511 Data Exchange including an Open511 Protocol

Transit

January 5, 2021

Version 1.31

**METROPOLITAN
TRANSPORTATION
COMMISSION**

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Document History

Description	Version	Date
Working Draft - addressed reorganization comments	0.9	08/28/13
First published version with transit, traffic, tolling, and parking APIs	1.0	09/13/13
Update Traffic APIs' structure information, parameters and filters, and their examples to sync with specification provided on Open511.org.	1.0	5/2/2014
Add GTFS-realtime Trip Updates and Vehicle Positions, and their examples.	1.0	5/7/2014
Minor updates and corrections	1.0	5/28/2014
Add sample request endpoint and parameters and filters tables for Section 3.14 and 3.15. Update references for resource endpoints with their exact URL.	1.0	6/12/2014
Minor updates to Section 3.14 and 3.15	1.0	7/17/2014
Separated Traffic and Transit	1.0	8/26/2014
Minor updates to remove references for Traffic	1.0	9/24/2014
Updated request endpoint URLs for all APIs	1.0	04/06/2016
Added two new APIs: *GTFS Operators List* and *GTFS Dataset Download*. Added sample message response to Section A.1 and B.1	1.0	04/06/2016
Added missing OperatorRef parameter for *Transit Scheduled Departure for a Stop*	1.0	04/06/2016
Marked following two APIs are "Possible Future Implementation" o Transit Addition and Cancellation of Trips by Agency o Transit Schedule Updates for an agency	1.0	04/06/2016
Updated JSON output (Section B.1.7) for Holiday API	1.0	04/06/2016
Added ServiceAlerts API	1.1	06/10/2016
Updates to Pattern, Timetable and Holiday APIs o Included Stop Names in Pattern API o Added parameter to Timetable API for returning timetables for Special services o Updated Holiday API to align with GTFS Service Exceptions	1.2	11/08/2016

Add Offset parameter in Timetable API	1.21	03/07/2017
Add element VehicleJourneyName in Stop Timetable API	1.22	05/22/2017
Updated examples to use the two character Agency ID	1.23	08/14/2017
Added GTFS+ files in GTFS Data Feed download API and added appendix for GTFS+ files definition	1.24	09/11/2017
Standardized GTFS Operator API response	1.25	10/02/2017
Added ExceptionDate parameter to Timetable API Removed daytypes section from Holiday API	1.26	05/30/2018
Elements added to Stop Monitoring API and Vehicle Monitoring API	1.27	07/01/2019
Elements and filters added to Stop API. Added Shapes API.	1.28	11/27/2019
Filters added to GTFS DataFeed download API.	1.29	06/09/2020
Added Historic Regional GTFS Feed	1.30	06/26/2020
Announcements and Public Announcencements API marked discontinued	1.31	01/05/2021

1 Overview

This document focuses on data exchange APIs for the Transit data. For a complete overview of 511 Data Exchange, please refer to *Open 511 Data Exchange Specifications – Overview* document. The overview document covers:

- General information about 511 Data Exchange

- Different protocols and data feeds available through Open 511 APIs

- Standard Discovery API specifications.

- Encodings and Protocols along with reference to standard documentation.

- Technical Guidelines

It is highly recommened that all users of Open 511 Data Exchange have reviewed the information in the Overview document.

2   Transit APIs

The NeTEx data structures wrapped within the SIRI framework has been adopted for dynamic exchange of Transit service configuration and schedules. Open511 however recommends using HTTP Get method for requests instead of using HTTP Post, as specified by the NeTEx/SIRI standards. The SIRI framework has also been adopted for dynamic exchange of real-time transit data (stop monitoring and vehicle monitoring). GTFS+ standard has been adopted for bulk exchange of static transit configuration data, while GTFS-RT has been adopted for bulk exchange of real-time transit data (service alerts, trip updates and vehicle positions).

The data communication architecture for San Francisco Bay Area 511 is depicted in Figure 1 below.
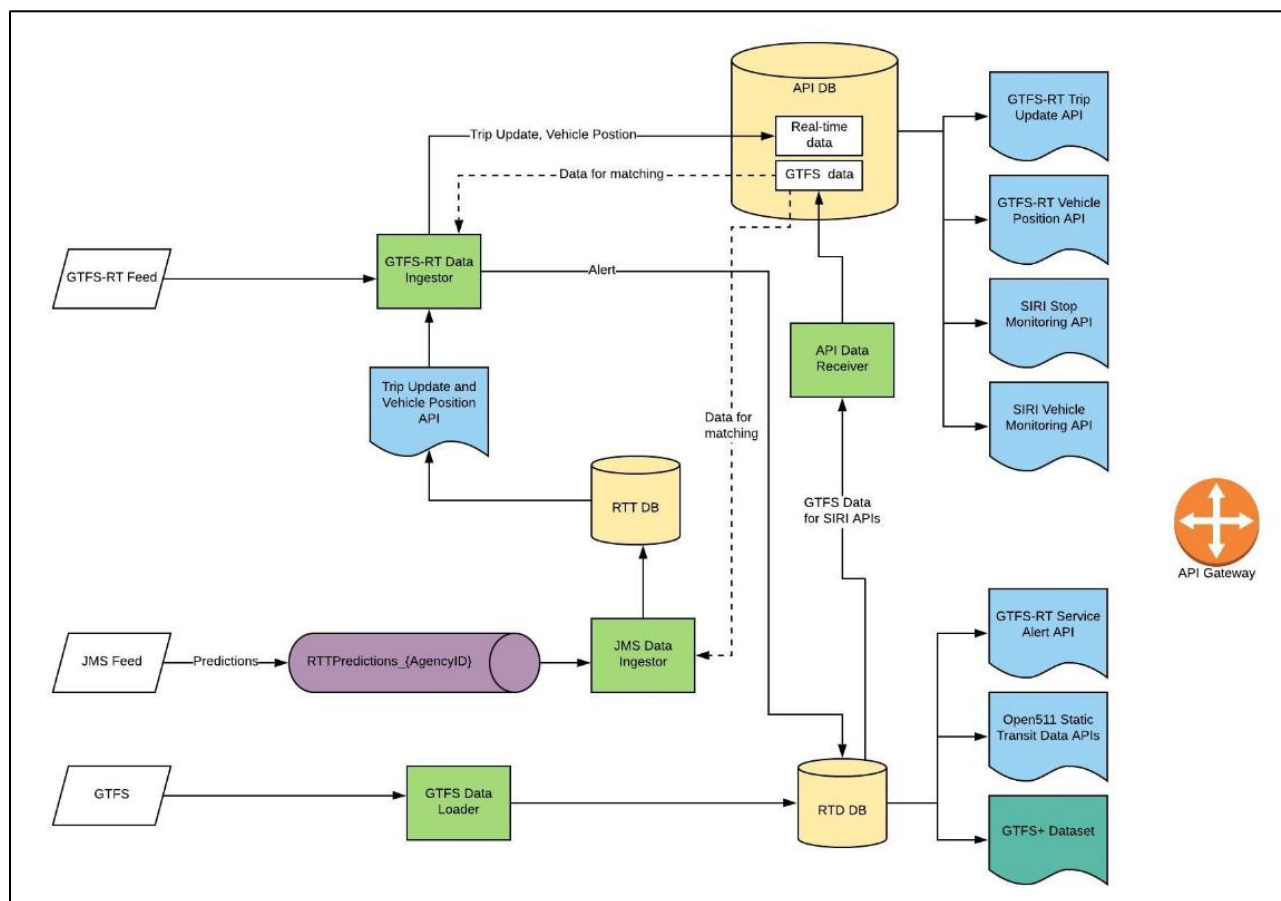
Figure 1 – Transit data communication architecture for San Francisco Bay Area 511

All NeTEx responses shall be enclosed within the SIRI ServiceDelivery structure as shown below.

Field	Type	Mandatory/ Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Time response was created
DataObjectDelivery	DataObjects Delivery structure	*Mandatory*	Delivery for NeTEx service containing one or more NeTEx data objects
— ResponseTimestamp	DateTime	*Mandatory*	Time individual response element was created
— dataObjects	Collection of NeTEx dataobjects	*Mandatory*	NeTEx Entities of any type

2.1 API: Operator

Operator within a jurisdiction represents a company providing public transport services. Consumers can request a list of all the operators within the jurisdiction or they can use additional filters such as operator code/id to restrict the results as per their needs and use case.

Below is a message structure of dataObjects for Organisations contained within a NeTEx ResourceFrame. Organisations are a collection of the Operator resource.

Field	Type	Mandatory/ Optional	Description
ResourceFrame	NeTEx frame	*Mandatory*	NeTEx container frame for Organizations.
—organisations	Collection of Operators	*Mandatory*	A collection of Operator elements. Can contain multiple operator elements, at least one occurrence is mandatory.

Operator structure

The operator structure is the main element of the organizations collection. It represents a company providing public transport services.

Field	Type	Mandatory/ Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the operator
Extensions	Container	*Optional*	Container for extensions to NeTEx
—Monitored	Boolean	*Optional*	Whether agency is real-time enabled or not
—OtherModes	Enum list	*Optional*	List of transport modes other than primary mode.
—Coverage	Container	*Optional*	Coverage area of the operator – can be a polygon or a list of lines
——gml:Polygon	GML structure	*Optional*	GML Polygon representing the coverage
—— gml:LineString	GML structure	*Optional*	GML Line representing the coverage. Multiple lines can be provided

PrivateCode	Free Text	Optional	Agency/operator code used within the jurisdiction
SiriOperatorRef	Free Text	Optional	An alternative code that uniquely identifies the operator in real-time systems(AVMS)
Name	Free Text	Optional	Name of the operator.
ShortName	Free Text	Optional	Short name for the operator.
Locale	Container	Optional	Container for the operator's locale information
—TimeZone	Free Text	Optional	Timezone Name
—DefaultLanguage	Xsd:Language	Optional	Default Language
ContactDetails	Container	Optional	Container for operator's contact information
—ContactTelephoneNumber	Free Text	Optional	Contact telephone number
—WebSite	Xsd:AnyURI	Optional	Website address
PrimaryMode	Enum	Optional	Primary transport mode of operator

Sample request endpoint for operators

Request Type	GET
Request EndPoint Example	For e.g. http://api.511.org/transit/operators?api_key={your-key}

Parameters and filters supported with the request are shown in the table below. The transit operator response for XML is shown in Appendix A Section A.1.1. The transit operator response for JSON is shown in Appendix B Section B.1.1.

Parameter	Mandatory/ Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
accept_language	*Optional*	If multiple languages are supported, this can be used to request data in desired language, If the jurisdiction doesn't support the response in requested language, response could be in default language selected by jurisdiction.
Operator_id	*Optional*	The operator_id parameter supports filtering based on a particular operator id/code
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual Operator resource cannot be located). For e.g. http://api.511.org/transit/Operators?operator_id=1345&api_key={your-key}&format=json

2.2 API: Line

Lines are routes covered by transit operators within the jurisdiction. Consumers can request list of all the routes within an operator or they can use additional filters like line id to restrict the results as per their needs and use case.

Below is a message structure of dataObjects for lines contained within a NeTEx ServiceFrame. Lines are a collection of the Line (Route) resource.

Field	Type	Mandatory/ Optional	Description
ServiceFrame	NeTEx frame	*Mandatory*	NeTEx container frame for Lines.
—lines	Collection of Lines	*Mandatory*	A collection of Line elements. Can contain multiple line elements, at least one occurrence is mandatory.

Line structure

The line structure is the main element of the Lines collection. It represents a route generally known to the public by a name or a number.

Field	Type	Mandatory/Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the route.
Name	Free Text	*Mandatory*	Name of the line.
TransportMode	Enum	*Optional*	Mode of transport of line
PublicCode	Free Text	*Optional*	Public identifier of the line
SiriLineRef	Free Text	*Optional*	An alternative code that uniquely identifies the operator in real-time systems(AVMS)
OperatorRef	ID	*Mandatory*	Reference to the operator for the line
Monitored	Boolean	*Optional*	Indicates if real-time data available for line.

Sample request endpoint for lines

Request Type	GET
Request EndPoint Example	For e.g. http://api.511.org/transit/lines?api_key={your-key}&operator_id=AC

Parameters and Filters

Parameters and Filters supported with the request are shown in the table below. The transit line response for XML is shown in Appendix A Section A.1.2. The transit line response for JSON is shown in Appendix B Section B.1.2.

Parameter	Mandatory/Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
accept_language	*Optional*	If multiple languages are supported, this can be used to request data in desired language, If the jurisdiction doesn't support the response in requested language, response could be in default language selected by jurisdiction.
Operator_id	*Mandatory*	The operator_id parameter limits the search for lines within a particular operator id/code
Line_id	*Optional*	The line_id parameter supports filtering based on a particular line

api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual line resource cannot be located). For e.g. http://api.511.org/transit/lines?api_key={your-key}&operator_id=1345

2.3   API: Stop

Stop or ScheduledStopPoint is a location where passengers can board or alight from vehicles. Consumers can request list of all the stops serviced by an agency/operator within the jurisdiction. Stop groupings or StopAreas are also returned when specifically requested using the include_stop_areas parameter.

Below is a message structure of dataObjects for stops contained within a NeTEx ServiceFrame. ScheduledStopPoints are a collection of the ScheduledStopPoint (Stop) resource.

Field	Type	Mandatory/ Optional	Description
ServiceFrame	NeTEx frame	*Mandatory*	NeTEx container frame for ScheduledStopPoints.
— scheduledStopPoints	Collection of ScheduledStop Points	*Mandatory*	A collection of ScheduledStopPoint elements. Can contain multiple ScheduledStopPoint elements, at least one occurrence is mandatory.
— stopAreas	Collection of Stop Areas	*Optional*	A collection of StopArea elements. Stop Areas group stops within an operator. A hierarchy of stop groups could also be provided. The stopAreas are returned only when specifically requested using the include_stop_areas parameter.

ScheduledStopPoint structure

The ScheduledStopPoint structure is the main element of the ScheduledStopPoints collection. It represents a location where passengers can board or alight from vehicles.

Field	Type	Mandatory/ Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the stop.
Extensions	Container	*Optional*	Container for extensions

Field	Type	Mandatory/Optional	Description
—LocationType	Int	Optional	Location Type of the stop. Conforms to location_type in GTFS specifications for stops.txt
—PlatformCode	Text	Optional	Platform identifier for a platform stop. Conforms to platform_code in GTFS specifications for stops.txt
—ParentStation	Text	Optional	Contains the Id of the parent station.
Name	Free Text	Optional	Name of the stop.
Location	Container	Optional	Location of stop
—Longitude	Float	Optional	Longitude of stop using WGS84 projection
—Latitude	Float	Optional	Latitude of stop using WGS84 projection
Url	Text	Optional	URL of a web page about the location/stop.
StopType	Enum	Optional	Indicates type of stop (Bus, Train, Ferry, etc.)

StopArea structure

The StopArea structure is the main element of the stopAreas collection. It represents a grouping of stops within or across multiple operators.

Field	Type	Mandatory/Optional	Description
id (Attribute)	Free Text	Mandatory	Unique identifier of the stop area.
Name	Free Text	Optional	Name of the stop group (parent stop).
Members	Container	Optional	Container of stops that belong to the group
—ScheduledStopPointRef	Reference ID	Optional	ID of the ScheduledStopPoint (within the 'ref' attribute)
ParentStopAreaRef	Reference ID	Optional	Id of the parent stop. Used to build a hierarchy of stop areas. For example, MUNI stops at Embarcadero could be a StopArea 1; ferry stops at Embarcadero could be StopArea 2. Stop Area 3 could be a parent stop area which comprises of all regional transit stops at Embarcadero. Stop Area 3 is then the ParentStopArea for StopArea 1 and 2.

Sample request endpoint for stops

Request Type	GET
Request Endpoint Example	For e.g. http://api.511.org/transit/stops?api_key={your-key}&operator_id=SF

Parameters and Filters

Parameters and Filters supported with the request are shown in the table below. The transit stop response for XML is shown in Appendix A Section A.1.3. The transit stop response for JSON is shown in Appendix B Section B.1.3.

Parameter	Mandatory/ Optional	Description
Format	Optional	The response format (json/xml) desired. If none specified, then default response would be JSON.
accept_language	Optional	If multiple languages are supported, this can be used to request data in desired language, If the jurisdiction doesn't support the response in requested language, response could be in default language selected by jurisdiction.
Operator_id	Mandatory	The operator_id parameter supports filtering based on a particular operator id/code
api_key	Mandatory	Unique key assigned to a user after they signup for Open511.
include_stop_areas	Optional	When this parameter is set to true, all stop areas (stop groupings) along with the referenced stops (ScheduledStopPoints) are returned.
Line_id	Optional	The line_id parameter supports filtering based on a particular route. The line_id should correspond to the id attribute of a Line returned by the Line API.
Direction_id	Optional	The direction_id parameter supports filtering based on a particular route and direction. This parameter has to be provided along with the line_id parameter. The direction_id should correspond to the id attribute of a Direction returned by the Pattern API for the operator and route.
Pattern_id	Optional	The pattern_id parameter supports filtering based on a particular pattern. The pattern_id should correspond to the id attribute of a ServiceJourneyPattern returned by the Pattern API.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual stop resource cannot be located). For e.g.
  http://api.511.org/transit/stops?api_key={your-key}&operator_id=1345

2.4   API: StopPlace

StopPlace is a named place or the physical stop where public transport may be accessed. Consumers can request list of all the stop places by operator code or they can use additional filters such as stop id to restrict the results as per their needs and use case. For a given stop, the physical representation of the stop (StopPlace) and the representation of the stop as a point in the timetable (ScheduledStopPoint) will use the same stop identifier (id).

Below is a message structure of dataObjects for lines contained within a NeTEx ServiceFrame. StopPlaces is a collection of the StopPlace resource.

Field	Type	Mandatory / Optional	Description
SiteFrame	NeTEx frame	*Mandatory*	NeTEx container frame for StopPlaces.
—stopPlaces	Collection of StopPlaces	*Mandatory*	A collection of stopPlace elements. Can contain multiple stopPlace elements, at least one occurrence is mandatory.

StopPlace structure

The StopPlace structure is the main element of the stopPlaces collection. It represents a physical stop where public transport may be accessed.

Field	Type	Mandatory/ Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the StopPlace.
Name	Free Text	*Optional*	Name of the StopPlace.
Description	Free Text	*Optional*	Description of StopPlace
Centroid	Container	*Optional*	Center coordinate of the stopPlace
Location	Container	*Optional*	The position of the Point that represents the center of the stopPlace
—Longitude	Float	*Optional*	Longitude of stopPlace using WGS84 projection
—Latitude	Float	*Optional*	Latitude of stopPlace using WGS84 projection
AccessibilityAssessment	Container	*Optional*	The accessibility characteristics of the stopPlace
—MobilityImpairedAccess	Enum	*Mandatory*	Summary indication as to whether the stopPlace is considered accessible or not
—limitations	Container	*Optional*	Accessibility limitations
——AccessibilityLimitation	Container	*Mandatory*	Assessment of the accessibility of the stopPlace
———WheelChairAccess	Enum	*Mandatory*	Whether the stopPlace is wheelchair accessible
alternativeNames	Container	*Optional*	Container for alternative names
—AlternativeName	Container	*Mandatory*	Container for Alternative name
——Name	Free Text	*Mandatory*	Alternative Name
PostalAddress	Container	*Optional*	Postal address of the stopPlace
—AddressLine1	Free Text	*Optional*	First line of address
—Town	Free Text	*Optional*	Town

Url	URI	*Optional*	Web address of stopPLace
OperatorRef	Reference ID	*Optional*	Reference to the operator of the stopPlace (contained in ref attribute of OperatorRef element)
adjacentSites	Container	*Optional*	Reference to adjacent sites such as parking locations
—ParkingRef	Reference ID	*Mandatory*	Reference to parking associated with the stopPlace(contained in ref attribute of ParkingRef element) Multiple ParkingRef elements can be included to associate multiple parking locations to the stopPlace
placeEquipments	Container	*Optional*	Equipments that may be located in the stopPlace
—SanitaryEquipment	Container	*Optional*	Container for a sanitary facility such as a restroom, shower, etc.
——Description	Free Text	*Optional*	Description of the facility
—CycleStorageEquipment	Container	*Optional*	Container for cycle storage equipments
——Description	Free Text	*Optional*	Description of the facility
——CycleStorageType	Enum	*Optional*	Type of storage (e.g. Racks)
——NumberOfSpaces	Integer	*Optional*	Number of storage spaces
—SignEquipment	Container	*Optional*	Sign visible to passengers such as information boards
——Description	Free Text	*Optional*	Description of the sign
—EscalatorEquipment	Container	*Optional*	Escalators in the stopPlace
——Description	Free Text	*Optional*	Description of the escalator
—LiftEquipment	Container	*Optional*	Elevators(Lifts) in the stopPlace
——Description	Free Text	*Optional*	Description of the elevator
—ShelterEquipment	Container	*Optional*	Shelter equipment such as waiting areas
——Description	Free Text	*Optional*	Description of shelter
—SeatingEquipment	Container	*Optional*	Seating equipment such as benches
——Description	Free Text	*Optional*	Description of seating equipment
PublicCode	Free Text	*Optional*	Short public code for passengers to use when uniquely identifying the stop
TransportMode	Enum	*Optional*	Primary mode of transport associated with the stopPlace
StopPlaceType	Enum	*Optional*	Type of stopPlace (for e.g. Rail Station)
quays	Container	*Optional*	A collection of quays
—Quay	Container	*Mandatory*	A place such as platform where passengers have access to Public transport vehicles
——CompassOctant	Enum	*Optional*	Heading of quay relative to street (E/W/N/S/NE/NW/SE/SW)
parkings	Container	*Optional*	A collection of parking locations linked to the stopPlace
—Parking	Container	*Mandatory*	Single parking location
——Name	Free Text	*Optional*	Name of parking location

——Description	Free Text	*Optional*	Description
——Centroid	Container	*Optional*	Container for center location of Parking
———Location	Container	*Optional*	Center point of Parking
————Longitude	Float	*Optional*	Longitude of Parking using WGS84 projection
————Latitude	Float	*Optional*	Latitude of Parking using WGS84 projection
——PostalAddress	Container	*Optional*	Address of Parking
———AddressLine1	Free Text	*Optional*	Address Line 1
———Town	Free Text	*Optional*	Town
——ParkingType	Enum	*Optional*	Parking type (for e.g. Train station parking, Park and Ride)
——TotalCapacity	Integer	*Optional*	Total number of parking places
——RealTimeOccupancyAvailable	Boolean	*Optional*	Whether real time occupancy data available for the parking location
——parkingAreas	Container	*Optional*	List of Parking areas(Accessible parking, Reserved parking)
———ParkingArea	Container	*Mandatory*	Parking Area
————Description	Free Text	*Optional*	Description of area
————ParkingProperties	Container	*Optional*	Properties of parking area
—————ParkingUserType	Enum	*Optional*	Type of Parking area (for Disabled, Reserved)
—————spaces	Container	*Optional*	Container for parking capacity
—————ParkingCapacity	Container	*Mandatory*	Container for parking capacity
—————NumberOfSpaces	Integer	*Optional*	Number of spaces
—————charges	Container	*Optional*	Parking charges for the parking area
—————tariffBands	Container	*Optional*	Charge bands for parking
—————ParkingTariffChargeBand	Container	*Mandatory*	An area within the parking area for grouping charges (Monthly parking, single day parking, etc.)
—————Description	Free Text	*Optional*	Description of parking charge band
—————MaximumStay	Xsd:Duration	*Optional*	Maximum allowed stay duration for tariff amount
—————Amount	Decimal	*Optional*	Charge for stay

Sample request endpoint for stops

Request Type	GET
Request Endpoint Example	For e.g. http://api.511.org/transit/stopPlaces?api_key={your-key}&operator_id=AC&stop_id=58538&format=Json

Parameters and Filters supported with the request

Parameter	Mandatory / Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
accept_language	*Optional.*	If multiple languages are supported, this can be used to request data in desired language, If the jurisdiction doesn't support the response in requested language, response could be in default language selected by jurisdiction.
Operator_id	*Mandatory*	The operator_id parameter supports filtering based on a particular operator id/code
Stop_id	*Optional*	The stop_id parameter supports filtering based on a particular stop id
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

The transit stop place response for XML is shown in Appendix A Section A.1.4. The transit stop place response for JSON is shown in Appendix B Section B.1.4.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual StopPlace resource cannot be identified)

2.5   API: Pattern

Pattern is an ordered list of stop points and time points for a Line, it describes a pattern followed by the public transport vehicle. A pattern may pass through the same stoppoint more than once. A Line may consist of more than one pattern.

