A Java-based tool for accurate, interactive 3D terrain visualization: Visual Terrain
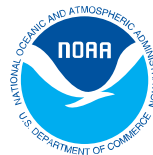
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- How to characterize the relation between visual quality and hardware resources in terrain visualization to estimate the tradeoffs associated with:

  – Visual quality

    - Responsiveness

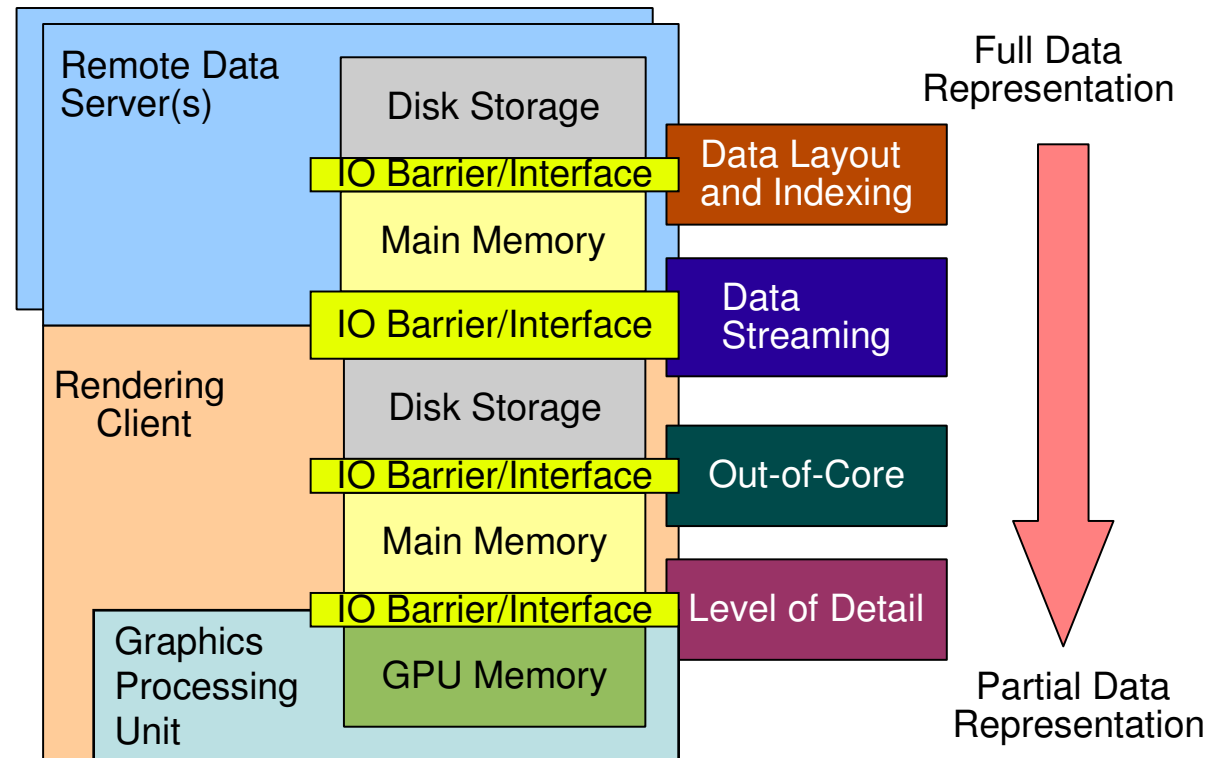   - Accuracy

  – Hardware

    - Memory

Methodology

- Solution taking into consideration all levels

- Explore issues affecting each level

Remote Data Server(s)

Disk Storage

IO Barrier/Interface

Main Memory

IO Barrier/Interface

Rendering Client

Disk Storage

IO Barrier/Interface

Main Memory

IO Barrier/Interface

Graphics Processing Unit

GPU Memory

Data Layout and Indexing

Data Streaming

Out-of-Core

Level of Detail

Full Data Representation

Partial Data Representation

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Automated Information Processing

Application Tools

Java Platform 1.5
Cross-platform development and deployment.

OpenGL 2.0
Cross-platform hardware-accelerated 3D rendering.
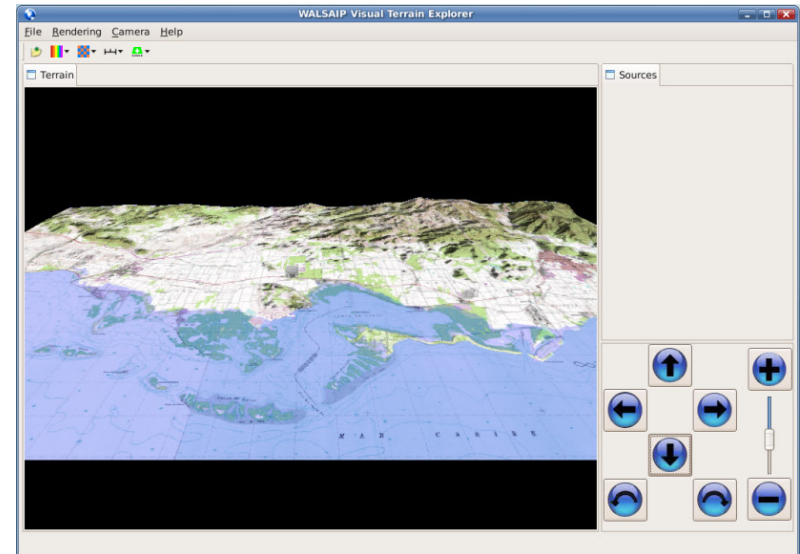
Eclipse Rich-Client Platform
Modular application development.

Research Results

- **Implementation**
  - Modular and extensible cross-platform application
  - Multiple data formats support
  - Level-of-Detail management
  - Out-of-core operation and data streaming support currently in development

- **Publications**
  - Veguilla, R., Santiago, N. G., and Rodríguez, D., "Issues in Terrain Visualization for Environmental Monitoring Applications", Fourth Latin American and Caribbean Conference for Engineering and Technology LACCEI 2006, Mayagüez, Puerto Rico, June 21-23, 2006