Delhi Transit Routing Interoperability Pilot (DTRIP)

Call for Sponsorship and Participation (CFS/P)

CFS/P Issuance Date: 09 September 2008

Response Due Date: 10 October 2008

DTRIP Kickoff Workshop: 04-07 November 2008

Preface

This Call for Sponsorship and Participation (CFS/P) seeks participants in the Delhi Transit Routing Interoperability Pilot (DTRIP). A Pilot is a collaborative effort that applies open standards for interoperability to achieve user objectives in an environment of operational use.

Outcomes include best practices and interoperability arrangements suitable for an operational capability. An aim of the Pilot is to reach consensus on architectural elements that initiatives supporting geospatial information systems can carry forward into operations, thereby increasing the overall level of interoperability.

This Call for Participation invites organizations to:

- Participate in the collaborative development of scenarios to guide testing, demonstrations and operations of the identified interoperable services.

- Provide services relevant to transportation and routing activities; where those services are deployed consistent with the OGC architecture based on Interoperability Arrangements. Participate in interoperability testing to confirm the architecture and,

- Contribute to the refinement of the architecture and interoperability arrangements.

Participants in DTRIP will also sponsor the Pilot in the amount of US $5,000. In certain cases of hardship this requirement may be waived.

To be most effective organizations responding to the CFS/P should plan to fully participate in the Pilot development activities beginning with the Kickoff Workshop.

TABLE OF CONTENTS

1 Introduction

1.1 Purpose

This Call for Sponsorship and Participation (CFS/P) seeks organizations to participate in the Delhi Transit Routing Interoperability Pilot (DTRIP). Since the Pilot will address interoperability and user support in the broadest manner, broad participation is encouraged in order to achieve the Pilot's objectives on a voluntary basis. All organizations interested in participating in the Pilot shall respond to this CFP. Instructions for responding are provided in Section 3.

1.2 The CFS/P Process

The CFS/P Process is part of a Development Process for Interoperability Initiatives. The DTRIP Development Process is defined in Annex A . The DTRIP Information Architecture is defined in Annex B.

The Process for the Pilot has been defined using the Open Geospatial Consortium's (OGC's) Interoperability Program process. The OGC Interoperability Program is a global, collaborative prototyping program designed for rapid development of implementations and specifications for geospatial interoperability.

1.3 Master Schedule

The following table details the major events associated with this CFP:

CFP Issued	09 September 2008
CFP Response Due Date*	10 October 2008
Kickoff Workshop in Delhi, India	04-07 November 2008
Status and Interim demonstration to Map World Forum, Hyderabad, India	08-10 February 2009
Final Demonstration	April 2009

*Responses received by this date will be used to prepare for the Kickoff Workshop.

2 Context

The area under consideration for the project encompasses the Delhi metropolitan area, known as the National capital region (NCR). Official documents point out NCR to be consisting of concurrence of the National Capital Region (NCT) Delhi along with the constituent States of Haryana, Rajasthan and Uttar Pradesh with a total area of 30,242 sq. km. (http://ncrup.up.nic.in/). National Capital Region of Delhi (NCR Delhi) is estimated to be the home to about 17 million people and has a good

mixture of both urban and rural areas. Large-scale migration from all parts of the country and growing commercial activity has forced mega-scale infrastructure investments in this area including transportation, water supply and power distribution.

Delhi, like any other major city, has significant reliance on its transport infrastructure. The city has a developed and complex public transport system, which is undergoing rapid modernization and expansion. The population in Delhi is highly mobile and road transport has been the dominating mode of getting across from one place to the other. Important organizations in this regard include:

- Delhi Transport Corporation (DTC), which plans and operates buses on different routes. A total of over 3000 buses (including GPS enabled ones) are the arterial lifeline of public transport.

- The Delhi Metro Rail Corporation (DMRC), which provides alternative transportation through rail-lines running across different parts. GPS equipped feeder buses operate to and from the metro stations to different parts of region around the metro station.

- Other important transportation organizations include the Northern Railways division of Indian Railways, UP State transport and Haryana State Transport Corporations. Private call-taxi companies also operate in the region.

