Request for Information on Disasters Concept Development Study

Architecture, Data, Services, Requirements & Constraints

RFI Issuance Date: February 28, 2018
Response Due Date: March 30, 2018

1. Abstract

This Request for Information (RFI) is part of an OGC Innovation Program Project "Disasters Concept Development Study and Pilot (Disasters CDS and Pilot)". Sponsored by the Department of Homeland Security, US Geological Survey (USGS) and the partnering agencies of the Federal Geographic Data Committee (FGDC). The goal of the Disasters CDS and Pilot is to demonstrate to stakeholders the diversity, richness and value of a Spatial Data Infrastructure (SDI) – specifically data, analysis and associated IT services including web services - in addressing needs of the full Disaster lifecycle, including the preparation, response, recovery, and mitigation phases.

The motivation for issuing this RFI is to gather information to better support governments, agencies, non-governmental organizations and citizens to prepare for, respond to and recover from a disaster. The RFI results will provide information on the current state of the geospatial infrastructure(s) for disaster management. In addition, analysis of results to assess interoperability, availability and usability of geospatial Web services and tools across different types of disasters along with identification of gaps, and definition of core components of SDI to support disasters will be used to define reference use-cases and scenarios for use in future pilot activities.

Results of the RFI responses will be analyzed and documented in a report that will serve as the basis for improvement of SDIs' to support Disaster Management. RFI responses will be discussed with potential sponsoring organizations that will provide funding opportunities for the Disaster Pilot(s) initiatives planned for later this, and in subsequent, years. Pilot(s) will advance the utility of the FGDC-governed *GeoPlatform* as a broad mission support and information delivery capability of the Nation's SDI — a resource that can support disaster-related mission execution. The Pilot(s) will raise stakeholder awareness and knowledge of the GeoPlatform's collaborative utility by assessing, improving, and applying its utility to real-world use cases, applicable to numerous disaster stakeholders and addressing the full disaster event lifecycle.

Responses to the RFI are requested by March 30, 2018. This RFI includes instructions on how organizations can respond to and submit questions about the RFI.

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3. Background

Multiple jurisdictions across expansive regions are spending increasing time and resources to prepare, protect, and assist communities and citizens for response and recovery from major disaster events including hurricanes, earthquakes, flooding, disease outbreaks, extended drought, and wildfires to name a few. To avoid or minimize disaster impacts, a coordinated ability to understand changing conditions, efficiently deploy resources, and gain maximum value from multiple levels and types of responders requires effective coordination policies and practices as well as current and often near real time data of known quality – much of which is location-based or geospatially enabled information from a range of sources. Many local, national and regional jurisdictions have adopted common Spatial Data Infrastructure (SDI) policies and best practices to support the sharing and exploitation of important location and condition information, and to support rapid adoption of new geoinformation sources and technologies. However, in reality, these policies and practices are inconsistently implemented and coordinated which has limited the ability of valuable information and tools to be shared and used to address critical challenges such as disasters.

Per the FGDC, the National SDI encompasses the policies, organizational responsibilities, data, information, technologies, standards, services, and financial and human resources necessary. The NSDI has become a critical vehicle for facilitating seamless data development, information sharing, and collaborative decision-making across multiple sectors of the economy.

Geospatial information has been proven effective in supporting both the understanding of and response to disasters. The supported activities include identifying at-risk areas by building scientific models and analyzing historical data, assessing damage and coordinating response teams using near real-time imagery and data in the wake of a crisis, and a myriad of other applications.

The ability to effectively share, use, and re-use geospatial information and applications across and between governments and Non-Government Organizations (NGOs) in support of disaster response and resilience is dependent upon having a SDI already in-place when disaster strikes. Figure 1 below presents an example of a U.S. Geospatial CONOPS for Disaster preparedness, this CDS and resultant Pilots are expected to connect Geospatial communities across all operational tiers to bring together requirements for data, tools and services required for effective disaster management. Figure 2 from Natural Resources Canada below presents an example that shows the key aspects of an SDI. Figure 3 from U.S. FGDC shows the National SDI —*GeoPlatform architecture*, which is a resource that can be used in natural disasters.

