511 Data Exchange including an Open511 Protocol

Traffic

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Version 1.0

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
Split API specification document into sub docs for each API domain	1.0	8/26/2014
Minor updates to remove Transit references	1.0	9/24/2014

1 Overview

This document focuses on data exchange APIs for the Parking 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 Traffic API

The core traffic data resources consist of events and roadway segments (Links). Open511provides message structure and API endpoint for accessing these resources. Open511 will also provide metadata/lookup information that can be used by consumers to filter and limit information during requests.

2.1 API: Event

The event resource provides information about various types of events within a jurisdiction. These can be active incident, scheduled construction/roadway work or public events which may or may not have an impact on traffic conditions. Consumers can request list of all the active events or they can use additional filters such as city, roads to restrict the results as per their needs and use case.

The event structure is the main element of the events collection. Although an event should be considered as independent, it is possible that one major event (mainly construction) could be split across several events. Below is a message structure of Event.

Field	Type	Mandatory/ Optional	Description
self	Link	*Mandatory*	Self link to the current resource.
jurisdiction	Link	*Mandatory*	Link to the jurisdiction publishing the event.
id	String	*Mandatory*	A globally unique ID for the event, following the format jurisdiction-id/event-id. For example, 511.org/8c3f2.

			The first segment of the event ID is the jurisdiction ID. The second segment is a string ID that must be unique within its jurisdiction. It can contain the characters a-zA-Z0-9_.-. The two segments are separated with a /. The event's self link is of course itself a globally unique ID, and it is a suggested practice to use the event ID in the event URL, but a separate ID field is included for user-friendliness.
status	Enum	*Mandatory*	Status of the event. The status allows a client to determine if the current event should be considered as currently effective. Value list: - ACTIVE : The event should be considered as effective - ARCHIVED : The event should not be considered as effective
headline	Free Text	*Mandatory*	Title of the event. Should be shorter than 500 characters.
event_type	Enum	*Mandatory*	Basic type of event. Value list - CONSTRUCTION : planned road work - SPECIAL_EVENT : special events (fair, sport event, etc.) - INCIDENT : accidents and other unexpected events - WEATHER_CONDITION : Weather condition affecting the road - ROAD_CONDITION : Status of the road that might affect travelers.
severity	Enum	*Mandatory*	Severity of the event. Value list: MINOR: the event has very limited impact on traffic. MODERATE: the event will have a visible impact on traffic but should not create significant delay; if there is a delay, it should be small and local. MAJOR: the event will have a significant impact on traffic, probably on a large scale. UNKNOWN: the impact is unknown, for example in the case of an accident that has been recorded without any precise description.

geography	Geospatial	*Mandatory*	Geographical information about the event. Can be Point, MultiPoint, LineString, MultiLineString, or Polygon.
created	DateTime (UTC)	*Mandatory*	When the event was initially created.
updated	DateTime (UTC)	*Mandatory*	When the content of the event last changed. Will be the same as created if no updates have occurred.
schedule	*schedule* elements	*Mandatory*	Indicates the dates and times when the event is active.
timezone	timezone	*Optional*	Timezone to be used for this event, e.g. America/Montreal. If not provided, the event is assumed to be in the default timezone of its jurisdiction.
description	Free text	*Optional*	*But strongly recommended.* Description of the event. Plain text description of the event, the reason for the event and any other relevant information for travelers.
event_subtypes	Collection of event_subtype elements	*Optional*	List of values to provide more detail about the type of event.
— **event_subtype**	Enum	*Optional*	- ACCIDENT - SERIOUS_ACCIDENT - NUMEROUS_ACCIDENTS - STALLED_VEHICLE - SPILL - OBSTRUCTION - MAJOR_HAZARD - DEMONSTRATION - ROAD_CONSTRUCTION - WORK_IN_THE_MEDIAN - NARROW_LANES - TRAFFIC_ALTERNATING_DIRECTIONS - BRIDGE_OPERATIONS - BLASTING - WORK_ON_UNDERGROUND - EMERGENCY_MAINTENANCE - SPORTING_EVENT - MAJOR_EVENT - CONCERT - FESTIVAL - FIREWORKS

			- PARADE - CROWD - SEVERE_WEATHER - HEAVY_SNOW - SNOW - ICE_GLAZE - HEAVY_FROST - ICE_STORM - DAMAGING_HAIL - THUNDERSTORM - HEAVY_DOWNPOUR - TORNADO - HURRICANE - STRONG_WINDS - DENSE_FOG - FREEZING_FOG - ICE_FOG MIST - VISIBILITY_REDUCED - VISIBILITY_BLOCKED - BLOWING_SNOW - BLOWING_DUST - SANDSTORM - INSECT_SWARMS - IMPASSABLE - ALMOST_IMPASSABLE - PASSABLE_WITH_CARE - SURFACE_WATER_HAZARD - HYDROPLANING_DANGER - SLIPPERY - MUD - LOOSE_GRAVEL - OIL_ON_ROADWAY - ICE - BLACK_ICE - WET_ICY_ROAD - SLUSH - FROZEN_SLUSH - SNOW - PACKED_SNOW - PLOWED_SNOW - POWDER_SNOW - DEEP_SNOW
certainty	Enum	*Optional*	Degree of certainty of the event. Should only be used for unplanned events (e.g incidents, weather conditions and pavement conditions events). Value list to be confirmed. Could be observed/likely/possible/unknown. Value list - OBSERVED - LIKELY

			- POSSIBLE - UNKNOWN
grouped_events	Collection of links	*Optional*	This structure is used to group events together. In specific situations (for example complex construction projects), several events might be related together. This field should be used to point a related event.
— related	Link	*Optional*	Link pointing to another event resource related to the current event.
detour	Free Text	*Optional*	Description of a detour route to avoid this event.
roads	Collection of road elements	*Optional*	List of roads affected by the current event. One event can impact several roads.
areas	Collections of area elements	Optional	Areas affected by the event.
attachments	Collection of attachment links	Optional	Collection of attachments providing additional information about the event (PDFs, images, etc.)
— related	Link	Optional	Link to an attachment. While only the URL is mandatory, more information may be provided via type, length, title, and hreflang, with semantics as in Atom.