There are 55 lakh (5.5 million) registered vehicles in the city, which is the highest in the world among all cities (within municipal limits), while the Delhi metropolitan region (NCT Delhi) has 112 lakh (11.2 million) motor vehicles, again highest in the world among all metropolitan regions. Delhi and NCR lose nearly 42 crore (420 million) man-hours every month while commuting between home and office through public transport, due to the traffic congestion. Therefore serious efforts, including a number of transport infrastructure projects, under way to encourage usage of public transport in the city, most of which have been successful. While such efforts are in place, no system is envisioned to bring a unified system that can give timely, accurate and up-to-date information to the commuters in real-time. While such systems are already in use or planned by the transport organisations, a unified system is to be worked upon that also has the geographical aspect embedded.

Geospatial data is core to all planning and operations. These include both non-real time information (Topographic maps, road networks etc) as well as real-time information (GPS feeds, sensor data etc). Such data and the applications that use them are utilised often within the government to provide citizen services such as a call centre for disaster management or long-term transportation planning of the region. Online routing engines available to citizens over the web are also dependent on the availability of such data.

3 CFP Response Terms and Conditions

Documentation submitted in response to this CFS/P will be distributed to many organizations and may be posted on a publicly accessible web site. Responders shall not include information in their responses for which they are not authorized to distribute. Proprietary and confidential information must **not** be submitted under this request. **It will be assumed that CFP responses do not contain confidential information.**

This CFS/P does not offer compensation to organizations preparing responses. The CFS/P does not offer funds to any organizations for participation in the Pilot. Participants will commit to sponsor the Pilot in the amount of US $5,000. In certain cases of hardship this requirement may be waived.

Submit an electronic copy of your CFS/P response to the OGC Technology Desk (techdesk@opengeospatial.org). Portable Document Format is preferred; however, Rich Text Format or Microsoft Word® (2000 for Windows, 2001 for Macintosh, or higher format) are acceptable.

Proposals must be received no later than the date and time in Master Schedule (Section 1.3).

Questions and requests for clarification should be sent electronically to the OGC Technology Desk (techdesk@opengeospatial.org).

4 CFS/P Response Format and Content

4.1 Response Outline

Responses should follow the following outline:

- Cover page
- Overview
- Proposed Contributions
- Description of Responding Organization

4.2 Cover Page

Provide the name(s) of the responding organization(s). Teams of organizations should list the names of all organizations. It is encouraged that organizational logos are included on the cover page. .

4.3 Overview

Provide a one-page introduction to the contents of your proposal and its benefits.

4.4 Proposed Contributions

Describe your proposed contribution to the Pilot based on your desired role. Justify your approach. If you plan to contribute components and services, please include the following in your response:

- Descriptions of components and services to be developed,

- Agencies you expect to partner with to deploy the components and services,

- Relationship of the components and services to the architecture in Annex B (comments to support the refinement of the Annex B architecture are encouraged).

- Support of open standards by the services, with explanation of use in this Pilot, as well as multiple-use potential outside of this Pilot,

- Performance capability of the components including typical traffic (hits per hour) that the components support, and

- Availability of the components for participation in the Pilot activities including persistence.

4.5 Description of Responding Organization

Provide a brief description of responding organization including its relationship to the Pilot Initiative, e.g., Sponsor, Software Participant, or Data Provider.

Describe the Organization's approach to supporting the Pilot including identifying the human and system resources to be assigned to participate in the Pilot.

Provide contact information for both a Programmatic Contact and for a Technical Contact. The contact person may be the same for Programmatic and Technical contacts.

Annex A – Development Plan

1   Overview

This Annex to the Call for Participation (CFP) describes the development plan for the Pilot initiative.

The procedures in this annex are an application of the OGC Interoperability Program procedures for a Pilot Initiative. More information can be found here: http://www.opengeospatial.org/ogc/policies/ippp

2   Pilot development process

A Pilot Initiative is where open standards can be "stress tested" and perfected based on real-world application and experience. While some research may be done during a pilot in terms of refining, documenting, and distributing specifications and in terms of developing prototypical software that exercises the refined specification, this research is directed at improving existing specifications rather than in creating new specifications.

