



## **Federal Geographic Data Committee**

February 10, 2000

### Financing the NSDI: National Spatial Data Infrastructure

The report “Financing the NSDI: National Spatial Data Infrastructure” was prepared for the Federal Geographic Data Committee (FGDC) to research alternative mechanisms and options for securing financial resources for spatial data activities. The report has been delivered to the FGDC by Urban Logic.

This report represents a significant accomplishment as a resource for use in considering a wide array of potential opportunities to align or leverage resources and investments for spatial data activities in support of the NSDI. The FGDC intends to use the report in support of ongoing activities to find additional ways of developing resources and providing incentives for NSDI actions.

The FGDC is in the process of considering the Report’s recommendations and will formulate actions to capitalize on the results of this groundbreaking research and the ideas that it stimulates.

# Financing the NSDI: National Spatial Data Infrastructure

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Aligning Federal and Non-Federal  
Investments in Spatial Data,  
Decision Support  
and Information Resources  
(Revision 2.0 for Public Comment)

The Report is the result of research conducted by Urban Logic, Inc., for the Federal Geographic Data Committee (FGDC), pursuant to Cooperative Agreement #98HQAG2193 with the U.S. Department of the Interior - U.S. Geologic Survey.

Presently, FGDC is reviewing the Report and its recommendations and considering appropriate actions to take based on them. This Summary was prepared for the general public as a convenient introduction to key findings of the Report. This Summary is qualified in its entirety by the full Report (<http://www.fgdc.gov/whatsnew/whatsnew.html#financing>), and is not to be quoted or referenced.

## Executive Summary

Businesses and houses are located on streets, inside state and city boundaries. To achieve its mandates and missions, government at all levels generates and consumes vast amounts of data – from planning road, water and sewer infrastructure to emergency response and economic development. So too data is used by the private sector: in utilities and telecommunications companies for infrastructure engineering, in the real estate industry for urban development projects and leasing activity, in the airline and transportation industries for route and fleet analysis, by marketing companies for finding target consumers, and many others. Interest groups tap data to understand environmental, health, neighborhood and social conditions and consequences of public and business policies, and to shape viable alternatives to those policies.

This and much more information traditionally shown on maps (**Spatial Data**) rests everywhere in databases maintained by government, industry, universities and non-profits (**sources**). Since 1994, the inter-agency working group known as the [Federal Geographic Data Committee \(FGDC\)](#) has stewarded the [National Spatial Data Infrastructure \(NSDI\)](#) to improve the reliability, consistency and dissemination of Spatial Data. The Internet may have “Changed everything” (according to CEO Larry Ellison of ORACLE), yet Spatial Data’s transformation into a universally trusted commodity supplied to users throughout the Digital Economy is just beginning. Maximizing the value of that information requires (1) maintaining it as current and accurate in a standardized form useful outside of the organization that collects it, (2) pooling it through the Internet, Intranets or other Data Service Bureaus for use in future interoperable business settings and (3) decision support tools – from basic to advanced – to use and leverage the Data into Information and ultimately Knowledge for society at large. In turn, these maximizing activities require **Capital** to transform and align legacy and inconsistent Spatial Data into more universally transacted commodities. How Capital can be better used and invested in Spatial Data and shared decision support tools (**Spatial Information Services**) driving the demand for Spatial Data is the subject of the Report.

### A Set of Recommendations for Financing the NSDI

Much of the Report focused on communities and how they organized capacities to build homes and businesses, improve the environment, improve infrastructure and revitalize their economies. The focus was for and towards a *community of users*. Spatial Data has multiple communities of users, sharing the same region, industry or issue. The research bears out the wisdom of approaching the NSDI as a **Network of Data Consortia** organizable by region, industry and thematic issue with its own audience of data providers and users looking to make that Spatial Data accessible as part of the Digital Economy. The recommendations in Urban Logic’s [June 9, 1999 Testimony before the House Subcommittee on Government Management Information & Technology \(GMIT\)](#) reflected a Data Consortia approach and previewed what was learned in preparing the Report.

At the dawn of the Digital Economy, the Report finds an urgent opportunity to provide a national capacity to support the capital financing that **Regional, Industry and Interest Group Consortia** need to form and grow. These Consortia pool and align intergovernmental and public-private investments in Spatial Data acquisition and maintenance, decision support applications and supporting hardware, software and integration services.

**A National Information Technology Development and Finance Corporation** – a specialized bank to underwrite information technology investments like spatial information services- could be formed as a public-private partnership, or as a quasi-governmental institution, with appropriate oversight and citizen accountability to reflect the public policy benefits and concerns (i.e., public access, privacy, security, etc.) implicit in Spatial Data use.