Below is a message structure of dataObjects for Pattern contained within a NeTEx ServiceFrame.

Field	Type	Mandatory/ Optional	Description
ServiceFrame	NeTEx frame	*Mandatory*	NeTEx container frame for directions and journeyPatterns.
—directions	Collection of Direction	*Optional*	A collection of Direction elements referenced by the patterns within the journeyPatterns collection. Can contain multiple Direction elements, at least one occurrence is mandatory.
—journeyPatterns	Collection of ServiceJourney Pattern	*Mandatory*	A collection of ServiceJourneyPattern elements. Can contain multiple ServiceJourneyPattern elements, at least one occurrence is mandatory.

Direction structure

The Direction structure is the main element of the directions collection. It is a classification for the general orientation of a pattern within a Line.

Field	Type	Mandatory/ Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the Direction.
Name	Free Text	*Optional*	Name of the Direction.

ServiceJourneyPattern structure

The ServiceJourneyPattern structure is the main element of the journeyPatterns collection. It is the journeyPattern for a (passenger carrying) Service.

Field	Type	Mandatory/ Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the ServiceJourneyPattern.
Extensions	Container	*Mandatory*	Container for extensions to NeTEx
— LineRef	Free Text	*Mandatory*	Reference to the Line resource.
Name	Free Text	*Optional*	Name of the ServiceJourneyPattern.
DirectionRef	ID	*Mandatory*	Reference to the direction
DestinationDisplayView	Container	*Optional*	Container for Pattern Headsign
— FrontText	Free Text	*Optional*	Pattern Headsign (Should contain Pattern Destination information only)
pointsInSequence	Container	*Mandatory*	Contains sequence of points in Servicejourneypattern, points may be scheduledstop points or timingpoints.
—TimingPointInJourneyPattern	Container	*Mandatory*	A timing point within the Pattern
— TimingPointInJourneyPattern id (attribute)	Free Text	*Mandatory*	Unique identifier of TimingPointInJourneyPattern
— TimingPointInJourneyPattern order (attribute)	Positive Integer	*Mandatory*	Order of Point within PointsInSequence
——ScheduledStopPointRef ref (attribute)	Free Text	*Mandatory*	Identifier of Schedule Stoppoint corresponding to the timing point
——DestinationDisplayView	Container	*Optional*	If pattern headsign changes at a stop, specify the headsign here
———FrontText	Free Text	*Optional*	Headsign to display at the stop (Pattern Destination information only)

——Extensions	Container	*Mandatory*	Container for extensions to NeTEx
——— Name	Free Text	*Mandatory*	Timepoint Stop Name.
—StopPointInJourneyPattern	Container	*Mandatory*	A stop point within the Pattern
— StopPointInJourneyPattern id (attribute)	Free Text	*Mandatory*	Unique identifier of StopPointInJourneyPattern
— StopPointInJourneyPattern order (attribute)	Positive Integer	*Mandatory*	Order of Point within PointsInSequence
——ScheduledStopPointRef ref (attribute)	Free Text	*Mandatory*	Identifier of Schedule Stoppoint
——DestinationDisplayView	Container	*Optional*	If pattern headsign changes at a stop, specify the headsign here
———FrontText	Free Text	*Optional*	Headsign to display at the stop (Pattern Destination information only)
——Extensions	Container	*Mandatory*	Container for extensions to NeTEx
——— Name	Free Text	*Mandatory*	Stop Name.
linksInSequence	Container	*Optional*	Sequence of links (The pattern could be represented as one single link or multiple links in sequence)
—ServiceLinkInJourneyPattern	Container	*Optional*	SeviceLine in a specified order
——projections	Container	*Optional*	Projections of the link
———LinkSequenceProjection	Container	*Optional*	Projection of the link sequence as an ordered series of points
————gml:LineString	Line string	*Optional*	Series of points representing the link

Sample request endpoint for patterns

Request Type	GET
Request Endpoint Example	For e.g. http://api.511.org/transit/patterns?api_key={your-key}&operator_id=SF&pattern_id=151834

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.

accept_language	*Optional*	If multiple languages are supported, this can be used to request data in desired language, If the jurisdiction doesn't support the response in requested language, response could be in default language selected by jurisdiction.
Operator_id	*Mandatory*	The operator_id parameter limits the search for lines within a particular operator id/code
Pattern_id	*Optional*	The pattern_id parameter supports filtering based on a particular Patternid
Line_id	*Mandatory*	The line_id parameter limits the search for patterns within a particular line id (All patterns for specified line_id will be returned)
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

The transit pattern response for XML is shown in Appendix A Section A.1.5. The transit pattern response for JSON is shown in Appendix B Section B.1.5.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual Journey pattern resource cannot be identified)

2.6   API: Timetable

Timetable represents a timetable for a given Line, Direction and DayType. It also contains supporting elements referenced by the timetable such as the Route (ordered list of timepoints for which times are provided), day type (service type) and optionally day assignments (assignment of a daytype to each day within the service period). When the IncludeSpecialService parameter is set to true, this API returns all the holiday services (if any) for specified Line. When the InlcudeSpecialService parameter is set to false or the IncludeSpecialService parameter is not provided, it returns all the regular timetables for the specified Line. When the ExceptionDate parameter is set to a service exception date (one of the dates returned by the Holiday API for the same agency), the API returns the exception/holiday timetable for the specified line and date. If no timetables are returned, it shall be assumed that the agency is not providing any service for the line on the given exception date.

Below is a message structure of dataObjects for Timetable within a NeTEx CompositeFrame.

Field	Type	Mandatory / Optional	Description
CompositeFrame	NeTEx frame	*Mandatory*	NeTEx container version Frame that groups a set of content version frames to which same validity conditions have been assigned.

Field	Type	Mandatory/Optional	Description
— ServiceFrame	NeTEx frame	*Mandatory*	NeTEx container frame for routes which is collection of Route. Route represents an ordered list of timepoint stops for which times are provided in the timetable. Multiple routes could be provided in cases where multiple timetables are returned. Each timetable would reference the appropriate route for the timetable.
— ServiceCalendarFrame	NeTEx frame	*Mandatory*	NeTEx container frame for collection of DayType and DayTypeAssignments. Should contain at least one DayType. DayTypeAssignments are returned only if requested specifically using the input parameter(flag) IncludeDayTypeAssignments
— TimetableFrame	NeTEx frame	*Mandatory*	NeTEx container frame for a timetable. Multiple TimetableFrames can be returned, one per timetable. The id attribute of the TimetableFrame should be unique across all timetables.

Service Calendar Frame Structure

Field	Type	Mandatory/Optional	Description
ServiceFrame	NeTEx frame	*Mandatory*	NeTEx container frame for routes.
— routes	Collection of Routes	*Mandatory*	A collection of Route elements. Can contain multiple Route elements, at least one occurrence is mandatory.

Route Structure

The Route structure is the main element of the routes collection. At least one Route is mandatory within the routes. Route represents an ordered list of timepoint stops for which times are provided in the timetable.

Field	Type	Mandatory / Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the Route.
Name	Free Text	*Optional*	Name for the Route.
LineRef	ID	*Mandatory*	Reference to the Line, ref attribute contains identifier of the line

DirectionRef	ID	Mandatory	Reference to the Direction, ref attribute contains identifier to the Direction
pointsInSequence	Container	Mandatory	Container for ordered set of time points making up the Route. It should contain at least 2 PointOnRoute
— PointOnRoute	Free Text	Mandatory	It is the reference to the ordered route points of Route, id attribute contains unique identifier for PointOnRoute
—— PointRef	ID	Mandatory	It is reference scheduled stoppoint representing the timepoint, ref attribute contains identifier to the point

DayType Structure

The dayTypes structure contains the collection of DayTypes referenced by the timetables. DayType is a type of day characterized by one or more properties which affect public transport operation.

Field	Type	Mandatory / Optional	Description
id (Attribute)	Free Text	Mandatory	Unique identifier of the DayType.
Name	Free Text	Mandatory	Name of the DayType.
properties	Container	Mandatory	Container for the list of PropertyOfDay. Should contain at least one PropertyOfDay.
—PropertyOfDay	Container	Mandatory	A container for DaysOfWeek property.
——PropertyOfDayGroup	Enum	Mandatory	It contains DaysOfWeek logically appended together

DayTypeAssignment structure

The dayTypeAssignments structure contains the collection of DayTypeAssignments, which links every operating day within the service period to a daytype. The service period is defined within the Timetable Frame.

Field	Type	Mandatory/ Optional	Description
id (Attribute)	Free Text	Mandatory	Unique identifier of the DayTypeAssignment.
Description	Free Text	Optional	Description of the DayTypeAssignment
Date	Date	Mandatory	Operating Date (within the service period)
DayTypeRef	Reference	Mandatory	Reference to a DayType (within the ref attribute).

TimetableFrame structure

TimetableFrame is coherent set of timetable data which consist of vehicle Journeys and blocks to which the same validity condition has been assigned.

Field	Type	Mandatory/ Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the TimetableFrame.
Name	Free Text	*Optional*	Name of the TimetableFrame.
frameValidityConditions	Container	*Mandatory*	Container for the AvailabilityCondition which applies to whole Timetable.
— AvailabilityCondition	Container	*Mandatory*	It is a container for available conditions.
——FromDate	DateTime	*Mandatory*	Start date of Timetable validity period.
——ToDate	DateTime	*Mandatory*	End date of Timetable validity period.
——dayTypes	Container	*Mandatory*	Container for DayType reference. It lists the daytypes referenced by the timetable.
———DayTypeRef	ID	*Mandatory*	It is a reference to DayType, ref attribute has reference value to a DayType
vehicleJourneys	Container	*Mandatory*	Container for collection of ServiceJourney (Trip).
—ServiceJourney	Free Text	*Mandatory*	ServiceJourney is a planned movement of public transport on a DayType. Id attribute has unique identifier for Service Journey
——SiriVehicleJourneyRef	Free Text	*Mandatory*	An alternative code that uniquely identifies the journey. Specifically for use in AVMS systems
——JourneyPatternView	Container	*Mandatory*	It is a container for simplified journey pattern view
———— ServiceJourneyPatternRef	ID	*Mandatory*	Reference to Service Pattern, ref attribute contains identifier for service journey Pattern
——— RouteRef	ID	*Mandatory*	Reference to Route, ref attribute contains identifier for Route
——— DirectionRef	ID	*Mandatory*	Reference to Direction, ref attribute contain identifier for Direction
——calls	Container	*Mandatory*	It is container for complete sequence of stops along the route path.
———call	Container	*Mandatory*	It is a visit to a scheduled stop point as part of a vehicle journey, order attribute contains sequence number within the journey
———— ScheduledStopPointRef	ID	*Mandatory*	Reference to scheduled stop point, ref attribute contains identifier for scheduled stop point
————Arrival	Container	*Mandatory*	Container for arrival time for call
—————Time (Arrival)	Time	*Mandatory*	Arrival time for call

—————DaysOffset (Arrival)	Integer	*Mandatory*	When DaysOffset is set to 0, it indicates Time is for the current day. When set to 1, it indicates Time is for the next day.
—————Departure	Container	*Mandatory*	Container for departure time for call
—————Time (Departure)	Time	*Mandatory*	Departure time for call
—————DaysOffset (Departure)	Integer	*Mandatory*	When DaysOffset is set to 0, it indicates Time is for the current day. When set to 1, it indicates Time is for the next day.

Sample request endpoint for timetable

Request Type	GET
Request Endpoint Example	For e.g. http://api.511.org/transit/timetable?api_key={your-key}&operator_id=BA&line_id=COLS/OAKL

Parameters and Filters supported with the request

Parameter	Mandatory / Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
accept_language	*Optional*	If multiple languages are supported, this can be used to request data in desired language, If the jurisdiction doesn't support the response in requested language, response could be in default language selected by jurisdiction.
Operator_id	*Mandatory*	The operator_id parameter supports filtering based on a particular operator id/code
Line_id	*Mandatory*	The line_id parameter supports filtering based on a particular line id. All timetables for the line are returned
IncludeDayTypeAssignments	*Optional*	DayTypeAssignments will be included only if this flag is set to true.
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.
IncludeSpecialService	*Optional*	The timetables for service exceptions for the selected Line are returned (if available) when this parameter is set to 'true'. When this parameter is omitted or the value is set to 'false', service exceptions are not included. Any value other than 'true' or 'false' will result in a 404 error.

ExceptionDate	*Optional*	When this parameter is set to one of the dates returned by the Holiday API for the same agency, the exception/holiday timetable for the given line and the exception/holiday is returned. When no timetables are returned for an exception date (no TimetableFrame elements), it should be assumed that the agency is not providing any service for the line on the date. The ExceptionDate should be provided in the yyyymmdd format.

The transit timetable response for XML is shown in Appendix A Section A.1.6. The transit timetable response for JSON is shown in Appendix B Section B.1.6.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual Holiday resource cannot be identified)

2.7 API: Holidays

Holidays is a collection of service exceptions defined by an agency or operator.

Below is a message structure of dataObjects for service exceptions contained within a NeTEx ServiceCalendarFrame.

Field	Type	Mandatory/ Optional	Description
ServiceCalendarFrame	NeTEx frame	*Mandatory*	NeTEx container frame for service exceptions and dayTypes.
— ServiceCalendar	ServiceCalendar	*Mandatory*	Represents the service period.
— contentValidityConditions	Collection of AvailabilityCondition	*Mandatory*	A collection of AvailabilityCondition elements. Can contain multiple AvailabilityCondition elements. Each AvailabilityCondition specifies an exception date/holiday that the agency defines.

ServiceCalendar structure

The ServiceCalendar structure represents the service period for the service exceptions.

Field	Type	Mandatory/ Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the ServiceCalendar.
FromDate	DateTime	*Mandatory*	Start date of ServiceCalendar (Service Period)
ToDate	DateTime	*Mandatory*	End date of ServiceCalendar (Service Period)

AvailabilityCondition structure

The AvailabilityCondition structure is the main element of the contentValidityConditions collection. Every exception/holiday date defined by the agency is provided as an AvailabilityCondition element.

Field	Type	Mandatory/ Optional	Description
id (Attribute)	Free Text	*Mandatory*	Unique identifier of the AvailabilityCondition.
Description	Free Text	*Optional*	Description of the AvailabilityCondition.
FromDate	DateTime	*Mandatory*	Start date of AvailabilityCondition(Service Exception)
ToDate	DateTime	*Mandatory*	End date of AvailabilityCondition(Service Exception)

Sample request endpoint for stops

Request Type	GET For e.g. http://api.511.org/transit/holidays?api_key={your-key}&operator_id=SF

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
accept_language	*Optional.*	If multiple languages are supported, this can be used to request data in desired language, If the jurisdiction doesn't support the response in requested language, response could be in default language selected by jurisdiction.
Operator_id	*Mandatory*	The operator_id parameter supports filtering based on a particular operator id/code

api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

The transit Holidays response for XML is shown in Appendix A Section A.1.7. The transit Holidays response for JSON is shown in Appendix B Section B.1.7.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual Holiday resource cannot be identified)

2.8   API: Announcement *(Discontinued)*

Announcement is completely SIRI entity; it is a description of a situation/condition about the public transport. Announcement consists of Situations which is collection of PtSituationElement which contains description of situation/condition, at least one PtSituationElement is mandatory.

Amessage structure of PtSituationElement for Announcement contained within Situations is shown in Appendix C Section C.1.8.

Sample request endpoint for stops

Request Type	GET For e.g. http://api.511.org/transit/transitannouncements?api_key={your-key}

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
Operator_id	*Optional*	The operator_id parameter supports filtering based on a particular operator id/code
Line_id	*Optional*	The line_id parameter supports filtering based on a particular line id
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

The transit announcement response for XML is shown in Appendix A Section A.1.8. The transit announcement response for JSON is shown in Appendix B Section B.1.8.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual Announcement resource cannot be identified)

2.9   API: Transit Scheduled Departures for a Stop

SIRI Stop Timetable service provides static/scheduled timetables in the system for a particular stop. Amessage structure of Transit Scheduled Departures in SIRI ST (Stop Timetable) format which consists of a single **ServiceDelivery** node containing details on scheduled visits to this stop within a departure window is shown in Appendix C Section C.1.9.

Sample request endpoint

Request Type	**GET** For e.g. http://api.511.org/transit/stoptimetable?api_key={your-key}&MonitoringRef=13008&OperatorRef=SF

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
LineRef	*Optional*	The RouteCode that uniquely identifies a transit route.
OperatorRef	*Mandatory*	The operator_id parameter supports filtering based on a particular operator id/code
MonitoringRef	*Mandatory*	The StopCode that uniquely identifies a physical stop or platform.
StartTime	*Optional*	The start date parameter allows for requesting departures within a departure window.
EndTime	*Optional*	The end date parameter allows for requesting departures within a departure window.
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

The example response for XML in SIRI ST format is shown in Appendix A Section A.1.9. The example response for JSON in SIRI ST format is shown in Appendix B Section B.1.9.

2.10 API: Real-time predictions at a Stop

Siri Stop Monitoring service provides current and forthcoming vehicles arrivals and departures at a stop.

A message structure of real-time departures which consists of a single **ServiceDelivery** node containing details on monitored visits to this stop is shown in Appendix C Section C.1.10

Sample request endpoint

Request Type	**GET** For e.g. http://api.511.org/transit/StopMonitoring?api_key={your-key} &agency=AC

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.
agency	*Mandatory*	Agency ID to be monitored (e.g. actransit)
stopCode	*Optional*	Numeric stop code for the stop to be monitored. When stop code is not provided, the API will return all available information for all stops. Depending on the amount of data, the response time for the API can be more than 5-7 seconds.

The transit real time departure service delivery mode response for XML is shown in Appendix A Section A.1.10 and for JSON is shown in Appendix B Section B.1.10.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If a resource cannot be located)

2.11 API: Real-time Vehicle Monitoring

Siri Vehicle monitoring service provides information about current location and expected activities of a particular vehicle. It also provides details for current and subsequent Journey patterns.

A message structure for real-time vehicle/trip monitoring which consists of a single **ServiceDelivery** node containing details on vehicle/trip within an agency that are currently operational and being monitored is shown in Appendix C Section C.1.11.

Sample request endpoint

Request Type	GET
Request Endpoint Example	For e.g. http://api.511.org/transit/VehicleMonitoring?api_key={your-key}&agency=AC

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.
agency	*Mandatory*	Agency ID to be monitored (e.g. AC)
vehicleID	*Optional*	The unique identifier of the vehicle to be monitored.

The real time vehicle monitoring response for XML in SIRI format is shown in Appendix A Section A.1.11 and for JSON is shown in Appendix B Section B.1.11.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If a resource cannot be located)

2.12 API: Transit Schedule Updates for an agency *(Possible Future Implementation)*

Siri Production Timetable provides information about the expected operation of a transport network for a specified day.

Amessage structure of Transit Schedule Updates in SIRI PT (Production Timetable) format which consists of a single **ServiceDelivery** node containing details on schedule updates for a specific line and direction by an agency is shown in Appendix C Section C.1.12.

Sample request endpoint

Request Type	GET
Request Endpoint Example	

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
format	Optional	The response format (json/xml) desired. If none specified, then default response would be JSON.
OperatorRef	Mandatory	The Agency Name that uniquely identifies a transit agency.
Lineref	Optional	The unique identifier or a transit route. Value could either be RouteCode or RouteName as required. Recommend RouteCode because response has "PublishedLineName" as RouteName.
DirectionRef	Optional	Direction (ID) for the route.
api_key	Mandatory	Unique key assigned to a user after they signup for Open511.

The transit schedule update response for XML is shown in Appendix A Section A.1.12. The transit schedule update response for JSON is shown in Appendix B Section B.1.12.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If a resource cannot be located)

2.13 API: Transit Addition and Cancellation of Trips by Agency *(Possible Future Implementation)*

Siri Estimated Timetable service provides details of the operation of the transport network for a period within the current day, detailing real time deviations from the timetables and control actions affecting the Timetable (cancellations, additional Journeys and Detours).

A message structure of Transit Addition and Cancellation of Trips in SIRI ET (Estimated Timetable) format which consists of a single **ServiceDelivery** node containing details on schedule updates for a specific line and direction by an agency is shown in Appendix C Section C.1.13.

