Technical Memorandum

Florida Advanced Traveler Information System (FL-ATIS)

Third Party Data Feed User's Guide

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Prepared for:

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Acronyms

24/7 ..... 24 hours a day / 7 days a week
C2C ..... Center-to-Center
CCTV ..... Closed-Circuit Television
DMS ..... Dynamic Message Sign
FDOT ..... Florida Department of Transportation
FL-ATIS ..... Florida Advanced Traveler Information System
GIS ..... Geographic Information System
ITS ..... Intelligent Transportation Systems
JPEG ..... Joint Photographic Experts Group
RTMC ..... Regional Transportation Management Center
SOAP ..... Simple Object Access Protocol
TCP/IP ..... Transmission Control Protocol/Internet Protocol
WSDL ..... Web Service Definition Language
XML ..... Extensible Markup Language

1 Overview

The Third Party Data Feed was created with the intention of making the traveler information reported from the Florida Advanced Traveler Information System (FL-ATIS) available to third party agencies. This document describes how third party agencies can connect to and obtain the traveler information available from the Third Party Data Feed.

1.1 General Information

The FL-ATIS system collects traveler information throughout the entire state of Florida from Florida Department of Transportation (FDOT) Regional Traffic Management Centers (RTMC) and from other agencies located in Florida. These agencies operate and provide this information on a 24/7 basis. Agencies provide traveler information to the FL-ATIS system using a standards-based Center-to-Center communications application (C2C). The information reported from FL-ATIS, including the information available from the Third Party Data Feed, depends on the data provided to it from these various agencies. FDOT has systems and operational procedures in place to handle issues with delivering the data to FL-ATIS.

Figure 1 below describes the steps the data takes.

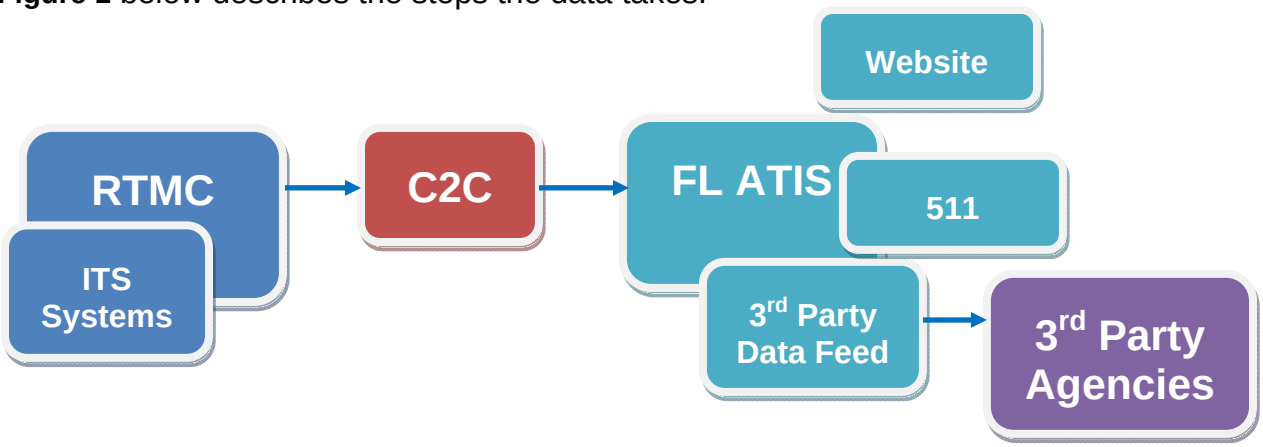

Figure 1: High Level Data Flow Diagram

RTMCs utilize existing Intelligent Transportation Systems (ITS) for the primary objective of traffic management. Most RTMCs use SunGuide® software to provide ITS device and event management, in which case RTMC operators use SunGuide to manage traffic within their jurisdictional boundaries.[1] SunGuide, or other ITS software, then makes the traffic information available to C2C. FL-ATIS acquires traffic information from around the state of Florida by pulling the data from C2C. FL-ATIS then reports this data to a public Web site, a 511 telephone service, and the Third Party Data Feed. Third party agencies

[1] SunGuide is a registered trademark of the Florida Department of Transportation.

have access to the data reported from FL-ATIS by requesting the data from the Third Party Data Feed.