Financing is just one of six lines of business— business services - that such Consortia need to grow. The other five are Bulk Procurement, Internet & Digital Democracy, Data and Systems Quality Assurance, Public Policy and Legal, and Technology Transfer. A public-private partnership (**U.S. Community Technology Partners**) to align access to, and enhance the robustness of, all six services is also recommended. Consortia and their members would remain forever free to find other means of obtaining these six services on better market terms – participation in the recommended initiatives would be entirely voluntary, not compulsory. Pooled demand for these 6 services encourages new business models to form and serves to expand the market for existing businesses.

The Report reviews the context for financing the NSDI, including

- (A) research regarding pertinent settings for (and Digital Economy impacts on) the NSDI,
- (B) the evaluation of analogies that define characteristics of success in other industries,
- (C) the review process that culminated in the GeoData Forum and the GMIT Hearings, and
- (D) the conclusions of the [GeoData Forum's Finance Thread](#).

This context led to formulating six recommendations for financing the NSDI:

Recommendation 1. Finance is an available, potent and largely untapped dimension for achieving the NSDI Vision. Financial engineering of cash flows and investments in Spatial Information Services would benefit from organizing a range of capital planning and other commonly desired strategies that affect the timing, amount, recurrence and credit quality of those investments. Finance makes meaningful and depends on the work of standards-development organizations (like FGDC and [OpenGIS® Consortium](#)) by using technical specifications for Spatial Data, interoperability and other responsible design elements as underwriting criteria. Financing that uses such Web-enabling standards will create liquidity for investment decisions, spatial data transactions and institutional data interdependencies. It adds market driving forces to move the “NSDI” further into the Digital Economy.

Recommendation 2. Users in the emerging Internet marketplace for Spatial Data value will demand trustworthy data from reliable sources. **Branding** a Spatial Dataset's quality will implement minimal federal Metadata & Data Content Standards by building user and vendor familiarity and trust in quality accessible Spatial Data.

Recommendation 3. Finance mechanisms can be used not only to construct efficient projects, but to construct parallel consortia of privately-led, publicly-accountable Service Bureaus to leverage Spatial Data transactions into the NSDI - just like Service Bureaus process credit cards, mortgages and many other commercial transactions. Spatial Information Service Bureaus that pool community capital and information resources devoted to servicing federal “Data Mandates” can readily be bundled into 3 types of Consortia:

- i) *Regional* (such as San Diego's Regional Urban Information System or the Pacific Disaster Center in Hawaii),
- ii) *Industry* (such as Energy, Financial Services, Healthcare, Insurance, Real Estate and Telecommunications) and
- iii) *Interest Groups* (such as The Nature Conservancy's 80 data centers to track and preserve Biodiversity, and the National Alliance of Breast Cancer Organizations and National Action Plan on Breast Cancer to spatially-enable the etiology of breast cancer through data collections and analysis sponsored.

These Consortia provide an “architectural unit” (like LEGO® blocks) for public-public, public-private and private-private partnerships (where “private” includes nonprofit and academic users) to align their investments for projects and implementations around trusted information and the

availability of Spatial Information Services. Federal Agencies become members of such consortia, and Private Data Developers & Technology Suppliers service the outsourced needs of such consortia as a new line of their business.

To coordinate the Consortia, an Association of the Consortia evolves to help remarket, finance and procure Spatial Data for them and their state, county, regional, industry and interest group client/members, manage the intellectual property of a Brand for reliable Spatial Data specifications and procedures and develop public policy implications, initiatives and guidance. This Association would also promote the national development of 6 lines of business well-suited for the private sector to lead, co-develop and co-fund.

Recommendation 4. Adopting a Finance strategy for the NSDI would fuel demand for 6 supporting business services that speed Spatial Technology transactions using consistent investment standards, while leaving each Consortium and its members free to perform all information, project, and operational support services on its own or through its own arrangements. The economies of scale in organizing the support services let Consortia focus on maintaining and delivering quality Spatial Data and Information Services. These six lines of business services include:

- 1) Internet Portals for discovery, access, and use of Spatial Data
  - a) Branding of “Quality” Spatial Data/geo-processing Websites essential to let the market price the data quality it needs for a given application or customer base
- 2) National Information Technology Development and Finance Corporation to develop finance options on behalf of Basic Networks and the Association
  - a) Be the investment “banker” to service Basic Data Consortia and their Members
  - b) Incorporate a Financial Advisory Board to vet options for debt, equity, CRADA, partnering and other formats for investment pooling
  - c) Finance portions of the NSDI like physical infrastructure using bonds, revolving loan programs and other debt structures that provide capital to build the Network of Data Consortia as Service Bureaus
  - d) Conduct regular surveys of the functional requirements of users, their investment plans and commitments, their in-house expertise and desire to use that expertise for data assembly, decision support tool-building, both or neither, and other IT capital planning “metrics” that help frame and prioritize Consortia roles, outsourcing, member data - supply commitments, financing and staffing
  - e) Following-up inquiries to enhance investment alignment & pooling opportunities
  - f) Offer appropriate data and software reliability insurance and risk-minimization programs
- 3) Bulk Procurement Service Center that offers Consortia-based purchasing strategies and expertise
  - a) Creates a large market mechanism for the GIS vendors, consultants and integrators to go after, thereby economizing their sales and marketing efforts, letting companies compete based on after-sales service and product differentiation
  - b) Serve as the “first negotiator” on behalf of non-federal units desiring to enter into data sharing/IT partnerships across multiple federal Agency missions, simplifying the partnering process, and creating a strong local/industry/interest group balance to federal partnering activity. Non-exclusivity of Consortia’s role leaves non-federal units (Consortia members) free to negotiate separate partnerships and data sharing mechanisms with federal agencies, if the situation or context serves them better.
  - c) By specifying and pricing outsourcing options, performs a needed government technology reform service to assure that acquiring Spatial Data/geo-processing from other Basic Consortia is regularly contrasted with the internal development of traditional

- stovepipe systems or other procurement options.
- d) Provide less expert users a “Best Practices” guideline to shorten learning curve of buying and upgrading Spatial Data and GIS/IRM systems
- 4) System & Data Quality and Underwriting Certifiers
    - a) [FGDC Metadata and Data Content Standards](#) and [OpenGIS®](#) and other industry interoperability specifications processes become transactional and investment criteria through this facet of the Recommendations
    - b) Incorporating the latest technical advances for e.g., metadata creation and management, new spatial information services, Web-mapping, design elements for enhancing Security and Privacy or “reduced sets” of elements necessary to drive transactions in Spatial Data are identified and made known to Consortia in updated project guidance and underwriting conditions and criteria.
    - c) This business service becomes a risk management strategy for data sources and users whose data and information product and tort liability would be gauged against “normative” or “reasonable man” floors for Spatial Data and geo-processing design, quality control and appropriate use
    - d) “Best Practices” guidelines would spare less-expert users the learning curve of assembling, building and maintaining specifications for complex data appropriate to routine tasks
    - e) Requirements for “Watermarking,” cookies, data “traps” and other techniques could address Copyright and Cyber-terrorism concerns from misuse of Spatial Data
  - 5) Public Policy & Legal Strategies Development & Outreach Services
    - a) Sponsor an ongoing discussion and public debate of Federal and State Freedom of Information policies that balance public access to Consortia data against competing policy concerns
    - b) Research & Promulgate Model Spatial Data Licensing Policies
    - c) Craft Model Privacy Policy Guidelines for Internet Portals with Spatial Data/geo-processing Characteristics
    - d) Review Copyright and database protection issues
    - e) Understand the role of Consortia and Consortia member training in reducing the liability in transactions that build and use Consortia data
  - 6) Operational and Technology Transfer Services
    - a) As data acquisition, integration, e-government, e-business, e-citizen and decision support tools are built in one Consortia, transfer those tools as “best practices” to other Consortia
    - b) Funnel advanced military/intelligence capabilities to Consortia to improve “consequence management” in emergency response and give American citizens and businesses the benefits of using advanced techniques on a daily basis in appropriate non-military settings

Recommendation 5. Permit the Commercial aspects of the NSDI to flourish

- 1) Financial and other strategies in the Report use the public sector’s policy goals, emphasize private sector roles and foster innovation and entrepreneurship in organizing and driving 6 business services
- 2) Will promote the clarification of copyright protection for Spatial Data developed or shared by private sector
- 3) Review government and private Data Pricing and Data Licensing patterns across the country for similar types and quality of data. As appropriate given applicable policy

goals, market driven, competitive pricing strategies for value-added data and information services will emerge based on review of government and private data pricing and data licensing patterns across the country for similar types and quality of data.

- 4) CRADA's and other procedures can be efficiently employed by the Consortia to grow the private sector's role.

