

**The Changing Landscape of Geospatial:
The NSDI
&
Disruptive Technology:
Isn't it Fun!**

JACIE

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Outline of Today's Presentation

- ▶ **The National Spatial Data Infrastructure its Origins and Present Status**
- ▶ **A Non-Scientific Report Card**
- ▶ **Trends in the Industry Influencing the NSDI**
- ▶ **Cloud Computing**
- ▶ **Where do We Need to Focus**

Components of a National Spatial Data Infrastructure (NSDI)

- ▶ **Policies & Institutional Arrangements (governance, data privacy & security, data sharing, business models, data licensure and publicly available data)**
- ▶ **People (training, professional development, career models, job descriptions, certification and licensure)**
- ▶ **Data (digital base map, thematic, statistical, place names, authoritative data and crowd sourced data)**
- ▶ **Technology (sensors, cloud computing, hardware, software, networks, database)**

Anne's impression of the NSDI report card

- ▶ **Technology: A-**
- ▶ **Data: C**
- ▶ **People: C**
- ▶ **Policy and Institutional Arrangements: C--**

Industry Trends and the Changing Landscape

- **Geospatial is an International Business with Global Markets** (large investments in capital equipment, outsourcing to lower cost providers, global demand & economies of scale)
- **Speed of Innovation and Technology Insertion and Adoption** (innovation coming from small startups and new sectors not just the from the large corporations and military)
- **Disruptive Technology Introduction** (The digital camera, the all digital work flow, cloud computing, open source code, crowd sourcing)
- **Professional and Casual Consumer** (location based services market vs mission support of business applications)

Industry Trends and the Changing Landscape

- **The Profession (not just PE's and geographers anymore)**
- **Embedded Technology (integration into the CIO & CTO office, embedded in other application, smart phones)**
- **The Data (where it comes from, who owns it, its accuracy)**
- **Consolidation and Diversification (market forces driving change and opportunity in the industry)**

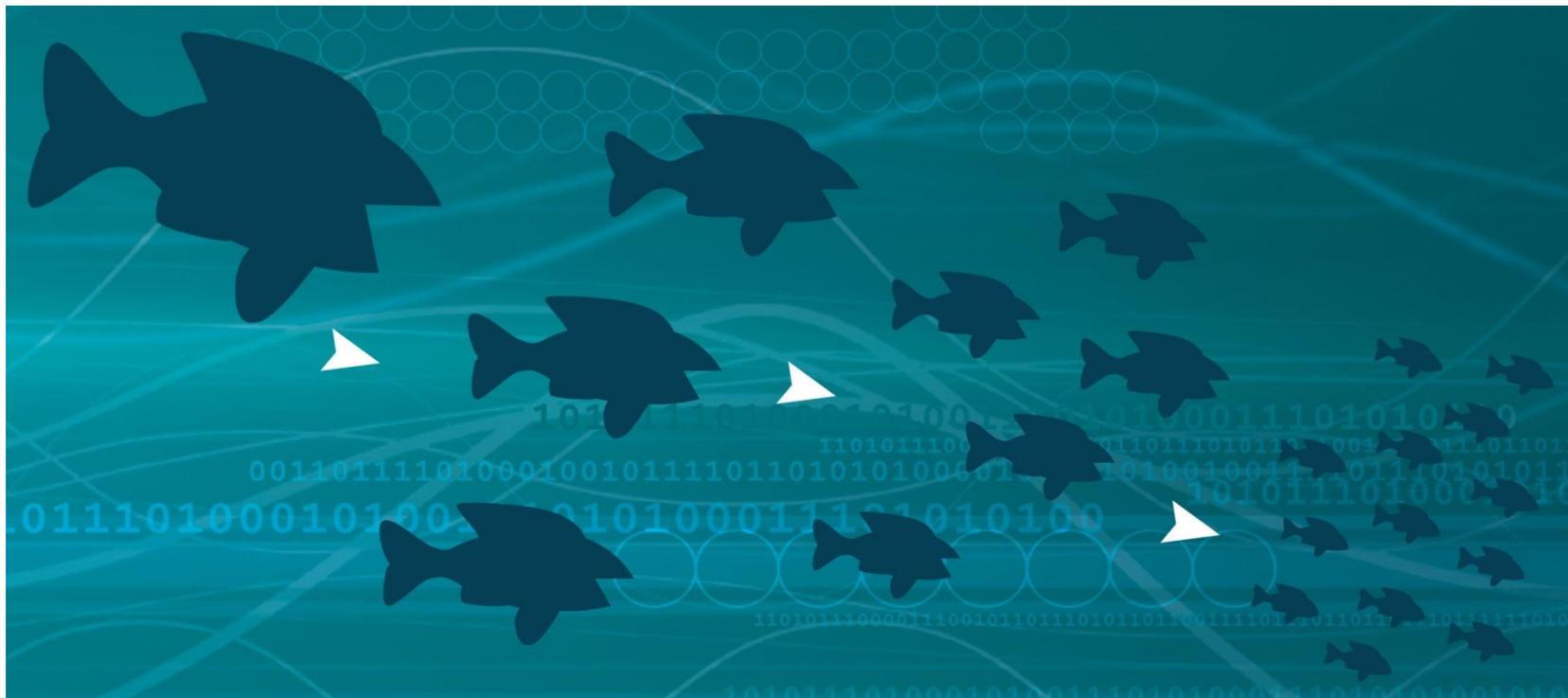
Industry Consolidation and Diversification !