The general approach to performing one of phase of the pilot is to go through a five-step process (Figure 1). The details of these Tasks are explained below.

B.1.1.

Figure 1 – Steps of a Pilot Phase

2.1 Concept Development

The Concept Development phase results in an architecture, requirements and a plan sufficient to develop a Call for Participation in the Pilot Initiative. The OGC Interoperability Program Team (IP Team) has executed the Concept Development stage, which has resulted in this Call for Participation.

2.2 Call for Participation

Phase B of a Pilot is to release a Call for Participation (CFP) and to receive and evaluate responses to this CFP. The desire is that multiple organisations will submit proposals that explain the technical contribution they intend to make, how their contribution maps to the architecture, and the contributions they will make to the initiatives.

The following guidelines are provided to organizations for developing a CFS/P response:

- Annex B is the initial baseline for the Pilot Initiative. The relationship between the content of the response and Annex B should be noted by the Responding organizations. Responses need not address the full spectrum of the architecture as outlined in Annex B. Responses can focus on specific portions of that architecture.

- Responding organizations should plan on performing all development work at their own facilities. These facilities should include a server (where applicable) that is accessible to other Pilot participants via the Internet. Testing will be carried out among the participants based on these Internet-accessible servers.

- Responding organizations should be prepared to build interoperable components and thus should be prepared to cooperate with all selected development teams, regardless of whether individual proposals covered the full pilot architecture or portions of it.

- Software components developed in the initiative should either be based upon currently operational components, or should be prototypes or pre-release versions of components that the responding organization intends to deploy.

- Responding organizations must participate in the full course of interface and component development, test and integration experiments, and other essential activities throughout the initiative in order to have access to and participate in demonstration exercises.

- Responding organizations shall respond using the outline for responses.

Organizations should plan to send at least one technical representative to the Kickoff meeting. Dates for the Pilot events are provided in 1.3 Master Schedule.

2.3 Kickoff activities

The IP Team will review responses and update the architecture and plan for the kickoff meeting. All responding organizations should assume that their responses are accepted for participation in the Pilot unless they are notified otherwise. The IP Team will also work with Initiative Sponsors to develop an agenda for the Kickoff.

One goal of the Pilot Kickoff is to obtain consensus on the work plans by all stakeholders in the initiative.

The Kickoff meeting will address two development activities in the Pilot process: (1) component interface and protocol definitions, and (2) demonstration scenario development. The development activities will interact and affect each other, and the interaction will be iterative. During the Kickoff, both activities will be jump-started using the preliminary architecture and other assets that participants bring to pilot. Participants will be asked to volunteer to address any perceived shortfalls.

An additional product of the Kickoff meeting will be a development schedule that defines specific milestones. These milestones will include component-to-component interactions across the interfaces under development, and component insertion into demonstration scenarios. Among the milestones will be Technology Integration Experiments (TIEs). The TIEs will be conducted during the Execution Phase. Participants providing components shall participate in all relevant TIEs.

At the Kickoff meeting there will be technical breakouts to begin developing component interface solutions. The participants are expected to have systems and/or software engineers in attendance to assist in the initial assessment and interaction of the interfaces. This may include UML modeling of the interfaces. Use cases will be made available to the demonstration development team, and the interface definition team should incorporate in their own analysis use cases provided by the demonstration development team. As a way of validating the interfaces, they will be "exercised" against the demonstration scenarios.

Simultaneously, there will be technical breakouts at the Kickoff meeting to begin demonstration scenario design and creation. This activity will involve the development of use cases to explore the implications of the scenarios. These use cases should be made available to the interface development team, and demonstration developers should incorporate in their own analysis the use cases provided by the interface development team.

2.4 Execution

The completion of the Kickoff marks the beginning of the Execution phase of the initiative. Using the agreed upon work package as the governing documents for the conduct of the initiative, the stakeholders will begin the principal tasks of refining engineering specifications as needed, developing components, and testing those components. The key outcome of the Pilot initiative will be persistent, operational exemplars and demonstrations of the exemplars.

To achieve the demonstrations, a series of design and testing activities will be needed. It is anticipated that TIEs will go through some number of iterations before the Components share information interoperably. A TIE is generally understood to minimally include a participant providing a client component and another participant providing a server component working in conjunction to test the implementation of a particular specification.