Recommendation 6. Organize appropriate Public Sector support:

1) Federal Government

- a) Conduct a thorough study of the Spatial Data marketplace and Spatial Data's value-added to the Digital Economy
- b) Recognize the Spatial Data portion of statutory and regulatory data mandates imposed at all levels of government on subsidiary intergovernmental levels, corporations and citizens
- c) Convert data mandates in stove-piped programs to membership fees, revolving loan grants to states or other credit enhancement for the Association and data Consortia
- d) Consider the appropriateness of deeming Spatial Data of the mandated scale and coverage developed by eligible Consortia (i.e. those providing consistent Spatial Data) as per se appropriate for use in response to data mandates, absent a showing by the mandating agency that the Spatial Data developed by the consortia is out of date, or fails to adhere to the quality standards.
- e) Where appropriate to (i) drive market investment, (ii) reduce government outlay and (iii) increase Spatial Data supply and quality choices for government, recharacterize data mandates as "take or pay", "revolving loan" or other arrangements that represent cash flow revenues that attract capital. This would expand procurement and regulatory options and foster private equity investment in spatial technology.
- f) Use pilot programs to optimize the benefits of various financing scenarios as was done with procurement pilots under ITMRA (Information Technology Reform Act).
- g) Clarify Internal Revenue Code so that bonds issued in support of Consortia will be deemed issued for a "public purpose" and accorded tax-exempt status
- h) Re-examine Federal membership in the Association and the minimal Spatial Data standards and interoperability specifications required as "underwriting criteria" sufficient to align public and private investments and create web-based transactions for Spatial Data.
- i) Review how to make Federal imagery products accessible to private sector and intergovernmental users to reduce cost and delay of Spatial Data updates and improve accuracy of geo-processing for decision-making purposes
- j) As another enabler of public access and digital citizenship feature available to the basic network of data consortia, reestablish a geographer for Congress as existed in 1830s to help Congress use Spatial Data/geo-processing to assess the impact and effectiveness of past and future legislation

2) State Government

- a) Issue Bonds in support of regional or local Data Consortia
- b) Host Federal revolving loan fund for Spatial Data/geo-processing development

3) County / Local / Tribal Government

- a) Structure Consortia Service Bureaus or Utilities to oversee Spatial Data pooling and geo-processing investment alignment
- b) Embrace and help transition existing data sharing arrangements, and to the extent appropriate, certify them as qualifying "Consortia" under the new program

4) Major Institutional Public & Private Sector Spatial Data Users

- a) Subscribe as members in the Consortia

- b) Use State One-Call Laws to fuel Infrastructure user support
- 5) Investment Banks & Financial Intermediaries
- a) Consider the appropriateness of making purchases of a small annual amount of bonds issued by Data Consortia eligible for Community Reinvestment Act (CRA) credit
  - b) Use GASB 34 requirements on municipal bond issuers to justify capital invested in Consortia

A “National Spatial Data Council” was recommended in the [National Academy of Public Administration’s 1998 Report: \*Geographic Information for the 21<sup>st</sup> Century\*](#) and referenced in [Secretary Bruce Babbitt’s GMIT testimony](#). This assembly of stakeholder groups could take the form of the Association that creates, finances and manages the 6 recommended business services on behalf of the Consortia and implements the successful use of the 21 characteristics identified in the Report (attached as Table A). A proposal for such Association appears as Appendix C of the Report.

The Report chronicles some human lessons essential for the NSDI to reflect the passion of its vision. Futurists who come from the public and private user and technology communities - visionary, yet practical people - were at the heart of the Analogies cited in the Report. They understood the technology and end-user requirement. They also understood how to explain and build the natural partnerships, franchises, contractual arrangements and technology paths. With those explanations as consensus for underwriting criteria, funding investments involved came naturally.

Creative financing options, mirroring some of the service bureaus and structures described in the Report, may attract more public and private sector participants to the NSDI through regional, industry and interest group data consortia or other architectures, launching new financial instruments, and building practical steps out of foundations laid through the art of persuasion in previous studies, conferences and hearings. Eventually, as the market understands investments in Spatial Data-based securities, the Federal investment in them will be saleable, just as Fannie Mae shares now trade on the New York Stock Exchange.

Embedding public access requirements within the underwriting criteria for national financing options may overcome the permutations in State Freedom of Information Laws that treat Spatial Data access different than regular data. Such national financing intermediation would spawn enough basic Spatial Data and geo-processing access to support a more meaningful Digital Democracy, a more responsive E-Government and a better equipped 21<sup>st</sup> Century populace.