System Integrators

National and International Mapping Firms

GIS Consultants and Service Companies

Google and Microsoft !!!!



Geospatial Hardware & software firms

Satellite & Airborne Mapping Companies

A & E Firms

Believe it or not... just ten years ago ago

**I built them!
I paid for them!
They're MINE!**



C'mon, won't you share your data?



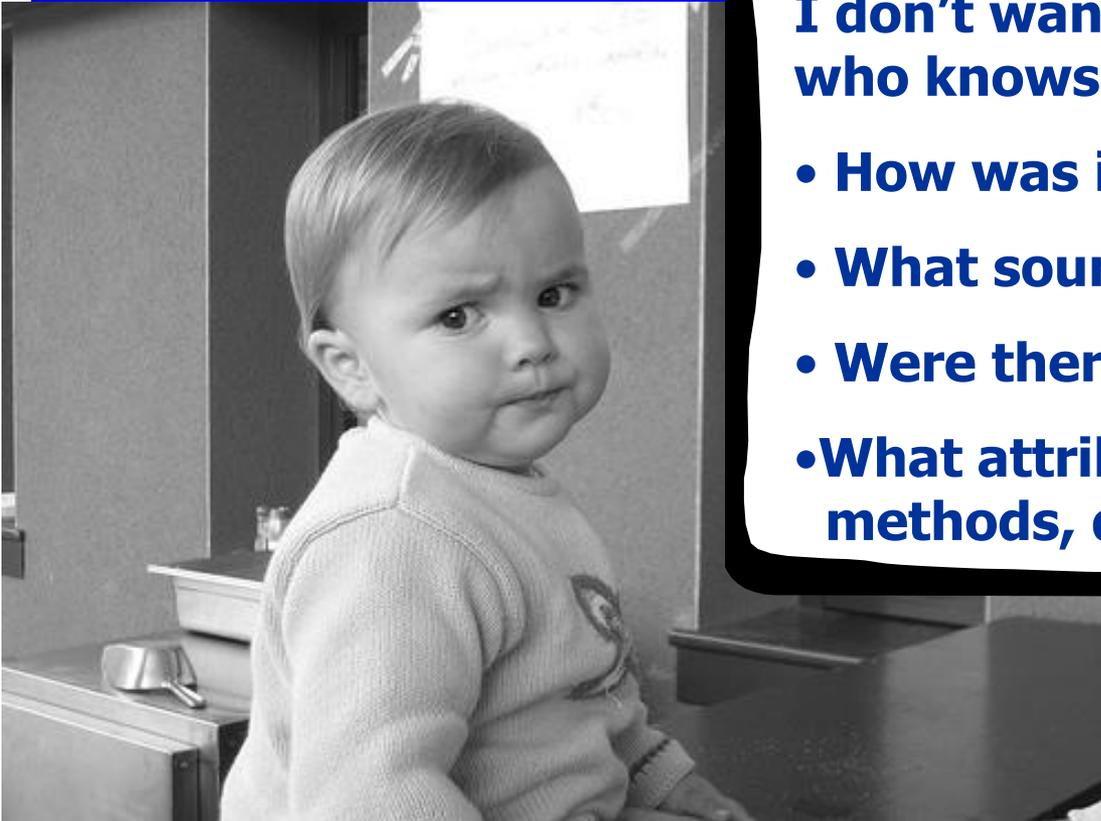
NO! If I share my data, other people will:

- **take credit for it**
- **mess it up**
- **use it for their own good!**

But if you share your data, others will share their data with you...

I don't want their stinky data – who knows where it's been?

- **How was it created?**
- **What sources were used?**
- **Were there field checks?**
- **What attributes, measures, methods, did they use?**



Geospatial Data is Changing, Like Sands Through The Hour Glass...

Federal



State and Local



Private Sector & Volunteer Data



**State and Local
Data Fit for Use?**

**Federal
Data Fit for Use?**

**Fit for Use?
Licensing Restrictions?**

Cloud Computing Service Models

Software as a Service (SaaS)

End-user applications, delivered as a service, rather than on-premises software

Platform as a Service (PaaS)

Application platform or middleware as a service on which developers can build and deploy custom applications

Infrastructure as a Service (IaaS)

Compute, storage, and other IT infrastructure as a service, rather than as a dedicated capability

Data as a Service (DaaS)

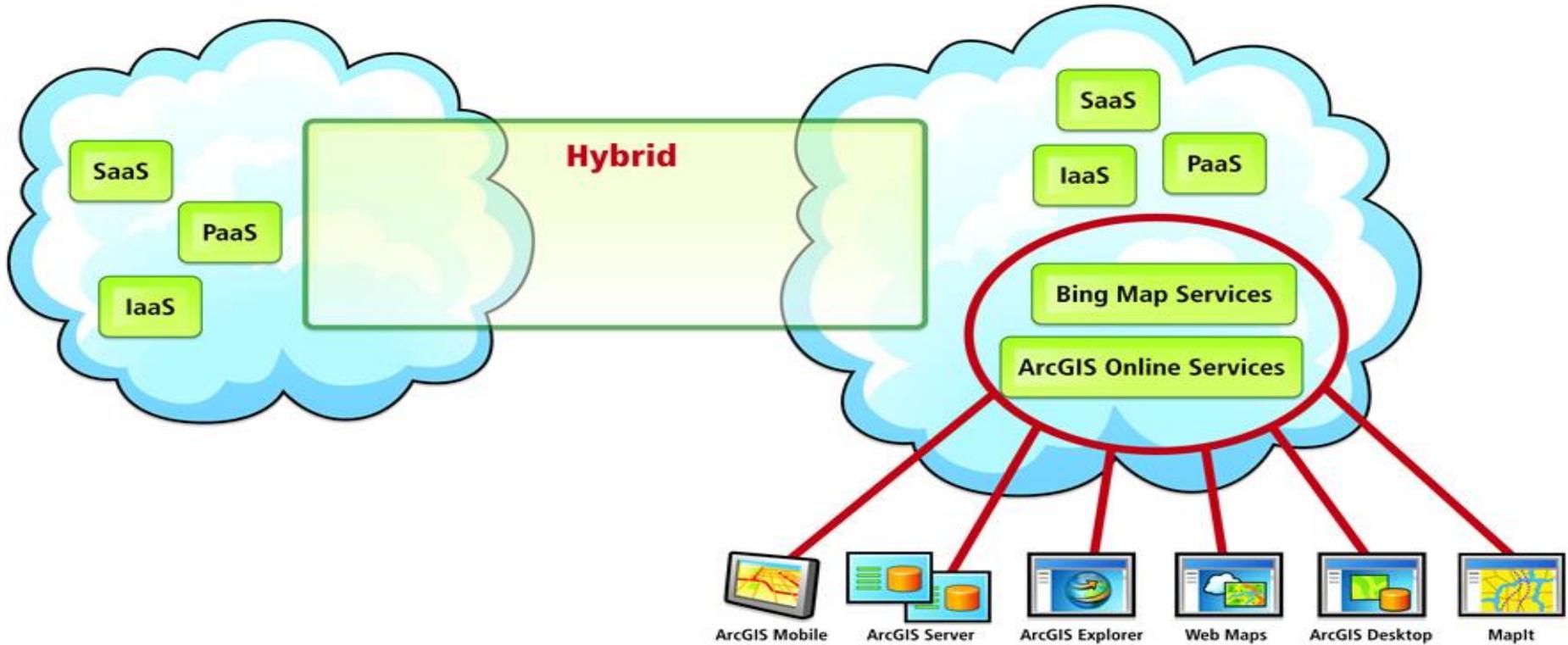
Multi-tenancy system configured to be a pooled and shared resources