Road_structure

The road data format is used to provide information about the road(s) affected by an event. The structure of road_affected is:

Field	Type	Mandatory/ Optional	Description
name	Free Text	*Mandatory*	Name of the road affected by the event. Ideally, road names should be formatted in accordance with national or regional standards, and the same road should be named consistently in different events.
self / url	Link	*Optional*	Link to the Road resource for this road.
from	Free text	*Optional*	*Mandatory if to is provided.* Approximate start point of the event on the road. It can be an intersection with another street or it can be a mileage indication. This value should not be used to determine the

			exact start point since it can be an approximation. The geometry field should be considered as the reference for exact location. If no *to* field is provided, this field means "nearby".
to	Free text	*Optional*	Approximate end point of the event on the road. It can be an intersection with another street or it can be a distance indication.
state	Enum	*Optional*	Whether the road segment is closed or not. Value list: - CLOSED (road closed in the given direction) - SOME_LANES_CLOSED (but the road remains open) - SINGLE_LANE_ALTERNATING (a single lane alternates between both directions of traffic) - ALL_LANES_OPEN
direction	Enum	*Conditional*	*Mandatory if state is provided.* Direction of the road that is affected by the event. If a lane_status is provided, the direction becomes mandatory. In the same situation, if both directions are affected, two occurrences of the road element are needed, one for each direction and with a dedicated lane_status for each direction. Value list: - N - NW - W - SW - S - SE - E - NE - NONE - BOTH
lanes_open	Integer	*Optional*	Allowed only if **state** is SOME_LANES_CLOSED and direction is not BOTH. Number of lanes in the given direction remaining open during this event.
lanes_closed	Integer	*Optional*	Allowed only if **state** is SOME_LANES_CLOSED and direction is not

			BOTH. Number of lanes in the given direction closed during this event.
impacted_systems	Collection of *impacted_system* elements	*Optional*	Allows provision of information about other systems that can be affected.
— impacted_system	Enum	*Optional*	Value list of systems: ROAD SIDEWALK BIKELANE PARKING
restrictions	Collection of *restriction* elements	*Optional*	Some events may come with some restrictions affecting vehicles using the road (speed, weight).

Restriction structure

Field	Type	Mandatory/ Optional	Description
restriction_type	Enum	*Mandatory*	Type of restriction that affects vehicles. Value list: SPEED: Limitation of the speed of vehicles. Unit is in kilometers/hour. WIDTH: Width limitation, mainly for trucks. Unit is meters. HEIGHT: Height limitation, mainly for trucks. Unit is meters WEIGHT: Weight limitation for vehicles. Unit is metric tons. AXLE_WEIGHT: Weight limitation per axle for truck. Unit is metric tons.
value	Float	*Mandatory*	Value of the limitation. For example a speed limitation of 60km/h will have a value of 60 with a **restriction_type** set to SPEED

Schedule structure

The schedule defines timelines of an event.

Field	Type	Mandatory/ Optional	Description

recurring_schedules	Collection of *recurring_schedule* elements	Conditional	*One (and only one) of* recurring_schedules *or* intervals *is required* The recurring_schedule structure expresses repeating schedules, like "Every day starting December 4th", or "Mondays 9 to 11 from September 1 to October 30." An event can include multiple recurring_schedule elements inside this recurring_schedules tag; exception elements can override them.
— start_date	Date	*Mandatory*	***Mandatory in each recurring_schedule*** Start date of this schedule.
— end_date	Date	Optional	End date of the event. If a start date but no end date is provided, the schedule continues indefinitely.
— daily_start_time	Time	Optional	Daily start time of the event, as HH:mm, e.g. 13:00. Applies to each day in this recurring_schedule.
— daily_end_time	Time	Conditional	***Mandatory if daily_start_time is provided, not allowed otherwise*** Daily end time of the event, as HH:mm, e.g. 17:30. Applies to each day in this recurring_schedule.
— days	collection of *day* elements	*Optional*	Contains a day tag for every day of the week during which this recurring_schedule is active. Days are indicated with an integer, with (following the ISO standard) Monday being 1 and Sunday 7. So, for an event active on Monday and Wednesday, <days><day>1</day><day>3</day></days>. If omitted, the schedule is active every day between its start and end dates.
exceptions	Collection of exception elements	*Optional*	*if present, there must be a* recurring_schedules *element (and no* intervals*)* Exceptions override recurring schedules.

— exception	Custom time format	*Mandatory*	An exception provides the definitive schedule for a specific date. It overrides any `recurring_schedule` information for that date. An exception of the form `YYYY-MM-DD` indicates that this event is **not** in effect for the given date. An exception of the form `YYYY-MM-DD HH:mm-HH:mm` indicates that, on that date, the event is in effect only between the provided start and end time. If there are multiple disjoint periods on that day, more than one start-end period can be included: `YYYY-MM-DD HH:mm-HH:mm HH:mm-HH:mm`.
intervals	Collection of `interval` elements	Conditional	*One (and only one) of `recurring_schedules` or `intervals` is required* Represent an event's schedule as a list of explicit periods. An event must use either `recurring_schedules` or `intervals`, not both. If this contains more than one `interval`, their time periods may not overlap. This also implies that no more than one can omit an end time.
— interval	Custom time format, largely a subset of ISO8601 intervals	*Mandatory*	Defines a specific period of time during which the schedule is in effect; two datetimes (without timezone offset) joined with a `/`. For example, a period from 9 p.m. September 1 to 8 a.m. September 2 would be `2014-09-01T21:00/2014-09-02T08:00`. The second datetime, after the slash, may be omitted. So, to indicate a period from 9 p.m. September 1 until further notice, use: `2014-09-01T21:00/`