### **Benefits of the Six Recommendations**

The benefits of the Reports six recommendations would be to

- Add more dependability and liquidity to the capital sources traditionally used to budget for Spatial Information Services in governments at all levels by tapping Wall Street financial mechanisms, pooled member subscription fees and other economies of scale savings of collaborative action;
- Reduce federal outlays for Spatial Information Services by (i) externalizing the portion of Data Mandates that can be supported by Consortia, (ii) aligning the capital planning cycles and mechanisms for spatial information resources developed by or for intergovernmental units, and (iii) leveraging non-federal investments to supply high-quality standardized data essential to Agency functions;
- Simultaneously provide a nationwide infusion of market-leveraged capital to address the accuracy, detail and coverage of granular information now at the local level and required to understand the context for making better decisions in federal programs;
- Encourage intergovernmental, and inter-Agency cooperation and efficiencies in organizing

using, prioritizing and understanding the benefits of federal programs (environment, health care, housing, infrastructure, transportation and others) by causing all stakeholders in a set of decisions to share a common “view” of the affected population, community or industry;

- Support Regional, Industry and Interest Group Consortia to form using standardized data management and dissemination practices that provide better information at lower costs and in more detail and variety than currently available;
- Provide more consistently robust and better citizen access to Spatial Information Services as part of participating in the Digital Democracy – thus enhancing the national tools for understanding governmental and business decisions and programs and their effect on urban and rural livability;
- Expand the set of financial and market driving mechanisms to improve marketplace efficiencies and stimulate technology innovation and commercialization for Spatial Information Services;
- Provide a powerful market-driven alternative for International use in organizing and financing Spatial Information Services markets worldwide – furthering the ability of American companies to compete abroad and the interest of American foreign policy in widespread information resources as technologies that enhance open societies and stable, democratic forms of government;
- Reduce the Digital Divide so that all our communities know that they can tap federal and market mechanisms to finance and maintain long-term, functional Spatial Information Services;
- Leverage the work of the Federal Geographic Data Committee, OpenGIS and other standards development organizations by embedding their policy and technical specifications appropriately in market-driven underwriting, investment and purchasing decisions that businesses and governments make every day;
- Leverage the leadership resources of government officials, socially-responsive businesses and community-based organizations interested in better government, responsible access to information, and E-Government solutions; and
- Empower the Digital Economy so that Spatial Information Services represent a key enabler of cooperative decision-making, business marketing opportunities and economies of scale.

### **History of Developing a Set of Recommendations for Financing the NSDI**

The work and insights represented in the Report were developed through research inspired by numerous formal and informal discussions and meetings stretching over 18 months. The Finance Thread held on Tuesday, June 8, 1999 as part of FGDC’s 1999 GeoData Forum presented a special day-long opportunity to review the subject matter of financing the NSDI, to present the Report’s preliminary recommendations and to vet them before a distinguished group of 35 finance, legal, industry and government leaders.

In hearings on June 9, 1999, the Subcommittee on Government Management, Information and Technology of the Committee on Government Reform of the House of Representatives (GMIT) heard testimony from 11 federal, state and local officials, business and GIS industry leaders, and non-profit witnesses as to the potential of Spatial Technologies, and the justifications for Federal research, capacity-building and financial support. The recommendations and personal experiences of the witnesses at the GMIT Hearing and the goals and action items identified at the GeoData Forum form a powerful set of policy considerations and recommendations.

Preparing to chair the GeoData Finance Thread (with Dr Terry Keating), focusing the expert

presenters, presenting the work of the Report, leading the Finance Thread's discussion and hearing the participant's creative response, summarizing the Finance Thread's work for the GeoData Plenary session and for FGDC's GeoData Forum Website, preparing Congressional testimony for the GMIT Hearing and responding to questions of Subcommittee Chairman Stephen Horn and Rep. Paul Kanjorski provided an intensive context for considering all aspects of this subject matter with federal, state, local, tribal, international government, industry, finance, non-profit and university stakeholders.