Cloud Types

Private Cloud
On-Premises/Internal

Public Cloud
Off-Premises/External



Cloud Computing Enterprise Benefits

- ▶ Provides organizations a way to add/increase services “just-in-time” without investing in new infrastructure, training new personnel, or licensing new software
- ▶ Enables reallocation of Enterprise budgets, assets, and people into primary business/mission areas
- ▶ Supports interoperability and improvements in information sharing, analytics, intelligence, and knowledge management with increased intra- and inter-organizational adoption
- ▶ Supports new value added mission services e.g. Next Gen Analysis



Cloud Computing IT Benefits

▶ Speed-to-Delivery

- Allows new capability development without new infrastructure development
- Supports rapid scalability
- Diminishes constraints of scale and complexity

▶ Cost

- Massive scale leads to true economies of scale
- Reduced complexity leads to improved sustainability and reductions in O&M costs

▶ Information Sharing and Interoperability

- Streamlined data management
- Data availability - enabling information generation

▶ Changing Ecosystem

- Technology inflection point, impacting client buying patterns and introducing highly capitalized non-traditional players into federal IT market e.g. Amazon, Google



The GeoCloud Game

Top Grid Data Services:

Service	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12	Col 13	Col 14	Col 15	Col 16	Col 17
Tax Mapping Property Assessment System	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Building Permitting System	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Parks Management System	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Crim. Analysis Application	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Zoning Application & Mapping System	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Environmental Permitting System	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Management System	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Storm Water Management	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Disaster Information Management System	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Watershed Management System	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Web-Based Geospatial Mapping System	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Data Dissemination Service	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Data Storage Service	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Geocoding Service	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Reverse Geocoding Service	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Data Validation Service	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Map Production/Tracking Service	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2

Service Data Tables:

Service	Data 1	Data 2	Score
Tax Mapping Property Assessment System	Annual/Address Inquiry	Parcel Database	Map Production
Building Permitting System	Annual/Address Inquiry	Land Use Data	Parcel Database
Parks Management System	Demographic Data	Environmental Data	Land Cover Data
Crim. Analysis Application	Demographic Data	Street Address Data	Transportation Data
Zoning Application & Mapping System	Land Use Data	Parcel Database	Transportation Data
Environmental Permitting System	Annual/Address Inquiry	Environmental Data	Watershed Data
Traffic Management System	Traffic Data	Transportation Data	Land Cover Data
Storm Water Management	Elevation Data	Hydrologic Data	Land Cover Data
Disaster Information Management System	Demographic Data	Street Address Data	Transportation Data
Watershed Management System	Environmental Data	Hydrologic Data	Watershed Data
Web-Based Geospatial Mapping System	Annual/Address Inquiry	Street Address Data	Transportation Data
Data Dissemination Service	None	None	Software Database
Data Storage Service	None	None	Software Database
Geocoding Service	Street Address Data	Transportation Data	Software Database
Reverse Geocoding Service	Street Address Data	Transportation Data	Software Database
Data Validation Service	Annual/Address Inquiry	Elevation Data	Software Database
Map Production/Tracking Service	Annual/Address Inquiry	Transportation Data	Software Database

Central Board: National Geospatial Cloud

Tier 1 Infrastructure: 4 slots (1-4). Tier 2 Infrastructure: 6 slots (5-10). Tier 3 Infrastructure: 8 slots (11-18).