Sample request endpoint

Request Type	GET
Request Endpoint Example	

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
OperatorRef	*Mandatory*	The Agency Name that uniquely identifies a transit agency.
Lineref	*Optional*	The unique identifier or a transit route. Value could either be RouteCode or RouteName as required. Recommend RouteCode because response has "PublishedLineName" as RouteName.
DirectionRef	*Optional*	Direction (ID) for the route.
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

The transit addition and cancellation response for XML is shown in Appendix A Section A.1.13 and for JSON is shown in Appendix B Section B.1.13.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)

- 404 – Not found (If a resource cannot be located)

2.14 API: General Announcements *(Discontinued)*

Siri General Messaging Service provides a structured way to exchange arbitrary informative messages between participants, such as travel news, or operational advice.

A message structure of Service Announcements in SIRI GM (General Message) format which consists of a single **ServiceDelivery** node containing details on general messages is shown in Appendix C Section C.1.14.

Sample request endpoint

Request Type	**GET** For e.g. http://api.511.org/transit/GeneralAnnouncements?api_key={your-key}

Parameters and Filters supported with the request

Parameter	**Mandatory/ Optional**	**Description**
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

The transit general messaging service response for XML is shown in Appendix A Section A.1.14 and for JSON is shown in Appendix B Section B.1.14.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If a resource cannot be located)

2.15 API: GTFS-Realtime Trip Updates

GTFS-realtime Trip Updates service provides realtime update on the progress of the vehicles along a trip. Please refer to the GTFS-realtime Trip Updates Reference (https://developers.google.com/transit/gtfs-realtime/reference) for reference documentation regarding API response message structure.

GTFS-realtime trip updates service response format type is based on Protocol Buffers. Section B.1.

Sample request endpoint

Request Type	GET For e.g. http://api.511.org/Transit/TripUpdates?api_key={your-key}& agency=AC

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
format	*Conditional*	Conditional: mandatory if *Accept: application/x-google-protobuf* (or) *Accept: application/octet-stream* is not provided in HTTP header. The response format *protobuf* desired. If none specified, then *Accept: application/x-google-protobuf (*or) *Accept: application/octet-stream* must be provided in HTTP header.
agency	*Mandatory*	Agency ID to be monitored (e.g. AC)
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If a resource cannot be located)

2.16 API: GTFS-Realtime Vehicle Positions

GTFS-realtime Vehicle Positions service prodices realtime information about the vehicles including location and congestion level. Please refer to the GTFS-realtime Vehicle Positions Reference (https://developers.google.com/transit/gtfs-realtime/reference#VehiclePosition) for reference documentation regarding API response message structure

GTFS-realtime vehicle position service service response format type is based on Protocol Buffers. Section B.2.

Sample request endpoint

Request Type	GET For e.g. http://api.511.org/Transit/VehiclePositions?api_key={your-key}& agency=AC

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
format	*Conditional*	Conditional: mandatory if *Accept: application/x-google-protobuf* (or) *Accept: application/octet-stream* is not provided in HTTP header. The response format *protobuf* desired. If none specified, then *Accept: application/x-google-protobuf (*or) *Accept: application/octet-stream* must be provided in HTTP header.
agency	*Mandatory*	Agency ID to be monitored (e.g. AC)
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If a resource cannot be located)

2.17 GTFS Operator List

GTFS Operator List is the list of operators/agencies that have GTFS dataset available via Open511 APIs. This API also lists the operator that represents the regional GTFS feed.

Sample request endpoint

Request Type	**GET** For e.g. http://api.511.org/transit/gtfsoperators?api_key={your-key}

Below is a message structure of GTFSAgenciesList which is the main element of XML response for this API.

Field	Type	Mandatory/ Optional	Description
GTFSAgency	XML Element – Container	*Mandatory*	Parent element for each operator/agency providing details about that agency/operator

—Id	XML Attribute – Text	*Mandatory*	XML Attribute text value providing Carrier ID (Operator/Agency ID). Note: ID 'RG' represents regional GTFS feed
—Name	XML Attribute – Text	*Mandatory*	XML Attribute text value providing Carrier Name (Operator/Agency Name). Note: Name value 'Regional GTFS' represents regional GTFS Feed
— LastGenerated	XML Attribute – Text	*Mandatory*	XML Attribute text value providing timestamp when the last GTFS dataset was generated for this operator. The timestamp is in following format: `MM/dd/yyyy HH:mm:ss [AM|PM]` Example: 3/20/2016 2:52:54 AM

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

The transit GTFS Operator response for XML is shown in Appendix A Section A.1.15. The transit GTFS response for JSON is shown in Appendix B Section B.1.15.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual resource cannot be identified)

2.18 GTFS DataFeed download

GTFS datafeed download allows the user to download a zip file containing GTFS dataset for the specified operator/agency or the regional feed.

The zip file contains the text files corresponding to the GTFS file formats. It also contains additional files, called the GTFS+ files, that provide information that is not contained in the GTFS files such as the direction names, farezone names, etc. The list of GTFS+ files and their data structures are provided in Appendix D of this document.

When the request is processed successfully, the user will receive a zip file attachment in response to this API.

The regional GTFS feed can be downloaded by setting the operator_id parameter to the value 'RG'.

Historic regional GTFS feeds can be downloaded by using the historic parameter when the operator_id parameter is set to 'RG'. Additional information about Historic Regional GTFS Feed is available in Appendix E.

Sample request endpoint

Request Type	**GET** For e.g. http://api.511.org/transit/datafeeds?api_key={your-key}&operator_id=BG

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
Operator_id	*Mandatory*	The operator_id parameter supports filtering based on a particular operator id/code. These operator codes/IDs can be retrieved from CarrierID filed in the GTFS Operator List API response. The operator_id 'RG' can be used to download regional GTFS dataset.
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.
historic	*Optional*	Use this parameter to download historic regional feeds. This parameter should be used only with operator_id=RG. The value should be set as below: - A single month should be denoted with year and month in the format YYYY-MM (For example, '2020-02' for February 2020) NOTE: Data is available starting January 2020.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual resource cannot be identified)

2.19 GTFS ServiceAlerts
A GTFS dataset for Service Alerts. Service Alerts allow you to provide updates whenever there is disruption on the network.

Data formats supported are: JSON, XML, and Protobuf (default).

Sample request endpoint

Request Type	**GET** http://api.511.org/transit/servicealerts?api_key={your-key}

Parameters and Filters supported with the request

Parameter	Mandatory/ Optional	Description
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.
format	*Optional*	"json" to receive a JSON response or "xml" to receive an XML response
agency	*Optional*	When Agency/Operator ID are provided, the service alerts are filtered by the agency ID. These IDs could be obtained from operators API endpoint.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual resource cannot be identified)

2.20 API: Shapes

Shapes describe the path that a vehicle travels along a trip. Consumers can request the shape for an agency's trip id. Trip ids can be obtained using the Timetable API.

Below is a message structure of dataObjects for shapes contained within a NeTEx TimetableFrame.

Field	Type	Mandatory/ Optional	Description
vehicleJourneys	Container	*Mandatory*	Container for collection of ServiceJourney (Trip).
—ServiceJourney	Free Text	*Mandatory*	ServiceJourney is a planned movement of public transport, which is equivalent to a trip. Id attribute has unique identifier for the trip.

____ LinkSequenceProjection	Free Text	*Mandatory*	Corresponds to a shape, which is a collection of ordered points along the path of the vehicle. Id attribute has unique identifier for the shape.
————gml:LineString	Free Text	*Mandatory*	Special curve that consists of a single segment with linear interpolation. The 'srsName' attribute specifies the coordinate reference system used.
————gml:pos	Free Text	*Mandatory*	Coordinates for a point within the line, per the coordinate reference system specified in the srsName attribute of <gml:LineString>.

Sample request endpoint for lines

Request Type	GET
Request EndPoint Example	For e.g. http://api.511.org/transit/shapes?api_key={your-key}&operator_id=BA &trip_id=3010811SUN

Parameters and Filters

Parameters and Filters supported with the request are shown in the table below. The shape response for XML is shown in Appendix A Section A.1.18. The transit line response for JSON is shown in Appendix B Section B.1.18.

Parameter	Mandatory/ Optional	Description
Format	*Optional*	The response format (json/xml) desired. If none specified, then default response would be JSON.
accept_language	*Optional*	If multiple languages are supported, this can be used to request data in desired language, If the jurisdiction doesn't support the response in requested language, response could be in default language selected by jurisdiction.
Operator_id	*Mandatory*	The operator_id parameter specifies the operator id/code for which the shape is requested.
trip_id	*Mandatory*	The trip_id parameter specifies the trip id for which the shape is requested.
api_key	*Mandatory*	Unique key assigned to a user after they signup for Open511.

Possible Errors

Listed below are HTTP status code and message returned for certain common errors:

- 500 - Internal Server Error (System has issues processing your request)
- 401 – Unauthorized (Invalid API key)
- 404 – Not found (If an individual shape resource cannot be located). For e.g. http://api.511.org/transit/shapes?api_key={your-key}&operator_id=1345&trip_id=123

3 Appendix A: API Response Messages- XML

3.1 Transit XML

A.1.1 Example Transit Operator Response (XML)

```xml
<?xmlversion="1.0"encoding="iso-8859-1"?>
<siri:Sirixsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/netex/schema/0.99.1/xsd/NeTEx_siri.xsd"xmlns:siri="http://w
ww.siri.org.uk/siri"xmlns="http://www.netex.org.uk/netex"xmlns:xsi="http://www.w3.org/2001/XMLSche
ma-instance" >
  <siri:ServiceDelivery>
    <siri:ResponseTimestamp>2012-12-17T09:30:46-05:00</siri:ResponseTimestamp>
    <DataObjectDelivery>
      <siri:ResponseTimestamp>2012-12-17T09:30:47.0Z</siri:ResponseTimestamp>
      <dataObjects>
        <ResourceFrame id="RF" version="any">
          <organisations>
            <Operator id="SF" version="any">
              <Extensions>
                <Monitored>true</Monitored>
                <OtherModes>tram funicular</OtherModes>
                <Coverage>
                  <gml:Polygon srsName="EPSG:4326">
                    <gml:coordinates>
                      -71.17,47.33 -71.15,47.36 -71.10,47.35 -71.20,47.40
                    </gml:coordinates>
                  </gml:Polygon>
                </Coverage>
              </Extensions>
              <PrivateCode>SF</PrivateCode>
              <SiriOperatorRef>SF </SiriOperatorRef>
              <Name>Muni (San Francisco)</Name>
              <ShortName>Muni</ShortName>
              <Locale>
                <TimeZone>America/Vancouver</TimeZone>
                <DefaultLanguage>en</DefaultLanguage>
              </Locale>
              <ContactDetails>
                <ContactTelephoneNumber>1-415-701-2311</ContactTelephoneNumber>
                <WebSite>http://www.sfmta.com/</WebSite>
              </ContactDetails>
              <PrimaryMode>bus</PrimaryMode>
            </Operator>
          </organisations>
        </ResourceFrame>
      </dataObjects>
    </DataObjectDelivery>
  </siri:ServiceDelivery>
</siri:Siri>
```

A.1.2 Example Transit Line Response (XML)

```xml
<?xmlversion="1.0"encoding="iso-8859-1"?>
<siri:Sirixsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/netex/schema/0.99.1/xsd/NeTEx_siri.xsd"xmlns:siri="http://w
ww.siri.org.uk/siri"xmlns="http://www.netex.org.uk/netex"xmlns:xsi="http://www.w3.org/2001/XMLSche
ma-instance" >
<siri:ServiceDelivery>
      <siri:ResponseTimestamp>2013-09-09T16:55:24-08:00</siri:ResponseTimestamp>
      <DataObjectDelivery>
        <siri:ResponseTimestamp>2013-09-09T16:55:24-08:00</siri:ResponseTimestamp>
        <dataObjects>
          <ServiceFrame id="SF" version="any">
            <lines>
              <Line version="any" id=" BA:BAY PT/SFIA">
                <Name> Pittsburg/Bay Point to San Francisco International Airport</Name>
                <TransportMode>rail</TransportMode>
                <PublicCode></PublicCode>
                <SiriLineRef>722</SiriLineRef>
                <OperatorRef ref="BA"/>
                <Monitored>true</Monitored>
              </Line>
            </lines>
          </ServiceFrame>
        </dataObjects>
      </DataObjectDelivery>
    </siri:ServiceDelivery>
  </siri:Siri>
```

A.1.3 Example Transit Stop Response (XML)

```xml
<?xml version="1.0" encoding="utf-8"?>
<siri:Siri xmlns="http://www.netex.org.uk/netex" xmlns:siri="http://www.siri.org.uk/siri"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:atom="http://www.w3.org/2005/Atom" xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/netex/schema/0.99.1/xsd/NeTEx_siri.xsd" version="1.0">
  <siri:ServiceDelivery>
    <siri:ResponseTimestamp>2019-11-22T13:58:57-08:00</siri:ResponseTimestamp>
    <DataObjectDelivery>
      <siri:ResponseTimestamp>2019-11-22T13:58:57-08:00</siri:ResponseTimestamp>
      <dataObjects>
        <ServiceFrame version="any" id="SB">
          <scheduledStopPoints>
            <ScheduledStopPoint version="any" id="890001">
              <Extensions>
                <LocationType>0</LocationType>
                <PlatformCode />
                <ParentStation>2455444</ParentStation>
              </Extensions>
              <Name>San Francisco Ferry Building (Gate E)</Name>
              <Location>
                <Longitude>-122.391612</Longitude>
                <Latitude>37.795106</Latitude>
              </Location>
              <Url />
              <StopType>ferryStop</StopType>
            </ScheduledStopPoint>
            <ScheduledStopPoint version="any" id="890002">
              <Extensions>
                <LocationType>0</LocationType>
                <PlatformCode />
                <ParentStation>2455444</ParentStation>
              </Extensions>
              <Name>San Francisco Ferry Building (Gate G)</Name>
              <Location>
                <Longitude>-122.39079</Longitude>
                <Latitude>37.79436</Latitude>
              </Location>
              <Url />
              <StopType>ferryStop</StopType>
            </ScheduledStopPoint>
            <ScheduledStopPoint version="any" id="2455444">
              <Extensions>
                <LocationType>1</LocationType>
                <PlatformCode />
                <ParentStation />
              </Extensions>
              <Name>San Francisco Ferry Building</Name>
              <Location>
                <Longitude>-122.3933798907</Longitude>
                <Latitude>37.7954865278</Latitude>
```

```
              </Location>
              <Url />
              <StopType>ferryStop</StopType>
            </ScheduledStopPoint>
          </scheduledStopPoints>
          <stopAreas>
            <StopArea version="any" id="StopArea:2455444">
              <Name>San Francisco Ferry Building</Name>
              <members>
                <ScheduledStopPointRef version="any" ref="890001" />
                <ScheduledStopPointRef version="any" ref="890002" />
              </members>
              <ParentStopAreaRef version="any" ref="2455444" />
            </StopArea>
          </stopAreas>
        </ServiceFrame>
      </dataObjects>
    </DataObjectDelivery>
  </siri:ServiceDelivery>
</siri:Siri>
```

A.1.4 Example Transit Stop Place Response (XML)

```
<?xml version="1.0" encoding="iso-8859-1"?>
<siri:Siri xsi:schemaLocation="http://www.siri.org.uk/siri ../../../xsd/NeTEx_siri.xsd"
xmlns:siri="http://www.siri.org.uk/siri" xmlns="http://www.netex.org.uk/netex"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:atom="http://www.w3.org/2005/Atom" version="1.0">
  <siri:ServiceDelivery>
    <siri:ResponseTimestamp>2012-12-17T09:30:46-05:00</siri:ResponseTimestamp>
    <DataObjectDelivery>
      <siri:ResponseTimestamp>2012-12-17T09:30:47.0Z</siri:ResponseTimestamp>
      <dataObjects>
        <SiteFrame version="any"  id="SF">
        <stopPlaces>
          <StopPlace version="01" id="BA:12232">
    <Name>BART LAKE MERRIT</Name>
              <Description>800 Madison StreetOakland, CA 94607 (Between Madison St
&amp; Fallon St and 8th &amp; 9th)</Description>
          <Centroid>
                <Location>
                  <Longitude>-122.265668</Longitude>
                  <Latitude>37.797345</Latitude>
                </Location>
    </Centroid>
    <AccessibilityAssessment version="any" id="AccessibilityAssessment:BA:12232">
      <MobilityImpairedAccess>true</MobilityImpairedAccess>
      <limitations>
        <AccessibilityLimitation>
    <WheelchairAccess>true</WheelchairAccess>
  </AccessibilityLimitation>
      </limitations>
    </AccessibilityAssessment>
        <alternativeNames>
    <AlternativeName version="any" id="AlternativeName:BA:12232">          <Name>Lake
Merrit Station</Name>
```

```xml
              </AlternativeName>
            </alternativeNames>
              <PostalAddress version="any" id="PostalAddress:BA:12232">
                <AddressLine1>800 Madison St</AddressLine1>
                <Town>Oakland</Town>
              </PostalAddress>
              <Url>http://www.bart.gov/stations/LAKE</Url>
              <OperatorRef ref="BA"/>
              <adjacentSites>
                <ParkingRef ref="4234"/>
              </adjacentSites>
              <placeEquipments>
                <SanitaryEquipment version="any" id="123">
                  <Description>RestRoom in upper level</Description>
                </SanitaryEquipment>
                <CycleStorageEquipment version="any" id="233">
                  <Description>Bike Racks</Description>
                  <CycleStorageType>racks</CycleStorageType>
                  <NumberOfSpaces>4</NumberOfSpaces>
                </CycleStorageEquipment>
                <CycleStorageEquipment version="any" id="242">
                  <Description>Bike Lockers</Description>
                  <CycleStorageType>other</CycleStorageType>
                  <NumberOfSpaces>10</NumberOfSpaces>
                </CycleStorageEquipment>
                <SignEquipment version="any" id="141">
                  <Description>Information Display Board</Description>
                </SignEquipment>
                <EscalatorEquipment version="any" id="335">
                  <Description>Escalator 335</Description>
                </EscalatorEquipment>
                <LiftEquipment version="any" id="312">
                  <Description>Escalator 312</Description>
                </LiftEquipment>
                <ShelterEquipment version="any" id="12">
                  <Description>Waiting area 1</Description>
                </ShelterEquipment>
                <SeatingEquipment version="any" id="4566">
                  <Description>Bench near waiting area</Description>
                </SeatingEquipment>
              </placeEquipments>
      <PublicCode>1564</PublicCode>
      <TransportMode>rail</TransportMode>
      <StopPlaceType>railStation</StopPlaceType>
      <quays>
       <Quay version="any" id="543">
        <CompassOctant>W</CompassOctant>
       </Quay>
      </quays>
     </StopPlace>
       </stopPlaces>
         <parkings>
        <Parking version="any" id="4234">
     <Name>Lake Merritt BART Station Parking</Name>
     <Description>On Broadway, between 11th &amp; 14th</Description>
     <Centroid>
      <Location>
       <Longitude>-122.266382</Longitude>
       <Latitude>37.796615</Latitude>
```

```xml
            </Location>
      </Centroid>
                  <PostalAddress version="any" id="PostalAddress:4234">
                      <AddressLine1>800 Madison St</AddressLine1>
                      <Town>Oakland</Town>
                  </PostalAddress>
      <ParkingType>trainStationParking</ParkingType>
         <TotalCapacity>296</TotalCapacity>
            <RealTimeOccupancyAvailable>false</RealTimeOccupancyAvailable>
      <parkingAreas>
       <ParkingArea version="any" id="123">
        <Description>Accessible Parking</Description>
        <ParkingProperties>
             <ParkingUserType>registeredDisabled</ParkingUserType>
         <spaces>
           <ParkingCapacity version="any" id="ParkingCapacity:123">
      <NumberOfSpaces>10</NumberOfSpaces>
         </ParkingCapacity>
         </spaces>
        </ParkingProperties>
       </ParkingArea>
       <ParkingArea version="any" id="124">
        <Description>Reserved Parking</Description>
        <ParkingProperties>
        <ParkingUserType>reservationHolders</ParkingUserType>
        <spaces>
         <ParkingCapacity version="any" id="ParkingCapacity:124">
      <NumberOfSpaces>99</NumberOfSpaces>                 </ParkingCapacity>
         </spaces>
             <charges>
               <tariffBands>
                 <ParkingTariffChargeBand>
                    <Description>Single Day Reserved Parking</Description>
                    <MaximumStay>P1D</MaximumStay>
                    <Amount>4.50</Amount>
                 </ParkingTariffChargeBand>
                 <ParkingTariffChargeBand>
                    <Description>Monthly Reserved Parking</Description>
                    <MaximumStay>P1M</MaximumStay>
                    <Amount>100</Amount>
                 </ParkingTariffChargeBand>
               </tariffBands>
             </charges>
        </ParkingProperties>
       </ParkingArea>
             </parkingAreas>
      </Parking>
     </parkings>
          </SiteFrame>
        </dataObjects>
      </DataObjectDelivery>
    </siri:ServiceDelivery>
</siri:Siri>
```

