OGC's column for the February, 1997 issue of GIS World

Who Will Design, Fund and Build the NSDI?

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In a paper published in the September 1994 issue of the Association for Computing Machinery journal StandardView, H. Gregory Smith and Diane E. Mularz explained the concept of a spatial information infrastructure architecture for the National Spatial Data Infrastructure (NSDI). Smith later joined the Defense Mapping Agency, now the National Imagery and Mapping Agency, where he's helping to design such an architecture for the Department of Defense Geographic Information Integrated Product Team (GIIPT).

Smith and Mularz wrote, "An architecture is based on the context of the problem being addressed," and they noted how architects respond to the different contexts of a hotel and a subway station. They went on to say, "Similarly, the context for an information infrastructure includes its intended users, its integration requirements with respect to other infrastructures and systems, and interoperability standards that must be adhered to for such things as data exchange protocols. ... [The NSDI's context] ... includes the people who will access and provide services [NSDI partners] ... related infrastructures with which it must interoperate [computers, computer-aided design systems, networks, legacy databases, car navigation systems, surveying systems, etc.], and policies that establish boundaries within which the technology must operate [governing data sharing, public access, privacy, data security, intellectual property, cost recovery, commerce in value-added data, data standards, geoprocessing standards, etc.]."

The role of the OpenGIS Consortium (OGC) regarding NSDI is to promote the interoperability of technologies that underpin the NSDI. Other participants play other roles focused on NSDI organizational and policy components. Here's how the roles work together.

The Technology

Who will design the technology architecture of the NSDI? Technical generalists from local and state government professional associations, such as the National States Geographic Information Councils, the National Association of Counties and the American Planning Association, and from the Federal Geographic Data Committee (FGDC) and FGDC's federal member agencies could collaborate to design the technology architecture. The best place to do it would be in subcommittees of the OGC Management Committee and working groups of the OGC Technical Committee, aided by OGC's commercial, government and academic experts. OGC user members such as the GIIPT, engaged in their own architecture projects, would offer suggestions and links to their community-specific architectures. OGC, by providing this organizational structure and rich network of relationships, gives user organizations a handle on rapidly evolving geospatial technologies and the businesses that create and deliver these technologies.

The People and Policies

Who will design the people and policy parts of the NSDI? The same institutions creating the technology architecture should draft the people and policy architecture, based on their understanding of how the new technical capabilities can best serve their constituencies. Imagine naively introducing today's information technologies into an organization devoid of digital data, computers and networks. You would first apply technology to meet the immediate needs of the

organization, but soon you would see that the organization, given the new capabilities and realities, would need to refashion itself with the technology to optimize the organization's ability to fulfill its mission. The act of architecture (whether of buildings or information systems) is the act of anticipating and designing around scores of relationships among human and nonhuman elements to benefit humans and Earth ecosystems.

The Funds

Who will fund the NSDI? FGDC's member federal agencies can fund their own spatial data infrastructures and help fund the NSDI architecture, and the states can fund state projects. But tens of thousands of local data producers are the key players, and they are badly underfunded, piecing together patchwork municipal spatial data infrastructures-a little from this budget, a little from that budget. Bruce Cahan, Urban Logic Inc., New York, offers a solution: Local governments need at least one major capital financing program that will finance comprehensive public and private local spatial data infrastructure development projects. Cahan believes that metadata standards and OpenGIS interoperability standards could be translated into underwriting criteria suitable for treating spatial data as capital assets. If local governments and their lenders can be made to see the waste and limitations of the piecemeal approach, as well as the savings and benefits of an integrated local spatial data infrastructure, the NSDI could be funded and built in five years.

The Builders

Who will build the NSDI once it's designed and funded? Private-sector product vendors and integrators serving public and private sector customers will build the technology parts of the NSDI, using the OpenGIS Specification to ensure interoperability among the parts. The people and policy parts of the NSDI will be built by hundreds of established agencies and ad hoc teams who will negotiate the metadata standards necessary for data sharing, address new opportunities and problems raised by the new technologies, develop and promulgate models that elaborate parts of the architecture, provide feedback to revise the architecture and revise their operations to take advantage of distributed geoprocessing.

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