2 References

The following documents, of the exact issue shown, form a part of this document to the extent specified herein. In the event of a conflict between the documents referenced herein and the contents of this document, this document shall supersede.

Florida's Statewide Advanced Traveler Information System (ATIS) 3rd Party Data Feed System. *Preliminary (Architectural / High-Level) Design Description* Version 1.7 February 23, 2010	Florida Department of Transportation Traffic Engineering and Operations Office 605 Suwannee Street, M.S. 90 Tallahassee, Florida 32399-0450 (850) 410-5600
SunGuide Software Users Manual *SunGuide-SUM-4.2.0-Draft* April 8, 2009	Florida Department of Transportation Traffic Engineering and Operations Office 605 Suwannee Street, M.S. 90 Tallahassee, Florida 32399-0450 (850) 410-5600

3 Accessing Third Party Data Feed

The Third Party Data Feed is accessible via a standard internet connection but requires an assigned username and password. Third party agencies must first request access from the appropriate FDOT point of contact. The following is the current point of contact for requesting access to the Third Party Data Feed:

Gene Glotzbach
605 Suwannee Street, MS 27
Tallahassee, FL 32399-0450
gene.glotzbach@dot.state.fl.us

The requesting agency should include the name of the agency requesting access, the purpose and intended use of the data, and one or more technical contacts.

3.1 Username and Password

Once access is approved, the requesting agency will be assigned a username and password. Note that assigned usernames and/or passwords configured in the Third Party Data Feed are not changed on a regular basis; however, they may change at any time. If the username and/or password changes, third parties will be contacted with the new username and password via email. Upon being contacted, third parties are expected to update their username and password configuration immediately.

3.2 Uniform Resource Locator (URL)

The Third Party Data Feed is accessible via web services. All of these web services are accessible via a common base Uniform Resource Locator (URL). The following is the URL used to access the Third Party Data Feed web services:

http://datafeed.fl511.com/

4 Web Services

The Third Party Data Feed has a series Web Service Definition Language (WSDL) functions that provide FL-ATIS data. Each WSDL is accessed via an internet connection and communicates using standard Simple Object Access Protocol (SOAP) Extensible Markup Language (XML) requests and responses. Communications use standard Transmission Control Protocol/Internet Protocol (TCP/IP) port 80.

The WSDL is documented online at the URL listed in Section 3.2 of this document.

Table 1 lists the web services available.

Table 1: List of Web Services

Web Service	*Parameters*	*Recommended Request Rate*	*Service Description*
ObtainCameraData	Username Password County[1]	Request data from Web Service once per day or less Request JPG image files once per 2 minutes	Returns a list of reported Closed-Circuit Television (CCTV) cameras and URL's of camera snapshots. URL updates are very infrequent. Snapshots are in JPEG[2] file format and are updated once every 1 to 5 minutes.
ObtainMessageBoardData	Username Password County[1]	Once per minute	Returns a list of reported Dynamic Message Signs (DMS) and the message currently displayed on each DMS. DMS messages are formatted in DMS MULTI string[3] format. Messages are updated no more frequently than once per minute.
ObtainTrafficSensorLinkData	Username Password County[1]	Once per 2 minutes	Returns a list of reported traffic sensor links. Each traffic sensor link contains a unique identifier, location information, roadway link length, and the averaged speed. Latitude/ Longitude information is reported in microdegrees, roadway link length is reported in feet, and average speed is reported in miles per hour. The possible values of roadway direction are N, S, E, and W, each corresponding to a cardinal direction of travel. Speeds are updated once every 2 minutes.