Sample request endpoint for events

Request Type	**GET**
Request Endpoint Example	For e.g. http://api.511.org/Traffic/Events

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. e.g. ?format=json (returns json respone for v1, if v1 is the latest version or specified via version parameter) ?format=xml (returns XML response for v1)
version	*Optional*	The version of Open511 desired. e.g ?version=v1 (returns response for v1 in conjunction with format requested.
api_key	Mandatory	Unique key assigned to a user after they signup for Open511.
status	*Optional*	By default the API should only send active events. Supported values: ACTIVE Default value, returns only active events. ARCHIVED Returns only archived events ALL Returns both active and archived events.
in_effect_on	*Optional*	Show only events that are, according to their schedules, in effect at a specific time, or during a specific time period. Can be either a single time, or a start and end time joined by a comma. The times must be complete ISO 8601 datetimes, with or without a timezone. So to find, for example, all events in effect at some point on June 20th, you would ask for events between 00:00 and 23:59: in_effect_on=2013-06-20T00:00,2013-06-20T23:59 Or, to find events in effect within the next two hours, you'd get the current UTC timestamp — let's say it's 2013-06-20T17:40Z — and then request ?in_effect_on=2013-06-20T17:40Z,2013-06-20T19:40Z. You can also use the special value ?in_effect_on=now to show events currently taking place.

		If no timezone is provided, as in the first example, the server searches according to the local time as entered in the event. For example, if highways are closed for an hour at midnight on January 1st in both London and LA, ?in_effect_on=2014-01-01T00:00 would return both events (even though there's no single moment in time when the roads are closed in both cities), whereas the timezone-aware ?in_effect_on=2014-01-01T00:00Z would return only the London event. If this argument is not provided, the API should not perform any filtering based on the event schedules.
severity	*Optional*	Filter by the value of the severity field. OR queries are possible via a comma-separated list: ?severity=MINOR,MODERATE.
bbox	Optional	Filter events by geographical bounding box. Four comma-separated coordinates, xmin, ymin, xmax, ymax.
geography	Optional	Filtering near a point or linestring. The geography value should be provided as a WKT string in WGS84 latitude/longitude. Example: ...geography=POINT (-73.64 45.52). The geography must be used in conjuction with the tolerance filter.
tolerance	Conditional	Provide a tolerance of radius in meters around if a POINT or LINESTRING is used as filtering parameter. For example ...geography=POINT+(-73.64+45.52)&tolerance=50 would retrieve all the events within a circle of 50m radius around the selected point.
jurisdiction	Optional	The ID or URL of a jurisdiction, in order to show only events from a given jurisdiction. Use a comma-separated list to make OR queries. Example: jurisdiction=511.org.
event_type	Optional	Filter events using the event_type value list. Use a comma-separated list to make OR queries.
event_subtype	Optional	Filter events using the event_subtype value list. Use a comma-separated list to make OR queries.
created	Optional	Filter events based on the creation date and time. This parameter can (and generally will) be preceded with one of the following operators: < <= > >=. These allow searches for events created before or after a supplied time, e.g. created=>2013-05-10T12:00Z.

updated	Optional	Filter events based on the last update timestamp. Accepts the same < <= > >= operators as created. Note: by default, the servers should only return ACTIVE events. When using the updated filter, in order to get events going from ACTIVE to ARCHIVED, the client must ask for all events: ...?status=ALL
road_name	Optional	Shows only events containing a road element with the provided name. Case-sensitive exact match. Use a comma-separated list to make OR queries.
road	Optional	Shows only events containing a road element linking to a road element with the provided id. Use a comma-separated list to make OR queries.
area	Optional	Shows only events containing an area element with the provided id. Use a comma-separated list to make OR queries.
limit	Optional	The maximum number of events to return in a single paginated response. The default value for this (i.e. how many items to include on a page if no limit parameter is provided) is up to individual implementors. Likewise, implementors may want to enforce a maximum value for this parameter in order to conserve server resources, so that a ?limit=10000 query would still return only e.g. 500 events per page. However, if such a maximum is implemented, it must not be lower than 500.

The traffic event structure response for XML is shown in Appendix A Section A.2.1 and for JSON is shown in Appendix B Section B.2.1.

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 event resource cannot be located).

2.2 API: Announcement

Announcement is special type of event that isn't specific to a location. These may include travel advisories during a bridge closure or emergency messages during a major incident. Announcements can also include notifications by agencies such as start/stop of a new service,

Below is a message structure of Announcements.

Announcement structure

The announcement is the main element of the announcements collection.

Field	Type	Mandatory/ Optional	Description
self	Link	*Mandatory*	Self link to the current resource.
jurisdiction	Link	*Mandatory*	Link to the jurisdiction which published the announcement. In XML, the `rel` attribute needs the value `jurisdiction`.
status	Enum	*Mandatory*	Status of the announcement. The status allows a client to determine if the current announcement should be considered as currently effective. Value list;
			active; The announcement should be considered as effective **archive**; The announcement should not be considered as effective
headline	Free text	*Mandatory*	Title of the announcement. Should be shorter than 500 characters.
type	Enum	*Mandatory*	Basic type of announcement. Value list:
			Traffic **Transit** **General**
city	City	*Optional*	City in which the announcement is for (or near).
crated	DateTime	*Mandatory*	Date of creation of the announcement.
updated	DateTime	*Mandatory*	This field provides the date and time of the last update. The value is the same as the creation date if no change occurred.
related_events	Collection of Links to event resource	*Optional*	This field is used to link an announcement to one of more events.