The primary goal of a pilot is to demonstrate the value of the interaction of a set of components that exercise a set of specifications in support of user defined scenarios. This capability will be instantiated in a persistent environment provided in part by the OGC Network. Therefore, participants will provide components and conduct TIEs to determine if these components can function in an interoperable environment. Typically there will be several "software builds" until interoperability in the environment is demonstrated via the TIEs.

If, during the course of Pilot Execution, modifications to existing open standards specification are found to be necessary, then a change proposal must be written following the guidelines at http://www.opengeospatial.org/standards/cr. Change proposals need not be adopted during the Pilot. Rather they are intended to document both the change and the requirement that led to the change.

The design activities will be used by the participants to clearly demonstrate the capabilities of the components by exercising the scenarios. As a core requirement of the Pilot effort, all demonstrations shall be made available via the Internet.

Participation in demonstration exercises is predicated upon full engagement with development, testing, and planning activities throughout the initiative.

To finalize the demonstrations, a Demonstration Event will be convened to conduct the final integration of the components and to refine the steps in the demonstrations. During the demonstration event, the demonstrations will be captured through techniques such as client screen capture software. The demonstrations will then be made available for distribution. The Date and location for the Demonstration Event is provided in the Master Schedule contained in the main body of the CFP.

2.5 Persistent operations and demonstration

Once the Execution phase is complete, the components and demonstrations developed during the Execution Phase will continue to be made available. This activity will result in configuration-controlled components that are considered stable enough to use in ongoing demonstrations. The components will be available for persistent operations and demonstration.

3 Roles in Pilot Initiative

The following roles are defined for the Pilot Initiative.

3.1 Participants

Participants are organizations that contribute to the definition of interfaces, prototypical implementations, scenario development and other support for an IP initiative. Participants are represented in an Initiative by business and technical representatives.

3.2 IPTeam

The Interoperability Program (IP) Team is an engineering and management team to oversee and coordinate an Interoperability Initiative. The IP Team facilitates architectural discussions, synopsizes technology threads, and supports the specification editorial process. The IP Team is comprised of OGC staff, representatives from organizations, and OGC consultants.

3.3 Observers

Observers are organizations that have been granted access to the initiative communication tools but are not contributing as participants. Observers are given full access to email lists, initiative web sites and regularly scheduled initiative wide teleconferences. Observers may make recommendations and comments to the participants via any of these forums. The Initiative Manager has the authority to table any comments, recommendations or other discussions raised by observers at any point without prior warning. Failure of an observer to comply may result in suspension of access.

4   Communications Plan

4.1 Distributed communication requirements

The communications plan supports development of the Initiative given the geographically distributed locations of the participants. Communication requirements include:

- The need to proactively and rapidly alert participants of events, deadlines, and decisions that affect them,
- The need to keep participants apprised of the status of all participants to ensure coordination and cross-communication,
- The need for participants to post items of interest, status reports, and software for distribution amongst the participants,
- The need for participants who are in remote locations to provide to IP Team or other participants with software for installation at various support sites, and
- The need for groups of participants to communicate/discuss and resolve ongoing definitional and development issues and related solutions.

The following sections describe communication to be used during the initiative.

4.2 Webex teleconferences

Teleconferences will be conducting using the combined webex and telecon facility provided by OGC. Details on the operations will be provided via the mailing lists.

4.3 E-mail reflector

E-mail will be exchanged for the Pilot using several e-mailing listservs.

4.4 Principles of Conduct

While non-binding, the following principles of conduct can support an effective pilot process:

1. Pilot participants extend respect and courtesy to their colleagues at all times. Initiative participants come from diverse origins and backgrounds and are equipped with multiple capabilities and ideals. Regardless of these individual differences, participants treat their colleagues with respect as persons--especially when it is difficult to agree with them. Seeing from another's point of view is often revealing, even when it fails to be compelling.

   English is the de facto language of the process, but it is not the native language of many process participants. Native English speakers attempt to speak clearly and a bit slowly and to limit the use of slang in order to accommodate the needs of all listeners.