Web Service	*Parameters*	*Recommended Request Rate*	*Service Description*
ObtainTravelTimeLinkData	Username Password County[1] IncludeTrafficSensorLinks	IncludeTrafficSensorLinks set to True, once per day IncludeTrafficSensorLinks set to False, once per 2 minutes	Returns a list of reported travel time links. Each travel time link consists of one or more traffic sensor links. Service includes an "IncludeTrafficSensorLinks" parameter, when set to "True" all traffic sensor links associated with each travel time link is reported; otherwise only travel time link information is reported. Each traffic sensor link contains a unique identifier, link description, location information, roadway link length, and the calculated travel time. Roadway link length is reported in feet and travel time is reported in seconds. The possible values of roadway direction are N, S, E, and W, each corresponding to a cardinal direction of travel. Travel times are updated once every 2 minutes.
ObtainEventData	Username Password County[1]	Once per minute	Returns a list of reported traffic events. Each event contains a unique identifier, event description in English and in Spanish, location information, type, severity, and associated timestamps. Detailed information about each of these fields is listed later in this document. The number of events in the system varies through the day and they are updated continuously.
ObtainFloodgateData	Username Password County[1]	Once per minute	Returns a list of reported floodgates. Each floodgate contains a unique identifier, a floodgate level indicating to what the floodgate applies, a message description, and the message itself. The message is encoded as a Base64 string; recipients of data must decode data into binary. The resulting message data is a WAV file. The number of floodgates in the system varies through the day and they are updated continuously.

1. County parameter must be the name of a single county within the state of Florida. All possible county values are listed later in this document. Note that for ObtainCameraData, ObtainEventData, and ObtainFloodgateData, the value "All" can be passed to obtain data for all counties.

2. Joint Photographic Experts Group (JPEG) image compression format standard.
3. DMS messages are formatted in NTCIP-compliant DMS MULTI string format. See DMS NTCIP standards for details regarding MULTI string format.
4. Floodgate messages are recorded in WAV file format. File attributes include: Mu Law, 8-bit wav, 8000 Hz, Mono Channel, 16bit Resolution, Normalized to -8 db.

4.1 Selected Counties

All web services allow requesters to select the desired county. Once specified, the web service will return all data applicable to the selected county. Note that for ObtainCameraData, ObtainEventData, and ObtainFloodgateData, the value "All" can be passed to obtain data for all counties.

Table 2 lists all possible values for county.

Table 2: Possible County Values

County Value				
All		Hamilton		Okaloosa
Alachua		Hardee		Okeechobee
Baker		Hendry		Orange
Bay		Hernando		Osceola
Bradford		Highlands		Palm Beach
Brevard		Hillsborough		Pasco
Broward		Holmes		Pinellas
Calhoun		Indian River		Polk
Charlotte		Jackson		Putnam
Citrus		Jefferson		Santa Rosa
Clay		Lafayette		Sarasota
Collier		Lake		Seminole
Columbia		Lee		St. Johns
DeSoto		Leon		St. Lucie
Dixie		Levy		Sumter
Duval		Liberty		Suwannee
Escambia		Madison		Taylor
Flagler		Manatee		Union
Franklin		Marion		Volusia
Gadsden		Martin		Wakulla
Gilchrist		Miami-Dade		Walton
Glades		Monroe		Washington
Gulf		Nassau		

4.2 Include Traffic Sensor Links Flag

The ObtainTravelTimeLinkData web service includes a special parameter specific only to this service: IncludeTrafficSensorLinks. When set to true, this service returns a list of all sensor links that is used to calculate each travel time link. This traffic sensor link data includes roadway location and latitude/longitude coordinates which may be used to map the travel time links. However, the inclusion of the traffic sensor link data significantly

increases the amount of data returned from the ObtainTravelTimeLinkData web service (the returned data with traffic sensor link data included is roughly ten times larger than when it is not included). Also, the traffic sensor link roadway location and latitude/longitude coordinates change very infrequently once configured. As such, the ObtainTravelTimeLinkData web service provides the ability to only receive the travel time link information and exclude the traffic sensor link data.

It is recommended that data from ObtainTravelTimeLinkData should be requested no more frequent than once per day when IncludeTrafficSensorLinks is set to True. This would allow subscribers of the data to receive the latest traffic sensor link configuration data for mapping purposes. When IncludeTrafficSensorLinks is set to False, data from ObtainTravelTimeLinkData can be requested once every two minutes.

5 Returned Data

Data returned from the Third Party Data Feed web services are in XML format. Appendix A provides the XML schemas for the returned XML. Table 3 relates the available web services with the XML schema used. Note that some fields returned use complex data types. These complex types are defined in schemas also included in Appendix A.