A.1.5 Example Transit Pattern Response (XML)

```xml
<?xml version="1.0" encoding="iso-8859-1"?>
```

```xml
<siri:Siri version="1.0" xmlns:gml="http://www.opengis.net/gml"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://www.netex.org.uk/netex" xmlns:siri="http://www.siri.org.uk/siri"
xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/netex/schema/0.99.1/xsd/NeTEx_siri.xsd">
  <siri:ServiceDelivery>
    <siri:ResponseTimestamp>2016-11-08T09:41:50-08:00</siri:ResponseTimestamp>
    <DataObjectDelivery>
      <siri:ResponseTimestamp>2016-11-08T09:41:50-08:00</siri:ResponseTimestamp>
      <dataObjects>
        <ServiceFrame id="Alcatraz Hornblower Ferry" version="any">
          <directions>
            <Direction id="IB" version="any">
              <Name>Inbound</Name>
            </Direction>
            <Direction id="OB" version="any">
              <Name>Outbound</Name>
            </Direction>
          </directions>
          <journeyPatterns>
            <ServiceJourneyPattern id="192989" version="any">
              <Extensions>
                <LineRef version="any" ref="Day Tour Ferry"/>
              </Extensions>
              <DirectionRef version="any" ref="IB"/>
              <DestinationDisplayView>
                <FrontText>Alcatraz</FrontText>
              </DestinationDisplayView>
              <pointsInSequence>
                <TimingPointInJourneyPattern id="8329124" version="any" order="1">
                  <ScheduledStopPointRef version="any" ref="12175093"/>
                  <Extensions>
                    <Name>Pier 33</Name>
                  </Extensions>
                </TimingPointInJourneyPattern>
                <TimingPointInJourneyPattern id="8329125" version="any" order="2">
                  <ScheduledStopPointRef version="any" ref="12175092"/>
                  <Extensions>
                    <Name>Alcatraz</Name>
                  </Extensions>
                </TimingPointInJourneyPattern>
              </pointsInSequence>
            </ServiceJourneyPattern>
            <ServiceJourneyPattern id="192990" version="any">
              <Extensions>
                <LineRef version="any" ref="Day Tour Ferry"/>
              </Extensions>
              <DirectionRef version="any" ref="OB"/>
              <DestinationDisplayView>
                <FrontText>Pier 33</FrontText>
              </DestinationDisplayView>
              <pointsInSequence>
                <TimingPointInJourneyPattern id="8329126" version="any" order="1">
                  <ScheduledStopPointRef version="any" ref="12175092"/>
                  <Extensions>
                    <Name>Alcatraz</Name>
                  </Extensions>
                </TimingPointInJourneyPattern>
                <TimingPointInJourneyPattern id="8329127" version="any" order="2">
```

```
                        <ScheduledStopPointRef version="any" ref="12175093"/>
                        <Extensions>
                           <Name>Pier 33</Name>
                        </Extensions>
                     </TimingPointInJourneyPattern>
                  </pointsInSequence>
               </ServiceJourneyPattern>
            </journeyPatterns>
         </ServiceFrame>
      </dataObjects>
   </DataObjectDelivery>
  </siri:ServiceDelivery>
</siri:Siri>
```

A.1.6 Example Timetable Response (XML)

```
<?xmlversion="1.0"encoding="iso-8859-1"?>
<siri:Sirixsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/netex/schema/0.99.1/xsd/NeTEx_siri.xsd"xmlns:siri="http://w
ww.siri.org.uk/siri"xmlns="http://www.netex.org.uk/netex"xmlns:xsi="http://www.w3.org/2001/XMLSche
ma-instance"xmlns:atom="http://www.w3.org/2005/Atom"version="1.0">
  <siri:ServiceDelivery>
     <siri:ResponseTimestamp>2012-12-17T09:30:46-05:00</siri:ResponseTimestamp>
     <DataObjectDelivery>
       <siri:ResponseTimestamp>2012-12-17T09:30:47.0Z</siri:ResponseTimestamp>
       <dataObjects>
         <CompositeFrame id="CF" version="1">
            <frames>
              <ServiceFrame id="SF" version="any">
                <routes>
                  <Route id="BG:TIBURON:North:Weekday" version="any">
                    <Name>Tiburon_North_Weekday</Name>
                    <LineRef ref="BG:TIBURON" version="any" />
                    <DirectionRef ref="BG:TIBURON:North" version="any" />
                    <pointsInSequence>
                      <PointOnRoute id="BG:TIBURON:North:Weekday:1" version="any">
                        <PointRef ref="BG:4432" version="any"
xsi:type="ScheduledStopPointRefStructure" />
                      </PointOnRoute>
                      <PointOnRoute id="BG:TIBURON:North:Weekday:2" version="any">
                        <PointRef ref="BG:4433" version="any"
xsi:type="ScheduledStopPointRefStructure" />
                      </PointOnRoute>
                      <PointOnRoute id="BG:TIBURON:North:Weekday:3" version="any">
                        <PointRef ref="BG:4437" version="any"
xsi:type="ScheduledStopPointRefStructure" />
                      </PointOnRoute>
                    </pointsInSequence>
                  </Route>
                  <Route id="BG:TIBURON:North:Weekend" version="any">
                    <Name>Tiburon_North_Weekend</Name>
                    <LineRef ref="BG:TIBURON" version="any" />
                    <DirectionRef ref="BG:TIBURON:North" version="any" />
                    <pointsInSequence>
                      <PointOnRoute id="BG:TIBURON:North:Weekend:1" version="any">
```

```xml
                    <PointRef ref="BG:4433" version="any"
xsi:type="ScheduledStopPointRefStructure" />
                </PointOnRoute>
                <PointOnRoute id="BG:TIBURON:North:Weekend:2" version="any">
                    <PointRef ref="BG:4437" version="any"
xsi:type="ScheduledStopPointRefStructure" />
                </PointOnRoute>
              </pointsInSequence>
            </Route>
          </routes>
        </ServiceFrame>
        <ServiceCalendarFrame id="SC" version="any">
          <dayTypes>
            <DayType id="BG:Weekday" version="any">
              <Name>Weekday</Name>
              <properties>
                <PropertyOfDay>
                  <DaysOfWeek>Monday Tuesday Wednesday Thursday Friday</DaysOfWeek>
                </PropertyOfDay>
              </properties>
            </DayType>
            <DayType id="BG:Weekend" version="any">
              <Name>Weekend</Name>
              <properties>
                <PropertyOfDay>
                  <DaysOfWeek>Saturday Sunday</DaysOfWeek>
                </PropertyOfDay>
              </properties>
            </DayType>
          </dayTypes>
          <dayTypeAssignments>
            <DayTypeAssignment>
              <DayTypeRef ref="BG:Weekday" version="any" />
            </DayTypeAssignment>
          </dayTypeAssignments>
        </ServiceCalendarFrame>
        <TimetableFrame id="BG:TIBURON:North:Weekday" version="any">
          <Name>Tiburon_North_Weekday</Name>
          <frameValidityConditions>
            <AvailabilityCondition id="AC:BG:TIBURON:North:Weekday" version="any">
              <FromDate>2013-02-06T00:00:00Z</FromDate>
              <ToDate>2013-06-06T00:00:00Z</ToDate>
              <dayTypes>
                <DayTypeRef ref="BG:Weekday" version="any" />
              </dayTypes>
            </AvailabilityCondition>
          </frameValidityConditions>
          <vehicleJourneys>
            <ServiceJourney id="BG:11455" version="any">
              <SiriVehicleJourneyRef>11455</SiriVehicleJourneyRef>
              <JourneyPatternView>
                <ServiceJourneyPatternRef ref="BG:112333" version="any" />
                <RouteRef ref="BG:TIBURON:North:Weekday" version="any" />
                <DirectionRef ref="BG:TIBURON:North" version="any" />
              </JourneyPatternView>
              <calls>
                <Call order="1">
                  <ScheduledStopPointRef ref="BG:4432" />
                  <Arrival>
```

```xml
                    <Time>06:05:00</Time>
                    <DaysOffset>0</DaysOffset>
                  </Arrival>
                  <Departure>
                    <Time>06:05:00</Time>
                    <DaysOffset>0</DaysOffset>
                  </Departure>
                </Call>
                <Call order="2">
                  <ScheduledStopPointRef ref="BG:4437" />
                  <Arrival>
                    <Time>06:30:00</Time>
                    <DaysOffset>0</DaysOffset>
                  </Arrival>
                  <Departure>
                    <Time>06:30:00</Time>
                    <DaysOffset>0</DaysOffset>
                  </Departure>
                </Call>
              </calls>
            </ServiceJourney>
            <ServiceJourney id="BG:11456" version="any">
              <SiriVehicleJourneyRef>11456</SiriVehicleJourneyRef>
              <JourneyPatternView>
                <ServiceJourneyPatternRef ref="BG:112334" version="any" />
                <RouteRef ref="BG:TIBURON:North:Weekday" version="any" />
                <DirectionRef ref="BG:TIBURON:North" version="any" />
              </JourneyPatternView>
              <calls>
                <Call order="1">
                  <ScheduledStopPointRef ref="BG:4433" />
                  <Arrival>
                    <Time>10:10:00</Time>
                    <DaysOffset>0</DaysOffset>
                  </Arrival>
                  <Departure>
                    <Time>10:10:00</Time>
                    <DaysOffset>0</DaysOffset>
                  </Departure>
                </Call>
                <Call order="2">
                  <ScheduledStopPointRef ref="BG:4437" />
                  <Arrival>
                    <Time>10:45:00</Time>
                    <DaysOffset>0</DaysOffset>
                  </Arrival>
                  <Departure>
                    <Time>10:45:00</Time>
                    <DaysOffset>0</DaysOffset>
                  </Departure>
                </Call>
              </calls>
            </ServiceJourney>
          </vehicleJourneys>
        </TimetableFrame>
      </frames>
    </CompositeFrame>
  </dataObjects>
</DataObjectDelivery>
```

```
    </siri:ServiceDelivery>
</siri:Siri>
```

A.1.7 Example Transit Holiday Response (XML)

```xml
<?xml version="1.0" encoding="iso-8859-1"?>
<siri:Siri xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/netex/schema/0.99.1/xsd/NeTEx_siri.xsd"
xmlns:siri="http://www.siri.org.uk/siri" xmlns="http://www.netex.org.uk/netex"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:gml="http://www.opengis.net/gml" version="1.0">
  <siri:ServiceDelivery>
    <siri:ResponseTimestamp>2017-09-21T14:19:54-07:00</siri:ResponseTimestamp>
    <DataObjectDelivery>
      <siri:ResponseTimestamp>2017-09-21T14:19:54-07:00</siri:ResponseTimestamp>
      <dataObjects>
        <ServiceCalendarFrame id="SB" version="any">
          <ServiceCalendar id="SB" version="any">
            <FromDate>2017-05-01</FromDate>
            <ToDate>2017-10-29</ToDate>
          </ServiceCalendar>
          <contentValidityConditions>
            <AvailabilityConditions version="any" id="SB:2017-07-04">
              <FromDate>2017-07-04T00:00:00-07:00</FromDate>
              <ToDate>2017-07-04T23:59:00-07:00</ToDate>
            </AvailabilityConditions>
            <AvailabilityConditions version="any" id="SB:2017-09-04">
              <FromDate>2017-09-04T00:00:00-07:00</FromDate>
              <ToDate>2017-09-04T23:59:00-07:00</ToDate>
            </AvailabilityConditions>
          </contentValidityConditions>
        </ServiceCalendarFrame>
      </dataObjects>
    </DataObjectDelivery>
  </siri:ServiceDelivery>
</siri:Siri>
```

A.1.8 Example Transit Announcement Response (XML)

```xml
<?xml version="1.0" encoding="utf-8"?>
<Siri xmlns="http://www.siri.org.uk/siri" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.3" xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/siri/schema/1.3/siri.xsd">
  <ServiceDelivery>
    <ResponseTimestamp>2013-02-14T16:05:51Z</ResponseTimestamp>
    <SituationExchangeDelivery version="1.3">
      <ResponseTimestamp>2013-02-14T16:05:51Z</ResponseTimestamp>
      <Situations>
        <PtSituationElement>
          <CreationTime>2013-02-14T16:00:01Z</CreationTime>
          <SituationNumber>734</SituationNumber>
          <Source>
            <SourceType>feed</ SourceType >
            <Name>MTC</Name>
          </Source>
```

```
      <ValidityPeriod>
       <StartTime>2013-02-14T16:00:00Z</StartTime>
       <EndTime>2013-02-14T18:00:00Z</EndTime>
      </ValidityPeriod>
      <Priority>1</Priority>
      <ScopeType>route</ScopeType>
      <Summary>Major BART Delay</Summary>
      <Description>On Thursday, February 14, at 4:00pm, BART reports a major delay on the Daly
City Line in the East Bay direction due to an equipment problem on a train.</Description>
      <InfoLinks>
       <InfoLink>
        <Uri>http://www.bart.gov/</Uri>
       </InfoLink>
            </InfoLinks>
      <Consequences>
       <Consequence>
        <Severity>severe</Severity>
        <Affects>
         <Operators>
          <AffectedOperator>
           <OperatorRef>BA</OperatorRef>
           <OperatorName>BART</OperatorName>
          </AffectedOperator>
         </Operators>
         <Networks>
          <AffectedNetwork>
           <AffectedLine>
            <LineRef>05099</LineRef>
           </AffectedLine>
          </AffectedNetwork>
         </Networks>
         <StopPoints>
          <AffectedStopPoints>
           <StopPointRef>198761</OperatorRef>
           <StopPointRef>198762</OperatorRef>
           <StopPointRef>198763</OperatorRef>
           <StopPointRef>198764</OperatorRef>
          </AffectedStopPoints >
         </StopPoints>          </Affects>
        </Consequence>
      </Consequences>
    </PtSituationElement>
   </Situations>
  </SituationExchangeDelivery>
 </ServiceDelivery>
</Siri>
```

A.1.9 Example Transit Scheduled Depatures for a Stop Response (XML) in SIRI ST format

```
<?xml version="1.0" encoding="iso-8859-1"?>
<Siri xmlns="http://www.siri.org.uk/siri" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance"  xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/siri/schema/1.4/siri.xsd" version="1.4">
  <ServiceDelivery>
    <ResponseTimestamp>2013-09-10T13:08:23-08:00</ResponseTimestamp>
    <Status>true</Status>
```

```xml
    <StopTimetableDelivery>
      <ResponseTimestamp>2013-09-10T13:08:23-08:00</ResponseTimestamp>
      <SubscriptionRef>511SFBay</SubscriptionRef>
      <TimetabledStopVisit version="1.4">
        <RecordedAtTime>2013-09-02T22:16:20-08:00</RecordedAtTime>
        <MonitoringRef>12018522</MonitoringRef>
        <TargetedVehicleJourney>
          <LineRef>917</LineRef>
          <DirectionRef>S</DirectionRef>
          <FramedVehicleJourneyRef>
            <DataFrameRef>2013-08-22</DataFrameRef>
            <DatedVehicleJourneyRef>4718334</DatedVehicleJourneyRef>
          </FramedVehicleJourneyRef>
          <PublishedLineName>DALY/FREMONT</PublishedLineName>
          <OperatorRef>BA</OperatorRef>
          <OriginRef>12018513</OriginRef>
          <OriginName>BART DALY CITY</OriginName>
          <DestinationRef>12018519</DestinationRef>
          <DestinationName>BART FREMONT</DestinationName>
          <VehicleJourneyName>FREMONT</VehicleJourneyName>          <TargetedCall>
            <VisitNumber>1</VisitNumber>
            <AimedArrivalTime>2013-08-22T12:01:00-08:00</AimedArrivalTime>
            <AimedDepartureTime>2013-08-22T12:01:00-08:00</AimedDepartureTime>
          </TargetedCall>
        </TargetedVehicleJourney>
      </TimetabledStopVisit>
      <TimetabledStopVisit version="1.4">
        <RecordedAtTime>2013-09-02T22:16:20-08:00</RecordedAtTime>
        <MonitoringRef>12018522</MonitoringRef>
        <TargetedVehicleJourney>
          <LineRef>917</LineRef>
          <DirectionRef>S</DirectionRef>
          <FramedVehicleJourneyRef>
            <DataFrameRef>2013-08-22</DataFrameRef>
            <DatedVehicleJourneyRef>4718335</DatedVehicleJourneyRef>
          </FramedVehicleJourneyRef>
          <PublishedLineName>DALY/FREMONT</PublishedLineName>
          <OperatorRef>BA</OperatorRef>
          <OriginRef>12018513</OriginRef>
          <OriginName>BART DALY CITY</OriginName>
          <DestinationRef>12018519</DestinationRef>
          <DestinationName>BART FREMONT</DestinationName>
          <VehicleJourneyName>FREMONT</VehicleJourneyName>
          <TargetedCall>
            <VisitNumber>1</VisitNumber>
            <AimedArrivalTime>2013-08-22T12:16:00-08:00</AimedArrivalTime>
            <AimedDepartureTime>2013-08-22T12:16:00-08:00</AimedDepartureTime>
          </TargetedCall>
        </TargetedVehicleJourney>
      </TimetabledStopVisit>
    </StopTimetableDelivery>
  </ServiceDelivery>
</Siri>
```

A.1.10 Example Transit Real Time Predictions at a Stop Response (XML) in SIRI format

```xml
<?xml version="1.0" encoding="UTF-8"?>
```

```
<Siri xmlns="http://www.siri.org.uk/siri" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.4" xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/siri/schema/1.4/siri.xsd">
  <ServiceDelivery>
    <ResponseTimestamp>2004-12-17T09:30:46-05:00</ResponseTimestamp>
    <ProducerRef>BA</ProducerRef>
    <Status>true</Status>
    <StopMonitoringDelivery version="1.4">
      <ResponseTimestamp>2004-12-17T09:30:47-05:00</ResponseTimestamp>
      <Status>true</Status>
      <MonitoredStopVisit>
        <RecordedAtTime>2004-12-17T09:25:46-05:00</RecordedAtTime>
        <MonitoringRef>EMBR</MonitoringRef>
        <MonitoredVehicleJourney>
          <LineRef>Warm Springs/South Fremont - Daly City</LineRef>
          <DirectionRef>E</DirectionRef>
          <FramedVehicleJourneyRef>
            <DataFrameRef>2004-12-17</DataFrameRef>
            <DatedVehicleJourneyRef>1031357WKDY</DatedVehicleJourneyRef>
          </FramedVehicleJourneyRef>
          <PublishedLineName>Warm Springs/South Fremont - Daly City</PublishedLineName>
          <OperatorRef>BA</OperatorRef>
          <OriginRef>DALY</OriginRef>
          <OriginName>Daly City BART Station</OriginName>
          <DestinationRef>WARM</DestinationRef>
          <DestinationName>Warm Springs/South Fremont</DestinationName>
          <Monitored>true</Monitored>
          <InCongestion>false</InCongestion>
          <VehicleLocation>
            <Longitude>180</Longitude>
            <Latitude>90</Latitude>
          </VehicleLocation>
          <Bearing>23</Bearing>
          <Occupancy>full</Occupancy>
          <VehicleRef>1011730</VehicleRef>
          <ProgressStatus>Service running on time</ProgressStatus>
          <PreviousCalls>
            <PreviousCall>
              <StopPointRef>BART_10</StopPointRef>
              <VisitNumber>2</VisitNumber>
              <StopPointName>BART_DALY CITY</StopPointName>
              <VehicleAtStop>false</VehicleAtStop>
              <AimedDepartureTime>2004-12-17T09:32:43-05:00</AimedDepartureTime>
              <ActualDepartureTime>2004-12-17T09:32:43-05:00</ActualDepartureTime>
            </PreviousCall>
          </PreviousCalls>
          <MonitoredCall>
            <StopPointRef>EMBR</StopPointRef>
            <VisitNumber>1</VisitNumber>
            <StopPointName>Embarcadero BART Station</StopPointName>
            <VehicleAtStop>false</VehicleAtStop>
            <VehicleLocationAtStop>
              <Longitude>180</Longitude>
              <Latitude>90</Latitude>
            </VehicleLocationAtStop>
            <AimedArrivalTime>2004-12-17T09:40:46-05:00</AimedArrivalTime>
            <ExpectedArrivalTime>2004-12-17T09:40:46-05:00</ExpectedArrivalTime>
```

```
                <AimedDepartureTime>2004-12-17T09:42:47-05:00</AimedDepartureTime>
                <ExpectedDepartureTime>2004-12-17T09:40:47-05:00</ExpectedDepartureTime>
              </MonitoredCall>
              <OnwardCalls>
                <OnwardCall>
                  <StopPointRef>BART_12</StopPointRef>
                  <VisitNumber>4</VisitNumber>
                  <StopPointName>BAR_12th St Oakland</StopPointName>
                  <VehicleAtStop>false</VehicleAtStop>
                  <AimedArrivalTime>2004-12-17T09:30:56-05:00</AimedArrivalTime>
                  <ExpectedArrivalTime>2004-12-17T09:30:56-05:00</ExpectedArrivalTime>
                  <AimedDepartureTime>2004-12-17T09:30:57-05:00</AimedDepartureTime>
                  <ExpectedDepartureTime>2004-12-17T09:30:57-05:00</ExpectedDepartureTime>
                </OnwardCall>
              </OnwardCalls>
            </MonitoredVehicleJourney>
          </MonitoredStopVisit>
          <MonitoredStopVisitCancellation>
            <RecordedAtTime>2004-12-17T09:30:47-05:00</RecordedAtTime>
            <ItemRef>SED9843214675429</ItemRef>
            <Reason>Arrived</Reason>
          </MonitoredStopVisitCancellation>
          <MonitoredStopVisitCancellation>
            <RecordedAtTime>2004-12-17T09:30:47-05:00</RecordedAtTime>
            <MonitoringRef>BART_11</MonitoringRef>
            <VisitNumber>2</VisitNumber>
            <LineRef>Line123</LineRef>
            <DirectionRef>OB</DirectionRef>
            <VehicleJourneyRef>
              <DataFrameRef>2004-12-17</DataFrameRef>
              <DatedVehicleJourneyRef>0987656</DatedVehicleJourneyRef>
            </VehicleJourneyRef>
            <Reason>Arrived</Reason>
          </MonitoredStopVisitCancellation>
          <StopLineNotice>
            <RecordedAtTime>2004-12-17T09:30:47-05:00</RecordedAtTime>
            <ItemIdentifier>SED9843214675429</ItemIdentifier>
            <MonitoringRef>BART_11</MonitoringRef>
            <LineRef>123</LineRef>
            <DirectionRef>OB</DirectionRef>
            <LineNote>Mechanical Problems on Track</LineNote>
          </StopLineNotice>
          <StopLineNoticeCancellation>
            <RecordedAtTime>2004-12-17T09:30:47-05:00</RecordedAtTime>
            <ItemRef>SED9843214675429</ItemRef>
            <MonitoringRef>BART_11</MonitoringRef>
            <LineRef>123</LineRef>
            <DirectionRef>OB</DirectionRef>
          </StopLineNoticeCancellation>
          <Note>Hello Stop</Note>
        </StopMonitoringDelivery>
      </ServiceDelivery>
    </Siri>
```