2. Pilot participants develop and test ideas impartially, without finding fault with the colleague proposing the idea.

   We dispute ideas by using reasoned argument, rather than through intimidation or ad homonym attack. Or, said in a somewhat more consensus-like way: "Reduce the heat and increase the light"

3. Pilot participants think globally, devising solutions that meet the needs of diverse technical and operational environments.

   The goal of the initiative is to maintain and enhance a working, viable, scalable, global set of interfaces and protocols that provide a framework for interoperability in the geospatial domain. Many of the problems we encounter are genuinely very difficult. Participants use their best engineering judgment to find the best solution for the whole domain of geospatial interoperability, not just the best solution for any particular network, technology, vendor, or user.

Annex B – Information Architecture

The overall objective of the Pilot is to provide a platform for interoperable components for routing across heterogeneous data sources in the context of a multi-modal transportation network. It also builds capacity for further IP initiatives in India. Sponsorship of the Pilot will support these overarching objectives:

- Contribute to the demonstration of the benefits of interoperability, especially in context of regional agencies using geospatial data and services, thereby contributing to a better understanding of the OGC IP policies and processes in this regard.

- Support stakeholders and academic/research agencies to network with geospatial technology providers, both globally and locally, to evolve best practices and standards for interoperability of data and processing services related to transportation domain in general and routing in specific.

- Link existing investments the NCR and recent proposals to build transportation information systems based on principles of interoperability for more efficient, powerful solutions.

- Address and solve global interoperability problems related to service interfaces between data and processing, based on the use cases for interoperable routing.

The Pilot will develop a general architecture with application to several Societal Benefit Areas (SBAs):

- Transportation infrastructure development: A common issue for most developing countries and regions, transportation infrastructure development needs to be complemented with information dissemination in order to ensure optimal usage of the infrastructure.

- Disaster management Based on limited resources, disaster management programs around the world rely on existing investments in interoperable geospatial data and applications in disaster management scenarios. Routing remains one of the most important activities in such cases.

- Information enabled societies: link to the NSDI program and the various State level SDI initiatives being planned or executed in the country.

- Tourism development and commonwealth games: Development of tourism (both domestic and international) is an important constituent of economic development and the forthcoming Commonwealth Games in 2010 serves as a catalyst for such activity in the NCR. Availability of reliable routing services for tourists is important in such a context.

1 Deliverables

The deliverables produced as a result of the Pilot will include:

- Running software component services that utilize open standards and standard interfaces for interoperability

- Recorded demonstrations of the application of the services to scenarios of relevance to the stakeholders such as the local government and transportation utilities.

- Engineering Reports that:

    o Detail the results and immediate benefits of the Pilot activity

    o Identify future activities of value to the sponsors

    o Provide feedback to OGC and others regarding usage of standards in Pilot scenarios.

2 Use Cases

Each organisation works with a single GIS software system usually developed for internal use. The use case of each organisation is usually available. However a single use case that requires co-operation is easily seen in two contexts, one planned and the other unplanned. We outline each context in two separate scenarios as below.

2.1 Universal routing for Commonwealth Games-2010

Visitors (including tourists and local population will require transportation from different parts of the region to the venue of the games. All options including Metro, DTC buses and private taxis need to be given to online routing engines that provide navigation on the web or hand held devices and also at kiosk that can be placed in important places like Airports, Bus Stations, Metro Stations etc. The integration needs of such applications include data from major transportation providers (including GPS feeds) and landmarks/building data from urban planning authorities. Applications, which provide routing based on a combination of such real-time information, can be built only on the presumption of interoperability of the components.

2.2 Emergency routing during disasters and other scenarios

The NCR is susceptible to regional floods and other natural disasters, and this has often caused major transportation problems. Information sharing between transportation agencies and urban development authorities enable rerouting of traffic and 'reactive scheduling' of buses and metro trains. Some of the important use cases for emergency routing include (1) routing for ambulance services similar to the RFP issued by EMRI (2) routing for police and fire fighters (3) transport

related to mass exit in disaster situations such as earthquake (4) local disaster evacuation operations and advice. Routing plans need to be made available for each disaster scenario being modelled by the multi-hazard mapping of the Delhi NCR.