Table 3: Web Service to XML Schema Mapping

Web Service	*XML Schema*
ObtainCameraData	Camera_Data.xsd
ObtainMessageBoardData	Message_Board_Data.xsd
ObtainTrafficSensorLinkData	Traffic_Sensor_Link_Data.xsd
ObtainTravelTimeLinkData	Travel_Time_Link_Data.xsd
ObtainEventData	Event_Data.xsd
ObtainFloodgateData	Floodgate_Data.xsd

5.1 Error Data String

Each of the XML schemas listed in Table 3 contains the associated complex data type and an "ERROR" data field. The "ERROR" field is only populated if there is an error in reporting of the associated data, otherwise this field is empty (i.e., contains a null string). When populated, this field contains a text description of the error. The data contained within the complex data type should not be used if an ERROR is reported.

5.2 Timestamps

Every web service contains timestamps for each listed element that is reported. In other words, for each DMS listed from the Message Board Data, there is a reported timestamp. Timestamps reflect the date and time that the data was last updated. Timestamps are in Eastern Standard Time Zone.

Note that timestamps reported for camera data reflect the date and time that the reported URL was updated. This is not the date and time that the camera image was updated. The updated date and time of the camera image is not reported.

5.3 Latitude and Longitude

All latitude and longitude values are in decimal microdegrees based on stored Geographic Information Systems (GIS) information. The latitude and longitude information reported in FL-ATIS come directly from the latitude and longitude values reported from each RTMC. Each RTMC houses a database of GIS information, which has been made available to each RTMC from the FDOT Central Office.

5.4 Roadway Direction

Roadway direction is reported as one of four values: N, S, E, and W, each corresponding with north, south, east, and west, respectively.

5.5 Location Offset

The location offset is the relation of the actual event location to the reported event location. The possible values of the location offset include: at, before, after, rampTo, or rampFrom.

Figure 2 depicts how each of these location offset values relates to the reported event location.

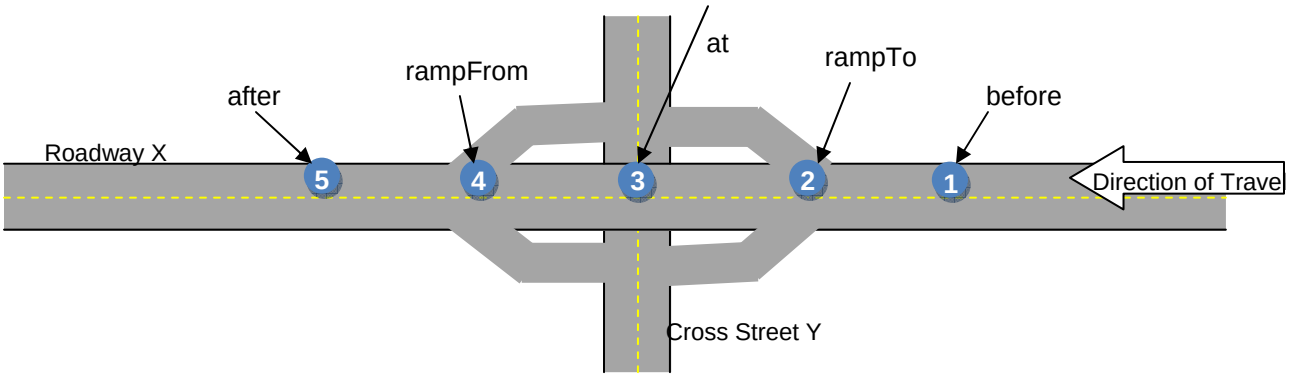

Figure 2: Location Offsets

All event locations refer to a single direction of travel. In Figure 2 above, the direction of travel is from right to left along Roadway X. If, for example, the actual location of an event is at point #2, then the event would be reported with the location on Roadway X "rampTo" Cross Street Y. If the actual location an event is at point #5, then the event would be reported with location on Roadway X "after" Cross Street Y.

5.6 Sensor and Travel Time Links

Each traffic sensor or a pair of traffic sensors is associated with a single sensor link. The sensor or sensor pair use various ITS technologies to determine the average speed of traffic along the sensor link. Each sensor link exists on a single roadway, measuring speeds in a single direction of travel. RTMCs have configured these sensor links based on geographic properties of the roadway and the availability of sensor coverage. The sensor link lengths vary, although they typically range between half-mile to a mile and a half.

RTMCs have also configured travel time links throughout their system. Each travel time link consists of one or more sensor links. The associated sensor links are contiguous along a single roadway, in a single direction of travel. Travel times are calculated based on the reported speeds of the sensor links and the total length of the travel time link.