A.1.11 Example Real Time Vehicle Monitoring Response (XML) in SIRI format

```xml
<?xml version="1.0" encoding="UTF-8"?>
<Siri xmlns="http://www.siri.org.uk/siri" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.4" xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/siri/schema/1.4/siri.xsd">
  <ServiceDelivery>
    <ResponseTimestamp>2004-12-17T09:30:47-05:00</ResponseTimestamp>
    <ProducerRef>BA</ProducerRef>
    <Status>true</Status>
    <VehicleMonitoringDelivery version="1.4">
      <ResponseTimestamp>2004-12-17T09:30:47-05:00</ResponseTimestamp>
    <VehicleActivity>
      <RecordedAtTime>2004-12-17T09:30:47-05:00</RecordedAtTime>
      <ValidUntilTime>2004-12-17T09:30:47-05:00</ValidUntilTime>
      <MonitoredVehicleJourney>
        <LineRef>17</LineRef>
        <DirectionRef>OB</DirectionRef>
        <FramedVehicleJourneyRef>
          <DataFrameRef>2004-12-17</DataFrameRef>
          <DatedVehicleJourneyRef>987675</DatedVehicleJourneyRef>
        </FramedVehicleJourneyRef>
        <PublishedLineName>123</PublishedLineName>
        <OperatorRef>BA</OperatorRef>
        <OriginName>SFO</OriginName>
        <Via>
          <PlaceName>16th st</PlaceName>
        </Via>
        <Via>
          <PlaceName>West Oakland</PlaceName>
        </Via>
        <DestinationRef>Fremont</DestinationRef>
        <DestinationName>Fremont</DestinationName>
        <Monitored>true</Monitored>
        <InCongestion>false</InCongestion>
        <VehicleLocation>
          <Longitude>180</Longitude>
          <Latitude>90</Latitude>
        </VehicleLocation>
        <Bearing>123</Bearing>
        <Occupancy>full</Occupancy>
        <ProgressRate>slowProgress</ProgressRate>
        <Delay>PT2M</Delay>
        <ProgressStatus>On time</ProgressStatus>
        <VehicleRef>VEH987654</VehicleRef>
        <PreviousCalls>
          <PreviousCall>
            <StopPointRef>SFO</StopPointRef>
            <VisitNumber>2</VisitNumber>
            <StopPointName>String</StopPointName>
            <VehicleAtStop>false</VehicleAtStop>
            <AimedDepartureTime>2004-12-17T09:32:43-05:00</AimedDepartureTime>
            <ActualDepartureTime>2004-12-17T09:32:43-05:00</ActualDepartureTime>
          </PreviousCall>
        </PreviousCalls>
        <OnwardCalls>
          <OnwardCall>
            <StopPointRef>80</StopPointRef>
            <VisitNumber>4</VisitNumber>
```

```
            <StopPointName>16th Street</StopPointName>
            <VehicleAtStop>false</VehicleAtStop>
            <AimedArrivalTime>2004-12-17T09:30:56-05:00</AimedArrivalTime>
            <ExpectedArrivalTime>2004-12-17T09:30:56-05:00</ExpectedArrivalTime>
            <AimedDepartureTime>2004-12-17T09:30:57-05:00</AimedDepartureTime>
            <ExpectedDepartureTime>2004-12-17T09:30:57-05:00</ExpectedDepartureTime>
          </OnwardCall>
        </OnwardCalls>
      </MonitoredVehicleJourney>
    </VehicleActivity>
    <VehicleActivity>
      <RecordedAtTime>2004-12-17T09:30:47-05:00</RecordedAtTime>
      <ValidUntilTime>2004-12-17T09:30:47-05:00</ValidUntilTime>
      <VehicleMonitoringRef>45678</VehicleMonitoringRef>
      <MonitoredVehicleJourney>
        <LineRef>Line123</LineRef>
        <FramedVehicleJourneyRef>
          <DataFrameRef>2004-12-17</DataFrameRef>
          <DatedVehicleJourneyRef>Outbound</DatedVehicleJourneyRef>
        </FramedVehicleJourneyRef>
        <Monitored>true</Monitored>
        <VehicleLocation>
          <Longitude>180</Longitude>
          <Latitude>90</Latitude>
        </VehicleLocation>
        <Delay>PT2M</Delay>
        <VehicleRef>VEH987654</VehicleRef>
        <OnwardCalls>
          <OnwardCall>
            <StopPointRef>HLTST012</StopPointRef>
            <StopPointName>Church</StopPointName>
          </OnwardCall>
        </OnwardCalls>
      </MonitoredVehicleJourney>
    </VehicleActivity>
    <VehicleActivityCancellation>
      <RecordedAtTime>2004-12-17T09:30:47-05:00</RecordedAtTime>
      <VehicleMonitoringRef>9876542</VehicleMonitoringRef>
      <VehicleJourneyRef>
        <DataFrameRef>2001-12-17</DataFrameRef>
        <DatedVehicleJourneyRef>09867</DatedVehicleJourneyRef>
      </VehicleJourneyRef>
      <LineRef>Line123</LineRef>
      <DirectionRef>OB</DirectionRef>
      <Reason>Done for the day</Reason>
    </VehicleActivityCancellation>
  </VehicleMonitoringDelivery>
 </ServiceDelivery>
</Siri>
```

A.1.12 Example Transit Schedule Update Response (XML) in SIRI PT format

```
<?xml version="1.0" encoding="UTF-8"?>
<Siri xmlns="http://www.siri.org.uk/siri" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.4" xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/siri/schema/1.4/siri.xsd">
```

```xml
  <ServiceDelivery>
    <ResponseTimestamp>2013-02-18T09:30:47-08:00</ResponseTimestamp>
    <Status>true</Status>
    <ProductionTimetableDelivery version="1.4">
      <ResponseTimestamp>2004-12-17T09:30:47-05:00</ResponseTimestamp>
      <ValidUntil>2001-12-17T10:30:47-05:00</ValidUntil>
      <DatedTimetableVersionFrame>
        <RecordedAtTime>2001-12-17T09:30:47-05:00</RecordedAtTime>
        <LineRef>123</LineRef>
        <DirectionRef>Out</DirectionRef>
        <PublishedLineName>String</PublishedLineName>
        <DatedVehicleJourney>
          <DatedVehicleJourneyCode>DVC0008767</DatedVehicleJourneyCode>
          <DatedCalls>
            <DatedCall>
              <StopPointRef>BART_11</StopPointRef>
              <CallNote>optional message here</CallNote>
              <AimedArrivalTime>2013-02-19T09:55:47-08:00</AimedArrivalTime>
              <AimedDepartureTime>2013-02-19T09:56:47-08:00</AimedDepartureTime>
            </DatedCall>
            <DatedCall>
              <StopPointRef>BART_99</StopPointRef>
              <CallNote>optional message here</CallNote>
              <AimedArrivalTime>2013-02-19T10:15:47-08:00</AimedArrivalTime>
              <AimedDepartureTime>2013-02-19T10:16:47-08:00</AimedDepartureTime>
            </DatedCall>
          </DatedCalls>
        </DatedVehicleJourney>
      </DatedTimetableVersionFrame>
    </ProductionTimetableDelivery>
  </ServiceDelivery>
</Siri>
```

A.1.13 Example Transit Addition and Cancellation of Trip Response (XML) in SIRI ET format

```xml
<?xml version="1.0" encoding="UTF-8"?>
<Siri xmlns="http://www.siri.org.uk/siri" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.4" xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/siri/schema/1.4/siri.xsd">
  <ServiceDelivery>
    <ResponseTimestamp>2013-02-18T09:30:47-08:00</ResponseTimestamp>
    <Status>true</Status>
    <EstimatedTimetableDelivery version="1.4">
      <ResponseTimestamp>2004-12-17T09:30:47-05:00</ResponseTimestamp>
      <EstimatedJourneyVersionFrame>
        <RecordedAtTime>2013-02-18T09:30:47-08:00</RecordedAtTime>
        <EstimatedVehicleJourney>
          <LineRef>917</LineRef>
          <DirectionRef>INBOUND</DirectionRef>
          <DatedVehicleJourneyRef>00008</DatedVehicleJourneyRef>
          <Cancellation>false</Cancellation>
          <PublishedLineName>Fremont</PublishedLineName>
          <EstimatedCalls>
            <EstimatedCall>
              <StopPointRef>BART_11</StopPointRef>
```

```
        <CallNote>optional message here</CallNote>
        <AimedArrivalTime>2013-02-19T09:55:47-08:00</AimedArrivalTime>
        <AimedDepartureTime>2013-02-19T09:56:47-08:00</AimedDepartureTime>
      </EstimatedCall>
      <EstimatedCall>
        <StopPointRef>BART_99</StopPointRef>
        <CallNote>optional message here</CallNote>
        <AimedArrivalTime>2013-02-19T10:15:47-08:00</AimedArrivalTime>
        <AimedDepartureTime>2013-02-19T10:16:47-08:00</AimedDepartureTime>
      </EstimatedCall>
    </EstimatedCalls>
  </EstimatedVehicleJourney>
  <EstimatedVehicleJourney>
    <LineRef>764</LineRef>
    <DirectionRef>INBOUND</DirectionRef>
    <DatedVehicleJourneyRef>00008</DatedVehicleJourneyRef>
    <Cancellation>true</Cancellation>
    <PublishedLineName>Pittsburgh Bay Point</PublishedLineName>
  </EstimatedVehicleJourney>
    </EstimatedJourneyVersionFrame>
  </EstimatedTimetableDelivery>
  </ServiceDelivery>
</Siri>
```

A.1.14 Example Transit General Messaging Service Response (XML) in SIRI GM format

```
<?xml version="1.0" encoding="UTF-8"?>
<Siri xmlns="http://www.siri.org.uk/siri" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
version="1.4" xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/siri/schema/1.4/siri.xsd">
  <ServiceDelivery>
    <ResponseTimestamp>2013-02-17T09:30:46-08:00</ResponseTimestamp>
    <Status>true</Status>
    <GeneralMessageDelivery version="1.4">
      <ResponseTimestamp>2001-12-17T09:30:47.0Z</ResponseTimestamp>
      <GeneralMessage formatRef="string">
        <RecordedAtTime>2013-02-17T09:30:46-08:00</RecordedAtTime>
        <InfoMessageIdentifier>12345</InfoMessageIdentifier>
        <InfoMessageVersion>2</InfoMessageVersion>
        <InfoChannelRef>WARNINGS</InfoChannelRef>
        <ValidUntilTime>2013-02-18T09:30:46-08:00</ValidUntilTime>
        <Content>some message here</Content>
      </GeneralMessage>
      <GeneralMessage formatRef="string">
        <RecordedAtTime>2013-02-17T09:30:46-08:00</RecordedAtTime>
        <InfoMessageIdentifier>23456</InfoMessageIdentifier>
        <InfoMessageVersion>1</InfoMessageVersion>
        <InfoChannelRef>WARNINGS</InfoChannelRef>
        <ValidUntilTime>2013-02-18T09:30:46-08:00</ValidUntilTime>
        <Content>some message here</Content>
      </GeneralMessage>
    </GeneralMessageDelivery>
  </ServiceDelivery>
</Siri>
```

A.1.15 Example Transit GTFS Operator List in XML format

```
<GTFSAgencies>
  <GTFSAgency Id="3D" Name="Tri Delta Transit" LastGenerated="9/8/2017 5:22:04 PM"/>
  <GTFSAgency Id="AC" Name="AC Transit" LastGenerated="8/27/2017 6:06:13 PM"/>
  <GTFSAgency Id="BA" Name="BART" LastGenerated="6/6/2017 1:26:30 PM"/>
  <GTFSAgency Id="CC" Name="County Connection" LastGenerated="8/16/2016 2:04:53 PM"/>
  <GTFSAgency Id="CT" Name="Caltrain" LastGenerated="6/20/2017 11:04:29 AM"/>
  <GTFSAgency Id="EM" Name="Emery Go-Round" LastGenerated="8/8/2017 4:50:45 PM"/>
  <GTFSAgency Id="GF" Name="Golden Gate Ferry" LastGenerated="7/26/2017 11:27:08 AM"/>
  <GTFSAgency Id="HF" Name="Alcatraz Hornblower Ferry" LastGenerated="9/21/2017 11:49:35
AM"/>
<GTFSAgency Id="RG" Name="Regional GTFS" LastGenerated="6/15/2020 5:11:56
AM"></GTFSAgency>
  <GTFSAgency Id="MA" Name="Marin Transit" LastGenerated="8/16/2016 1:54:42 PM"/>
</GTFSAgencies>
```

A.1.16 Example Transit ServiceAlerts Response (XML)

```
<FeedMessage xmlns:i="http://www.w3.org/2001/XMLSchema-instance"
xmlns="http://schemas.datacontract.org/2004/07/TransitRealtime">
  <Entities>
    <FeedEntity>
      <Alert>
        <ActivePeriods>
          <TimeRange>
            <End>1609488000</End>
            <Start>1532736000</Start>
          </TimeRange>
        </ActivePeriods>
        <DescriptionText>
          <Translations>
            <TranslatedString.Translation>
              <Language>en</Language>
              <Text>Call or visit 511.org for more real-time departures and alert
information.</Text>
            </TranslatedString.Translation>
          </Translations>
        </DescriptionText>
        <HeaderText>
          <Translations>
            <TranslatedString.Translation>
              <Language>en</Language>
              <Text>Call 511 or visit 511.org for more alert information. Issues with
this sign? feedback@511.org</Text>
            </TranslatedString.Translation>
          </Translations>
        </HeaderText>
        <InformedEntities>
          <EntitySelector>
            <AgencyId>5S</AgencyId>
            <RouteId></RouteId>
            <RouteType>0</RouteType>
            <StopId></StopId>
            <Trip i:nil="true" />
          </EntitySelector>
        </InformedEntities>
        <TtsDescriptionText i:nil="true" />
```

```xml
            <TtsHeaderText i:nil="true" />
            <Url>
              <Translations>
                <TranslatedString.Translation>
                    <Language>en</Language>
                    <Text></Text>
                </TranslatedString.Translation>
              </Translations>
            </Url>
            <cause>UnknownCause</cause>
            <effect>UnknownEffect</effect>
            <severity_level>UnknownSeverity</severity_level>
          </Alert>
          <Id>3469</Id>
          <IsDeleted>false</IsDeleted>
          <TripUpdate i:nil="true" />
          <Vehicle i:nil="true" />
        </FeedEntity>
        <FeedEntity>
          <Alert>
            <ActivePeriods>
              <TimeRange>
                  <End>1704049140</End>
                  <Start>1583089140</Start>
              </TimeRange>
            </ActivePeriods>
            <DescriptionText>
              <Translations>
                <TranslatedString.Translation>
                    <Language>en</Language>
                    <Text>For Issues reach out to feedback@511.org</Text>
                </TranslatedString.Translation>
              </Translations>
            </DescriptionText>
            <HeaderText>
              <Translations>
                <TranslatedString.Translation>
                    <Language>en</Language>
                    <Text>Issues? feedback@511.org</Text>
                </TranslatedString.Translation>
              </Translations>
            </HeaderText>
            <InformedEntities>
              <EntitySelector>
                <AgencyId>5S</AgencyId>
                <RouteId></RouteId>
                <RouteType>0</RouteType>
                <StopId></StopId>
                <Trip i:nil="true" />
              </EntitySelector>
            </InformedEntities>
            <TtsDescriptionText i:nil="true" />
            <TtsHeaderText i:nil="true" />
            <Url>
              <Translations>
                <TranslatedString.Translation>
                    <Language>en</Language>
                    <Text></Text>
                </TranslatedString.Translation>
```

```xml
          </Translations>
        </Url>
        <cause>UnknownCause</cause>
        <effect>UnknownEffect</effect>
        <severity_level>UnknownSeverity</severity_level>
      </Alert>
      <Id>21538899</Id>
      <IsDeleted>false</IsDeleted>
      <TripUpdate i:nil="true" />
      <Vehicle i:nil="true" />
    </FeedEntity>
  </Entities>
  <Header>
    <GtfsRealtimeVersion>1.0</GtfsRealtimeVersion>
    <Timestamp>1590704383</Timestamp>
    <incrementality>FullDataset</incrementality>
  </Header>
</FeedMessage>
```

A.1.17 Example Shapes Response (XML)

```xml
<?xml version="1.0" encoding="iso-8859-1"?>
<siri:Siri xsi:schemaLocation="http://www.siri.org.uk/siri
http://www.kizoom.com/standards/netex/schema/0.99.1/xsd/NeTEx_siri.xsd"
xmlns:siri="http://www.siri.org.uk/siri" xmlns="http://www.netex.org.uk/netex"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:gml="http://www.opengis.net/gml" version="1.0">
  <siri:ServiceDelivery>
    <siri:ResponseTimestamp>2019-11-22T10:45:00-08:00</siri:ResponseTimestamp>
    <DataObjectDelivery>
      <siri:ResponseTimestamp>2019-11-22T10:45:00-08:00</siri:ResponseTimestamp>
      <dataObjects>
        <TimetableFrame version="any" id="TF:BA" >
          <vehicleJourneys>
            <ServiceJourney version="any" id="3010811SUN" >
              <LinkSequenceProjection version="any" id="245016">
                <gml:LineString srsName="WGS84" gml:id="245016" >
                  <gml:pos>37.60808289 -122.3951075</gml:pos>
                  <gml:pos>37.60939749 -122.3964303</gml:pos>
                  <gml:pos>37.61078442 -122.3978387</gml:pos>
                  <gml:pos>37.61178447 -122.3988195</gml:pos>
                  <gml:pos>37.61224882 -122.3992295</gml:pos>
                  <gml:pos>37.61264766 -122.3994088</gml:pos>
                  <gml:pos>37.6128218 -122.3994895</gml:pos>
                  <gml:pos>37.61297159 -122.399568</gml:pos>
                  <gml:pos>37.61317171 -122.3996879</gml:pos>
                  <gml:pos>37.61334305 -122.3997649</gml:pos>
                  <gml:pos>37.61351504 -122.3998161</gml:pos>
                  <gml:pos>37.61380724 -122.3998666</gml:pos>
                  <gml:pos>37.61393581 -122.3998685</gml:pos>
                  <gml:pos>37.61423276 -122.3998292</gml:pos>
                  <gml:pos>37.61441157 -122.3997582</gml:pos>
                  <gml:pos>37.6146182 -122.3996593</gml:pos>
                  <gml:pos>37.61478632 -122.3995339</gml:pos>
                  <gml:pos>37.61494871 -122.3993958</gml:pos>
                  <gml:pos>37.61500888 -122.3993223</gml:pos>
                  <gml:pos>37.61513029 -122.399157</gml:pos>
                  <gml:pos>37.61526027 -122.3989516</gml:pos>
                  <gml:pos>37.61533452 -122.3988037</gml:pos>
                  <gml:pos>37.61541787 -122.3985962</gml:pos>
                  <gml:pos>37.61550791 -122.3982678</gml:pos>
                  <gml:pos>37.61551978 -122.3981671</gml:pos>
                  <gml:pos>37.61556776 -122.3976527</gml:pos>
                  <gml:pos>37.61557464 -122.3974131</gml:pos>
                  <gml:pos>37.61559137 -122.3969052</gml:pos>
                  <gml:pos>37.61558998 -122.3961968</gml:pos>
                  <gml:pos>37.61560202 -122.3948619</gml:pos>
                  <gml:pos>37.6156106 -122.3947422</gml:pos>
                  <gml:pos>37.61564872 -122.3942105</gml:pos>
                  <gml:pos>37.61602033 -122.3926008</gml:pos>
                </gml:LineString>
              </LinkSequenceProjection>
            </ServiceJourney>
          </vehicleJourneys>
        </TimetableFrame>
      </dataObjects>
    </DataObjectDelivery>
  </siri:ServiceDelivery>
</siri:Siri>
```

4 Appendix B: API Response Messages- JSON

4.1 Transit JSON

B.1.1 Example Transit Operator Response (JSON)

```
{
  "content":[
    {
      "Id": "SF",
      "Name": "San Francisco Municipal Railway",
      "ShortName": "Muni",
      "SiriOperatorRef": "SF",
      "TimeZone":"America/Vancouver",
      "DefaultLanguage":"en",
      "ContactTelephoneNumber":"1-415-701-2311",
      "WebSite":"http://www.sfmta.com/",
      "PrimaryMode": "bus",
      "PrivateCode": "SF",
      "Monitored":true,
      "OtherModes": "tram, funicular",
"Coverage": {
"type": "Polygon",
"coordinates": [
                [
                    [
                        -71.170000000000002,
                        47.329999999999998
                    ],
                    [
                        -71.150000000000006,
                        47.359999999999999
                    ],
                    [
                        -71.099999999999994,
                        47.350000000000001
                    ],
                    [
                        -71.200000000000003,
                        47.399999999999999
                    ],
                    [
                        -71.170000000000002,
                        47.329999999999998
                    ]
                ]
            ]
        }
    }
  ]}
```

B.1.2 Example Transit Line Response (JSON)

```
{
"content":[
    {
      "Id": "BA:BAY PT/SFIA",
      "Name": "Pittsburg/Bay Point to San Francisco International Airport",
      "TransportMode": "rail",
      "SiriLineRef": "722",
      "Monitored": "true",
      "OperatorRef": "BA"
    }
]
}
```

B.1.3 Example Transit Stop Response (JSON)

```
{
    "Contents": {
        "ResponseTimestamp": "2019-11-22T14:03:30-08:00",
        "dataObjects": {
            "id": "SB",
            "ScheduledStopPoint": [
                {
                    "id": "2455444",
                    "Extensions": {
                        "LocationType": "1",
                        "PlatformCode": null,
                        "ParentStation": null
                    },
                    "Name": "San Francisco Ferry Building",
                    "Location": {
                        "Longitude": "-122.3933798907",
                        "Latitude": "37.7954865278"
                    },
                    "Url": null,
                    "StopType": "ferryStop"
                },
                {
                    "id": "890001",
                    "Extensions": {
                        "LocationType": "0",
                        "PlatformCode": null,
                        "ParentStation": "2455444"
                    },
                    "Name": "San Francisco Ferry Building (Gate E)",
                    "Location": {
                        "Longitude": "-122.391612",
                        "Latitude": "37.795106"
                    },
                    "Url": null,
                    "StopType": "ferryStop"
                },
                {
                    "id": "890002",
                    "Extensions": {
```

```
                    "LocationType": "0",
                    "PlatformCode": null,
                    "ParentStation": "2455444"
                },
                "Name": "San Francisco Ferry Building (Gate G)",
                "Location": {
                    "Longitude": "-122.39079",
                    "Latitude": "37.79436"
                },
                "Url": null,
                "StopType": "ferryStop"
            }
        ],
        "stopAreas": {
            "StopArea": {
                "id": "StopArea:2455444",
                "Name": "San Francisco Ferry Building",
                "members": {
                    "ScheduledStopPointRef": [
                        { "ref": "890001" },
                        { "ref": "890002" }
                    ]
                },
                "ParentStopAreaRef": { "ref": "2455444" }
            }
        }
    }
  }
}
```