A General Use Case for Interoperable routing in the NCT of Delhi is an ideal use case in both scenarios. Applications and software supplied by GIS companies need to demonstrate interoperability under a testbed project.

2.3 Need of interoperability for routing

The Delhi NCT is served by many transportation facilities, including DTC and DMRC. Other state regional bus transportation corporations and the Northern Railways provide additional support to the transportation infrastructure of the territory. Privately owned taxi companies and bus services (including buses run by industrial/commercial establishments for their employees) add to this infrastructure.

The transportation sector has different demands for information as shown in Figure 2. However, the geospatial data about transportation networks, settlement points in the locality, and real-time data such as GPS feeds and sensor data are all core components of all use cases in the transportation domain.
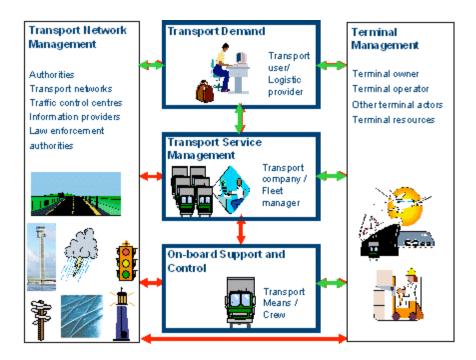

Figure 2 – Different aspects of transportation network management

With five national highways and railway connections with every part of the country, the traffic circulation pattern has been heavily overburdened. Traffic congestion and slow traffic movement is a regular feature in most parts of the territory in spite of

the large number of flyovers, road widening, overpasses and underpasses that have been completed. The sheer volume of vehicles (driven by the steadily increasing population) and major issues in traffic management make navigation a unique challenge. Although further improvement in the public transportation infrastructure can be expected in the near future, thereby bringing down the overall traffic congestion, the present problems are real and will continue for many years. This necessitates the need to ensure accurate and complete information about the transportation alternative available to citizens for travelling within the NCT. Appropriate routing based on such information can guarantee economic use of time and resource.

Accurate and complete information about routes can only be obtained by combining various sources of geospatial data. Such data in the NCT could include:

- Survey of India Topo-sheet map in combination with Satellite images
- Road network data
- Road traffic data
- Metro rail route data (including schedules)
- Real-time traffic data (GPS feeds from buses)
- Transportation nodes such as bus stops and metro stations
- Residential occupancy of localities and transportation demand at different transportation nodes
- Traffic simulation model outputs

Additionally in the case of an emergency[1] or disaster it is important to include data related to

- Emergency Facilities such as Fire Stations, Hospitals, Police stations
- Real time data for emergency vehicles (such as ambulances, fire fighters and police vehicles)
- Disaster simulation/modeling outputs related to floods/fire/earthquakes and other disasters.

Use case models for geospatial information in transportation companies and the disaster management authority have been illustrated (simplified) as below (Figure 3, Figure 4, Figure 5, and Figure 6) .

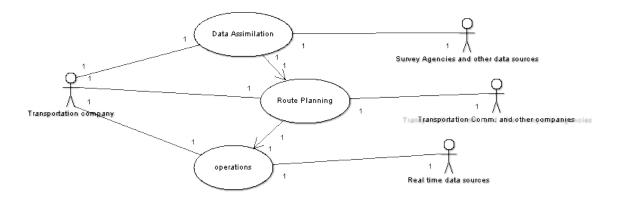[1] Emergencies include ambulance services, fire and crime related requirements

**Figure 3 – Information use case for a transportation company
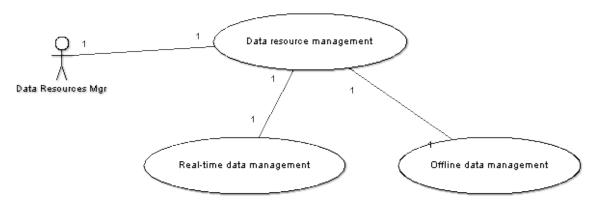in relation to other players**