Figure 3 describes how sensor and travel time links are related.

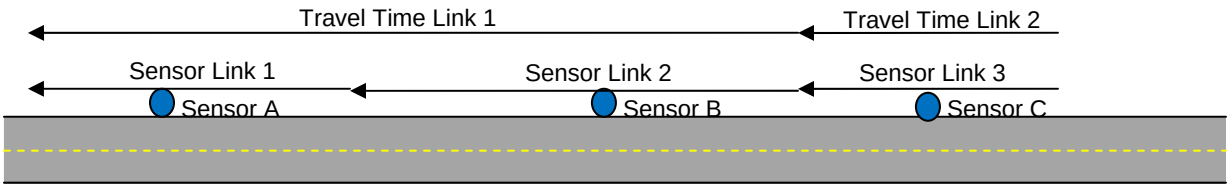

Figure 3: Example of Sensor and Travel Time Links

Note that travel time links are associated with at least one sensor link, although typically they are associated with multiple sensor links. Note that travel time links may be configured to overlap; in other words, a single sensor link may be used for multiple travel time links.

5.7 Floodgates

Floodgates are WAV files that are manually recorded by RTMC operators, submitted to the FL-ATIS system, and played on the FL-ATIS 511 traveler information telephone system at selected menu levels. A floodgate is regarded as vital traveler information that often has a major impact on large areas or important roadways throughout the state.

The Third Party Data Feed provides these WAV files as an encoded Base64 string. Recipients of this data must decode the Base64 string into binary. The resulting data can be saved and read as a WAV file. The WAV file has the following file attributes:

- Mu Law
- 8-bit wav
- 8000 Hz
- Mono Channel

- 16bit Resolution
- Normalized to -8 db

An operational rule requires RTMCs to record two versions of each floodgate; one recorded in English and another in Spanish. Consequently, there may be two WAV files for each floodgate. However, depending on when the data from the Third Party Data Feed is acquired, at any one time there could be only one WAV file for the floodgate.

5.8 Event Data

Event data is reported and updated as RTMC operators enter and submit this data to the FL-ATIS system. Each reported event contains a unique identifier that does not change regardless of the number of updates made to the event. Note that the identifiers are unique per RMTC. The RTMC is identified in the "Center" field. When events are closed, they are no longer reported from FL-ATIS; no "closed" message will be reported from FL-ATIS. Only the currently active events are reported from FL-ATIS.

Events are selectively added and removed from FL-ATIS by RTMC operators. Events are never automatically generated or removed from the system.

All events are reported at a single point on a roadway in a single direction of travel. A secondary point may be reported with an event; this point is the upstream start of congestion caused by the event. If an incident affects multiple directions of travel and/or multiple roadways, then multiple events are reported, one per roadway per direction.

Table 4 describes each field reported for each event.

Table 4: Event Data Field Descriptions

Field Name	*Example Value*	*Description*
Timestamp	4/14/2010 9:28:32 PM	The date and time that the event was reported to the FL-ATIS from the RTMC and saved in the FL-ATIS database.
Description_En	Emergency vehicles in Miami-Dade on I-95 south at Exit 8A NW 95 St/Rev Dr. A. Jackson Jr. Blvd, left lane blocked. Last updated at 09:26:35PM.	A textual description of the event reported in English.
Description_Es	Vehículos de emergencia en Miami-Dade en I-95 sur en salida 8A NW 95 St/Rev Dr. A. Jackson Jr. Blvd, carril de la izquierda obstruido. Última actualización en 09:26:35PM.	A textual description of the event reported in Spanish.
ID	241323	Identifier for event. Identifier remains the same throughout the life of the event. Identifier is unique for the specific RTMC reporting the event.
Center	District 6	The RTMC reporting the event.
Type	current	Event type. The possible values are "current" or "planned". Reported construction events that are not currently active have a "planned" type; otherwise most events are "current".
Severity	minor	Severity values include "minor", "moderate", "major", and "unknown". These values are automatically determined by the RTMCs ITS software based on event duration and lane blockage status.
Reported_At	4/14/2010 9:24:11 PM	The date and time that the event was originally reported within the RTMC's ITS software.