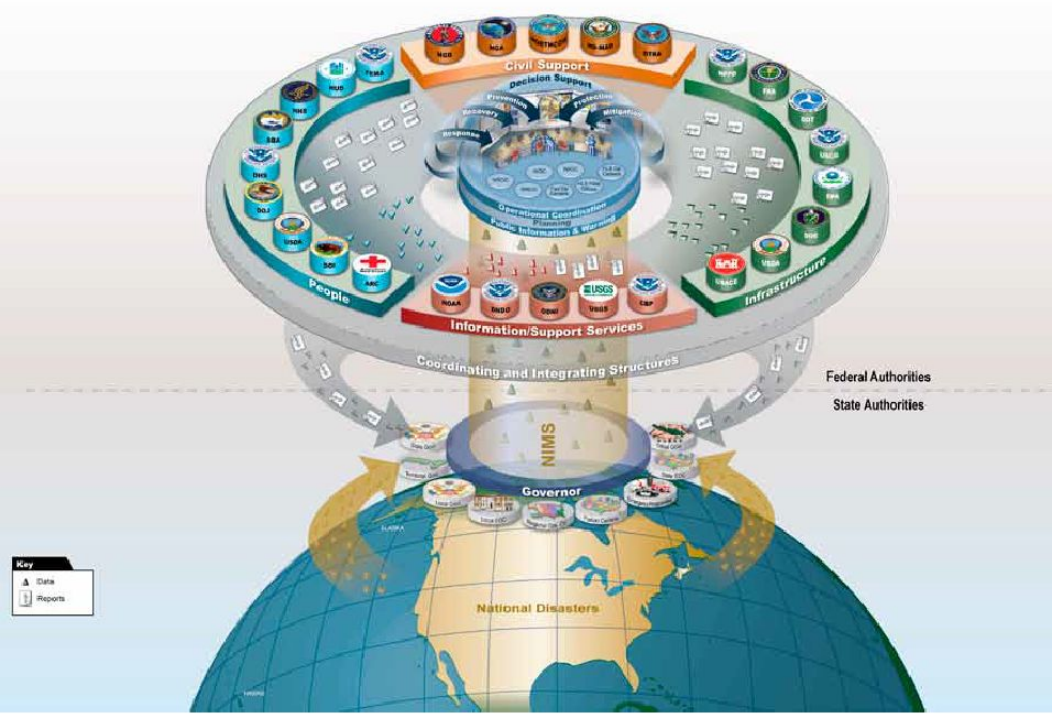

Figure 1: Disasters Geospatial Concept of Operations: Department of Homeland Security, USA

