The Virtualization Gate Project
Edmond Boyer, Benjamin Petit, Bruno Raffin

To cite this version:
Edmond Boyer, Benjamin Petit, Bruno Raffin. The Virtualization Gate Project. ERCIM News, 2010, Digital Preservation, 80, pp.55. inria-00568917

HAL Id: inria-00568917
https://inria.hal.science/inria-00568917
Submitted on 23 Feb 2011

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
A Virtualization gate virtualizes users into graphical objects that capture both their shape and their appearance in real time. These graphical objects can be plugged into any virtual reality application including immersive and interactive applications where users can see and act on virtual worlds. Geographically distant users can also be immersed into a common virtual environment for collaborative applications.

The Vgate project introduces a new type of immersive environment that allows full-body immersion and interaction with virtual worlds. The project is a joint initiative between computer scientists from research teams in computer vision, parallel computing and computer graphics at the INRIA Grenoble Rhône-Alpes, and the 4D View Solutions company.

Hardware Setup

Vgate uses several video cameras and 3D modelling tools to build a graphical model of the observed shape in real time (about 20 frames per second). This model is fed into a physical simulation where it becomes a solid object that can act upon other objects. User-centred visualization is provided through a head-mounted display that is tracked with an infrared positioning system (Cyclope). Computations are distributed on a PC cluster to enable real-time execution.

Software Components

Vgate uses the following software:

- Computer Vision: silhouette-based models are computed in real time from the video streams. They are represented with meshes onto which the acquired images are back-projected to produce photorealistic models (http://www.4Dviews.com).
- Simulation: the Simulation Open Framework Architecture (SOFA) runs the physical simulation. It allows objects of very different natures to interact, including rigid bodies, deformable objects and fluids (http://sofa-framework.org).
- Middleware: the Vgate application is developed on top of the FlowVR library, a middleware dedicated to high-performance interactive applications. It enforces modular programming through a hierarchical component model that leverages software engineering issues while enabling efficient execution on parallel architectures (http://flowvr.sourceforge.net/).

Images from the VGate project.