scientific visualization over two transatlantic 10 GE links

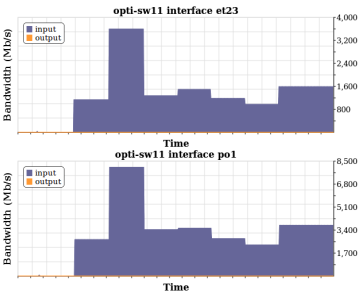
SARA - Paul Melis, Ronald van der Pol, Tijs de Kler, Sander Boele, Freek Dijkstra, Dennis Stam, Walter de Jong, Paul Wielinga

SARA

Science Park 140
1098 XG Amsterdam
The Netherlands

www.sara.nl
info@sara.nl





SARA demonstrates high-resolution remote scientific visualization, coupling a remote render cluster with a local high-resolution tiled-panel display. The visualization is computed and rendered on a 16-node render cluster located in Amsterdam, The Netherlands. The visualization application running on the render cluster can be used to create visualizations interactively, using data-sets stored at the SARA data center. The visualization is streamed over two 10 Gbps network links and displayed here on a 5x3 tiled-panel display.

Remote Visualization

Running a visualization application remotely on a dedicated render cluster has several advantages from a user's point-of-view:
1) The full visualization power of a cluster with GPUs becomes available to a user, compared to just a single desktop PC.
2) No data files have to be transferred to the user, as all transfers are within the remote site. The user only receives an image stream, which usually needs considerably less bandwidth when viewing on a single desktop display.

Visualization with ParaView and SAGE

ParaView is a popular scientific visualization application that provides flexible visualization functionality, for interactive exploration and visualization of scientific data. By using ParaView's tiled-display mode together with the SAGE high-resolution streaming framework it becomes possible to interactively generate high-resolution visualizations, that give both a high-level overview, as well as a detailed view.

Example demonstrations:

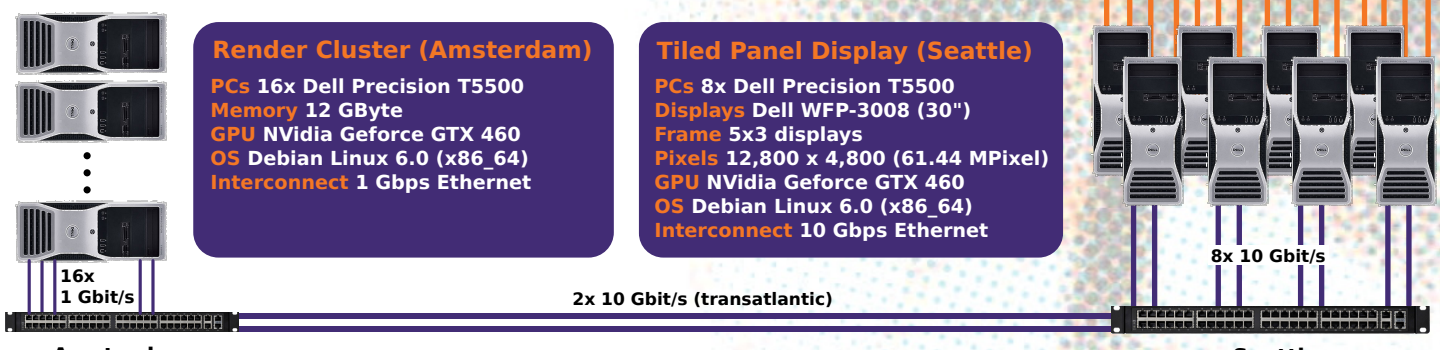
- **CosmoGrid simulation (Leiden Observatory)**
- **Theoretical geophysics (Utrecht University)**
- **Jungle computing (VU University A'dam)**

Render Cluster (Amsterdam)

PCs 16x Dell Precision T5500
Memory 12 GByte
GPU NVidia Geforce GTX 460
OS Debian Linux 6.0 (x86_64)
Interconnect 1 Gbps Ethernet

Tiled Panel Display (Seattle)

PCs 8x Dell Precision T5500
Displays Dell WFP-3008 (30")
Frame 5x3 displays
Pixels 12,800 x 4,800 (61.44 MPixel)
GPU NVidia Geforce GTX 460
OS Debian Linux 6.0 (x86_64)
Interconnect 10 Gbps Ethernet



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