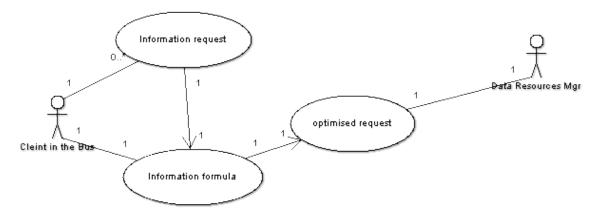**Figure 4 – Use cases of the Data Resource Manager**

Figure 5 – Use case for a user of transportation infrastructure for navigation
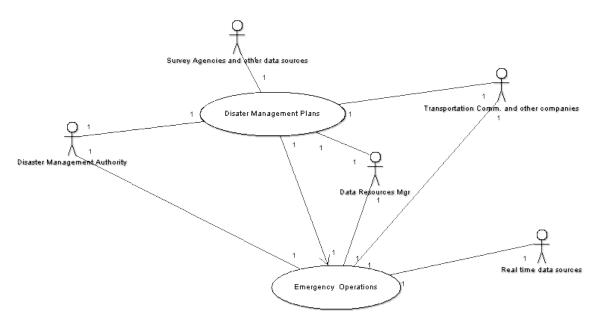
Figure 6 – Use cases in disaster management related to routing

2.4 Interoperable routing

In the context of above sources of data for accurate and complete information, the routing utility (either IT based or manual) needs to address interoperability issues. Such issues include:

- Problems related to interoperability between applications and data for a single mode of transport

- Interoperability issues between routing applications and data across different modes of transport in the case of a multi-modal transport scenario.
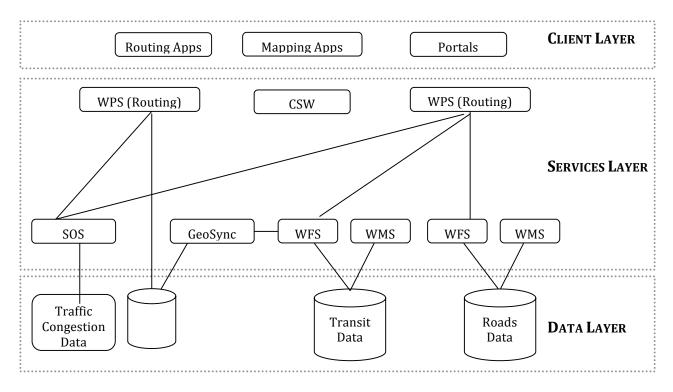
Considering the IT assisted routing scenarios, such as an enterprise based application for routing for multimodal transportation or in a more specialized case of Web services based architecture for the same objective; interoperable routing is the case where different routing services across organizations and systems are chained together to provide the accurate and complete solution in a given context. The use case diagrams as shown below, highlights the use of existing standards and models towards such a solution.

3   Computational Architecture

The architecture to be used in the Pilot consists of a three-layer-architecture based on the separation of data, services and applications. The data sources such as roads data, base maps, aerial images and transit data are enabled by web services such as Web Feature Service (WFS) and Web Mapping Service (WMS). Similarly, real-time

traffic congestion data and GPS feeds are web service-enabled as Sensor Observation Services (SOS). Federated Geosynchronization further enables an environment for collaboration and maintenance of a shared geospatial dataset. Services are also enabled on the application side, in the form of Web Processing Services (WPS) for routing and other service-oriented architectures of Routing applications, portals and mapping applications.

While this architecture is based on the idea of loosely coupled distributed services and processing capabilities for transit routing, it is recognized that routing applications and portals are mostly monolithic. The decoupling of processing from the data sets provides a unique opportunity to establish mechanisms for shared vocabularies and the use of federated web services for geospatial data.

Legend

CSW: Catalog Services for the Web

GeoSync: Federated Geo-synchronization Service

SOS: Sensor Observation Service

WPS: Web Processing Service

WFS: Web Feature Service

Figure 7 – Service Components for DTRIP

This Pilot will focus on the Service layer of the entire architecture and shall utilize many of the established and evolving standards as shown in Figure 7. The use of different data sources (and hence the services that provide them) depends upon the requirements of individual routing applications proposed, and their specific requirements. However,

- In view of the need for real-time requirements in transit routing, it is expected that routing engines will also utilize real-time data.

