

Building on the 21st Century Cyberinfrastructure Vision to Leverage and Support GIScience Capabilities

By

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Overview

It is our pleasure to submit this position paper for consideration in the planned GIScience 2008 Workshop – Cyberinfrastructure for GIScience. The timing of such an initiative couldn't have been better given the increasing need for such an infrastructure for global efforts such as the Global Earth Observing System of Systems (GEOSS) and the maturing technology areas of geospatial web services, standards-based Sensor Web, grid computing applications and semantics. As Figure 1 indicates, the concept of building on the Cyberinfrastructure vision to leverage and support GIScience capabilities is an indication of the proliferation of GIScience technologies and the readiness of the community to come together to support initiatives that can benefit various Societal Benefit Areas (SBA) at a scale that is much bigger than an individual project or grant.

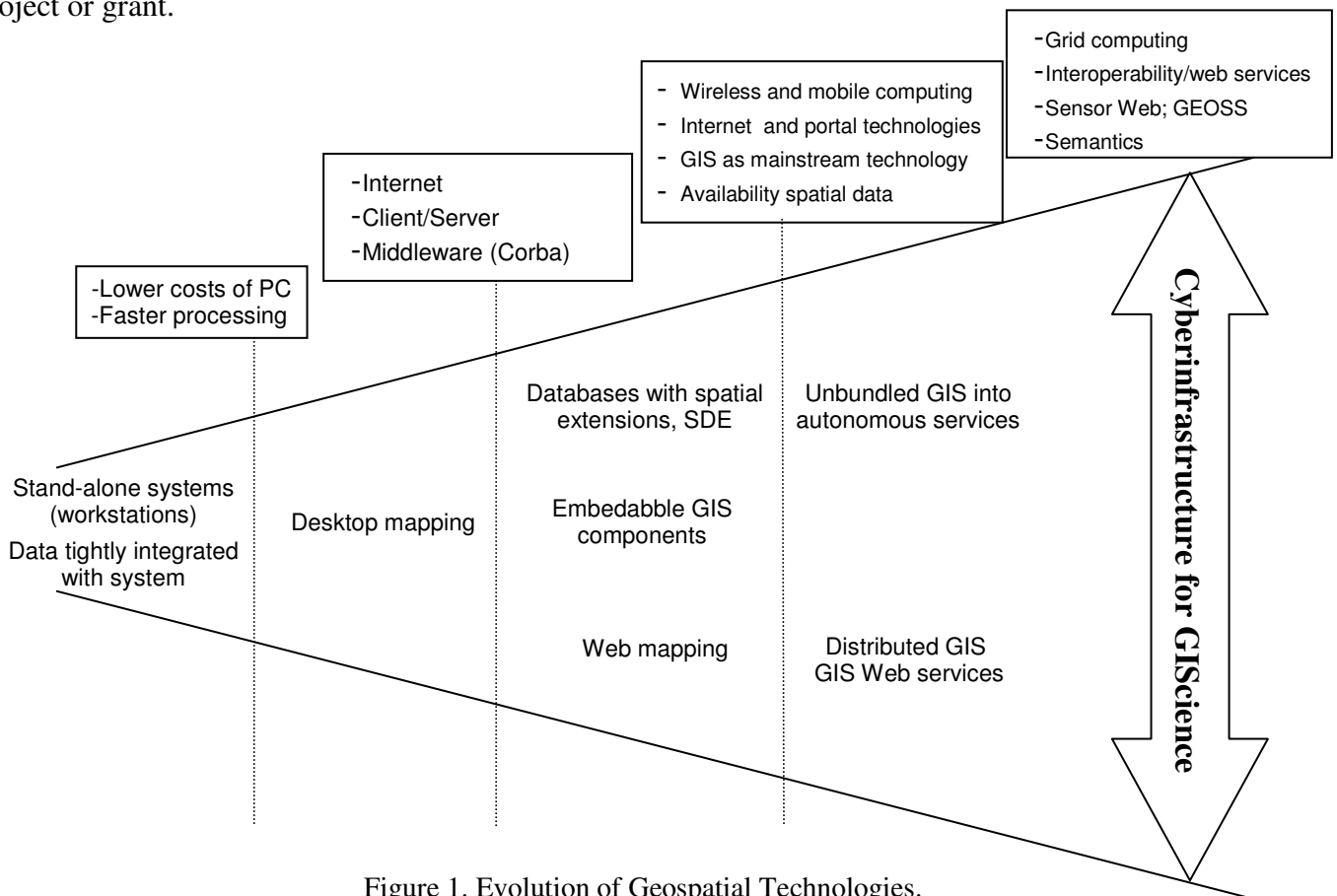


Figure 1. Evolution of Geospatial Technologies.

Leveraging and contributing to the Cyberinfrastructure is the only way to meet in a scalable, extensible and collaborative fashion the core goals of the Digital Earth including its multi-dimensional, multi-scale, multi-resolution interoperable models, seamless data, distributed services, interactive and immersive, and predictive interoperable models characteristics, as show in Table 1.