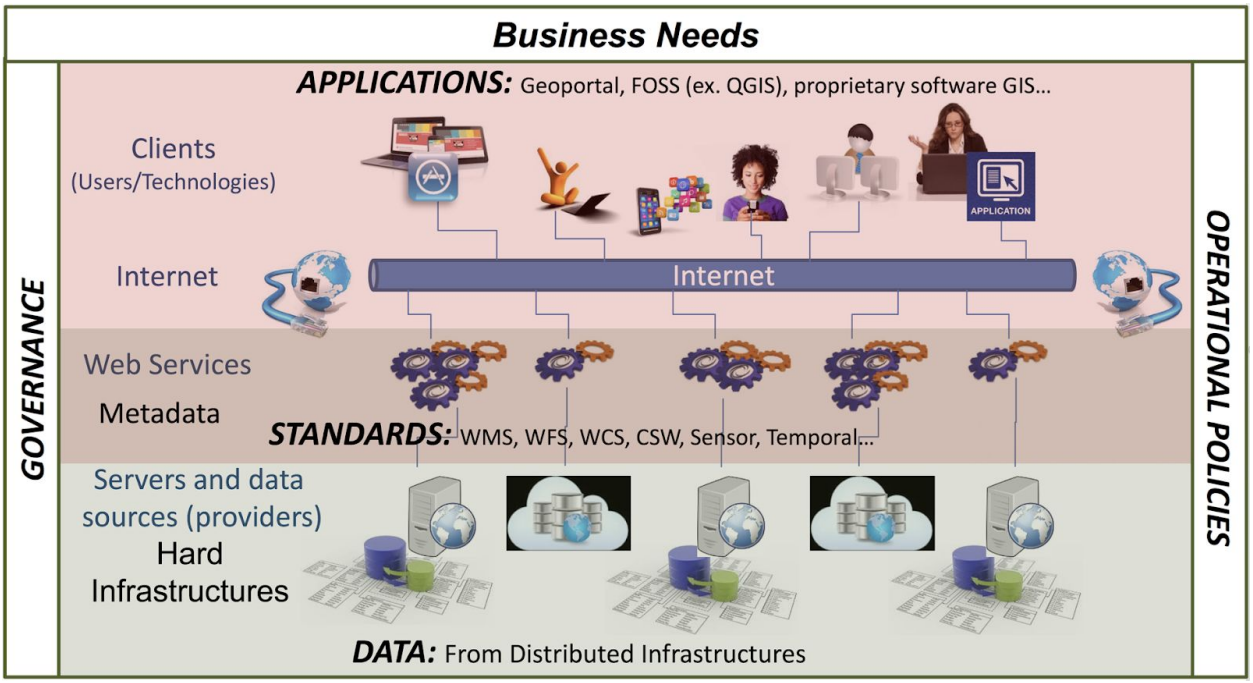

***Figure 2. Aspects of an SDI** (Source: Natural Resources Canada)*

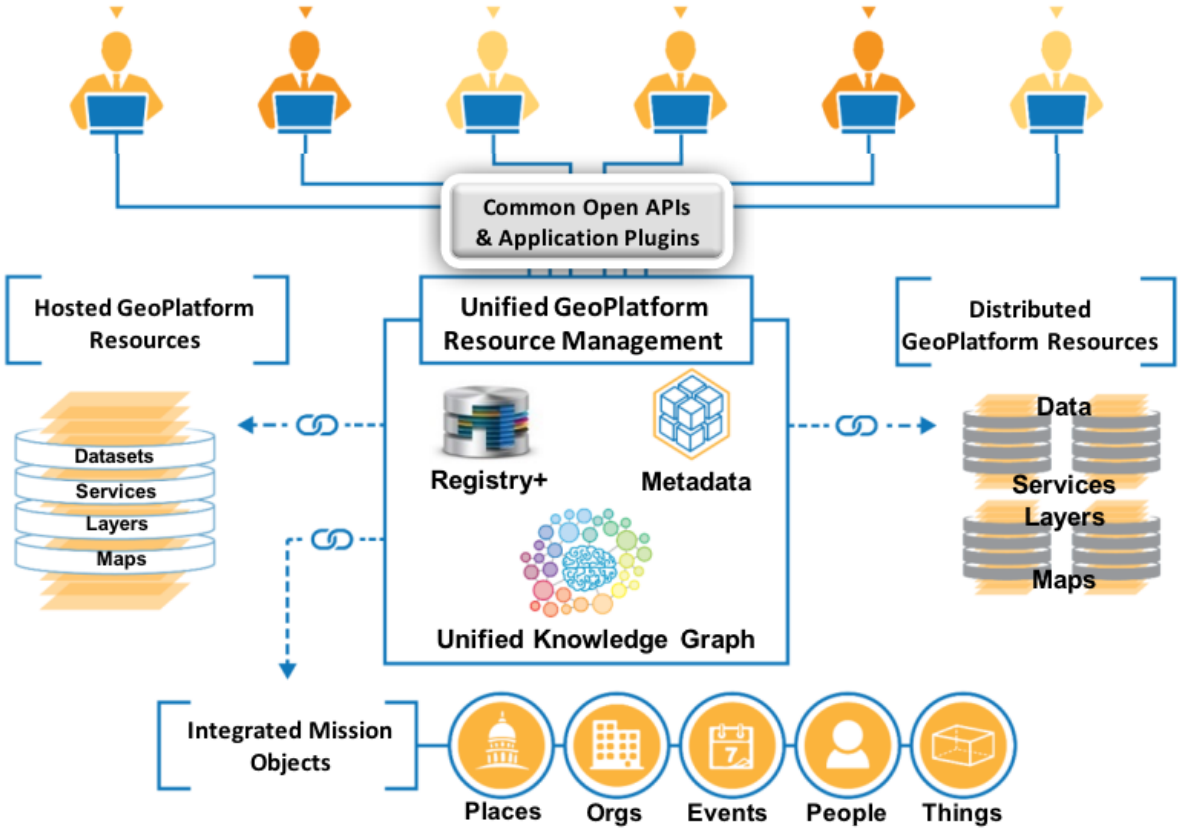

Figure 3. US National Spatial Data Infrastructure — GeoPlatform Architecture

Several recurring challenges are common in disaster events:

- Lack of an integrated policy and operational framework to facilitate rapid acceptance, qualification, ingest and use of relevant geospatial information from a range of government, commercial providers and citizens.
- Inability with existing metadata approaches to quickly discover and understand which information sources are most useful in the context of a user's need.
- Inability to properly fuse and synthesize multiple data sources locally to derive knowledge necessary for rapid disaster response decisions.
- The need for a persistent platform to organize and manage disaster related geospatial information and tools necessary for collaborating organizations to address the full disaster lifecycle – preparedness, response and recovery.

4. Disaster Concept Development Study and Pilot

The OGC's Disasters Interoperability CDS will assess the current state of data and product exchange practices and technologies as used in disaster planning, response, and recovery. The

information gained in the CDS will aid in developing a series of future pilots that will in turn advance the state of SDIs that support disaster risk reduction across the globe. The overall Disasters project is being executed in **two phases**:

Phase one: OGC Concept Development Study (CDS) will bring together diverse stakeholders from the global disasters community to assess the current state of SDI components for the use of disasters. The study will document data exchange technologies, develop an inventory of available geospatial Web services across different types of disasters, define the core components of a SDI architecture, and define use-cases and scenarios for future disaster pilot(s) as part of phase two. This request for information (RFI) is part of phase one, used to gather the knowledge from disasters stakeholders and contributors.

