

Workflows: GIS Data to a Visualization Environment

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Introduction

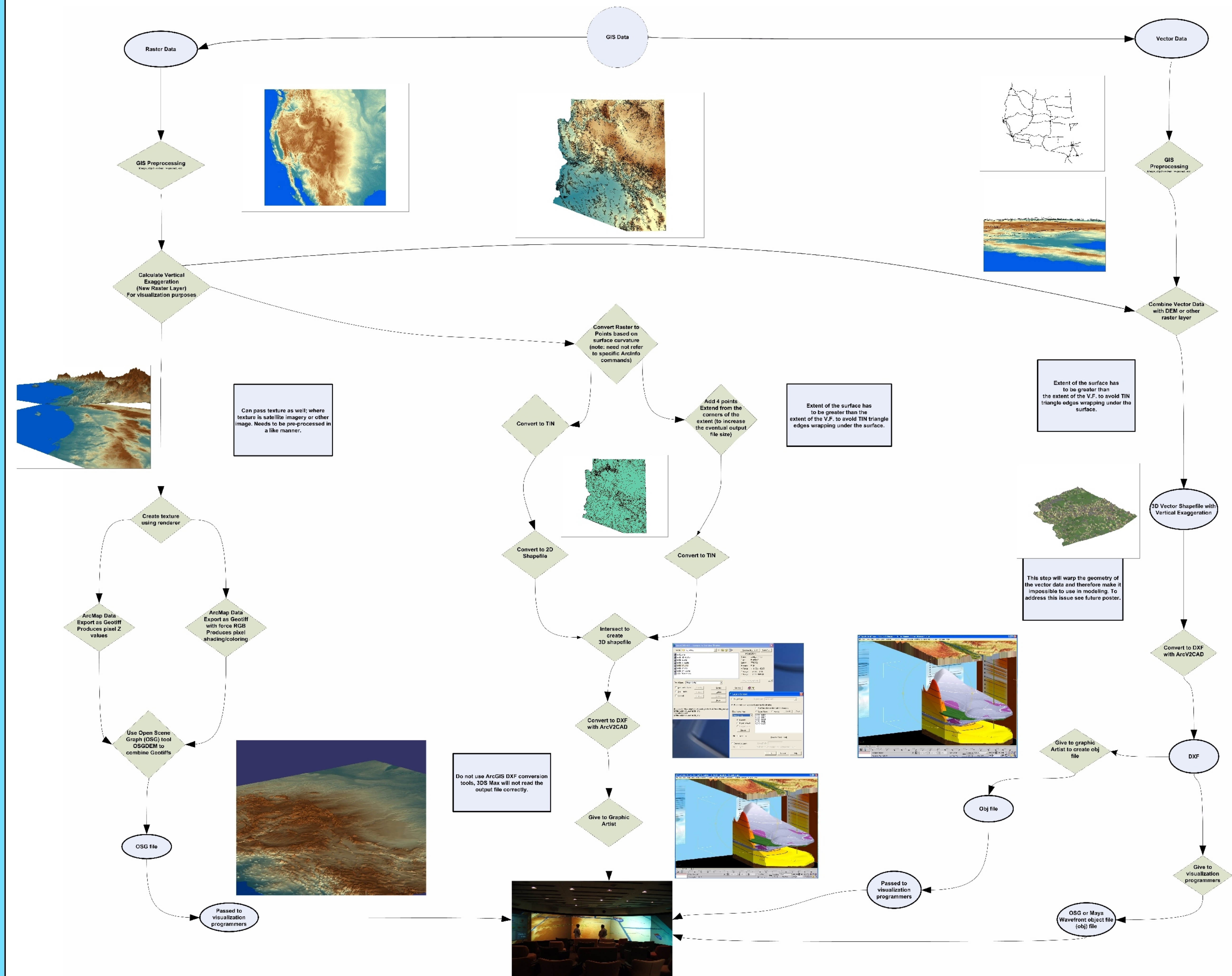
Policymakers and researchers in virtually every discipline face the challenge of understanding complicated variables to forecast the impacts of their choices. Visualizing futures is a powerful tool for anyone interested in assessing the impact of today's decision making. Arizona State University has a tool to meet this challenge in the Decision Theater. Scientists, academics, government officials, community and business leaders have, for the first time, an opportunity to tap into a tool with such potential. The theater itself consists of an interactive 3D immersive environment that includes a high-performance computing cluster, and state-of-the-art graphics technologies.

The core component, called the Drum, is a 260-degree faceted screen with seven rear projection passive stereo sources displaying panoramic computer graphics or 3D screen video content. The computing power behind the Drum is called the Vis cluster. The Vis cluster is composed of eight BOXX computers running RedHat 4 64-bit Linux OS. The software packages behind the visualizations are VR Juggler, an open source virtual reality engine, and Open Scene Graph (OSG), a powerful 3D graphics toolkit. These packages are written in C++ and open GL and have been significantly customized by Decision Theater programmers specifically for the Drum environment.

While an ideal configuration for data visualization, there are broad categories of data used by policymakers and researchers that are not viewable in the Drum in their native formats. One very common data type, GIS data, is frequently used for data storage and analysis. In particular, the formats native to the industry standard, ESRI GIS, are commonly used by government agencies, social scientists, and the like. A great deal of the ecological data collected, stored and used by CAP-LTER is in ESRI formats, typically in the format of 2D shapefiles. To streamline the use of these data in Drum visualization, standardized workflows were developed to port data from the largely 2D ESRI ArcGIS desktop to 3D visualization in the Drum.

The workflows outlined here have been put into practice on several Decision Theater projects already, with GIS data serving as the source for background graphics and imagery, terrain and general geospatial reference, the geometry and connectivity of network models, the results of policy scenario modeling, and scientific results.

Main Visualization Flowchart



Overview Flowchart