B.1.4 Example Transit StopPlace Response (JSON)

```
  {
    "content": {
      "Id": "BA:12232",
      "Name": "BART LAKE MERRIT",
      "Description": "800 Madison StreetOakland, CA 94607 (Between Madison St & Fallon
St and 8th & 9th)",
      "Centroid": {
        "Location": {
          "Longitude": "-122.265668",
          "Latitude": "37.797345"
        }
      },
      "AccessibilityAssessment": {
        "MobilityImpairedAccess": "true",
        "limitations": {
          "AccessibilityLimitation": { "WheelchairAccess": "true" }
        }
      },
      "alternativeNames": {
        "AlternativeName": { "Name": "Lake Merrit Station" }
      },
      "PostalAddress": {
        "AddressLine1": "800 Madison St",
        "Town": "Oakland"
      },
      "Url": "http://www.bart.gov/stations/LAKE",
      "OperatorRef": "BA",
```

```
      "adjacentSites": { "ParkingRef": "4234" },
      "placeEquipments": {
        "SanitaryEquipment": { "Description": "RestRoom in upper level" },
        "CycleStorageEquipment": [
          {
            "Description": "Bike Racks",
            "CycleStorageType": "racks",
            "NumberOfSpaces": "4"
          },
          {
            "Description": "Bike Lockers",
            "CycleStorageType": "other",
            "NumberOfSpaces": "10"
          }
        ],
        "SignEquipment": { "Description": "Information Display Board" },
        "EscalatorEquipment": { "Description": "Escalator 335" },
        "LiftEquipment": { "Description": "Escalator 312" },
        "ShelterEquipment": { "Description": "Waiting area 1" },
        "SeatingEquipment": { "Description": "Bench near waiting area" }
      },
      "PublicCode": "1564",
      "TransportMode": "rail",
      "StopPlaceType": "railStation",
      "quays": {
        "Quay": { "CompassOctant": "W" }
      },
      "parkings": {
        "Parking": {
          "Id": "4234",
          "Name": "Lake Merritt BART Station Parking",
          "Description": "On Broadway, between 11th & 14th",
          "Centroid": {
            "Location": {
              "Longitude": "-122.266382",
              "Latitude": "37.796615"
            }
          },
          "PostalAddress": {
            "AddressLine1": "800 Madison St",
            "Town": "Oakland"
          },
          "ParkingType": "trainStationParking",
          "TotalCapacity": "296",
          "RealTimeOccupancyAvailable": "false",
          "parkingAreas": {
            "ParkingArea": [
              {
                "Id": "123",
                "Description": "Accessible Parking",
                "ParkingProperties": {
                  "ParkingUserType": "registeredDisabled",
                  "spaces": {
                    "ParkingCapacity": { "NumberOfSpaces": "10" }
                  }
                }
              },
              {
                "Id": "124",
```

```
                    "Description": "Reserved Parking",
                  "ParkingProperties": {
                    "ParkingUserType": "reservationHolders",
                    "spaces": {
                      "ParkingCapacity": { "NumberOfSpaces": "99" }
                    },
                    "charges": {
                      "tariffBands": {
                        "ParkingTariffChargeBand": [
                          {
                            "Description": "Single Day Reserved Parking",
                            "MaximumStay": "P1D",
                            "Amount": "4.50"
                          },
                          {
                            "Description": "Monthly Reserved Parking",
                            "MaximumStay": "P1M",
                            "Amount": "100"
                          }
                        ]
                      }
                    }
                  }
                }
              ]
            }
          }
        }
      }
    }
  }
}
```

B.1.5 Example Transit Pattern Response (JSON)

```
{
  "directions": [
    {
      "DirectionId": "IB",
      "Name": "Inbound"
    },
    {
      "DirectionId": "OB",
      "Name": "Outbound"
    }
  ],
  "journeyPatterns":
  [
    {
      "serviceJourneyPatternRef": "192989",
      "LineRef": "Day Tour Ferry",
      "Name": "Alcatraz",
      "DirectionRef": "IB",
      "DestinationDisplayView": { "FontText": "Alcatraz" },
      "PointsInSequence": {
        "StopPointInJourneyPattern": [ ],
```

```json
      "TimingPointInJourneyPattern": [
        {
          "TimingPointInJourneyPatternId": "8329124",
          "Order": "1",
          "ScheduledStopPointRef": "12175093",
          "Name": "Pier 33"
        },
        {
          "TimingPointInJourneyPatternId": "8329125",
          "Order": "2",
          "ScheduledStopPointRef": "12175092",
          "Name": "Alcatraz"
        }
      ]
    },
    "LinksInSequence": { "ServiceLinkInJourneyPattern": "" }
  },
  {
    "serviceJourneyPatternRef": "192990",
    "LineRef": "Day Tour Ferry",
    "Name": "Pier 33",
    "DirectionRef": "OB",
    "DestinationDisplayView": { "FontText": "Pier 33" },
    "PointsInSequence": {
      "StopPointInJourneyPattern": [ ],
      "TimingPointInJourneyPattern": [
        {
          "TimingPointInJourneyPatternId": "8329126",
          "Order": "1",
          "ScheduledStopPointRef": "12175092",
          "Name": "Alcatraz"
        },
        {
          "TimingPointInJourneyPatternId": "8329127",
          "Order": "2",
          "ScheduledStopPointRef": "12175093",
          "Name": "Pier 33"
        }
      ]
    },
    "LinksInSequence": { "ServiceLinkInJourneyPattern": "" }
  }
]}
```

B.1.6 Example Timetable Response (JSON)

```
{

  "Content": {
    "ServiceFrame": {
      "id": "SF",
      "routes": {
        "Route": [
          {
            "id": "86855",
            "Name": "10:IB:Weekdays",
            "LineRef": { "ref": "10"  },
            "DirectionRef": { "ref": "IB"},
            "pointsInSequence": {
              "PointOnRoute": [
                {
                  "id": "86855:1",
                  "PointRef": {"ref": "17518", "type": "ScheduledStopPointRefStructure" }
                },
                {
                  "id": "86855:2",
                  "PointRef": { "ref": "14350", "type": "ScheduledStopPointRefStructure" }
                },
                {
                  "id": "86855:3",
                  "PointRef": {"ref": "16700", "type": "ScheduledStopPointRefStructure" }
                },
                {
                  "id": "86855:4",
                  "PointRef": {"ref": "16695", "type": "ScheduledStopPointRefStructure" }
                },
                {
                  "id": "86855:5",
                  "PointRef": {"ref": "16333", "type": "ScheduledStopPointRefStructure" }
                }
              ]
            }
          },

          {
            "id": "86858",
            "Name": "10:OB:Weekdays",
            "LineRef": {"ref": "10" },
            "DirectionRef": {"ref": "OB"},
            "pointsInSequence": {
              "PointOnRoute": [
                {
                  "id": "86858:1",
                  "PointRef": {"ref": "15147", "type": "ScheduledStopPointRefStructure" }
                },
                {
                  "id": "86858:2",
```

```
                    "PointRef": { "ref": "15859",   "type": "ScheduledStopPointRefStructure" }
                },
                {
                    "id": "86858:3",
                    "PointRef": { "ref": "15853", "type": "ScheduledStopPointRefStructure" }
                },
                {
                    "id": "86858:4",
                    "PointRef": { "ref": "16327", "type": "ScheduledStopPointRefStructure" }
                },
                {
                    "id": "86858:5",
                    "PointRef": { "ref": "13008", "type": "ScheduledStopPointRefStructure" }
                }
            ]
        }
    }
    ]
    }
},
"ServiceCalendarFrame": {
    "id": "SF",
    "dayTypes": {
        "DayType": [
            {
                "id": "6098",
                "Name": "Weekdays",
                "properties": {
                    "PropertyOfDay": { "DaysOfWeek": "Monday Tuesday Wednesday Thursday Friday
"}
            }
        }
    ]
},
"dayTypeAssignments": {
    "DayTypeAssignment": {
        "DayTypeRef": { "ref": "6098" }
    }
}
},
"TimetableFrame": [
    {
        "id": "Timetable:86855",
        "Name": "10:IB:Weekdays",
        "frameValidityConditions": {
            "AvailabilityCondition": {
                "id": "10:IB:Weekdays",
                "FromDate": "2013-02-18T09:30:47-08:00",
                "ToDate": "2013-02-18T09:30:47-08:00",
                "dayTypes": { "DayTypeRef": { "ref": "6098" }
            }
```

```
                }
            },
            "vehicleJourneys": {
                "ServiceJourney": [
                    {
                        "id": "4769819",
                        "SiriVehicleJourneyRef": "4769819",
                        "JourneyPatternView": {
                            "RouteRef": {
                                "ref": "86855"
                            },
                            "DirectionRef": {
                                "ref": "IB"
                            }
                        },
                        "calls": {
                            "Call": [
                                {
                                    "order": "1",
                                    "ScheduledStopPointRef": { "ref": "17518" },
                                    "Arrival": { "Time": "05:03:00", "DaysOffset": "0"},
                                    "Departure": { "Time": "05:03:00", "DaysOffset": "0" }
                                },
                                {
                                    "order": "2",
                                    "ScheduledStopPointRef": {"ref": "14350"},
                                    "Arrival": {"Time": "05:17:00", "DaysOffset": "0"},
                                    "Departure": {"Time": "05:17:00", "DaysOffset": "0"}
                                },
                                {
                                    "order": "3",
                                    "ScheduledStopPointRef": {"ref": "16700"},
                                    "Arrival": {"Time": "05:20:00", "DaysOffset": "0"},
                                    "Departure": { "Time": "05:20:00", "DaysOffset": "0"}
                                },
                                {
                                    "order": "4",
                                    "ScheduledStopPointRef": { "ref": "16695" },
                                    "Arrival": { "Time": "05:22:00" , "DaysOffset": "0" },
                                    "Departure": {"Time": "05:22:00", "DaysOffset": "0" }
                                },
                                {
                                    "order": "5",
                                    "ScheduledStopPointRef": { "ref": "16333" },
                                    "Arrival": { "Time": "05:32:00", "DaysOffset": "0" },
                                    "Departure": {"Time": "05:32:00", "DaysOffset": "0" }
                                }
                            ]
                        }
                    },
                    {
```

```
            "id": "4769820",
            "SiriVehicleJourneyRef": "4769820",
            "JourneyPatternView": {
                "RouteRef": { "ref": "86855"},
                "DirectionRef": {"ref": "IB"}
            },
            "calls": {
                "Call": [
                    {
                        "order": "1",
                        "ScheduledStopPointRef": {"ref": "17518"},
                        "Arrival": {"Time": "05:30:00", "DaysOffset": "0"},
                        "Departure": {"Time": "05:30:00", "DaysOffset": "0"}
                    },
                    {
                        "order": "2",
                        "ScheduledStopPointRef": {"ref": "14350"},
                        "Arrival": {"Time": "05:44:00", "DaysOffset": "0"},
                        "Departure": {"Time": "05:44:00", "DaysOffset": "0"}
                    },
                    {
                        "order": "3",
                        "ScheduledStopPointRef": {"ref": "16700"},
                        "Arrival": {"Time": "05:47:00", "DaysOffset": "0"},
                        "Departure": {"Time": "05:47:00", "DaysOffset": "0"}
                    },
                    {
                        "order": "4",
                        "ScheduledStopPointRef": {"ref": "16695"},
                        "Arrival": {"Time": "05:49:00", "DaysOffset": "0"},
                        "Departure": {"Time": "05:49:00", "DaysOffset": "0"}
                    },
                    {
                        "order": "5",
                        "ScheduledStopPointRef": {"ref": "16333"},
                        "Arrival": {"Time": "05:59:00", "DaysOffset": "0"},
                        "Departure": {"Time": "05:59:00", "DaysOffset": "0"}
                    }
                ]
            }
        }
    ]
    }
    ]
    }
}
```

B.1.7 Example Transit Holiday Response (JSON)

```json
{
    "Content":{
        "ServiceCalendar":{
            "id":"SB",
            "FromDate":"2017-05-01",
            "ToDate":"2017-10-29"
        },
        "AvailabilityConditions":[
            {
                "version":"any",
                "id":"SB:2017-07-04",
                "FromDate":"2017-07-04T00:00:00-07:00",
                "ToDate":"2017-07-04T23:59:00-07:00"
            },
            {
                "version":"any",
                "id":"SB:2017-09-04",
                "FromDate":"2017-09-04T00:00:00-07:00",
                "ToDate":"2017-09-04T23:59:00-07:00"
            }
        ]
    }
}
```

B.1.8 Example Transit Announcement Response (JSON)

```json
{

  "Siri": {
    "ServiceDelivery": {
      "ResponseTimestamp": "2013-09-10T15:53:47-08:00",
      "SituationExchangeDelivery": {
        "Situations": {
          "PtSituationElement": {
            "CreationTime": "2013-09-05T09:39:27-08:00",
            "SituationNumber": "169230",
            "Source": {
              "SourceType": "feed",
              "Name": "MTC"
            },
            "ValidityPeriod": {
              "StartTime": "2013-09-05T00:00:00-08:00",
              "EndTime": "2013-10-06T00:00:00-08:00"
            },
            "UnknownReason": null,
            "Priority": "2",
            "ScopeType": "route",
            "Summary": "Long-term Detour on Line 74 until May 2015",
            "Description": "Due to a long-term construction project in Richmond, Line 74 will be
detoured from August 26, 2013 through May 2015.&lt;br /&gt;&lt;br /&gt;Line 74 will not serve the stops
on Marina Bay Parkway at Meeker Avenue in either direction. Board Line 74 to Harbour Way on South
23rd Street at Potrero Avenue or to Hilltop Mall/Castro Ranch Road on South 23rd Street at Cutting
Boulevard.&lt;br /&gt;&lt;br /&gt;Line 74 will also not serve the stops on Marina Bay Parkway at Pierson
```

```
Avenue. Board Line 74 to Harbour Way on Regatta Boulevard at Seadrift Drive or to Hilltop Mall/Castro
Ranch Road on Regatta Boulevard at Melville Square. ",
                "InfoLinks": {
                    "InfoLink": {
                        "Uri": null
                    }
                },
                "Consequences": {
                    "Consequence": {
                        "Severity": "normal",
                        "Affects": {
                            "Operators": {
                                "AffectedOperator": {
                                    "OperatorRef": "AC Transit",
                                    "OperatorName": "AC"
                                }
                            },
                            "Networks": {
                                "AffectedNetwork": {
                                    "AffectedLine": {
                                        "LineRef": "74"
                                    }
                                }
                            }
                        }
                    }
                }
            }
        }
    }
}
```

B.1.9 Example Transit Scheduled Depatures for a Stop Response (JSON) in SIRI ST format

```
{
  "Siri":{
    "ServiceDelivery":{
      "ResponseTimestamp": "2013-02-18T09:30:47-08:00",
      "Status":true,
      "StopTimetableDelivery":{
        "version":1.4,
        "ResponseTimestamp": "2004-12-17T09:30:47-05:00",
        "TimetabledStopVisit":[
          {
            "RecordedAtTime": "2004-12-17T09:25:46-05:00",
            "MonitoringRef": "HLTST011",
            "TargetedVehicleJourney":{
              "LineRef":17,
              "DirectionRef": "INBOUND",
              "DatedVehicleJourneyRef ": " TRP123214",
              "PublishedLineName": "Fremont",
              "OperatorRef": "BA",            "OriginRef": "BART_11",
              "OriginName": "BART_CIVIC CENTER",
              "DestinationRef": "BART_99",
              "DestinationName": "BART_16th St-Mission",
```

```
            "VehicleJourneyName": "16th St-Mission",
            "TargetedCall":{
              "VisitNumber":1,
              "AimedArrivalTime": "2013-02-18T09:30:47-08:00",
              "AimedDepartureTime": "2013-02-18T09:31:47-08:00"
            }
          },
        },{
          "RecordedAtTime": "2004-12-17T09:25:46-05:00",
          "MonitoringRef": "HLTST011",
          "TargetedVehicleJourney":{
            "LineRef":17,
            "DirectionRef": "INBOUND",
            "DatedVehicleJourneyRef ": " TRP544514",
            "PublishedLineName": "Fremont",
            "OperatorRef": "BART",
            "OriginRef": "BART_11",
            "OriginName": "BART_CIVIC CENTER",
            "DestinationRef": "BART_99",
            "DestinationName": "BART_16th St-Mission",
            "VehicleJourneyName": "16th St-Mission",
            "TargetedCall":{
              "VisitNumber":2,
              "AimedArrivalTime": "2013-02-18T09:45:47-08:00",
              "AimedDepartureTime": "2013-02-18T09:46:47-08:00"
            }
          },
        }
      }
    ]
  }
 }
 }
}
```

B.1.10 Example Transit Real Time Predictions at a StopResponse (JSON) in SIRI format

```
{
 "Siri":{
  "ServiceDelivery":{
    "ResponseTimestamp": "2004-12-17T09:30:46-05:00",
    "ProducerRef": "BA",
    "Status":true,
    "StopMonitoringDelivery":{
      "version":1.4,
      "ResponseTimestamp": "2004-12-17T09:30:47-05:00",
      "Status":true,
      "MonitoredStopVisit":{
        "RecordedAtTime": "2004-12-17T09:25:46-05:00",
        "MonitoringRef": "EMBR",
        "MonitoredVehicleJourney":{
          "LineRef":" Warm Springs/South Fremont - Daly City",
          "DirectionRef": "E",
          "FramedVehicleJourneyRef":{
            "DataFrameRef": "2004-12-17",
            "DatedVehicleJourneyRef": "1031357WKDY"
```

```
        },
        "PublishedLineName": "Warm Springs/South Fremont - Daly City",
        "OperatorRef": "BA",
        "OriginRef": "DALY",
        "OriginName": "Daly City BART Station",
        "DestinationRef": "WARM",
        "DestinationName": "Warm Springs/South Fremont",
        "Monitored":true,
        "InCongestion":false,
        "VehicleLocation":{
          "Longitude":180,
          "Latitude":90
        },
        "ProgressStatus": "Service running on time",
        "Bearing": 23,
        "Occupancy": "full",
        "VehicleRef": "1011",
        "PreviousCalls":{
          "PreviousCall":{
            "StopPointRef": "BART_10",
            "VisitNumber":2,
            "StopPointName": "BART_DALY CITY",
            "VehicleAtStop":false,
            "AimedDepartureTime": "2004-12-17T09:32:43-05:00",
            "ActualDepartureTime": "2004-12-17T09:32:43-05:00"
          }
        },
        "MonitoredCall":{
          "StopPointRef": "EMBR",
          "VisitNumber": "1",
          "StopPointName": "Embarcadero BART Station",
          "VehicleAtStop":false,
          "VehicleLocationAtStop":{
            "Longitude":180,
            "Latitude":90
          },
          "AimedArrivalTime": "2004-12-17T09:40:46-05:00",
          "ExpectedArrivalTime": "2004-12-17T09:40:46-05:00",
          "AimedDepartureTime": "2004-12-17T09:42:47-05:00",
          "ExpectedDepartureTime": "2004-12-17T09:40:47-05:00"
        },
        "OnwardCalls":{
          "OnwardCall":{
            "StopPointRef": "BART_12",
            "VisitNumber":4,
            "StopPointName": "BAR_12th St Oakland",
            "VehicleAtStop":false,
            "AimedArrivalTime": "2004-12-17T09:30:56-05:00",
            "ExpectedArrivalTime": "2004-12-17T09:30:56-05:00",
            "AimedDepartureTime": "2004-12-17T09:30:57-05:00",
            "ExpectedDepartureTime": "2004-12-17T09:30:57-05:00"
          }
        }
      }
    }
  },
  "MonitoredStopVisitCancellation":[
    {
```

```json
          "RecordedAtTime": "2004-12-17T09:30:47-05:00",
          "ItemRef": "SED9843214675429",
          "Reason": "Arrived"
        },{
          "RecordedAtTime": "2004-12-17T09:30:47-05:00",
          "MonitoringRef": " EMBR ",
          "VisitNumber":2,
          "LineRef": "Line123",
          "DirectionRef": "OB",
          "VehicleJourneyRef":{
            "DataFrameRef": "2004-12-17",
            "DatedVehicleJourneyRef": "0987656"
          },
          "Reason": "Arrived"
        }
      ],
      "StopLineNotice":{
        "RecordedAtTime": "2004-12-17T09:30:47-05:00",
        "ItemIdentifier": "SED9843214675429",
        "MonitoringRef": " EMBR ",
        "LineRef":123,
        "DirectionRef": "OB",
        "LineNote": "Mechanical Problems on Track"
      },
      "StopLineNoticeCancellation":{
        "RecordedAtTime": "2004-12-17T09:30:47-05:00",
        "ItemRef": "SED9843214675429",
        "MonitoringRef": " EMBR ",
        "LineRef":123,
        "DirectionRef": "OB"
      },
      "Note": "Hello Stop"
    }
   }
  }
}
```