Sample request endpoint for Announcements

Request Type	**GET**

Request Endpoint Example	For e.g. http://api.511.org/Announcements

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. e.g. ?format=json (returns json respone for v1, if v1 is the latest version or specified via version parameter) ?format=xml (returns XML response for v1)
version	*Optional*	The version of Open511 desired. e.g ?version=v1 (returns response for v1 in conjunction with format requested.
api_key	*mandatory*	Unique key assigned to a user after they signup for Open511.

The traffic announcement response for XML is shown in Appendix A Section A.2.2 and for JSON is shown in Appendix B Section B.2.2.

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 located).

2.3 API: Area

A jurisdiction can provide information about its geographical coverage using an area resource. Area could be type of county, city, neighbourhood etc. Area resource is useful in defining other resources such as roads and segments.

Below is a message structure of Area. Area is a collection of the area resource.

Area structure

The area is the main element of the Area collection.

Field	**Type**	**Mandatory/ Optional**	**Description**

name	Free text	*Mandatory*	Name of the area.
id	Integer	*Mandatory*	Unique identifier for the area. If the area is a standard political division (city, state, province, county, etc.) you must use the ID from the GeoNames database, in the form of e.g. *geonames.org/5323810*. (GeoNames already lists millions of places, and so it's extremely likely that any area you're interested in is there already, but it's also possible to add to GeoNames areas not already in their database.) If (and only if) the area is defined internally by your jurisdiction, and is neither a standard political division nor already in GeoNames, assign a unique ID within your own jurisdiction: 511.org/management-district-3
self	Link	*Mandatory*	Link pointing to the RDF representation of the GeoNames place, i.e. http://geonames.org/{id}/about.rdf

Sample request endpoint for area

Request Type	**GET**
Request Endpoint Example	For e.g. http://api.511.org/Traffic/Areas

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. e.g. ?format=json (returns json respone for v1, if v1 is the latest version or specified via version parameter) ?format=xml (returns XML response for v1)
version	*Optional*	The version of Open511 desired.

		e.g ?version=v1 (returns response for v1 in conjunction with format requested.
api_key	*mandatory*	Unique key assigned to a user after they signup for Open511.
limit	Optional	The maximum number of areas to return in a single paginated response. The default value for this (i.e. how many items to include on a page if no limit parameter is provided) is up to individual implementors. Likewise, implementors may want to enforce a maximum value for this parameter in order to conserve server resources, so that a ?limit=10000 query would still return only e.g. 500 areas per page. However, if such a maximum is implemented, it must not be lower than 500.

The traffic area response for XML is shown in Appendix A Section A.2.3 and for JSON is shown in Appendix B Section B.2.3.

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)

2.4 API: Road

Roads are list of roadways covered by a jurisdiction. A consumer can use this information to filter events, segments and nodes during a request.

Below is a message structure of Roads.

Road structure

The road is the main element of the roads collection.

Field	Type	Mandatory/ Optional	Description
name	Free text	*Mandatory*	Name of the road.
id	Integer	*Mandatory*	A globally unique ID for the road, following the format jurisdiction-id/road-id. For example, 511.org/1234.
self	Link	*Mandatory*	Self link to the current resource.
jurisdiction	Link	*Mandatory*	Link to the jurisdiction publishing the road.

Sample request endpoint for Roads

Request Type	**GET** For e.g. http://api.511.org/Traffic/Roads

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. e.g. ?format=json (returns json respone for v1, if v1 is the latest version or specified via version parameter) ?format=xml (returns XML response for v1)
version	*Optional*	The version of Open511 desired. e.g ?version=v1 (returns response for v1 in conjunction with format requested.
api_key	*mandatory*	Unique key assigned to a user after they signup for Open511.
limit	Optional	The maximum number of roads to return in a single paginated

		response. The default value for this (i.e. how many items to include on a page if no limit parameter is provided) is up to individual implementors. Likewise, implementors may want to enforce a maximum value for this parameter in order to conserve server resources, so that a ?limit=10000 query would still return only e.g. 500 roads per page. However, if such a maximum is implemented, it must not be lower than 500.

The traffic road for XML is shown in Appendix A Section A.2.4 and for JSON is shown in Appendix B Section B.2.4.

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 road resource cannot be located).

2.5 API: Traffic Segment

Traffic and surface conditions along a roadway are provided on segments. Segments are defined as portion of road between two points (nodes) in one particular direction. The Traffic Segments API will provide configuration data for one or many segments covered by a jurisdiction. Segments are often referred as links in other system.

Below is a message structure of Segment.

Traffic Segment structure

The Traffic Segment is the main element of the Segments collection.

Field	Type	Mandatory/ Optional	Description
id	Integer	*Mandatory*	A globally unique ID for the traffic segment, following the format jurisdiction-id/traffic_segment-id. For example, 511.org/1234.
self	Link	*Mandatory*	Self link to the current resource.
jurisdiction	Link	*Mandatory*	Link to the jurisdiction publishing the traffic segment.

updated	DateTime	*Mandatory*	When the content of the resource last changed. More specifically, must be the time at which the current version of this resource first became available via this Open511 API. Clients are likely to poll for changes via requests like ?updated=>2013-10-01T15:10Z where the timestamp is the last time they made such a request. Because of this, implementors need to be certain that the resource version with an updated field of 2013-10-01T15:10Z was indeed accessible to API requests at that time.
geography	Geospatial	*Mandatory*	Geographical coordinates for this segment. May be Point or LineString. If LineString, coordinates must be ordered properly in the direction of the road.
roads	Collection of road elements	*Mandatory*	Roads to which this segment belongs. Usually a segment belongs to a single road, but the format supports multiple roads for cases where, for example, a single physical stretch of road is considered part of multiple numbered highways.
current_speed	Integer	*Mandatory*	The speed of traffic, as of the time in updated. In km, unless the jurisdiction has set a distance_unit of MILES.
current_travel_time	Integer	*Optional*	The time, in seconds, to drive through this segment. (Only makes sense if geography is a LineString.)
historical_speed	Integer	*Optional*	The usual speed for this segment at this time of the day; the exact semantics of how this number is calculated may differ between jurisdictions.
historical_travel_time	Integer	*Optional*	The usual time, in seconds, to drive through this segment at this time of the day.
historical_traffic_conditions	Link	*Optional*	A link to a list of historical traffic condition resources for this segment.
name	Free Text	*Optional*	A descriptive name for the road segment.
areas	Collections of area elements	*Optional*	Areas within which this segment falls.

