GIS and the Cloud Computing Conundrum

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"Cloud computing" is the latest in this trajectory of terminology and computing advances that appears to be coalescing these seemingly disparate evolutionary perspectives. While my technical skills are such that I can't fully address its architecture or enabling technologies, I might be able to contribute to a basic grasp of what cloud technology is, some of its advantages/disadvantages and what its near-term fate might be.

1) it involves ***virtualized*** resources …meaning that workloads are allocated among a multitude of interconnected computers acting as a single device;

2) it is dynamically ***scalable*** …meaning that the system can be readily enlarged;

3) it acts as a ***service*** …meaning that the software and data components are shared over the Internet.

The result is a "hosted elsewhere" environment for data and services …meaning that cloud computing is basically the movement of applications, services, and data from local storage to a dispersed set of servers and datacenters— an advantageous environment for many data heavy and computationally demanding applications, such as geotechnology.

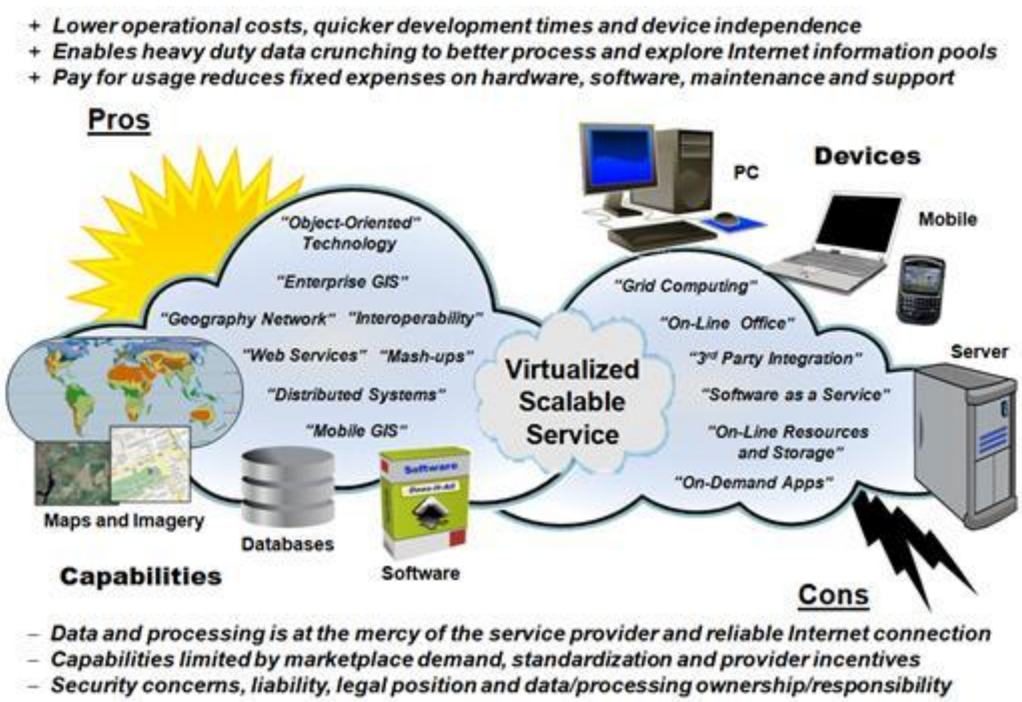

Figure 1. Cloud Computing characteristics, components and considerations.

Either way, it is important to note that cloud computing is not a technology—it is a concept. It essentially presents the idea of distributed computing that has been around for decades. While there is some credence in the argument that cloud computing is simply an extension of yesterday's buzzwords, it ingrains considerable technical advancement. For example, the cloud offers a huge potential for capitalizing on the spatial analysis, modeling and simulation functions of a GIS, as well as tossing gigabytes around with ease …a real step-forward from the earlier expressions.

There are two broad types of clouds depending on their application:

1) "*Software as a Service*" (SaaS) delivering a single application through the browser to a multitude of customers (e.g., WeoGeo and Safe Software are making strides in SaaS for geotechnology)— on the customer side, it means minimal upfront investment in servers or software licensing and on the provider side, with just one application to maintain, costs are low compared to conventional hosting; and,

2) "*Utility Computing*" offering storage and virtual servers that can be accessed on demand by stitching together memory, I/O, storage, and computational capacity as a virtualized resource pool available over the Internet— thus creating a development environment for new services and usage accounting.

Governments, non-profits and open source consortiums, on the other hand, see tremendous opportunities in serving-up gigabytes of data and analysis functionality for free. Their perspective focuses on improved access and capabilities, primarily financed through cost savings. But are they able to justify large transitional investments to retool under our current economic times?

All these considerations, however, pale in light legacy impediments, such as the inherent resistance to change and inertia derived from vested systems and cultures. The old adage "*don't fix it, if it ain't broke*" often delays, if not trumps, adoption of new technology. Turning the oil tanker of GIS might take a lot longer than technical considerations suggest—so don't expect GIS to "disappear" into the clouds just yet. But the future possibility is hanging overhead.