B.1.11 Example Real Time Vehicle Monitoring Response (JSON) in SIRI format

```json
{
  "Siri":{
    "ServiceDelivery":{
      "ResponseTimestamp": "2004-12-17T09:30:47-05:00",
      "ProducerRef": "BA",
      "Status":true,
      "VehicleMonitoringDelivery":{
        "version":1.4,
        "ResponseTimestamp": "2004-12-17T09:30:47-05:00",
        "VehicleActivity":[
          {
            "RecordedAtTime": "2004-12-17T09:30:47-05:00",
            "ValidUntilTime": "2004-12-17T09:30:47-05:00",
            "MonitoredVehicleJourney":{
              "LineRef":17,
              "DirectionRef": "OB",
              "FramedVehicleJourneyRef":{
                "DataFrameRef": "2004-12-17",
```

```
        "DatedVehicleJourneyRef":987675
      },
      "PublishedLineName":123,
      "OperatorRef": "BA",
      "OriginName": "SFO",
      "Via":[
        {
          "PlaceName": "16th st"
        },{
          "PlaceName": "West Oakland"
        }
      ],
      "DestinationRef": "Fremont",
      "DestinationName": "Fremont",
      "Monitored":true,
      "InCongestion":false,
      "VehicleLocation":{
        "Longitude":180,
        "Latitude":90
      },
      "Bearing":123,
      "Occupancy": "full",
      "ProgressRate": "slowProgress",
      "Delay": "PT2M",
      "ProgressStatus": "On time",
      "VehicleRef": "VEH987654",
      "PreviousCalls":{
        "PreviousCall":{
          "StopPointRef": "SFO",
          "VisitNumber":2,
          "StopPointName": "String",
          "VehicleAtStop":false,
          "AimedDepartureTime": "2004-12-17T09:32:43-05:00",
          "ActualDepartureTime": "2004-12-17T09:32:43-05:00"
        }
      },
      "OnwardCalls":{
        "OnwardCall":{
          "StopPointRef":80,
          "VisitNumber":4,
          "StopPointName": "16th Street",
          "VehicleAtStop":false,
          "AimedArrivalTime": "2004-12-17T09:30:56-05:00",
          "ExpectedArrivalTime": "2004-12-17T09:30:56-05:00",
          "AimedDepartureTime": "2004-12-17T09:30:57-05:00",
          "ExpectedDepartureTime": "2004-12-17T09:30:57-05:00"
        }
      }
    }
  },{
    "RecordedAtTime": "2004-12-17T09:30:47-05:00",
    "ValidUntilTime": "2004-12-17T09:30:47-05:00",
    "VehicleMonitoringRef":45678,
    "MonitoredVehicleJourney":{
      "LineRef": "Line123",
      "FramedVehicleJourneyRef":{
        "DataFrameRef": "2004-12-17",
```

```
                "DatedVehicleJourneyRef": "Outbound"
              },
              "Monitored":true,
              "VehicleLocation":{
                "Longitude":180,
                "Latitude":90
              },
              "Delay": "PT2M",
              "VehicleRef": "VEH987654",
              "OnwardCalls":{
                "OnwardCall":{
                  "StopPointRef": "HLTST012",
                  "StopPointName": "Church"
                }
              }
            }
          }
        }
      ],
      "VehicleActivityCancellation":{
        "RecordedAtTime": "2004-12-17T09:30:47-05:00",
        "VehicleMonitoringRef":9876542,
        "VehicleJourneyRef":{
          "DataFrameRef": "2001-12-17",
          "DatedVehicleJourneyRef": "09867"
        },
        "LineRef": "Line123",
        "DirectionRef": "OB",
        "Reason": "Done for the day"
      }
    }
  }
}
```

B.1.12 Example Transit Schedule Update Response (JSON) in SIRI PT format

```
{
  "Siri":{
    "ServiceDelivery":{
      "ResponseTimestamp": "2013-02-18T09:30:47-08:00",
      "Status":true,
      "ProductionTimetableDelivery":{
        "version":1.4,
        "ResponseTimestamp": "2004-12-17T09:30:47-05:00",
        "ValidUntil": "2001-12-17T10:30:47-05:00",
        "DatedTimetableVersionFrame":{
          "RecordedAtTime": "2001-12-17T09:30:47-05:00",
          "LineRef":123,
          "DirectionRef": "Out",
          "PublishedLineName": "String",
          "DatedVehicleJourney":{
            "DatedVehicleJourneyCode": "DVC0008767",
            "DatedCalls":{
              "DatedCall":[
                {
                  "StopPointRef": "BART_11",
                  "CallNote": "optional message here",
```

```
              "AimedArrivalTime": "2013-02-19T09:55:47-08:00",
              "AimedDepartureTime": "2013-02-19T09:56:47-08:00"
            },{
              "StopPointRef": "BART_99",
              "CallNote": "optional message here",
              "AimedArrivalTime": "2013-02-19T10:15:47-08:00",
              "AimedDepartureTime": "2013-02-19T10:16:47-08:00"
            }
          ]
        }
      }
     }
    }
   }
  }
 }
}
```

B.1.13 Example Transit Addition and Cancellation of Trip Response (JSON) in SIRI ET format

```
{
  "Siri":{
    "xmlns": "http://www.siri.org.uk/siri",
    "xmlns:xsi": "http://www.w3.org/2001/XMLSchema-instance",
    "version":1.4,
    "xsi:schemaLocation": "http://www.siri.org.uk/siri
http://www.kizoom.com/standards/siri/schema/1.4/siri.xsd",
    "ServiceDelivery":{
      "ResponseTimestamp": "2013-02-18T09:30:47-08:00",
      "Status":true,
      "EstimatedTimetableDelivery":{
        "version":1.4,
        "ResponseTimestamp": "2004-12-17T09:30:47-05:00",
        "EstimatedJourneyVersionFrame":{
          "RecordedAtTime": "2013-02-18T09:30:47-08:00",
          "EstimatedVehicleJourney":[
            {
              "LineRef":917,
              "DirectionRef": "INBOUND",
              "DatedVehicleJourneyRef": "00008",
              "PublishedLineName": "Fremont",
              "EstimatedCalls":{
                "EstimatedCall":[
                  {
                    "StopPointRef": "BART_11",
                    "CallNote": "optional message here",
                    "AimedArrivalTime": "2013-02-19T09:55:47-08:00",
                    "AimedDepartureTime": "2013-02-19T09:56:47-08:00"
                  },{
                    "StopPointRef": "BART_99",
                    "CallNote": "optional message here",
                    "AimedArrivalTime": "2013-02-19T10:15:47-08:00",
                    "AimedDepartureTime": "2013-02-19T10:16:47-08:00"
                  }
                ]
              }
            },{
```

```
                "LineRef":764,
                "DirectionRef": "INBOUND",
                "DatedVehicleJourneyRef": "00008",
                "Cancellation":true,
                "PublishedLineName": "Pittsburgh Bay Point"
            }
        ]
        }
      }
    }
  }
}
```

B.1.14 ExampleTransit General Messaging Service Response (JSON) in SIRI GM format

```
{
  "Siri":{
    "ResponseTimestamp": "2013-02-17T09:30:46-08:00",
    "Status":true,
    "GeneralMessageDelivery":{
      "version":1.4,
      "ResponseTimestamp": "2001-12-17T09:30:47.0Z",
      "GeneralMessage":[
        {
          "formatRef": "string",
          "RecordedAtTime": "2013-02-17T09:30:46-08:00",
          "InfoMessageIdentifier":12345,
          "InfoMessageVersion":2,
          "InfoChannelRef": "WARNINGS",
          "ValidUntilTime": "2013-02-18T09:30:46-08:00",
          "Content": "some message here"
        },{
          "formatRef": "string",
          "RecordedAtTime": "2013-02-17T09:30:46-08:00",
          "InfoMessageIdentifier":23456,
          "InfoMessageVersion":1,
          "InfoChannelRef": "WARNINGS",
          "ValidUntilTime": "2013-02-18T09:30:46-08:00",
          "Content": "some message here"
        }
      ]
    }
  }
}
```

B.1.15 Example GTFS Operator List in JSON format

```json
[
  {
    "Id": "3D",
    "Name": "Tri Delta Transit",
    "LastGenerated": "9/8/2017 5:22:04 PM"
  },
  {
    "Id": "AC",
    "Name": "AC Transit",
    "LastGenerated": "8/27/2017 6:06:13 PM"
  },
  {
    "Id": "AM",
    "Name": "Capitol Corridor Joint Powers Authority",
    "LastGenerated": "8/22/2017 11:23:13 AM"
  },
  {
    "Id": "AT",
    "Name": "Angel Island Tiburon Ferry",
    "LastGenerated": "9/13/2017 12:07:06 PM"
  },
  {
    "Id": "AY",
    "Name": "American Canyon Transit",
    "LastGenerated": "9/13/2017 12:02:18 PM"
  },
  {
    "Id": "RG",
    "Name": "Regional GTFS",
    "LastGenerated": "6/15/2020 5:11:56 AM"
  },
  {
    "Id": "BA",
    "Name": "BART",
    "LastGenerated": "6/6/2017 1:26:30 PM"
  }
]
```

B.1.16 Example Transit ServiceAlerts Response in JSON format

```json
{

  "Header": {
    "GtfsRealtimeVersion": "1.0",
    "incrementality": 0,
    "Timestamp": 1590704336
  },
  "Entities": [
    {
      "Id": "3469",
      "TripUpdate": null,
      "Vehicle": null,
      "Alert": {
        "ActivePeriods": [
          {
```

```
            "Start": 1532736000,
            "End": 1609488000
          }
        ],
        "InformedEntities": [
          {
            "AgencyId": "5S",
            "Trip": null
          }
        ],
        "cause": 1,
        "effect": 8,
        "Url": {
          "Translations": [
            {
              "Text": "",
              "Language": "en"
            }
          ]
        },
        "HeaderText": {
          "Translations": [
            {
              "Text": "Call 511 or visit 511.org for more alert information.
Issues with this sign? feedback@511.org",
              "Language": "en"
            }
          ]
        },
        "DescriptionText": {
          "Translations": [
            {
              "Text": "Call or visit 511.org for more real-time departures
and alert information.",
              "Language": "en"
            }
          ]
        },
        "TtsHeaderText": null,
        "TtsDescriptionText": null
      }
    },
    {
      "Id": "21538899",
      "TripUpdate": null,
      "Vehicle": null,
      "Alert": {
        "ActivePeriods": [
          {
            "Start": 1583089140,
            "End": 1704049140
          }
        ],
        "InformedEntities": [
          {
            "AgencyId": "5S",
            "Trip": null
          }
```

```
        ],
        "cause": 1,
        "effect": 8,
        "Url": {
          "Translations": [
            {
              "Text": "",
              "Language": "en"
            }
          ]
        },
        "HeaderText": {
          "Translations": [
            {
              "Text": "Issues? feedback@511.org",
              "Language": "en"
            }
          ]
        },
        "DescriptionText": {
          "Translations": [
            {
              "Text": "For Issues reach out to feedback@511.org",
              "Language": "en"
            }
          ]
        },
        "TtsHeaderText": null,
        "TtsDescriptionText": null
      }
    }
  ]
}
```

B.1.17 Example Transit Shapes Response in JSON format

```
{
  "Content": {
    "TimetableFrame": {
      "version": "any",
      "id": "TF:BA",
      "vehicleJourneys": {
        "ServiceJourney": {
          "version": "any",
          "id": "3010811SUN",
          "LinkSequenceProjection": {
            "version": "any",
            "id": "245016",
            "LineString": {
              "srsName": "WGS84",
              "id": "245016",
              "pos": [
                "37.60808289 -122.3951075",
```

```
                    "37.60939749 -122.3964303",
                    "37.61078442 -122.3978387",
                    "37.61178447 -122.3988195",
                    "37.61224882 -122.3992295",
                    "37.61264766 -122.3994088",
                    "37.6128218 -122.3994895",
                    "37.61297159 -122.399568",
                    "37.61317171 -122.3996879",
                    "37.61334305 -122.3997649",
                    "37.61351504 -122.3998161",
                    "37.61380724 -122.3998666",
                    "37.61393581 -122.3998685",
                    "37.61423276 -122.3998292",
                    "37.61441157 -122.3997582",
                    "37.6146182 -122.3996593",
                    "37.61478632 -122.3995339",
                    "37.61494871 -122.3993958",
                    "37.61500888 -122.3993223",
                    "37.61513029 -122.399157",
                    "37.61526027 -122.3989516",
                    "37.61533452 -122.3988037",
                    "37.61541787 -122.3985962",
                    "37.61550791 -122.3982678",
                    "37.61551978 -122.3981671",
                    "37.61556776 -122.3976527",
                    "37.61557464 -122.3974131",
                    "37.61559137 -122.3969052",
                    "37.61558998 -122.3961968",
                    "37.61560202 -122.3948619",
                    "37.6156106 -122.3947422",
                    "37.61564872 -122.3942105",
                    "37.61602033 -122.3926008"
                ]
            }
          }
        }
      }
    }
  }
}
```

5   Appendix C: API Data Structures

5.1   SIRI

C.1.8 Announcement Message Structure

Field	Type	Mandatory/ Optional	Description
CreationTime	DateTime	*Mandatory*	Time of the creation of the situation.
SituationNumber	Integer	*Mandatory*	Unique identifier for the situation.
Source	Container	*Mandatory*	Information about source of information
—SourceType	Enum	*Mandatory*	Nature of source (feed, email, text, etc.)
—Name	Free Text	*Optional*	Name of source
ValidityPeriod	Container	*Mandatory*	It is a container for validity period of the situation
—StartTime	DateTime	*Mandatory*	It is inclusive start time of the situation
—EndTime	DateTime	*Optional*	It is inclusive end time stamp for situation. If omitted the situation is interpreted as to be forever.
Priority	Non Negative Integer	*Optional*	An arbitrary rating of the situation priority (1=high).
ScopeType	Enum	*Optional*	Provides the nature of scope, e.g. general, network etc.
Summary	Free Text	*Optional*	It is the summary of situation, id absent it is derived from situation Description
Description	Free Text	*Mandatory*	Description of the situation
InfoLinks	Container	*Optional*	Hyperlinks to other resources associated with situation
—InfoLink	Container	*Mandatory*	It is container for the hyperlink associated with situation
——Uri	Link	*Mandatory*	Hyperlink associated with situation
Consequences	Container	*Mandatory*	It is the collection of consequence (SIRI element) which describes effect of the situation on Public Transport system. It has at least one consequence

Consequence structure

The Consequence structure is the main element of the Consequences collection. It contains information about the nature of the effect or disrupt on to the public transport service.

Field	Type	Mandatory/ Optional	Description
Severity	Enum	*Mandatory*	Severity of disruption, it could be different from that of situation

Affects	Free Text	*Optional*	Description about parts of transport network affected by situation.
—Operators	Container	*Mandatory*	Container for collection of affected operators. It has one or more AffectedOperator
——AffectedOperator	Container	*Mandatory*	Container for operators affected by the situation
———OperatorRef	Ref	*Mandatory*	Contains reference to operator affect by situation
———OperatorName	Free Text	*Mandatory*	Public name of the affected operator
——Networks	Container	*Mandatory*	Container for collection of affected Network. It has one or more AffectedOperator
———AffectedNetwork	Container	*Mandatory*	Contains network or Route(s) affected by situation
————AffectedLine	Container	*Mandatory*	Information about the individual lines in the network that are affected. Contains one or more LineRef sub elements
—————LineRef	Ref	*Mandatory*	Contains reference to Line affected by situation
—StopPoints	Container	*Optional*	Container for collection of affected StopPoints. It has one or more affected StopPoint
——AffectedStopPoint	Container	*Mandatory*	Container for StopPoints affected by the situation
———StopPointRef	Ref	*Mandatory*	Contains reference to StopPoint affect by situation

C.1.9 Transit Scheduled Departures for a Stop Message Structure

Field	Type	Mandatory / Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Timestamp of server response.
Status	Enum	*Optional*	Indicates success or failure of request. **true** - success **false**- failure, SIRI error response will be returned
StopTimetableDelivery	Object	*Mandatory*	Contains multiple **TimetabledStopVisit** nodes, one for each visit to the stop within the Departure window.

StopTimetableDelivery structure

Field	Type	Mandatory / Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Timestamp of server response.
SubscriptionRef	Xsd:NMToken	Mandatory	Identifier of service subscription- unique within Service and Subscriber

TimetabledStopVisit	Object	*Mandatory*	A visit to a stop by a vehicle in the production timetable

TimetabledStopVisit structure

This contains details on a single visit to the stop within the Departure window.

Field	Type	Mandatory / Optional	Description
RecordedAtTime	Date Time	*Mandatory*	Date and time when data was recorded.
MonitoringRef	Free Text	*Mandatory*	Identifier of stop monitoring point that Stop Visit applies.
TargetedVehicleJourney	Object	*Mandatory*	Contains a single **TargetedVehicleJourney** node.

TargetedVehicleJourney structure

This contains details on a single visit to the stop within the Departure window.

Field	Type	Mandatory / Optional	Description
LineRef	Free Text	*Mandatory*	A Line in SIRI is equivalent to a Route in GTFS. Value is RouteCode e.g.: "917" = "Fremont" for "BA" agency.
DirectionRef	Enum	*Mandatory*	Value could be either INBOUND or OUTBOUND etc.
FramedVehicleJourneyRef	Object	*Optional*	A compound element uniquely identifying the trip the vehicle is serving.
PublishedLineName	Free Text	*Optional*	Value is Route Name e.g.: "Fremont" for "BA" agency.
OperatorRef	Reference ID	*Optional*	Operator of the journey
OriginRef	Computed Text	*Optional*	The stop ID for the first stop on the trip the vehicle is serving, prefixed by Agency Name and or Route Name to make it unique e.g.: "BART_11".
OriginName	Free Text	*Optional*	The stop Name for the first stop on the trip the vehicle is serving, prefixed by Agency Name

			e.g.: "BART_CIVIC CENTER".
DestinationRef	Computed Text	*Optional*	The stop ID for the last stop on the trip the vehicle is serving, prefixed by Agency Name e.g.: "BART_99".
DestinationName	Free Text	*Optional*	The stop Name for the last stop on the trip the vehicle is serving, prefixed by Agency Name e.g.: "BART_16th St-Mission".
VehicleJourneyName	Free Text	*Optional*	*The trip headsign corresponding to the trip (journey) the vehicle is serving.*
TargetedCall	Object	*Optional*	*Contains a single **TargetedCall** node.*

FramedVehicleJourneyRef Structure

Field	Type	Mandatory / Optional	Description
DataFrameRef	Date time	*Mandatory*	The service date for the trip the vehicle is serving.
DatedVehicleJourneyRef	Free Text	*Mandatory*	The trip ID for trip the vehicle is serving

TargetedCall structure

This describes the arrival and departure times for a specific visit.

Field	Type	Mandatory/ Optional	Description
VisitNumber	Numeric	*Mandatory*	For journey patterns that involve repeated visits by a vehicle to a stop, the VisitNumber count is used to distinguish each separate visit.
AimedArrivalTime	DateTime	*Mandatory*	Value is expected arrival time.
AimedDepartureTime	DateTime	*Mandatory*	Value is expected departure time.

C.1.10 Real-time predictions at a Stop Message Structure

Field	Type	Mandatory / Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Timestamp of response from server.
Status	Enum	*Mandatory*	Indicates success or failure of request.

			true - success false- failure, SIRI error response will be returned
StopMonitoringDelivery	Object	*Mandatory*	Contains multiple **MonitoredStopVisit**entries, one per visit to the stop.

StopMonitoringDelivery structure

Field	Type	Mandatory / Optional	Description
MonitoredStopVisit	Object	*Required*	This contains monitored vehicle journey (real-time trip) information.
MonitoredStopVisitCancellation	Object	*Optional*	This contains cancellation information for a trip.
StopLineNotice	Object	*Optional*	This provides notices for lines serving this monitored stop.
StopLineNoticeCancellation	Object	*Optional*	This provides cancellation of previous issued notices for lines serving this monitored stop.

MonitoredStopVisit structure

Field	Type	Mandatory / Optional	Description
RecordedAtTime	DateTime	*Required*	The timestamp of the last real-time update from the particular vehicle.
MonitoringRef	Free Text	*Optional*	Name of the Stop being monitored
MonitoredVehicleJourney	Object	*Optional*	Real-time information about particular vehicles

MonitoredVehicleJourney structure

Field	Type	Mandatory / Optional	Description
OperatorRef	Free Text	*Mandatory*	***For AgencyCode requirement**, e.g.: "BA".* Could be moved under sub-node Extensions because it's NOT part of the SIRI spec.

LineRef	Free Text	*Mandatory*	***For Route Code requirement.*** A Line in SIRI is equivalent to a Route in GTFS. Value could either be RouteCode or RouteName as required. Recommend using RouteCode because "PublishedLineName" is using RouteName. e.g.: RouteCode "917" = RouteName "Fremont" for BART. Does not identify the Agency, so RouteCode or RouteName would have to be unique to an Agency.
DirectionRef	Defined Text	*Mandatory*	***For Direction requirement.*** E.g.: "IB"
FramedVehicleJourneyRef	Object	*Mandatory*	A compound element uniquely identifying the trip the vehicle is serving.
PublishedLineName	Free Text	*Mandatory*	***For Route name requirement.***
OriginRef	Computed Text	*Optional*	"The GTFS stop code or stop ID for the first stop on the trip the vehicle is serving." e.g.: "DALY".
OriginName	Free Text	*Optional*	***For Origin place name requirement.*** "The GTFS stop Name for the first stop on the trip the vehicle is serving." e.g.: " Daly City BART Station".
DestinationRef	Computed Text	*Optional*	"The GTFS stop code or stop ID for the last stop on the trip the vehicle is serving, prefixed by Agency ID." e.g.: " WARM".
DestinationName	Free Text	*Optional*	***For Destination place name requirement.*** "The trip head sign, if available. If not, GTFS stop Name for the last stop on the trip the vehicle is serving." e.g.: " Warm Springs/South Fremont".
Monitored	Boolean	*Mandatory*	True if the trip is monitored.
InCongestion	Boolean	*Optional*	Indicates the congestion level affecting the vehicle. Set to true if the agency provides the congestion

			level as STOP_AND_GO, CONGESTION or SEVERE_CONGESTION. Set to false if agency provides the congestion level as RUNNING_SMOOTHLY.
Bearing	Float	*Optional*	When data is available, this field provides values in degrees, clockwise from True North, i.e., 0 is North and 90 is East.
Occupancy	Enum	*Optional*	When data is available this field provides level of passenger occupancy in the vehicle - full, seatsAvailable, standingAvailable
VehicleRef	Free Text	*Optional*	Vehicle Identifier. Internal system identification of the vehicle. Should be unique per vehicle (for a given operator) and is used for tracking the vehicle as it proceeds through the system.
MonitoredCall	Object	*Mandatory*	Call data for the stop
OnwardsCalls	Object	*Optional*	Call data for next stops
PreviousCalls	Object	*Optional*	Call data for previous stops
ProgressStatus	Enum	*Optional*	Status of the current vehicle, On-time, Running early etc.
VehicleLocation	Object	*Optional*	Vehicle location information. (Latitude/Longitude)

FramedVehicleJourneyRef Structure

Field	Type	Mandatory / Optional	Description
DataFrameRef	Date time	*Mandatory*	The service date for the trip the vehicle is serving.
DatedVehicleJourneyRef	Free Text	*Mandatory*	The trip ID for trip the vehicle is serving.

Monitored/Onward/Previous Call structure

Field	Type	Mandatory/ Optional	Description
StopPointRef	Free Text	*Mandatory*	Regional stop identifier of the stop that is being monitored.

StopPointName	Free Text	*Mandatory*	Name of the stop
VehicleLocationAtStop	Object	*Optional*	Vehicle location information at stop. (Latitude/Longitude)
VehicleAtStop	Boolean	*Mandatory*	True if vehicle is at the stop.
AimedArrivalTime	DateTime	*Mandatory*	Scheduled arrival time requirement.
ExpectedArrivalTime	DateTime	*Mandatory*	Predicted arrival time requirement.
AimedDepartureTime	DateTime	*Mandatory*	Scheduled departure time requirement.
ExpectedDepartureTime	DateTime	*Mandatory*	Predicted departure time requirement.
Distances	Object	*Optional*	Extension to SIRI Call structure to incorporate distance and bearing information of vehicle from the stop.