Phase two: Pilot(s) will be an OGC initiative with active involvement by several OGC member organizations. The goal of Phase 2 is to articulate the value of interoperability and to demonstrate the benefits of standards through piot(s) and demonstrations. This will be done by piloting a recommended SDI architecture to support Disasters and developing demonstrations.

The Pilot(s) will support future SDI enhancements by:

- Gathering requirements on different portions of a common SDI architecture to support disasters.
- Explaining an SDI architecture concept, technology and its application to support disaster stakeholders.
- Making more data available.
- Analyzing consistent and long term retainability practices for disasters related material.
- Complementing it with clients, tools, and applications that allow efficient use of disasters SDI data, processing resources and long term storage capabilities.

5. RFI response outline

Stakeholders interested in responding to this RFI should respond to the following questions **as applicable** to your role or experience. You may also submit any documents you feel are applicable to this RFI:

5.1. Stakeholders

5.1.1. What organization are you affiliated with and what is your role in a disaster? (e.g. Emergency Responder, Flood Manager, GIS Analyst, Scientist etc.)

5.1.2. Are you a provider (e.g. data, tools, applications, services)?

5.1.3. How do you collaborate during the preparation, response and recovery phases?

5.1.4. Who are the key stakeholders you interact from local to international levels?

5.1.5. Who are additional stakeholders that you should interact with and participate during a disaster event?

5.1.6. How would you propose getting more stakeholders involved?

5.2. Architecture

5.2.1. How well does the NSDI for your location meet your needs for disasters?

5.2.2. What do you think should be the key technology components (e.g., standards, networks, clients, web services, data storage) of an SDI to support disasters?