Field Name	*Example Value*	*Description*
Data_Last_Updated_At	4/14/2010 9:26:35 PM	The date and time that the event was last updated as reported from the RTMC's ITS software.
Location_Name[1]	NW 95 St/Rev Dr. A. Jackson Jr. Blvd	The name of the cross street or point of reference along the Location_Highway where the event occurs.
Location_County[1]	Miami-Dade	The county in which the event occurs. Possible values include the all counties listed in Table 2, excluding "All".
Location_Highway[1]	I-95	The roadway on which the event occurs.
Location_Direction[1]	s	Direction of travel of traffic at the event location. Possible values are mentioned in the Roadway Direction section of this document.
Location_Exit[1]	8	Exit number at or near the event location. This field is blank (bull string) if no exit exists.
Location_Offset_Type[1]	at	Location offset of the actual event location. Possible values are listed and described in the Location Offset section of this document.
Location_Cross_Street[1]	NW 95 St/Rev Dr. A. Jackson Jr. Blvd	The name of the cross street along the Location_Highway where the event occurs.
Location_Latitude[1]	25861927	Latitude of event location in microdegrees.
Location_Longitude[1]	-80208403	Longitude of event location in microdegrees.

1. All reported events have a primary location. If congestion exists, a secondary location is reported. The secondary location is the upstream location where travelers will first experience the congestion.

Appendix A - XML Schema

Camera_Data.xsd

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Cameras.xsd" />
  <xs:complexType name="Camera_Data">
    <xs:sequence>
      <xs:element name="ERROR" type="xs:string" minOccurs="0" maxOccurs="1" />
      <xs:element name="Cameras" type="Cameras" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Cameras.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Camera.xsd" />
  <xs:complexType name="Cameras">
    <xs:sequence>
      <xs:element name="Camera" type="Camera" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Camera.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType name="Camera">
    <xs:sequence>
      <xs:element name="Timestamp" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Description" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="ID" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Center" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="County" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Highway" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Direction" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Latitude" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Longitude" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Image_Filename" type="xs:string" minOccurs="1" maxOccurs="1" />
     </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Message_Board_Data.xsd

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Message_Boards.xsd" />
  <xs:complexType name="Message_Board_Data">
    <xs:sequence>
      <xs:element name="ERROR" type="xs:string" minOccurs="0" maxOccurs="1" />
      <xs:element name="Message_Boards" type="Message_Boards" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Message_Boards.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Message_Board.xsd" />
  <xs:complexType name="Message_Boards">
    <xs:sequence>
      <xs:element  name="Message_Board"  type="Message_Board"  minOccurs="0"  maxOccurs="unbounded"
/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Message_Board.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType name="Message_Board">
    <xs:sequence>
      <xs:element name="Timestamp" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Description" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="ID" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Center" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="County" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Highway" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Direction" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Latitude" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Longitude" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Message" type="xs:string" minOccurs="1" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Traffic_Sensor_Link_Data.xsd

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Traffic_Sensor_Links.xsd" />
  <xs:complexType name="Traffic_Sensor_Link_Data">
    <xs:sequence>
      <xs:element name="ERROR" type="xs:string" minOccurs="0" maxOccurs="1" />
      <xs:element     name="Traffic_Sensor_Links"     type="Traffic_Sensor_Links"     minOccurs="0"
maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Traffic_Sensor_Links.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Traffic_Sensor_Link.xsd" />
  <xs:complexType name="Traffic_Sensor_Links">
    <xs:sequence>
      <xs:element     name="Traffic_Sensor_Link"     type="Traffic_Sensor_Link"     minOccurs="0"
maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Traffic_Sensor_Link.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation=".\Mid_Point.xsd" />
  <xs:complexType name="Traffic_Sensor_Link">
    <xs:sequence>
      <xs:element name="Timestamp" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="ID" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Center" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="County" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Highway" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Direction" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Begin_Point" type="Mid_Point" minOccurs="1" maxOccurs="1" />
      <xs:element name="End_Point" type="Mid_Point" minOccurs="1" maxOccurs="1" />
      <xs:element name="Length" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Average_Speed" type="xs:string" minOccurs="1" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Mid_Point.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType name="Mid_Point">
    <xs:sequence>
      <xs:element name="Latitude" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Longitude" type="xs:string" minOccurs="1" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Travel_Time_Link_Data.xsd