Road structure

Field	Type	Mandatory/ Optional	Description
name	Free Text	*Mandatory*	Name of the road affected by the event; should be the same as in the linked Road resource.
self/url	Link	*Mandatory*	Link to the Road resource for this road.
direction	Enum	*Mandatory*	Direction of this segment. Value list: - N - NW - W - SW - S - SE - E - NE
from	Free Text	*Optional*	A description of the point on the road where the segment begins -- for example, the name of an intersecting road, or an exit number. If no to field is provided, this field means "nearby".
to	Free Text	*Optional*	A description of the point on the road where the segment ends.

Sample request endpoint for Links

Request Type	**GET**
Request Endpoint Example	For e.g. http://api.511.org/Traffic/Traffic_Segments

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.

		e.g. ?format=json (returns json respone for v1, if v1 is the latest version or specified via version parameter) ?format=xml (returns XML response for v1)
version	*Optional*	The version of Open511 desired. e.g ?version=v1 (returns response for v1 in conjunction with format requested.
api_key	*Optional*	If a jurisdiction/disseminator requires use of API key. An API key registration service will have to be provided by a Jurisdiction.
bbox	Optional	Filter traffic segments by geographical bounding box. Four comma-separated coordinates, xmin, ymin, xmax, ymax.
geography	Optional	Filtering near a point or linestring. The geography value should be provided as a WKT string in WGS84 latitude/longitude. Example: ...geography=POINT (-73.64 45.52). The geography must be used in conjuction with the tolerance filter.
tolerance	Conditional	Provide a tolerance of radius in meters around if a POINT or LINESTRING is used as filtering parameter. For example ...geography=POINT+(-73.64+45.52)&tolerance=50 would retrieve all the events within a circle of 50m radius around the selected point.
jurisdiction	Optional	The ID or URL of a jurisdiction, in order to show only traffic segments from a given jurisdiction. Use a comma-separated list to make OR queries. Example: jurisdiction=511.org.
updated	Optional	Filter traffic segments based on the last update timestamp. Accepts the same < <= > >= operators as created.

road	Optional	Shows only traffic segments containing a road element linking to a road element with the provided id. Use a comma-separated list to make OR queries.
area	Optional	Shows only traffic segments containing an area element with the provided id. Use a comma-separated list to make OR queries.
limit	Optional	The maximum number of traffic segments to return in a single paginated response. The default value for this (i.e. how many items to include on a page if no limit parameter is provided) is up to individual implementors. Likewise, implementors may want to enforce a maximum value for this parameter in order to conserve server resources, so that a ?limit=10000 query would still return only e.g. 500 traffic segments per page. However, if such a maximum is implemented, it must not be lower than 500.

The traffic segment response for XML is shown in Appendix A Section A.2.5 and for JSON is shown in Appendix B Section B.2.5.

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 segment resource cannot be located).

2.6 API: Historical Traffic Conditon

Average historical speed on a traffic segment for a particular day and time, e.g. Wednesdays at 10:30 a.m.

Below is a message structure of historical traffic conditions.

Historical Traffic Condition Structure

The historical_traffic_condition is the main element of the historical_traffic_conditions collection.

Field	Type	Mandatory/ Optional	Description
traffic_segment	Link	*Mandatory*	Link to the traffic segment this data applies to.
day	Integer	*Mandatory*	The day of the week this data applies to. An ISO weekday, 1=Monday 7=Sunday.
time	Time	*Mandatory*	The time of day this data applies to, hh:mm.
historical_speed	Integer	*Mandatory*	The usual speed for this segment at the given day and time. As in traffic segments.
historical_travel_time	Integer	*Optional*	The usual time to drive through this segment at the given day and time. As in traffic segments.

Sample request endpoint for Links

Request Type	**GET**
Request Endpoint Example	For e.g. http://api.511.org/Traffic_Segments/511.org/101000/Historical_Conditions

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. e.g. ?format=json (returns json respone for v1, if v1 is the latest version or specified via version parameter) ?format=xml (returns XML response for v1)
version	*Optional*	The version of Open511 desired. e.g ?version=v1 (returns response for v1 in conjunction with format requested.
api_key	*Optional*	If a jurisdiction/disseminator requires use of API key. An API key registration service will have to be provided by a Jurisdiction.
day/time	*Optional*	Client should be able to request speed and travel time data for a specific day (ISO weekday, from 1 to 7) and time (hh:mm) period. For e.g. Monday at 8:00 am. When this parameter is specified the api will return only historical speed and travel time information nearest to the query.
limit	Optional	The maximum number of traffic conditions to return in a single paginated response. The default value for this (i.e. how many items to include on a page if no limit parameter is provided) is up to individual implementors. Likewise, implementors may want to enforce a maximum value for this parameter in order to conserve server resources, so that a ?limit=10000 query would still return only e.g. 500 traffic conditions per page. However, if such a maximum is implemented, it must not be lower than 500.

The traffic segment conditions response for XML is shown in Appendix A Section A.2.6 and for JSON is shown in Appendix B Section B.2.6.

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 link resource cannot be located).

