OpenScienceSim: An Infrastructure for e-Science based on the 3D Internet and NII's Cyber Science Infrastructure

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Objective

Our objective is to develop a foundation for e-Science 'workbench' on virtual world. The framework is composed of advanced communication, collaboration, and facilities for participatory science based on the an online three dimensional world like environment or immersive virtual worlds.

Approach

We make use of existing data from a diverse set of application areas including astrophysics, molecular science and we also utilize the computing facilities such as NAREGI Grid infrastructure to build e-Science workbench.

e-Science Workbench

Astro Users

Specialists/laymen in stellar dynamics (IAS, Princeton, NAOJ, Caltech, MIT, etc), MICA group, KIRA group

Bio Users

Researchers in molecular modeling & dynamics (e.g. Saarland University)

All Users

Researchers and students around the world

- Anyone – with an ordinary computer and Internet connection – can engage in e-Science, anytime, from anywhere
- Live collaboration in e-Science education
- Powerful multimedia visualization and interaction
- Increases awareness of environmental issues by allowing anyone to experience the consequences of behavior choices in the environment.
- Platform for **Participatory Science**: not only experts, but also general public can easily contribute to scientific discovery and innovation (=democratization of e-Science)
- Bridges the gap between large-scale data and users.
- Covers a diverse set of application areas
- Contributes to the vision of an eco-friendly society by replacing movement by digital alternatives without sacrificing the quality of social communication

INTERNET

Second Life OpenSimulator

Persistent Environment

Multimedia Interaction

Easy Access

Astrophysics

Globular star cluster

I think it was a 4-body interaction

Or, two single stars meeting a double-star simultaneously

Interactive labeling of star by color

Collaborative exploration, discovery, and understanding

Molecular Science

This is Salicin. Can you convert it to Aspirin?

I will try. What is this molecule ?

Collaborative molecular visualization & modeling, and understanding

Collaborative Scientific Visualization

SINET3

Cray XT4

国立天文台 NAOJ

Star cluster evolution

Simulation data

SINET3

NII-Chiba

Galaxy Formation

Grid Applications Grid Middleware Networking NAREGI

GROMACS

Molecular Dynamics Computation

NAREGI Grid Environment

Computing Simulation data

INTERNET

UNIVERSITÄT DES SAARLANDES

BALLView

Single-user molecular modeling tool

Molecular modeling

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