**TABLE A: Industry Analogies for Financing the National Spatial Data Infrastructure**

<b>Steps in Designing Financeable Market-Enhancing Mechanisms</b>	<b>Other Industry Examples (the Analogies)</b>	<b>Spatial Information Community: Capabilities &amp; Requirements: What exists &amp; needs to be done</b>
1. Start by looking at a Single Industry or Profession	Mortgage Industry (Fannie Mae) Grocery Stores (UPC Bar Coding)	Government need for environmental or transportation data
2. Identify the manual Business Processes in the Industry that <ul style="list-style-type: none"> <li>• create Transactions or other Value-Added in that Industry</li> <li>• increase processing costs</li> <li>• tie up capital / reduce liquidity</li> <li>• have no competitive opportunity or advantage unique to the enterprise that needs to perform that process</li> </ul>	Booking Passengers (SABRE) Finding Small Business Investments to generate CRA credit (SBIC) Searching case law for legal precedents (LEXIS/NEXIS) Updating business news developments (BLOOMBERG) Tracking Securities (CUSIP)	Data Mandates on Non-Federal Sectors Investments in non-productive Spatial Data that necessitates constant maintenance and fear of legacy status. Spatial Data & Technologies are just a tool to create or drive government & private business processes (permitting, real estate development, environmental protection).
3. Sort the Business Processes and find those that would benefit most from Cross-Industry Coordination	Exchange of Mortgages (Fannie Mae) Exchange of Electricity (Power) Airport Facility Construction (Airport Authorities)	
4. Determine the Coordination Incentives & Capabilities that Exist & are Missing	Banking CRA (SBIC, CDC, Non-Profit Facilities Fund) Tax Credits (LISC) Environmental (EPA Revolving Loans) Universal Acceptance & Remote Processing (VISA, NY Clearinghouse)	Existing: Data Mandates Internet/Digital Economy Missing: Financing Incentives Mechanisms to align Investments in Spatial Data
5. Prove the Business Case by comparing: <ul style="list-style-type: none"> <li>▪ the Value produced by Coordination of each Business Process,</li> <li>▪ the Costs of Coordination at that Business Process level using existing Capacities,</li> <li>▪ the Costs of Coordination at that Business Process level using new Capacities &amp; Technologies,</li> <li>▪ the Investment required to achieve the new Capacities &amp; Technologies,</li> <li>▪ the Net Present Value return for the entire Industry of making the Investment (D) to achieve the Benefits of (A) and the reduced costs (B – C)</li> </ul>	Volume Acceptance & Processing (Fannie Mae Home Mortgages, VISA Credit Card payments) Increased Search, Indexing, Content Qualification & Content Analysis (BLOOMBERG, LEXIS/NEXIS, MEDLINE, CUSIP) Increased Market Transactions in Commodity at reduced costs (SABRE Passenger Reservations, CUSIP Bond sales) Better Inventory Management to improve Pricing & Supply (UPC Bar Coding for consumer products)	*** Needs further study *** Recommendations: Track participants in FGDC's Funding Programs <sup>1</sup> for these metrics Find communities of similar size to those participants, and assemble metrics for those communities If a proposal such as C/FIP: Community/Federal Information Partnerships is launched, include its partnerships in metrics formulation activities.

<sup>1</sup> FGDC offers 3 programs: Cooperative Agreements Program, Framework Demonstration Program and NSDI Framework Benefits Program (<http://www.fgdc.gov/funding/funding.html>) whose recipients and participants should have an interest in helping to define these metrics.

<b>Steps in Designing Financeable Market-Enhancing Mechanisms</b>	<b>Other Industry Examples (the Analogies)</b>	<b>Spatial Information Community: Capabilities &amp; Requirements: What exists &amp; needs to be done</b>
<p>6. Form an Association of Users to congeal a core group of Advisors, Users, &amp; Investors who understand this Business Case</p>	<p>Banks &amp; Investment Banks (CUSIP, Fannie Mae, LISC, SBIC, VISA)                      Bar Associations &amp; Law Schools (LEXIS/NEXIS)                      Non-Profit Grass Roots Organizations (LISC, Nonprofit Facilities Fund)                      Transportation (Airlines for IATA &amp; Airport Authorities, Contractors for EPA Revolving Loans &amp; TEA-21)                      Utilities (Electric Power ISOs)                      Banks as members of VISA's Association</p>	<p>Build on Existing Capacities:                      FGDC                      GeoData Forum                      Mapping Science Community                      Add:                      Business Leaders from environmental, insurance, transportation, healthcare, petroleum, energy and other sectors</p>
<p>7. Translate the Missing Incentives/Capabilities into concisely described new Capacities</p>	<p>Volume Acceptance &amp; Processing (Fannie Mae Home Mortgages, VISA Credit Card payments)                      Increased Search, Indexing, Content Qualification &amp; Content Analysis (BLOOMBERG, LEXIS/NEXIS, MEDLINE, CUSIP)                      Increased Market Transactions in Commodity at reduced costs (SABRE Passenger Reservations, CUSIP Bond sales)                      Better Inventory Management to improve Pricing &amp; Supply (UPC Bar Coding for consumer products)</p>	<p>We want to build a Network of Data Consortia to support government, industry and interest group operations</p>
<p>8. Design the Capacities in Teams of Designers + Users to assure that the real world business processes embed in the Capacity's design &amp; implementation – assuring user adoption later</p>	<p>Airport Improvement Program                      CUSIP – Am Bankers Association + Standard &amp; Poors                      EPA's Financial Advisory Board's Financing Guidebook                      Electric Power Pooling Arrangements                      SABRE Reservations System</p>	<p>Environmental Team Candidates                      Aurora Partnership                      GDIN                      Transportation Team Candidates                      ITS America</p>
<p>9. Review opportunities for Technology Transfer &amp; Generalize Advanced Technology or Bandwidth from Military or Government</p>	<p>LEXIS/NEXIS (Wright Patterson Aircraft parts inventory software)                      MEDLINE (bandwidth)                      SABRE (SAGE air defense project)</p>	<p>Engage Intelligence Community                      NIMA – Spatial Technology                      Engage Government Process Reform Communities</p> <ul style="list-style-type: none"> <li>▪ OSTP</li> <li>▪ OMB / OIRA</li> <li>▪ House GMIT Subcommittee</li> </ul>