- In regard to the need of topologically corrected network data for routing applications employment of GML 3.1 or above (and hence WFS compliance to the same) is expected, especially for road networks and transit routes.

4   OGC Standards Baseline for DTRIP

The OGC Standards Baseline, at any point in time, is the set of all Adopted Specifications plus all other technical documents that have been made available to the public by the OGC Technical and Planning Committees. The Standards Baseline includes all member approved implementation/abstract standards and best practices documents. These specifications and other documents are freely available to the public at this website: http://www.opengeospatial.org/standards

DTRIP will use GML version 3.2.1 which is available as OGC Document 07-036, subject to corrections and revisions documented in OGC 07-061. This version of GML is also adopted as ISO 19136:2007. Many, if not most, specifications that depend on GML are now based on GML 3.1.1. We shall allow a migration path here.

Several documents were approved for public release at the recent OGC TC/PC meeting in June 2008 and are being processed for public release. These documents will become available over the next few weeks. If a specific document is needed by a proposer and it has not yet been published to the public link above, contact OGC (techdesk@opengeospatial.org).

The following tables list approved OGC Standards, as well as Discussion and Best Practices papers that are relevant to DTRIP.

Table 1 – Approved OGC Standards Related to DTRIP

OGC Standards			
Title	Version	Document #	Date
Catalog Service	2.0.2	07-006r1, 07-010, 07-110r2, 07-045, 07-144r2	2007-02-23
Web Feature Service (WFS)	1.1	04-094	2005-05-03
Web Map Service (WMS)	1.3.0	06-042	2006-03-15

Web Map Context (WMC)	1.1	05-005, 08-050	2005-01-19, 2008-03-14
Web Processing Service (WPS)	1.0	05-007r7	2007-06-08
Web Service Common	1.1	06-121r3	2007-02-09
Geography Markup Language (GML)	3.2.1 3.1.1	07-036, 07-061 03-105r1	2007-08-27 2004-02-07
City Geography Markup Language	1.0.0	08-007r1	2008-08-20
Styled Layer Descriptor (SLD)	1.1	05-078r4	2007-06-29
Symbology Encoding (SE)	1.1	05-077r4	2007-1-18
Filter Encoding (FE)	1.1	04-095	2005-05-03
Geospatial eXtensible Access Control Markup Language (GeoXACML)	1.0	07-026r2, 07-098r1, 07-099r1	2008-02-20
KML	2.2	07-147r2	2008-04-14
Open Location Services (OpenLS)	1.1	05-016	2005-05-02
SensorML with corrigendum	1.0.1	07-000, 07-122r2	2007-07-17, 2007-10-25
Sensor Observation Service	1.0	06-009r6	2007-10-26
Sensor Planning Service	1.0	07-014r3	2007-08-02

Table 2 – Approved OGC Best Practice Documents Related to DTRIP

Title	Version	Document #	Date
A URN namespace for OGC	0.4	07-107r3	2008-05-02
Binary Extensible Markup Language (BXML) Encoding Specification	-	03-002r9	2006-01-18
Definition identifier URNs in OGC namespace	1.1.2	07-092r1	2007-11-14
FGDC CSDGM Application Profile for CSW 2.0	-	06-129r1	2006-12-26
Gazetteer Service - Application Profile of the Web Feature Service Implementation Specification	0.9.3	05-035r2	2006-07-27
Sensor Alert Service	0.9.0	06-028r5	2007-05-16
Specification best practices	1.0.0	06-135r1	2007-01-29
Units of Measure Recommendation	1.0.0	02-007r4	2002-08-19
Web Notification Service	-	06-095	2007-01-25

Table 3 – Recently Approved OGC Discussion Papers Relevant to DTRIP

Title	Version	Document #	Date
Loosely Coupled Synchronization of Geographic Databases in the CGDI	0.0.9	08-001	2008-01-02
Geo-Synchronization Service	0.1.0	08-003	2008-05-14
CGDI WFS and GML Best Practices ER	0.0.9	08-002	2007-12-31
OWS-5 SOAP-WSDL Common ER	0.1.0	08-009r1	2008-01-16
OWS-5 GeoRM License Broker Specification ER (See Note 1)	0.5	08-076	2008-05-15