Maps	GIS	Digital Earth
<ul style="list-style-type: none"> - 2 dimensional - Single-scale - Selected features on Earth's surface - Static - Visual aid 	<ul style="list-style-type: none"> - 2D plus elevations - Multi-scale - Features on Earth's surface - Discrete datasets - Workstation hosted - Interactive - Additive-overlays - Analytical capability 	<ul style="list-style-type: none"> - Multi- dimensional - Multi-scale - Multi-resolution models of Earth - Seamless data - Distributed services - Interactive and immersive - Predictive process models

Table 1. Digital Earth Characteristics Enabled and Supported by Cyberinfrastructure.

Given the inherent reusability of GIScience information, the increasingly global nature of our problems and our improving ability at integrating information from difference sources (Figure 2), we look forward to the opportunity to contribute towards shaping the concept and execution of a Cyberinfrastructure that does not only support GIScience but leverages it for a plethora of decision support applications.

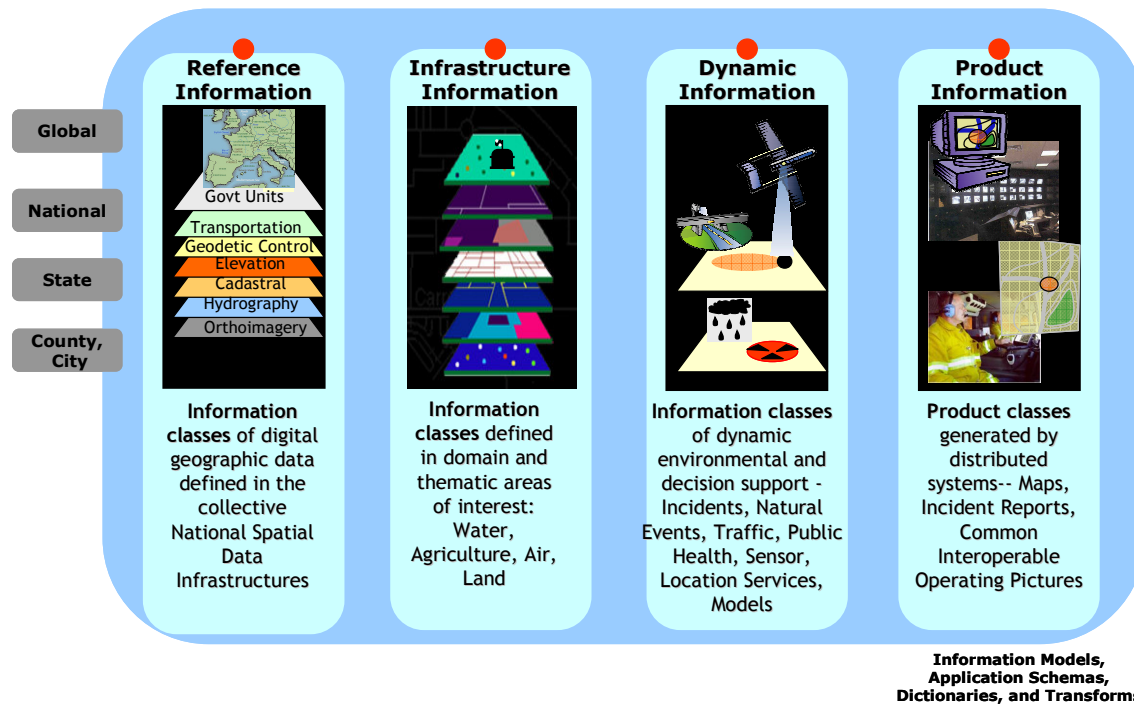


Figure 2. Spectrum of Information Sources and Types in GIScience Cyberinfrastructure.

Interests

In particular, our interests lie in the following

- Understanding how recent development in CI can enhance the design, delivery and use of GIScience technologies and resources and vice-versa;
- Contributing to the mainstream adoption and adaptation of GIScience products and technologies;
- Making data more accessible to not only its current base of users but to a multitude of non-traditional users as well (an area where semantics research will prove very valuable);
- Leveraging the recent advances in interoperability from the Open Geospatial Consortium (OGC) in the areas of Web Processing Services, Sensor Web and Cataloguing services;
- Enabling commercial products (such as Google Earth or Virtual Earth) to tap into the CI to meet an increasing appetite for GIScience information by the public as well as decision makers.

Company Background

MobiLaps, LLC is a Maryland-based woman-owned company, currently located in Montgomery County's Silver Spring Innovation Center. Registered in February 2004, MobiLaps received a USDA SBIR Phase I & II awards, NSF Phase I award, Montgomery County's Technology Growth Program award, and the State of Maryland's MIPS and TEDCO MTTF awards.