Distances structure

Field	**Type**	**Mandatory/ Optional**	**Description**
CallDistanceAlongRoute	Numeric	*Optional*	Distance of the stop from the beginning of the trip/route
DistanceFromCall	Numeric	*Optional*	Distance from the vehicle to the stop along the route, in meters
StopsFromCall	Numeric	*Optional*	The number of stops on the vehicle's current trip until the stop in question, starting from 0.
PresentableDistance	Text	*Optional*	Suggested display for the distance of vehicle from the stop.

MonitoredStopVisitCancellation structure

Field	**Type**	**Mandatory/ Optional**	**Description**
RecordedAtTime	DateTime	*Mandatory*	The timestamp of the last real-time update from the particular vehicle.
MonitoringRef	Free Text	*Mandatory*	Name of the Stop being monitored

			Reason for cancellation of monitoring. For e.g.
Reason	Free text	Mandatory	Reason for cancellation of monitoring. For e.g. Vehicle has already arrived at the stop.

StopLineNotice structure

Field	Type	Mandatory/ Optional	Description
RecordedAtTime	DateTime	*Mandatory*	The timestamp of the last real-time update from the particular vehicle.
ItemRef	Free Text	*Mandatory*	Reference to a previously issued notice.
MonitoringRef	Free Text	*Mandatory*	Name of the Stop being monitored
LineRef	Free Text	*Mandatory*	**For Route Code requirement.** A Line in SIRI is equivalent to a Route in GTFS. Value could either be RouteCode or RouteName as required. Recommend using RouteCode because "PublishedLineName" is using RouteName. e.g.: RouteCode "917" = RouteName "Fremont" for BART. Does not identify the Agency, so RouteCode or RouteName would have to be unique to an Agency.
DirectionRef	Defined Text	*Mandatory*	**For Direction requirement.** "In" =inbound, "Out" = outbound
Note	Free Text	*Optional*	Note about the cancellation.

StopLineNoticeCancellation structure

Field	Type	Mandatory/ Optional	Description
RecordedAtTime	DateTime	*Mandatory*	The timestamp of the last real-time update from the particular vehicle.
ItemIdentifier	Free Text	*Mandatory*	Unique identifier for this notice

MonitoringRef	Free Text	*Mandatory*	Name of the Stop being monitored
LineRef	Free Text	*Mandatory*	**For Route Code requirement.** A Line in SIRI is equivalent to a Route in GTFS. Value could either be RouteCode or RouteName as required. Recommend using RouteCode because "PublishedLineName" is using RouteName. e.g.: RouteCode "917" = RouteName "Fremont" for BART. Does not identify the Agency, so RouteCode or RouteName would have to be unique to an Agency.
DirectionRef	Defined Text	*Mandatory*	**For Direction requirement.** "In" =inbound, "Out" = outbound
LineNote	Free Text	*Mandatory*	Information about the notice.

C.1.11 Real-time Vehicle Monitoring Message Structure

Field	Type	Mandatory/ Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Timestamp of response from server.
Status	Enum	*Mandatory*	Indicates success or failure of request. **true** - success **false**- failure, SIRI error response will be returned
VehicleMonitoringDelivery	Object	*Mandatory*	Contains multiple **VehicleActivity** entries, one per trip, if monitored.

VehicleMonitoringDelivery structure

Field	Type	Mandatory/ Optional	Description

VehicleActivity	Object	*Required*	This contains monitored vehicle journey (real-time trip) information.
VehicleActivityCancellation	Object	*Optional*	This contains cancellation information for a trip.

VehicleActivity structure

Field	Type	Mandatory / Optional	Description
RecordedAtTime	DateTime	*Required*	The timestamp of the last real-time update from the particular vehicle.
ValidUntilTime	DateTime	*Required*	Time until which data is valid.
MonitoredVehicleJourney	Object	*Optional*	Real-time information about particular vehicles

MonitoredVehicleJourney structure

Field	Type	Mandatory/ Optional	Description
OperatorRef	Free Text	*Mandatory*	*For AgencyCode requirement*, e.g.: "BA". Could be moved under sub-node Extensions because it's NOT part of the SIRI spec.
LineRef	Free Text	*Mandatory*	*For Route Code requirement.* A Line in SIRI is equivalent to a Route in GTFS. Value could either be RouteCode or RouteName as required. Recommend using RouteCode because "PublishedLineName" is using RouteName. e.g.: RouteCode "917" = RouteName "Fremont" for BART. Does not identify the Agency, so RouteCode or RouteName would have to be unique to an Agency.
DirectionRef	Defined Text	*Mandatory*	*For Direction requirement.* E.g.: "IB"

FramedVehicleJourneyRef	Object	Mandatory	A compound element uniquely identifying the trip the vehicle is serving.
PublishedLineName	Free Text	Mandatory	**For Route name requirement.**
OriginRef	Computed Text	Optional	"The GTFS stop code or stop ID for the first stop on the trip the vehicle is serving, prefixed by Agency ID." e.g.: "DALY".
OriginName	Free Text	Optional	**For Origin place name requirement.** "The GTFS stop Name for the first stop on the trip the vehicle is serving." We don't have an Agency ID, so would use Agency Name e.g.: "Daly City BART Station".
DestinationRef	Computed Text	Optional	"The GTFS stop code or stop ID for the last stop on the trip the vehicle is serving, prefixed by Agency ID." e.g.: "WARM".
DestinationName	Free Text	Optional	**For Destination place name requirement.** "The trip head sign, if available. If not, GTFS stop Name for the last stop on the trip the vehicle is serving." e.g.: "Warm Springs/South Fremont".
Monitored	Boolean	Mandatory	True if the trip is monitored for real-time updates.
InCongestion	Boolean	Optional	Indicates the congestion level affecting the vehicle. Set to true if the agency provides the congestion level as STOP_AND_GO, CONGESTION or SEVERE_CONGESTION. Set to false if agency provides the congestion level as RUNNING_SMOOTHLY
Bearing	Float	Optional	When data is available, this field provides values in degrees, clockwise from True North, i.e., 0 is North and 90 is East.
Occupancy	Enum	Optional	When data is available this field provides level of passenger occupancy in the vehicle - full, seatsAvailable, standingAvailable
MonitoredCall	Object	Optional	Call data for the current stop
OnwardsCalls	Object	Optional	Call data for next stops
PreviousCalls	Object	Optional	Call data for previous stops
ProgressStatus	Enum	Optional	Status of the current vehicle, On-time, Running early etc.

| VehicleRef | Free Text | Optional | The unique identifier of the vehicle to be monitored. |
| VehicleLocation | Object | Optional | Vehicle location information. (Latitude/Longitude) |

FramedVehicleJourneyRef Structure

Field	Type	Mandatory / Optional	Description
DataFrameRef	Date time	*Mandatory*	The service date for the trip the vehicle is serving.
DatedVehicleJourneyRef	Free Text	*Mandatory*	The trip ID for trip the vehicle is serving.

Monitored/Onward/Previous Call structure

Field	Type	Mandatory / Optional	Description
StopPointRef	Free Text	*Mandatory*	Stop code or stop ID.
StopPointName	Free Text	*Mandatory*	Name of the stop
VehicleLocationAtStop	Object	*Optional*	Vehicle location information at stop. (Latitude/Longitude)
VehicleAtStop	Boolean	*Optional*	True if vehicle is at the stop.
AimedArrivalTime	DateTime	*Optional*	Scheduled arrival time requirement.
ExpectedArrivalTime	DateTime	*Optional*	Predicted arrival time requirement.
ActualArrivalTIme	Date Time	*Optional*	Observed arrival time.
AimedDepartureTime	DateTime	*Optional*	Scheduled departure time requirement.
ExpectedDepartureTime	DateTime	*Optional*	Predicted departure time requirement.
ActualDepartureTime	Date Time	*Optional*	Observed departure time.
Distances	Object	*Optional*	Extension to SIRI Call structure to incorporate distance and bearing information of vehicle from the stop.

Distances structure

Field	Type	Mandatory/ Optional	Description
CallDistanceAlongRoute	Numeric	*Optional*	Distance of the stop from the beginning of the trip/route
DistanceFromCall	Numeric	*Optional*	Distance from the vehicle to the stop along the route, in meters
StopsFromCall	Numeric	*Optional*	The number of stops on the vehicle's current trip until the stop in question, starting from 0.
PresentableDistance	Text	*Optional*	Suggested display for the distance of vehicle from the stop.

VehicleActivityCancellation structure

Field	Type	Mandatory/ Optional	Description
RecordedAtTime	Date Time	*Mandatory*	The timestamp when data was recorded.
VehicleJourneyRef	Object	Mandatory	A compound element uniquely identifying the trip the vehicle is serving.
LineRef	Free Text	*Mandatory*	***For Route Code requirement.*** A Line in SIRI is equivalent to a Route in GTFS. Value could either be RouteCode or RouteName as required. Recommend using RouteCode because "PublishedLineName" is using RouteName. e.g.: RouteCode "917" = RouteName "Fremont" for BART. Does not identify the Agency, so RouteCode or RouteName would have to be unique to an Agency.
DirectionRef	Defined Text	*Mandatory*	***For Direction requirement.*** "In" =inbound, "Out" = outbound
Reason	Free Text	Mandatory	Reason for cancellation of this trip. For e.g. Vehicle has completed all its journeys.

C.1.12 Transit Schedule Updates for an agency Message Structure

Field	Type	Mandatory/ Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Timestamp of server response.
Status	Enum	*Mandatory*	Indicates success or failure of request. **true** - success **false**- failure, SIRI error response will be returned
ProductionTimetableDelivery	Object	*Mandatory*	Contains multiple **DatedTimetableVersionFrame** nodes.

ProductionTimetableDelivery structure

Field	Type	Mandatory/ Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Timestamp of server response.
DatedTimetableVersionFrame	Object	*Mandatory*	A timetable to run on a specific date

DatedTimetableVersionFrame structure

Field	Type	Mandatory/ Optional	Description
RecordedAtTime	DateTime	*Mandatory*	Date and time when data was recorded.
LineRef	Free Text	*Mandatory*	A Line in SIRI is equivalent to a Route in GTFS. Value is RouteCode e.g.: "917" = "Fremont" for "BART" agency.
DirectionRef	Enum	*Mandatory*	Value is either INBOUND or OUTBOUND
PublishedLineName	Free Text	*Mandatory*	Value is Route Name e.g.: "Fremont" for "BART" agency.
LineNote	Free Text	*Optional*	Text message describing this change.
DatedVehicleJourney	Object	*Mandatory*	Contains a **DatedVehicleJourney** node.

DatedVehicleJourney structure

Field	Type	Mandatory/ Optional	Description
DatedVehicleJourneyCode	Free Text	*Mandatory*	Identifies the vehicle journey (Tripid).
DatedCalls	Objects	*Mandatory*	May contain multiple **DatedCall** nodes.

DatedCall structure

Field	Type	Mandatory/ Optional	Description
StopPointRef	Numeric	*Mandatory*	The GTFS stop ID for this stop on the trip the vehicle is serving, prefixed by Agency Name e.g.: "BART_11".
AimedArrivalTime	DateTime	*Mandatory*	Value is expected arrival time.
AimedDepartureTime	DateTime	*Mandatory*	Value is expected departure time.
CallNote	Text	*Optional*	Text message describing this change.

C.1.13 Transit Addition and Cancellation of Trips by Agency Message Structure

Field	Type	Mandatory/ Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Timestamp of server response.
Status	Enum	*Mandatory*	Indicates success or failure of request. **true** - success **false**- failure, SIRI error response will be returned
EstimatedTimetableDelivery	Object	*Mandatory*	Contains multiple **EstimatedJourneyVersionFrame** node.

EstimatedJourneyVersionFrame structure

Field	Type	Mandatory/ Optional	Description
RecordedAtTime	DateTime	*Mandatory*	Date and time when data was recorded.
EstimatedVehicleJourney	Object	*Mandatory*	May contain multiple **EstimatedVehicleJourney** nodes, one for each vehicle.

EstimatedVehicleJourney structure

Provides real-time information about a journey along which a vehicle is running.

Field	Type	Mandatory/ Optional	Description
LineRef	Free Text	*Mandatory*	A Line in SIRI is equivalent to a Route in GTFS. Value is RouteCode e.g.: "917" = "Fremont" for "BART" agency.

DirectionRef	Enum	*Mandatory*	Value is either INBOUND or OUTBOUND
DatedVehicleJourneyRef	Free Text	*Mandatory*	Reference to a dated vehicle journey or trip.
Cancellation	Enum	*Optional*	Value is "true" if cancelled.
PublishedLineName	Free Text	*Mandatory*	Value is Route Name e.g.: "Fremont" for "BART" agency.
EstimatedCalls	Objects	*Mandatory*	May contain multiple **EstimatedCall** nodes. Not returned if journey is cancelled.

EstimatedCall structure

This describes the times at a stop. A journey must contain at least two calls.

Field	Type	Mandatory/ Optional	Description
StopPointRef	Numeric	*Mandatory*	The GTFS stop ID for this stop on the trip the vehicle is serving, prefixed by Agency Name e.g.: "BART_11".
AimedArrivalTime	DateTime	*Mandatory*	Value is expected arrival time.
AimedDepartureTime	DateTime	*Mandatory*	Value is expected departure time.
CallNote	Text	*Optional*	Text message describing the update.

C.1.14 General Announcements Message Structure

Field	Type	Mandatory/ Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Timestamp of server response.
Status	Enum	*Mandatory*	Indicates success or failure of request. **true** - success **false**- failure, SIRI error response will be returned
GeneralMessageDelivery	Object	*Mandatory*	May contain multiple **GeneralMessage** nodes.

GeneralMessageDelivery structure

Field	Type	Mandatory/ Optional	Description
ResponseTimestamp	DateTime	*Mandatory*	Date and time when message was recorded.
GeneralMessage	Object	*Optional*	A message from an agency.

GeneralMessage structure

Field	Type	Mandatory/ Optional	Description
RecordedAtTime	DateTime	*Mandatory*	Date and time when message was recorded.
InfoMessageIdentifier	String	*Optional*	Unique identifier of this message.
InfoMessageVersion	Int	*Optional*	Version number of this message.
InfoChannelRef	Text	*Optional*	Informationchannel to which message belongs.
ValidUntilTime	DateTime	*Optional*	Date and time of message expiration. If not provided, message is open-ended.
Content	Free Text	*Mandatory*	Text message.

C.1.15 ServiceAlerts Structure

Described in the Google documentation at:

https://developers.google.com/transit/gtfs-realtime/service-alerts

https://developers.google.com/transit/gtfs-realtime/examples/alerts

6 Appendix D: GTFS+ Files Structures

D.1.1 directions.txt File Structure

This file contains descriptions for each of the direction_ids provided for a route in the GTFS trips.txt file.

Field	Type	Mandatory/ Optional	Description
Route_id	Text	*Mandatory*	From GTFS routes.txt file.
Direction_id	Numeric	*Mandatory*	Binary direction_id from GTFS trips.txt file. Each (route_id, direction_id) pair is unique in directions.txt.

Direction	Text	*Mandatory*	Corresponding direction name. Following are the values for direction:
			    North
			    South
			    East
			    West
			    Northeast
			    Northwest
			    Southeast
			    Southwest
			    Clockwise
			    Counterclockwise
			    Inbound
			    Outbound
			    Loop
			    A Loop
			    B Loop

D.1.2 calendar_attributes.txt File Structure

This file contains descriptions for each of the service_ids provided in the GTFS calendar.txt file.

Field	Type	Mandatory/ Optional	Description
Service_id	Text	*Mandatory*	From GTFS calendar.txt file.
Service_description	Text	*Mandatory*	Description of the service. For example, Weekdays, Sunday/Holiday, etc.

D.1.3 farezone_attributes.txt File Structure

This file contains zone names for each of the zone_ids provided in the GTFS stops.txt file.

Field	Type	Mandatory/ Optional	Description
Zone_id	Text	*Mandatory*	From GTFS stops.txt file.

Zone_name	Text	*Mandatory*	Public name of the fare zone, such as EastBay, WestBay, etc.

D.1.4 rider_categories.txt File Structure

The GTFS fare_attributes.txt file provides the fares for the regular adult fare category only. This file lists the other rider categories that the agency may define for discounted fares.

Field	Type	Mandatory/ Optional	Description
Rider_category_ id	Numeric	*Mandatory*	Unique rider category ID. Values are: 2 - Senior 3 - Child 4 - Student 5 – Youth 6 - Disabled 7 – Promotional category 11 – Military 15 to 25 – Custom categories defined by the agency.
Rider_category_ description	Text	*Mandatory*	Rider category description, such as Child (ages 5-11), Seniors (Ages 62 & Up).

D.1.5 fare_rider_categories.txt File Structure

GTFS file fare_attributes.txt contains the fares for the regular adult rider category. Fares for other rider categories defined in the rider_categories.txt file above such as Child, Senior, etc will be provided in this GTFS+ file. The combination of fare_id and rider_category_id will be unique in this file.

Field	Type	Mandatory/ Optional	Description
Fare_id	Text	*Mandatory*	From GTFS fare_attributes.txt file.
Rider_category_ id	Numeric	*Mandatory*	From GTFS+ file rider_categories.txt.
Price	Decimal	*Mandatory*	Fare for the specified fare_id and rider_category_id in USD.

7   Appendix E: Historic Regional GTFS Feed

The Historical Regional Feed is produced monthly and gives a complete, retrospective view of service scheduled on each day of the month. By combining multiple Historical Regional Feed months, users can perform analyses across months, quarters, and years.

Historical Regional Feed products are fully valid GTFS feeds, but they differ somewhat in their contents from the daily Regional Feed products. This document describes the process used to produce the Historical Regional Feed products and their key differences.

E.1.1 Slicing regional feeds

Each day, the Regional Feed is produced from the versions of agency feeds on 511.org that provide the best view of service on that day. Each month, the Historical Regional Feed creation process takes these Regional Feeds and combines them together, taking one day of service from each feed, which we are calling a "slice."

For example:

Feed filename	Published	Contributes service slice for
mtc-regional-feed-2020-04-24.zip	2020-04-24	2020-04-24
mtc-regional-feed-2020-04-23.zip	2020-04-23	2020-04-23
mtc-regional-feed-2020-04-22.zip	2020-04-22	2020-04-22
mtc-regional-feed-2020-04-21.zip	2020-04-21	2020-04-21
mtc-regional-feed-2020-04-20.zip	2020-04-20	2020-04-20

If the Regional Feed for a given day is missing, the closest previous day provides service. For instance, if 2020-04-22 was missing, the 2020-04-21 feed slice would cover both 2020-04-21 and 2020-04-22.

E.1.2 Global entity copying

Agencies, stops, and routes are considered "global", and are handled using a simple ID-based merge with the most recent version winning. For example, if BART has a route with ID "OR-S" that is called "Richmond - Warm Springs", but then later renames it to "Richmond to Warm Springs", then the latter version will be used.

E.1.3 Trip hashing, comparison, and copying

Trips are more complicated and handled separately. A simple combining of all the trips and stop_times in all of the input files can easily create a GTFS feed that is too large for practical use, especially given that programs like OpenTripPlanner need to hold the entire schedule in memory. Therefore, duplicate copies of trips are detected using a hash based approach and only copied to the output once. This reduces the output size by approximately 90%.

For example, here are three hypothetical versions of Trip ID "BA:2210503" from three consecutive days of input regional feeds.

Feed filename	Trip ID	Route ID	Service ID	Headsign	1st stop	2nd stop	n stops	Hash
2020-04-24.zip	BA:2210503	BA:OR-S	BA:Wkd_BASE-Weekday-07	Warm Springs/South Fremont	RICH 5:03	DELN 5:07	PLZA 5:10...	8c4ecb
2020-04-23.zip	BA:2210503	BA:OR-S	BA:Wkd_BASE-Weekday-07	Warm Springs/South Fremont	RICH 5:03	DELN 5:07	PLZA 5:10...	8c4ecb
2020-04-22.zip	BA:2210503	BA:OR-S	BA:Wkd_BASE-Weekday-07	Warm Springs to South Fremont	RICH 5:04	DELN 5:06	PLZA 5:12...	a4bf1a

For each of these, the hashing function takes into account all trip attributes, all the calendar attributes for that trip, and the full details of each entry in stop_times.txt. Any change in any field will result in a different hash. This allows us to directly compare trips between versions of the input feed. Above, all details and schedule for 2020-04-23 and 2020-04-24 match exactly, so these trips two will be considered identical. The trip for 2020-04-22 has some minor differences in name and schedule, so will generate a different hash, and be considered a different trip.

As the historical feed merging program processes each input feed, it calculates the hash of each trip in the feed. If it has not seen a trip before, it copies it to the output and notes the hash for future use. If it has been seen before, it is not copied again. To prevent clashes, the original Trip IDs are appended with the trip hash (e.g. BA:2210503 -> BA:2210503:8c4ecb). The merging program then takes all trips in the input feed (both seen and unseen) and examines the calendars to see which are active for each day in this slice, and then creates calendar_dates.txt entries for each trip on each day where that trip is scheduled to run. The original service IDs are changed to be the same as the hash appended Trip ID, and the calendar is unrolled into a day-by-day format, but it works reliably. This hashing approach is resource efficient and allows us to create historical feeds of arbitrary duration while minimizing the output size.

Example output calendar_dates.txt:

Service ID	Date	Exception Type
BA:2210503:8c4ecb	2020-04-24	1 (Added)
BA:2210503:8c4ecb	2020-04-23	1 (Added)
BA:2210503:a4bf1a	2020-04-22	1 (Added)

In this way, the 8c4ecb version of the trip is scheduled to run on the two days of input data where it was seen, and the a4bf1a version is scheduled to run on the other day.

E.1.4 Differences between Regional and Historic feeds

Historic Regional Feeds are equivalent to the original daily Regional Feeds in the stops, routes, and scheduled services they contain. Using a Historic will produce the same output in a routing engine or another type fo analysis.

Historic Feeds are different from Regional Feeds in their specific GTFS structure:

•   calendars.txt records are removed and rewritten in calendar_dates.txt

•   trips.txt records are hashed and compared (as described above)

•   IDs for global records are namespaced (as described above)

These differences should not affect routing engine or similar types of analysis. However, keep these differences in mind if you are trying to use historical feeds to understand changes in GTFS data and its practices over time at Bay Area agencies.