3 Appendix A: API Response Messages- XML

3.1 Traffic XML

A.1.1 Example Traffic Event Structure Response (XML)

```
<open511
      xmlns:gml="http://www.opengis.net/gml"
      xml:lang="en"
      xml:base="http://api.511.org"
      version="v1"
   >
<events>
  <event>
  <status>ACTIVE</status>
  <link rel="self" href="/traffic/events/511.org/149"/>
  <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/"/>
  <id>511.org/149</id>
  <headline>CHP : Roadwork on CA-160 NorthBound between Main St (Antioch) and Antioch
Bridge - Toll Plaza (Oakley) Acceleration lane closed Expect delays</headline>
  <event_type>INCIDENT</event_type>
  <severity>UNKNOWN</severity>
  <created>2014-05-01T19:28:31Z</created>
  <updated>2014-05-01T19:28:31Z</updated>
  <geography>
    <gml:Point srsName="EPSG:4326">
      <gml:coordinates>-121.75382399999999,38.004908</gml:coordinates>
    </gml:Point>
  </geography>
  <roads>
    <road>
      <name>CA-160</name>
      <from>Main St</from>
      <to>Antioch Bridge - Toll Plaza</to>
      <direction>NorthBound</direction>
      <state>Open</state>
    </road>
  </roads>
  <schedules>
    <schedule>
      <start_date>2014-05-01</start_date>
    </schedule>
  </schedules>
</event>
<event>
  <status>ACTIVE</status>
  <link rel="self" href="/traffic/events/511.org/209"/>
  <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/"/>
  <id>511.org/209</id>
  <headline>CHP : Obstruction on US-101 N NorthBound before Coyote Creek Golf Dr (San
Jose) blocked Expect delays</headline>
  <event_type>INCIDENT</event_type>
  <severity>UNKNOWN</severity>
  <created>2014-05-02T01:13:55Z</created>
  <updated>2014-05-02T02:43:16Z</updated>
  <geography>
    <gml:Point srsName="EPSG:4326">
      <gml:coordinates>-121.69346399999999,37.19068</gml:coordinates>
    </gml:Point>
```

```
  </geography>
  <roads>
    <road>
      <name>US-101 N</name>
      <from>Coyote Creek Golf Dr</from>
      <to/>
      <direction>NorthBound</direction>
      <state>Open</state>
    </road>
  </roads>
  <schedules>
    <schedule>
      <start_date>2014-05-01</start_date>
    </schedule>
  </schedules>
</event>
</events>
   <pagination>
     <offset>0</offset>
     <link rel="next" href="/traffic/events/?api_key={api_key}&limit=2&amp;offset=2"/>
   </pagination>
   <link rel="self" href="/traffic/events/?api_key={api_key}&limit=2&amp;offset=0"/>
   <link rel="up" href="/"/>
 </open511>
```

A.1.2 Example Traffic Announcment Response (XML)

```
<open511
    xml:lang="en"
    xml:base="http://api.511.org"
    version="v1"
>
   <linkrel="up"href="http://api.511.org"/>
   <Announcement>
    <status>active</status>
    <link rel="self"href="/announcements/23948/"/>
    <link rel="jurisdiction"href="/jurisdictions/SFBayArea/"/>
    <headline>
     Bart to run extra trains during world series.
    </headline>
    <description>
     Bart to run extra trains during world series.
    </description>
    <Type>Traffic</Type>
    <creation_date>2012-05-23T20:33:10Z</creation_date>
    <last_update>2012-05-24T10:00:10Z</last_update>
   </Announcement>
</open511>
```

A.1.3 Example Traffic Area Response (XML)

```
<open511
    xml:lang="en"
    xml:base="http://api.511.org"
    version="v1"
>
<areas>
  <area>
    <name>Anaheim</name>
```

```
    <id>5323810</id>
    <link rel="self" href="http://geonames.org/5323810/about.rdf" />
  </area>
  <area>
    <name>Orange County</name>
    <id>5379524</id>
    <link rel="self" href="http://geonames.org/5379524/about.rdf" />
  </area>
</areas>
  <pagination>
    <offset>0</offset>
    <link rel="next" href="/traffic/areas/?api_key={api_key}&limit=2&offset=2"/>
  </pagination>
  <link rel="self" href=" /traffic/areas/?api_key={api_key}&limit=2&offset=0"/>
  <link rel="up" href="/"/>
</open511>
```

A.1.4 Example Traffic Road Response (XML)

```
<open511
    xml:lang="en"
    xml:base="http://api.511.org"
    version="v1"
>
<roads>
  <roads>
    <road>
      <link rel="self" href="/traffic/roads/511.org/7"/>
      <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/"/>
      <name>106TH AVE</name>
      <id>511.org/7</id>
    </road>
    <road>
      <link rel="self" href="/traffic/roads/511.org/12"/>
      <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/"/>
      <name>10TH ST</name>
      <id>511.org/12</id>
    </road>
    <road>
      <link rel="self" href="/traffic/roads/511.org/15"/>
      <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/"/>
      <name>11TH ST</name>
      <id>511.org/15</id>
    </road>
    <road>
      <link rel="self" href="/traffic/roads/511.org/39"/>
      <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/"/>
      <name>14TH ST</name>
      <id>511.org/39</id>
    </road>
    <road>
      <link rel="self" href="/traffic/roads/511.org/50"/>
      <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/"/>
      <name>163RD AVE</name>
      <id>511.org/50</id>
    </road>
</roads>
<pagination>
    <offset>0</offset>
```

```
    <link rel="next" href="/traffic/roads/?api_key={api_key}&limit=5&offset=5"/>
</pagination>
<link rel="self" href="/traffic/roads/?api_key={api_key}&limit=5&offset=0"/>
<link rel="up" href="/"/>
</open511>
```