Bottom Board: Federal Infrastructure

Services: Annual/Address Inquiry, Demographic Data, Elevation Data, Environmental Data, Hydrologic Data, Land Cover Data, Parcel Database, Traffic Data, Street Address Data, Environmental Control, Weather Data, Software Database, Data Dissemination, Data Storage, Map Production.

Resources: Federal Mission Value Points, Federal Resources.

Right Side: Local Infrastructure

Services: Annual/Address Inquiry, Demographic Data, Elevation Data, Environmental Data, Land Use Data, Parcel Database, Traffic Data, Street Address Data, Environmental Control, Weather Data, Software Database, Data Dissemination, Data Storage, Map Production.

Resources: Local Resources.

What Worked!

- ▶ **The game successfully pointed out the importance of**
 - **Collaboration and sharing**
 - **The varying fidelity of spatial data between federal, state and local agencies**
 - **The opportunity to decrease cost and increase data sharing**
 - **The interdependencies of these data sets in solving real-world geospatial opportunities/problems**
 - **The importance of role-playing to think through and experience complex organizational behavior issues**
 - **The importance of guiding policies and process to facilitate process between and among government agencies**



Geospatial Platform Background

"In 2010 and 2011, Federal data managers for geospatial data will move to a portfolio management approach, creating a Geospatial Platform to support Geospatial One-Stop, place-based initiatives, and other potential future programs. This transformation will be facilitated by improving the governance framework to address the requirements of State, local and tribal agencies, Administration policy, and agency mission objectives. Investments will be prioritized based on business needs. The Geospatial Platform will explore opportunities for increased collaboration with Data.gov, with an emphasis on reuse of architectural standards and technology, ultimately increasing access to geospatial data."

President's Budget, Fiscal Year 2011

Foundation

▶ Definition

The Geospatial Platform will be a managed portfolio of common geospatial data, services, and applications contributed and administered by authoritative sources and hosted on a shared infrastructure, for use by government agencies and partners to meet their mission needs and the broader needs of the Nation

▶ Vision

All government agencies and their partners have access to geospatial capabilities to meet mission needs, ensure transparency and accountability, and geo-enable the business of government

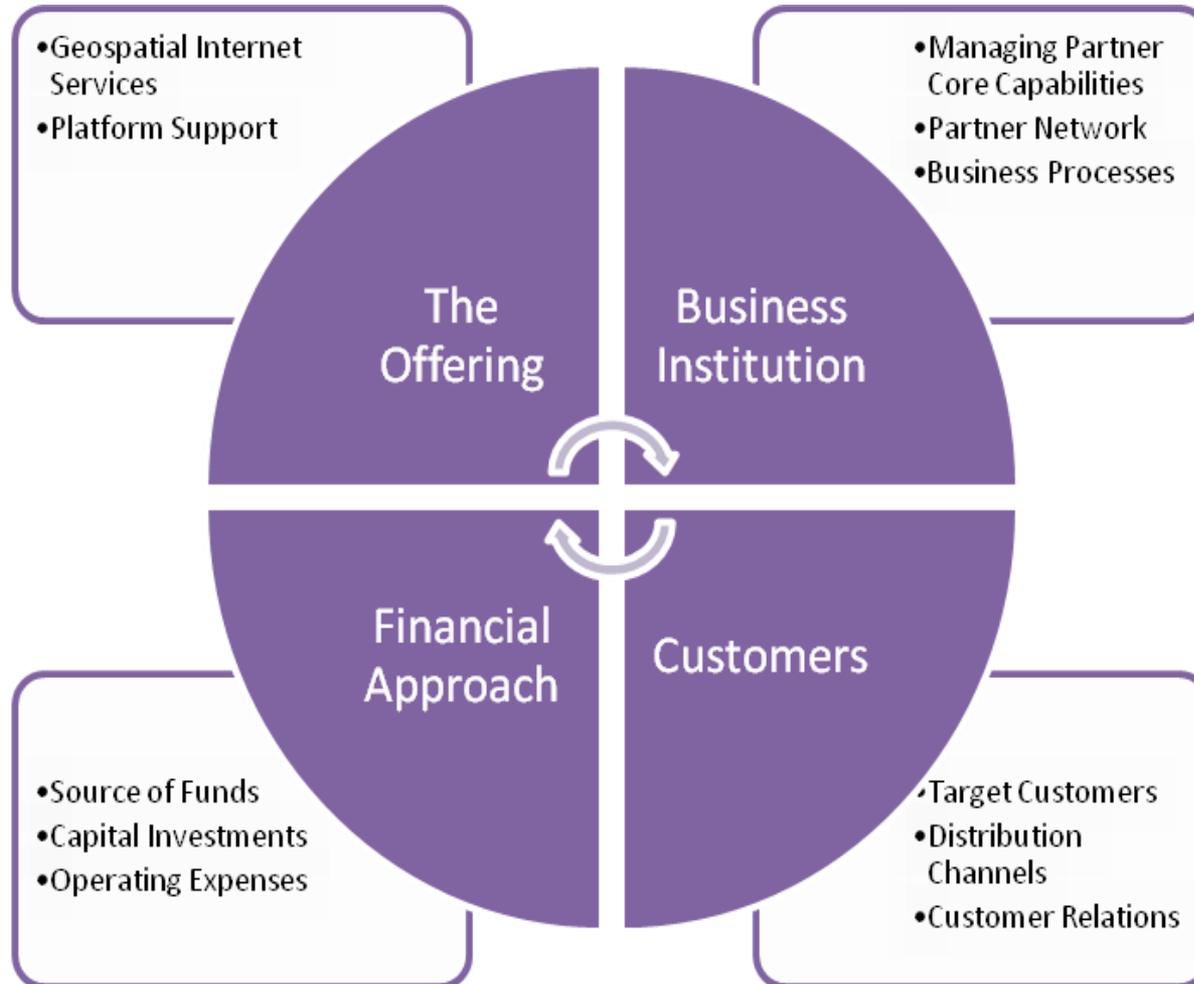
What it Will Take...