<b>Steps in Designing Financeable Market-Enhancing Mechanisms</b>	<b>Other Industry Examples (the Analogies)</b>	<b>Spatial Information Community: Capabilities &amp; Requirements: What exists &amp; needs to be done</b>
<p>10. Use Federal Grants, Guarantees, Procurement, Regulation or other support to foster Capacities for Transactions that achieve National Efficiency, Equity or Effectiveness Public Policy goals</p> <p>Where Federal Guarantees are provided, the private investor’s capital provides “first loss” protection, and payment on the Federal Guarantee historically has been minimal.</p> <p>Let States &amp; local governments dedicate future federal programmatic support as their share in matching formulas. Alternatively, licensing &amp; user fees may represent non-Federal matching funds.</p> <p>Optimize &amp; tailor Federal financing support programs &amp; their capabilities through pilots &amp; demonstration projects.</p>	<p>CUSIP – Federal Reserve System standards                      EPA Revolving Loans – Grants to State Bond Banks                      Electric Utility Power Exchanges – FERC Regulations                      FAA’s Passenger Facility Fee                      Fannie Mae Home Mortgage Loans – “Implicit” Federal Guarantee                      FHWA State Infrastructure Bank Pilot – States can use 10% of their future federal funding.                      Nonprofit Facilities Fund – Treasury CDFI Grants                      Power Industry – federal regulations fostering competition at wholesale level                      Transportation - TEA 21 Grants                      SBIC – Guarantees                      US Investigations ESOP – Primary Contract</p>	<p>Choose several Pilot Data Consortia Project types to fund on varying structural models:</p> <ul style="list-style-type: none"> <li>▪ Public-Public/Intergovernmental</li> <li>▪ Public-Private</li> <li>▪ Purely Private</li> <li>▪ University/Academic</li> <li>▪ Non-Profit</li> </ul> <p>Offer several options of Federal support that can be used exclusively, or in combination subject to an aggregate maximum cap on support per project to test the most useful and administrable form(s) of support</p> <ul style="list-style-type: none"> <li>▪ seed grants</li> <li>▪ matching grants</li> <li>▪ take or pay arrangements</li> <li>▪ data consortia membership fees</li> <li>▪ guaranty of marketable debt</li> </ul>
<p>11. Build a Test-Bed environment to optimize the technology application in a real world environment</p>	<p>MEDLINE at National Library of Medicine                      SABRE at Tulsa Oklahoma                      UPC Bar Coding Test Bed                      VISA</p>	<p>Existing capabilities:                      OGC Testbed                      UCGIS                      NIMA/NIDL Labs</p>
<p>12. Adopt &amp; Share Quality Assurance &amp; Underwriting Criteria that standardize best practices for growing transactions</p>	<p>BLOOMBERG Editorial Review                      EPA’s Financial Advisory Board’s Financing Guidebook                      Fannie Mae Mortgage Lending &amp; Delegated Authority Criteria                      NY Clearinghouse Member Agreements                      SBIC Lending &amp; SBA Certification Guidelines</p>	<p>Review the outcomes of the Pilots in Step 10 every 6 months for 2 years.</p>