A.1.5 Example Traffic Segment Response (XML)

```
<open511
    xmlns:gml="http://www.opengis.net/gml"
    xml:lang="en"
    xml:base="http://api.511.org"
    version="v1"
>
<traffic_segments>
  <traffic_segment>
    <link rel="self" href="/traffic/traffic_segments/511.org/101000"/>
    <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/"/>
    <id>511.org/101000</id>
    <updated>2014-03-01T00:02:26Z</updated>
    <roads>
      <road>
        <link rel="self" href="/traffic/roads/511.org/27806"/>
        <name>I-80 E</name>
        <direction>E</direction>
        <from>I-80 E @ US-101 N</from>
        <to>I-80 E @ US-101 S</to>
      </road>
    </roads>
    <geography>
      <gml:LineString srsName="urn:ogc:def:crs:EPSG::4326">
        <gml:posList>37.76521699999072 -122.40486400000083 37.765668000137815 -
122.40484599955917 37.76580999992818 -122.40484599955917 37.765832348638327 -
122.40484734074388 37.765959999830677 -122.40485499978001 37.766123999716797 -
122.40486400000083 37.766255000100692 -122.4048759996964 37.766476000097676 -
122.40489800033605 37.767247000224465 -122.40497199995586 37.768353999762653 -
122.405079000086 37.768518999856688 -122.4050949999795 37.76961870608794 -
122.40520139105189</gml:posList>
      </gml:LineString>
    </geography>
    <current_speed>10</current_speed>
    <current_travel_time>184</current_travel_time>
    <historical_speed>8</historical_speed>
    <historical_travel_time>209</historical_travel_time>
    <link rel="historical_traffic_conditions"
href="/traffic/traffic_segments/511.org/101000/historical_conditions"/>
  </traffic_segment>
  <traffic_segment>
    <link rel="self" href="/traffic/traffic_segments/511.org/101001"/>
    <link rel="jurisdiction" href="http://api.511.org/jurisdictions/511.org/"/>
    <id>511.org/101001</id>
    <updated>2014-03-01T00:02:26Z</updated>
    <roads>
      <road>
        <link rel="self" href="/traffic/roads/511.org/27806"/>
        <name>I-80 E</name>
        <direction>E</direction>
        <from>I-80 E @ US-101 S</from>
        <to>I-80 E @ 7TH ST</to>
```

```
      </road>
    </roads>
    <geography>
      <gml:LineString srsName="urn:ogc:def:crs:EPSG::4326">
        <gml:posList>37.76961870608794 -122.40520139105189 37.769624999705492 -
122.40520200010964 37.769707999710661 -122.40521200015537 37.769781000014625 -
122.40522300002604 37.769890999889093 -122.40524200029262 37.770001000310039 -
122.40526599968375 37.770132000216933 -122.40530000001894 37.770325000302094 -
122.40536699996611 37.770514999746645 -122.40544800015692 37.770613000128897 -
122.40550500005835 37.770695999735139 -122.40555899958672 37.770790999751895 -
122.40562800008202 37.770946999731393 -122.40573900041008 37.771024000150732 -
122.40578799991556 37.771104999693769 -122.40584499981698 37.771200999694805 -
122.4059100001143 37.771316999796014 -122.40599499960479 37.771416000332273 -
122.4060669995748 37.771556000147044 -122.40616000035955 37.771638000321232 -
122.40620800004014 37.771721000197104 -122.40625700044393 37.771756999823459 -
122.40627400016238 37.771929000084185 -122.40635700000304 37.772084000005286 -
122.40641999975223 37.77212600030817 -122.40643300017105 37.772197999859003 -
122.40645699956215 37.772224999761249 -122.40646599978299 37.772392999799315 -
122.40651099998884 37.772432999650654 -122.40651900038476 37.772572999670025 -
122.40654500032403 37.772626000120489 -122.40655100017179 37.772732000197308 -
122.40656299986738 37.772869000319389 -122.40656700006535 37.772883999814539 -
122.40656799989024 37.772899000016793 -122.40656700006535 37.772914000215948 -
122.40656600024043 37.773340000341705 -122.40654299977587 37.773434000032239 -
122.40652699988237 37.773568000260674 -122.40649500009532 37.773723000296236 -
122.40644700041473 37.77385399999956 -122.40639899983583 37.774047000310432 -
122.40631500017025 37.774164999726203 -122.40625700044393 37.774235999663034 -
122.40622200028382 37.774424000196575 -122.40612100000151 37.774580000321635 -
122.40602999976491 37.774708999712225 -122.40594600009931 37.774848999682291 -
122.40585099966474 37.774969862154933 -122.40576053392574</gml:posList>
      </gml:LineString>
    </geography>
    <current_speed>10</current_speed>
    <current_travel_time>223</current_travel_time>
    <historical_speed>26</historical_speed>
    <historical_travel_time>106</historical_travel_time>
    <link rel="historical_traffic_conditions"
href="/traffic/traffic_segments/511.org/101001/historical_conditions"/>
  </traffic_segment>
</traffic_segments>
<pagination>
    <offset>0</offset>
    <link rel="next"
href="/traffic/traffic_segments/?api_key={api_key}&limit=2&offset=2"/>
</pagination>
<link rel="self" href="/traffic/traffic_segments/?api_key={api_key}&limit=2&offset=0"/>
<link rel="up" href="/"/>
</open511>
```