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Travel_Time_Links.xsd" />
  <xs:complexType name="Travel_Time_Link_Data">
    <xs:sequence>
      <xs:element name="ERROR" type="xs:string" minOccurs="0" maxOccurs="1" />
      <xs:element  name="Travel_Time_Links"  type="Travel_Time_Links"  minOccurs="0"  maxOccurs="1"
/>
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Travel_Time_Links.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Travel_Time_Link.xsd" />
  <xs:complexType name="Travel_Time_Links">
    <xs:sequence>
      <xs:element       name="Travel_Time_Link"       type="Travel_Time_Link"       minOccurs="0"
maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Travel_Time_Link.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation=".\Traffic_Sensor_Link.xsd" />
  <xs:complexType name="Travel_Time_Link">
    <xs:sequence>
      <xs:element name="Timestamp" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Description" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="ID" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Center" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="County" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Highway" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Direction" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Traffic_Sensor_Links">
        <xs:complexType>
          <xs:sequence>
            <xs:element   name="Traffic_Sensor_Link"   type="Traffic_Sensor_Link"   minOccurs="0"
maxOccurs="unbounded" />
          </xs:sequence>
        </xs:complexType>
      </xs:element>
      <xs:element name="Length" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="travel_time" type="xs:string" minOccurs="1" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Event_Data.xsd

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Events.xsd" />
  <xs:complexType name="Event_Data">
    <xs:sequence>
      <xs:element name="ERROR" type="xs:string" minOccurs="0" maxOccurs="1" />
      <xs:element name="Events" type="Events" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Events.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Event.xsd" />
  <xs:complexType name="Events">
    <xs:sequence>
      <xs:element name="Event" type="Event" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Event.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation=".\Location.xsd" />
  <xs:complexType name="Event">
    <xs:sequence>
      <xs:element name="Timestamp" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Description_En" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Description_Es" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="ID" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Center" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Type" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Severity" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Reported_At" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Data_Last_Updated_At" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Primary_Location" type="Location" minOccurs="1" maxOccurs="1" />
      <xs:element name="Secondary_Location" type="Location" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Location.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType name="Location">
    <xs:sequence>
      <xs:element name="Name" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="County" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Highway" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Direction" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Exit" type="xs:string" minOccurs="0" maxOccurs="1" />
      <xs:element name="Offset_Type" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Cross_Street" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Latitude" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Longitude" type="xs:string" minOccurs="1" maxOccurs="1" />
    </xs:sequence>
```

```
  </xs:complexType>
</xs:schema>
```

Floodgate_Data.xsd

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Floodgates.xsd" />
  <xs:complexType name="Floodgate_Data">
    <xs:sequence>
      <xs:element name="ERROR" type="xs:string" minOccurs="0" maxOccurs="1" />
      <xs:element name="Floodgates" type="Floodgates" minOccurs="0" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Floodgates.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation="Floodgate.xsd" />
  <xs:complexType name="Floodgates">
    <xs:sequence>
      <xs:element name="Floodgate" type="Floodgate" minOccurs="0" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Floodgate.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:include schemaLocation=".\Message.xsd" />
  <xs:complexType name="Floodgate">
    <xs:sequence>
      <xs:element name="Timestamp" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="ID" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="County" type="xs:string" minOccurs="0" maxOccurs="1" />
      <xs:element name="Highway" type="xs:string" minOccurs="0" maxOccurs="1" />
      <xs:element name="Severity" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Entity" type="xs:string" minOccurs="0" maxOccurs="1" />
           <xs:element name="Message_En" type="Message" minOccurs="1" maxOccurs="1" />
      <xs:element name="Message_Es" type="Message" minOccurs="1" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

Message.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema    targetNamespace="http://tempuri.org/XMLSchema.xsd"    elementFormDefault="qualified"
xmlns="http://tempuri.org/XMLSchema.xsd"           xmlns:mstns="http://tempuri.org/XMLSchema.xsd"
xmlns:xs="http://www.w3.org/2001/XMLSchema">
  <xs:complexType name="Message">
    <xs:sequence>
      <xs:element name="Message_Text" type="xs:string" minOccurs="1" maxOccurs="1" />
      <xs:element name="Message_Speech" type="xs:string" minOccurs="1" maxOccurs="1" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```