Steps in Designing Financeable Market-Enhancing Mechanisms	Other Industry Examples (the Analogies)	Spatial Information Community: Capabilities & Requirements: What exists & needs to be done
<p>13. Leverage Existing State &amp; Local Interest Groups as financing intermediaries, customers, development partners &amp; early adopters of the benefits of a new shared solution (<i>If you build it, they will come.</i>)</p> <p><i>Flip side of the coin:</i></p> <p>Respect State sovereignty on issues of citizen concern that may be impacted by the technology or financing solutions and to the extent feasible work within existing State legal frameworks.</p>	<p>Non-Profit Housing Groups (LISC) Non-Profits (Nonprofit Facilities Fund) Bar Associations (LEXIS/NEXIS) State Bond Banks &amp; Metropolitan Planning Organizations (EPA Revolving Funds, TEA-21 Transportation Funds, FAA Airport Improvement Funds) SBA's SBIC, CDC &amp; RLF Networks of State Banking Departments, Banks, Economic Development &amp; Non-Profit groups. VISA Members issue credit card &amp; set interest rates in accordance with State (or Federal) Banking &amp; Consumer Protection laws.</p>	<p>Existing Capabilities: State Bond Banks</p> <p>Environmental Advocacy Groups Industry Environmental Groups EPA &amp; EPA's Financial Advisory Board Environmental Consultants, Contractors &amp; Developers</p> <p>Metropolitan Planning Organizations (MPOs) for Transportation Transportation Consultants, Engineers, Contractors</p>
<p>14. Leverage Federal interest in Targeted Programs with and across several Agencies</p> <p>This Federal interest can include:</p> <ul style="list-style-type: none"> <li>▪ pooling federal resources to simplify local partnering</li> <li>▪ maximizing the diffusion of know-how &amp; other benefits of the Federal program</li> <li>▪ reducing waste &amp; delayed implementation</li> <li>▪ showcasing American solutions globally</li> </ul>	<p>Fannie Mae + HUD Sustainable Community Development Initiative EPA's work with Transportation Agencies LISC certification by Treasury Department &amp; role in banks CRA investments MEDLINE was created to inventory &amp; rapidly disseminate the fruits of federally funded research across many Agencies, Universities and researchers. It serves as a global ambassador for American medical research.</p>	<p>Intergovernmental Agencies for Environment Transportation Urban Planning</p>
<p>15. Delegate Origination &amp; Pool Smaller Loans or Investments into Securizable Pools to achieve Efficient Servicing of Investments</p>	<p>Fannie Mae Warehousing of Whole-Loan Portfolios SBIC Debentures VISA Credit Card Receivables</p>	<p>***Needs further study, based on Pilot Project experience*** Start discussions with Public Finance Association State Comptrollers Association ABA Public Finance Section</p>
<p>16. Adopt &amp; coordinate the Minimal Data &amp; Metadata required to Index &amp; Self-Identify a product, service, investment or other information</p>	<p>CUSIP's 9 digit code for Bonds &amp; Securities MEDLINE's Abstract links to Publisher's site for purchase of journal article UPC Bar Code's 12 digits VISA's 16 digit Credit Card number</p>	<p>Existing Capabilities FGDC Metadata Standards OpenGIS Specification families</p>

<b>Steps in Designing Financeable Market-Enhancing Mechanisms</b>	<b>Other Industry Examples (the Analogies)</b>	<b>Spatial Information Community: Capabilities &amp; Requirements: What exists &amp; needs to be done</b>
17. Outsource Redundant or Non-Core Metadata, Inventory, Distribution & Servicing Functions	AOL/Netscape sale of Network operations to MCI/Worldcom Fannie Mae – Mortgage Servicing NY Clearinghouse Assn formed Small Value Payments Company to process small-dollar electronic payments on behalf of 21 major banks Standard & Poors' maintains CUSIP under a contract with Am Bankers Assn VISA Member's Credit Card Issuance & Processing functions	Solicit RFI (Request for Information) from OpenGIS Membership
18. Operate the Common Technology Process under a Brand name to assure Users of Quality, Integrity & Longevity of Standardized Processes	Internet Access, Content & Users – AOL Financial News – BLOOMBERG Mortgage Processing & Pooling – Fannie Mae Legal Information Search & Analytic Services – LEXIS/NEXIS	***Needs further study based on market metrics reviewed in Step 5***
19. Foster Technologies & Processes that let Association Members build Portals that enable Proprietary Intranet Applications to be publicly accessible through the Internet	CUSIP – Internet Accessible 7 million securities' registrations help automate online brokerage & investment sites Fannie Mae – HomePath.Com SABRE – Travelocity.Com SBICs – Angel Capital Electronic Network	Existing Capabilities Internet OpenGIS
20. Offer Shares to the Public to grow capital base  Alternatively, create a Performance-Based Organization (PBO) within the government to retain & attract quality employees and make the enterprise more flexible and adaptive to market conditions.	Fannie Mae (NYSE: FNMA) US Investigations Service ESOP Federal Student Loan Program (PBO)	Organize a For-Profit entity to perform 6 sustaining functions on behalf of the Association: Internet Portal Development Financing Bulk Procurement Technology Transfer Systems Quality Strategies Legal Solutions  Reconstitute FGDC or an Interagency Spatial Technology optimization team as a PBO
21. Above All, build in support for the Human Factors (management and employee training & consistency)	FAA's Human Factors Initiative across small, medium and large airports SABRE's understanding of how travel industry participants work	Existing Capabilities UCGIS URISA NSGIC