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High End Visualization with Scalable Display System

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Today we can have huge datasets resulting from computer simulations (CFD, physics, chemistry etc) and sensor measurements (medical, seismic and satellite). There is exponential growth in computational requirements in scientific research. Modern parallel computers and Grid are providing the required computational power for the simulation runs. The rich visualization is essential in interpreting the large, dynamic data generated from these simulation runs. The visualization process maps these datasets onto graphical representations and then generates the pixel representation. The large number of pixels shows the picture in greater details and interaction with it enables the greater insight on the part of user in understanding the data more quickly, picking out small anomalies that could turn out to be critical and make better decisions. However, the memory constraints, lack of the rendering power and the display resolution offered by even the most powerful graphics workstation makes the visualization of this magnitude difficult or impossible. The initiative to develop high end visual environment at Computer Division, BARC explores how to build and use a scalable display system for visual intensive applications by tiling multiple LCD displays driven by the Linux based PC graphics-rendering cluster. We are using the commodity off-the-shelf components such as PCs, PC graphics accelerators, network components and LCD displays. This paper focuses on building an environment which render and drive over 20 millions of pixels, using the open source software framework. We describe the software packages developed for such a system and its use to visualize data generated by computational simulations and applications requiring higher intrinsic display resolution and more display space.

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