MobiLaps' Geospatial Consulting Practice is committed to providing comprehensive geospatial integration solutions to government and corporate senior management. MobiLaps is a leader and pioneer in the architecture, development and implementation of geospatial technologies and standards and continues to offer first-class expertise in state-of-the-art spatial test-bedding, prototyping and deployment methodologies. MobiLaps's world-renowned team has a proven track record in providing unique and customized solutions that maximally meet customers' needs and requirements.

- The MobiLaps GEO team has significant expertise in traditional (e.g. ESRI) as well as emerging geospatial and information technologies (e.g. World Wind and GEOSS Portal),
- The MobiLaps GEO team is world-renowned for its expertise in geospatial interoperability and standards (e.g. OGC and ISO standards), and has pioneered the applications of Web Services and Service Oriented Architectures in the geospatial field. MobiLaps continues to provide OGC with program leadership in the areas of system architecture and technical project management, as well as leading the development of professional training material on the basics of geospatial standards and interoperability. MobiLaps has organized and conducted OGC/interoperability training workshop at the Institute of Professional Education, Towson University, URISA, GML days as well as various client sites.
- The MobiLaps GEO team has a proven and successful track record in supporting NASA (through the Geoscience Interoperability Office, the Global Earth Observation System of Systems (GEOSS) and the Strategic Evolution of Earth Science Data Systems initiatives). MobiLaps has been supporting NASA in enabling efficient access, discovery and publishing of its earth science data via open web services and is currently providing strategic-level consulting to the NASA Geosciences Interoperability Office (GIO) to develop, promote and incorporate geospatial interoperability within NASA's Enterprise

Architecture and systems.

- MobiLaps GEO has strong contacts with the science and technology community at NASA as well as with key contacts at partner agencies (such as NOAA, EPA and USGS), and internationally (within GEOSS and OGC).
- MobiLaps GEO has extensive expertise in working with international and Federal partners and proven successes in policy and documentation development as well as an international, consensus building reputation for participation in comprehensive projects from concept to completion based on effective strategic planning and productive technical implementation.

Selected Publications

Alameh, Nadine; Bambacus, Myra & al. "NASA's Earth Science Gateway: A Platform for Interoperable Services in Support of the GEOSS Vision", 2006 IGARSS conference proceedings (Denver, Aug. 2006).

Alameh, Nadine; Bambacus, Myra & al. "Leveraging Open Standard Interfaces in Providing Efficient Discovery, Retrieval and Integration of NASA-Sponsored Observations and Predictions", 2006 AGU Spring Assembly proceedings (Baltimore, May 2006).

Alameh, Nadine. "Leveraging GIS Standards and Interoperability for Data Sharing", Proceedings of the 2005 ESRI Federal User Conference, Washington DC, February 2005.

Alameh, Nadine. "Chapter 7 - Geospatial Services", The Global Spatial Data Infrastructure: The Spatial Infrastructure Cookbook, January 2004, available online at www.gsdi.org/docs2004/Cookbook/cookbookV2.0.pdf. (Cookbook received award from Pan American Institute of Geography and History)

Alameh, Nadine. "Chaining of Interoperable Geographic Information Services", IEEE Internet Computing journal, Sep/Oct 2003, Vol. 7, No.5.

Alameh, Nadine. "A Raster Image Re-Projection Web Service Prototype", Photogrammetric Engineering & Remote Sensing journal, May 2004, Vol. 70, No. 5.

Samadi, Shahin; Alameh, Nadine & al. "Strategies for Enabling Software Reuse within the Earth Science Community", Proceedings of IGARSS '04 Annual Conference, Alaska, 2004.

Alameh, Nadine. "Geospatial Interoperability", Proceedings of the Geospatial Information & Technology Association's 27th Annual Conference, Washington Seattle, 2004.

Alameh, Nadine. "GIS Web Services: Evolution & Impact on Urban & Regional Information Systems", Proceedings of the Urban & Regional Information Systems Association's 40th Conference, Chicago, IL, 2002.

Alameh, Nadine. "Prototyping a Raster Image Re-Projection Web Service: Challenges and Lessons", Proceedings of EOGeo 2002, Milan, Italy, 2002.

Alameh, Nadine. "Chaining GIS Web Services" , Proceedings of the Geospatial Information & Technology Association' s 26th Annual Conference, San Antonio, TX, 2003

Alameh, Nadine. "ArcView GIS Extension for Retrieving Data from WMT-Compliant Map Servers", Proceedings of the 2002 Environmental Systems Research Institute International User Conference, ESRI, San Diego, California, 2002.

Alameh, Nadine. "Scalable and Extensible Infrastructures for Distributing Interoperable Geographic Information Services on the Internet", Ph.D. Dissertation Submitted to the Department of Civil and Environmental Engineering at MIT, Cambridge, 2001.

Alameh, Nadine. "Internet-Based Collaborative Geographic Information Systems", Masters Thesis Submitted to the Department of Civil and Environmental Engineering and the Department of Urban Studies and Planning, Cambridge, 1997.