Open Inventor Viewer
for Terrain Data

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Open Inventor vs. VRML

- VRML is an ASCII description of the contents of three-dimensional virtual worlds
- VRML has to be read into a browser to be displayed
- VRML is based on Open Inventor ASCII file format
- Open Inventor is a programming environment which enable displaying and manipulation of three - dimensional virtual worlds
- This environment provides an API that allows writing any user-application in C++ or C
- Open Inventor uses ASCII file format for exchange of description of the virtual worlds contents among applications
- New Open Inventor 2.1 accepts VRML 1.0 syntax

GIS in VRML

VRML as a language is sufficient for modeling of 3D data in GIS applications, however:

– Modeling terrain in VRML produces enormous data sets, very difficult to maintain and transfer over the World-Wide Web

– The functionality offered by general-purpose browsers is not satisfying:

» No extensibility

» No option to let user control visualization of data

» No option to use data formats other than VRML (Open Inventor, binary form, etc.)

» No option to implement interaction with other applications

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Solution:

– Instead of using general purpose VRML browsers, we build a specialized browser for terrain data

– Open Inventor library is used for three-dimensional visualization

– The browser is extensible and allows introduction of additional functionality

– The syntax of VRML may be extended to achieve certain desirable results:

» selection of data by user

» selection of the form of data presentation

» binary coding of terrain data (conversion to VRML on client side)

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Advantages

– Efficient compression may be used to reduce the size of binary data volume (k x 100 times less data describing terrain needs to be sent)

– User may control desired level of details in generated VRML representation

– Extra functionality:

» visualization controlled by a user

» simultaneous visualization of various kinds of information (e.g. exchangeable textures representing satellite images, maps, weather information, etc.)

» client-side VRML generation - no big ASCII files

» using VRML and/or Inventor file syntax

» handling of custom VRML extensions

» interaction with other applications

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Architecture