Moving Forward

- ▶ **Common Understanding** – shared vision, shared opportunities, and shared commitments
- ▶ **Open Governance** – define a structure where all sectors have a voice and a role, clear and unambiguous policy
- ▶ **Technology** – seize upon advances in geospatial technologies and standards to implement shared vision
- ▶ **Leadership** – identify and cultivate true leaders within the community. Develop the diverse workforce needed to support this multidisciplinary profession

Business Model

Roadmap



What We Could Achieve *Moving Forward*

- ▶ **Open and transparent government with greater collaboration between all sectors**
- ▶ **High quality and timely geospatial data, services and applications, easy to discover and use by all sectors of the economy**
 - **Global Climate Change**
 - **Green Energy**
 - **More efficient business operations**
 - **Etc.....**

What We Could Achieve *Moving Forward*

- ▶ **Enhanced shared infrastructure and interoperability**
- ▶ **Attain cost-savings and economies of scale through collaborative**
- ▶ **Expand the geospatial marketplace and industry**
- ▶ **Ensure U.S. maintains global competitiveness in the geospatial field**

Where we need to focus *Moving Forward*

- ▶ **Science to support decision making**
- ▶ **Develop a National Geospatial Policy that is inclusive of GIS and Remote Sensing activities**
- ▶ **The Business Model!!**
- ▶ **Public & Private sector collaboration**
- ▶ **Get out of the IT business**

Questions?
Thank You

- ▶ The future of imagery, remote sensing, products, and science.
- ▶ Future (5 – 10 years) technology trends for remote imaging, data collection, archiving and access. The strong need for quality imagery and Remote Sensing data in the science community.
- ▶ The value of imagery and remote sensing in support of the global earth observation community and the importance of understanding fundamental climate variables to support societal benefit areas.
- ▶ The positive connection between Remote Sensing and science.
- ▶ The value of civil and commercial remote sensing programs, systems and data. The value of joint agency imagery collaboration, such as JACIE, to insure the collection and use of quality data in the science community.
- ▶ The pro and cons to the National Commercial Remote Sensing Space Policy.
- ▶ Government's continued need for commitment to continuing and expanding the imagery role in the community.
- ▶ The need for integrated data collection.

▶ Image processing and storage capabilities and the doors that these technologies