5.2.3. What do you think is the best way to support the National SDI architecture for disasters?

5.2.4. Does your organization have a disaster plan? If so please provide a reference to the plan.

5.2.5. What are the key geospatial standards you use to access data and services?

5.3. Data

5.3.1. What data sets, available to you, should become part of an SDI to support disasters?

5.3.2. What data sets do you provide that should become part of a National SDI architecture for disasters?

5.3.3. What data is currently missing that is needed and should be made available or developed?

5.3.4. Are there any global, regional, national or local datasets that you rely on for disaster management?

5.3.5. Is the data you require “analysis ready” or “fit for use”? Available in the formats you require? Are the datasets updated in the time interval that meets your needs?

5.3.6. Are there adequate tools for your analysis of data?

5.3.7. Are the tools or data you have only accessible to limited, experienced people or general populations?

5.3.8. Do you use models, and if so, how?

5.4. Requirements

5.4.1. What requirements, (including constraints) do you experience that should be considered for future design and development National SDI architecture for disasters?

5.4.2. Are there sufficient tools available to help you meet your requirements? Please describe any performance issues you may experience during a disaster event? If so what are the issues?

5.5. Scenarios and Use Cases

5.5.1. What scenarios and use cases would you like to recommend as part of future Pilot Activities?

5.6. Operation & Organization

5.6.1. What policy, organizational, and administrative challenges do you have that must be addressed to improve a National SDI architecture for disasters?

5.6.2. Are there unique needs that need to be considered at various levels of disaster operations (local, state, regional, national, international levels, and by various players (government, commercial, NGO, academia/research)?

5.7. Technologies & Applications

5.7.1. Are there other national, regional or topical portals that can be used to support disaster that are currently available and serve your needs? How might they be improved?

5.7.2. What other type of applications, tools, and services do you believe should be developed or integrated as part of the National SDI architecture for disasters?

5.8. Other Factors

5.8.1. What other success factors or considerations do you see as needed for a successful National SDI architecture for disasters?

Readers of this RFI are encouraged to respond with recommendations for the aspects listed above or any additional procedures, technology, data, borderline conditions, or open standards issue that you think should be considered for National SDI architecture for disasters. The

recommendations can address needs of any phase of the Disaster lifecycle, including the preparation, response, recovery, and mitigation phases.

6. Organizations issuing this RFI

The **Department of Homeland Security** **(DHS)** provides the coordinated, comprehensive federal response in the event of a terrorist attack, natural disaster or other large-scale emergency while working with federal, state, local, and private sector partners to ensure a swift and effective recovery effort.

US Federal Geographic Data Committee (**FGDC**) The FGDC is an interagency committee to promote the coordinated use, sharing, and dissemination of geospatial data on a national basis. The FGDC is composed of representatives from 32 Cabinet-level and independent Federal agencies.The FGDC is an organized structure of Federal geospatial professionals and constituents that provide executive, managerial, and advisory direction and oversight for geospatial management and policy across the Federal government.

As the largest water, earth, and biological science and civilian mapping agency of the United States, the **U.S. Geological Survey** (**USGS**) collects, monitors, and analyzes data and information, and provides scientific understanding about natural resource conditions, issues, and problems. The diversity of its scientific expertise enables USGS to carry out large-scale, multi-disciplinary investigations and provide impartial scientific information to resource managers, planners, and other customers.

The **Open Geospatial Consortium** (**OGC**) is an international consortium of more than 500 companies, government agencies, research organizations, and universities participating in a consensus process to develop publicly available geospatial standards. OGC standards support interoperable solutions that "geo-enable" the Web, wireless and location-based services, and mainstream IT. OGC standards empower technology developers to make geospatial information and services accessible and useful with any application that needs to be geospatially enabled. OGC has planned and completed over 100 initiatives – testbeds, pilots, and experiments – designed to join the public and private sectors in hands on collaborative development, testing, prototyping and demonstration of enhanced or new interoperable, standards-based approaches. Recommendations from these initiatives become new or revised open standards and best practices which help to improve decision making, reduce the time and cost in mobilizing new capabilities, and to save lives and minimize the impact to property and the environment.

