PC Cluster based VR System

Li Weiqing
VR Team, Computer Science school,
Nanjing University of Sci & Tech
PC Cluster based VR System

In today’s VR system, there is a need to use models of several million polygons. Even the most powerful graphicsboards, such as ATI’s Radeon X800 or nVidia’s GeForce 6800 can not run these models at high frame rates. To overcome this problem, cluster architectures can be used. Therefore we have developed a PC-cluster, which overcomes graphics performance limitations.

Today it is possible to set-up a low cost and high performance graphics machine for multiprojection immersive environments by connecting PCs equipped with 3D accelerated graphics cards (a graphics cluster).
PC Cluster based VR System
PC Cluster based VR System

We built the system based on OpenSceneGraph and MPI

(use MPI+ VR Juggler)
Data Synchronization in the Cluster

- Communication via MPI
- An Event-Driven FIFO
- Integrated With OSG’s Node Callback
Application of VR Cluster — Flight Simulator

- Large Scale (more than 3GB) Terrain, built on DEM/LandSat.
- 3 Channel Projector with 150 degree FOV
- Fly-through controlling
- Supported format include OpenFlight, TerrainPage, BinaryTerrain, etc
Application of VR Cluster — Substation Simulator

• walk-through of the actual transformer station.
• complex 3d models of all kinds of devices, bind them with simulation data stream of a electric grid.
• We have setup several simulation systems, for simulating, testing, and training.
Application of VR Cluster—Walking Through Systems

• Walk-through of our university.
• Walk-through of JiuZhai & HuangLong, the famous scenery area.
• With active stereo support, via Nvidia FX4400 card and NuVision GX60 glasses
Ship Driving Simulator & Fight Game

A ship driving simulator for Jiangsu Science Museum

Tank Game & Virtual Battle Field
VR based Urban Planning

We setup a City’s 3D model according the data of GIS & CAD. The efficient methodologies developed to construct a realistic model and render in real-time. The model is accurate enough for high quality community and city visual simulation. The urban simulation system has proven to be an extremely useful tool for exploring potential design solutions. It is possible to evaluate alternatives rapidly and in more detail than through traditional analysis. Results of the planning/design process are illustrated visually in real-time.