

Research Activities

Virtual reality is nowadays viewed as the solution for achieving communication and collaboration between scattered users, in various areas of interest, such as entertainment, learning, training, etc. This led to the creation of Networked Virtual Environments (NVEs).

NVEs is a twofold term. Even though the “Virtual Environments” part prevails, the “networked” substance changes the meaning and nature of these environments. Regarding the Virtual Environment, it can be considered as a simulation generated by a computer and can simulate either an imaginary or real world. As far as it concerns the “networked” part of the term, this dimension is mainly related to the support of multiple concurrent users, scattered around the globe, even though Networked Virtual Environments can be single user applications, as for example the Streamed Browser Worlds.



RU6 is working on the design and development of NVEs, where the user can navigate through the 3D virtual worlds and interact with different objects and with other users. Main aim is the exploitation of the functional characteristics of NVEs in order to support advanced services such as CSCW, e-learning, etc.). Detailed topics are the research on both the technical and functional characteristics of NVEs, design and development of platforms to

support NVEs, development of 3D objects and worlds for use in NVEs etc.

Design and Development of 3D Applications

RU6 is working on the design and development of Networked Virtual Environments that integrate and support various types of functionalities, as: a) text communication, b) audio communication, c) gestures, d) application sharing.

Some of the applications developed by RU6, include EVE, a multi-user platform, which is based on open source technologies (i.e. X3D) and facilitates the communication and collaboration process through various services, integrated in one environment.



In addition RU6 has developed 3D standalone and multi-user networked virtual laboratories, aimed to support the learning procedure in the field of radiopharmacy.

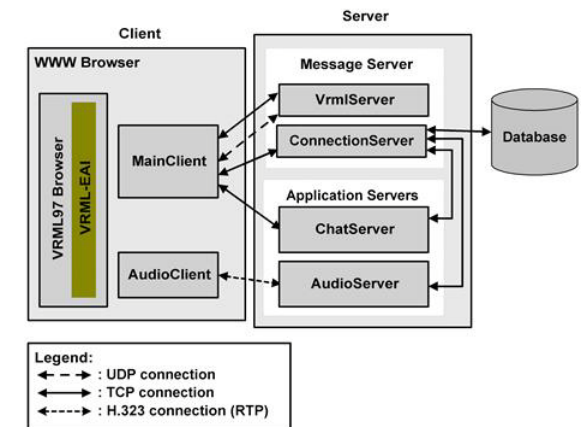
Algorithms for Large-Scale Virtual Environments

One of the key issues in the design of scalable and cost effective large-scale Distributed Virtual Environments is the partitioning problem, which is related to the efficient assignment of the workload

of the applications to the servers of the system. To this direction, RU6 conducts research on algorithms and techniques that could be adopted and applied for achieving effective partitioning results. The research is realized through extensive experiments, which simulate a variety of diverse scenarios for achieving an optimal partitioning solution.

Architectures and Protocols

The development of NVEs, from a more technical point of view, can significantly vary regarding the architectural models used as well as the protocols adopted for implementing their networking behaviour. This diversity is related to the wide range of real or imaginary scenarios that NVEs can simulate as well as to the types of users it aims at. Therefore, based on the type of application, the needs that it aims to support and the services it offers, different types of architectural models and protocols need to be used for achieving optimized performance and wider adaptation.



To this direction, RU6, based on the special needs of each application exploits various types of architectural model (e.g. client-server, peer-to-peer

or hybrid architectures) and develops tools, platforms and services on the top of these models. In addition, given the model that each type of application requires and the networking demands for optimized performance and consistency, RU6 exploits and integrates various communication protocols and technologies, which altogether constitute the core of the developed and supported applications.

Performance Evaluation and Monitoring Techniques

The performance of network applications has always been a critical factor for the designers, since it has a great impact on the applications' approval by the target groups. For NVEs, where the sizes of the virtual worlds, the graphics and the variety of the provided services result in demanding applications, the performance evaluation and monitoring is of great importance.

RU6 is working on the design and implementation of algorithms and mechanisms that could face efficiently the challenges induced by the network as well as to the performance monitoring of the implemented network software in order to identify the boundaries in which the applications could operate efficiently.

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NETWORKS, TELEMATICS AND NEW SERVICES

Research Field:

Networked Virtual Environments



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