7. Responding to this RFI

7.1. General terms and conditions

Responses to this RFI are due by March 30, 2018, as listed in the Master Schedule (see Section 8). Responses will be distributed to members of the organizations listed in section 1. Submissions will remain in the control of this group and will be used for the purposes identified in this RFI. A summary of the RFI Responses may be made public. If you wish to submit proprietary information, contact (techdesk@opengeospatial.org) in advance of sending the response.

7.2. How to transmit a response

Send your response in electronic version to the OGC Technology Desk (techdesk@opengeospatial.org) by the submission deadline. Microsoft® Word format is preferred, however, Rich Text Format, or Adobe Portable Document Format® (PDF) are acceptable.

7.3. RFI response outline

A response to this RFI shall respond to as many applicable aspects defined in section 5 as possible. No particular format is required, but any response should be structured in a way that allows understanding of the respondents' position on key aspects as listed in Section 6: stakeholders, architecture, data, scenarios & use cases, requirements & constraints, operation & organization, and applications & technologies. Respondents are free to add any additional topic as they think appropriate.

7.4. Questions and clarifications

Questions and requests for clarification should be sent to techdesk@opengeospatial.org.

Questions received as well as clarifications from the RFI developers will be posted publicly at the Disasters CDS web site: http://www.opengeospatial.org/projects/initiatives/disasterscds

7.5. Reimbursements

The organizations issuing this RFI will not reimburse submitters for any costs

incurred in connection with preparing responses to this RFI. Cost share opportunities should arise from the Request for Quotation described in the abstract of this document, during the follow-on Pilot activity.

8. Master Schedule

The following table details the major events associated with this RFI and the follow-on Pilot.

Activity/Milestone	Date
RFI issued	February 28, 2018
RFI responses due	March 30, 2018
1st Planned Workshop	March 2018
2nd Planned Workshop	April 2018
RFI result publication	June 2018
Disasters SDI Pilot RFQ Release	August 2018

9. Glossary

CDS: Concept Development Study
FGDC: Federal Geographic Data Committee
NSDI: National Spatial Data Infrastructure
OGC: Open Geospatial Consortium
OMB: Office of Management and Budget
RFI: Request for Information
RFQ: Request for Quotation
SDI: Spatial Data Infrastructure
USGS: US Geological Survey
NGDA: FGDC National Geospatial Data Assets

10. Reference Documents and Resources

U.S. Department of Homeland Security	https://cms.geoplatformhttps://cms.geoplatform.gov/geoc

GeoConops	onops/geoconops-home.gov/geoconops/
Geospatial Concept of Operations for Emergency Management for the Canadian Safety and Security Community	http://cradpdf.drdc-rddc.gc.ca/PDFS/unc199/p800827_A1b.pdf
Sendai Framework for Disasters Risk Reduction	http://www.unisdr.org/we/coordinate/sendai-framework
International Disaster Charter	https://disasterscharter.org/web/guest/home;jsessionid=F83F387AE66444AD6192DF9CDC62C9EB.jvm1
U.S. GeoPlatform	https://www.geoplatform.gov
USGS Emergency Operations Portal	https://hdds.usgs.gov/
Federal Emergency Management	https://www.fema.gov/openfema
OMB A-16 Circular	https://www.fgdc.gov/policyandplanning/a-16/circular-A-16.pdf
OMB Circular A-16 Supplemental Guidance	https://www.fgdc.gov/policyandplanning/a-16/omb-circular-a16-supplemental-guidance
FGDC National Geospatial Data Asset Portfolio Management	https://www.fgdc.gov/what-we-do/manage-federal-geospatial-resources/a-16-portfolio-management/index_html
Stages of the Geospatial Data Lifecycle pursuant to OMB Circular A–16, sections 8(e)(d), 8(e)(f), and 8(e)(g)	https://www.fgdc.gov/policyandplanning/a-16/stages-of-geospatial-data-lifecycle-a16.pdf