A.1.6 Example Historical Traffic Conditions Response (XML)

```
<open511
    xml:lang="en"
    xml:base="http://api.511.org"
    version="v1"
>
<historical_traffic_conditions>
  <historical_traffic_condition>
    <link rel="traffic_segment" href="/traffic/traffic_segments/511.org/101000"/>
    <day>1</day>
```

```
    <time>00:00</time>
    <historical_speed>92</historical_speed>
    <historical_travel_time>19</historical_travel_time>
  </historical_traffic_condition>
  <historical_traffic_condition>
    <link rel="traffic_segment" href="/traffic/traffic_segments/511.org/101000"/>
    <day>1</day>
    <time>00:15</time>
    <historical_speed>96</historical_speed>
    <historical_travel_time>17</historical_travel_time>
  </historical_traffic_condition>
  <historical_traffic_condition>
    <link rel="traffic_segment" href="/traffic/traffic_segments/511.org/101000"/>
    <day>1</day>
    <time>00:30</time>
    <historical_speed>89</historical_speed>
    <historical_travel_time>19</historical_travel_time>
  </historical_traffic_condition>
</historical_traffic_conditions>
<pagination>
    <offset>0</offset>
    <link rel="next"
href="/traffic/traffic_segments/511.org/101000/historical_conditions?api_key={api_key}&li
mit=3&offset=3"/>
</pagination>
<link rel="self"
href="/traffic/traffic_segments/511.org/101000/historical_conditions?api_key={api_key}&li
mit=3&offset=0"/>
<link rel="up" href="/traffic/traffic_segments/511.org/101000"/>
</open511>
```

4 Appendix B: API Response Messages- JSON

4.1 Traffic JSON

B.1.1 Example Traffic Event Structure Response (JSON)


```
{
      "events": [
    {
      "url": "/traffic/events/511.org/149",
      "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
      "id": "511.org/149",
      "status": "ACTIVE",
      "headline": "CHP : Roadwork on CA-160 NorthBound between Main St (Antioch) and
Antioch Bridge - Toll Plaza (Oakley) Acceleration lane closed Expect delays",
      "event_type": "INCIDENT",
      "severity": "UNKNOWN",
      "created": "2014-05-01T19:28:31Z",
      "updated": "2014-05-01T19:28:31Z",
      "geography": {
        "type": "Point",
        "coordinates": [
          -121.753824,
          38.004908
        ]
      },
      "roads": [
        {
          "name": "CA-160",
          "from": "Main St",
          "to": "Antioch Bridge - Toll Plaza",
          "direction": "NorthBound",
          "state": "Open"
        }
      ],
      "schedules": [
        {
          "start_date": "2014-05-01"
        }
      ]
    },
    {
      "url": "/traffic/events/511.org/209",
      "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
      "id": "511.org/209",
      "status": "ACTIVE",
      "headline": "CHP : Obstruction on US-101 N NorthBound before Coyote Creek Golf Dr
(San Jose) blocked Expect delays",
      "event_type": "INCIDENT",
      "severity": "UNKNOWN",
      "created": "2014-05-02T01:13:55Z",
      "updated": "2014-05-02T02:43:16Z",
      "geography": {
        "type": "Point",
        "coordinates": [
          -121.693464,
          37.19068
        ]
      },
```

```
      "roads": [
        {
          "name": "US-101 N",
          "from": "Coyote Creek Golf Dr",
          "to": "",
          "direction": "NorthBound",
          "state": "Open"
        }
      ],
      "schedules": [
        {
          "start_date": "2014-05-01"
        }
      ]
    }
     ],
     "pagination": {
         "next_url": "/traffic/events/?api_key={api_key}&limit=2&offset=2",
         "offset": 0
     },
    "meta": {
          "url": "traffic/events/?api_key={api_key}&limit=2&offset=0",
          "up_url": "/",
          "version": "v1"
      }
 }
```


B.1.2 Example Traffic Announcment Response (JSON)


```
{
"content": [
        {
"status": "active",
"description": "Bart to run extra trains during world series.",
"url": "/announcements/23948/",
"creation_date": "2012-05-23T20:33:10Z",
"headline": "Bart to run extra trains during world series.",
"last_update": "2012-05-24T10:00:10Z",
"Type": "Traffic",
"jurisdiction_url": "/jurisdictions/SFBayArea/"
        }
    ],
"meta": {
"url": "http://api.511.orghttp://api.511.org/Announcements",
"up_url": http://api.511.orghttp://api.511.org
"version": "v1"
    }
}
```


B.1.3 Example Traffic Area Response (JSON)


```
{
  "areas" : [
    {
      "name" : "Anaheim",
      "id" : 5323810,
      "url" : "http://geonames.org/5323810/about.rdf"
    },
    {
      "name" : "Orange County",
```

```
      "id" : 5379524,
      "url" : "http://geonames.org/5379524/about.rdf"
    }
  ],
  "pagination": {
      "next_url": "/traffic/areas/?api_key={api_key}&limit=2&offset=2",
      "previous_url": null,
      "offset": 0
   },
 "meta": {
    "url": "/traffic/areas/? api_key={api_key}&limit=2&offset=0",
    "up_url": "/",
    "version": "v1"
 }
}
```


B.1.4 Example Traffic Road Response (JSON)


```
{
   "roads": [
    {
      "url": "/traffic/roads/511.org/7",
      "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
      "name": "106TH AVE",
      "id": "511.org/7"
    },
    {
      "url": "/traffic/roads/511.org/12",
      "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
      "name": "10TH ST",
      "id": "511.org/12"
    },
    {
      "url": "/traffic/roads/511.org/15",
      "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
      "name": "11TH ST",
      "id": "511.org/15"
    },
    {
      "url": "/traffic/roads/511.org/39",
      "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
      "name": "14TH ST",
      "id": "511.org/39"
    },
    {
      "url": "/traffic/roads/511.org/50",
      "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
      "name": "163RD AVE",
      "id": "511.org/50"
    }
  ],
  "pagination": {
      "next_url": "/traffic/roads/?api_key={api_key}&limit=5&offset=5",
      "previous_url": null,
      "offset": 0
   },
 "meta": {
    "url": "/traffic/roads/?api_key={api_key}}&limit=5&offset=0",
    "up_url": "/",
```

```
    "version": "v1"
  }
}
```

B.1.5 Example Traffic Segment Response (JSON)

```
 {
  "traffic_segments": [
   {
     "url": "/traffic/traffic_segments/511.org/101000",
      "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
      "id": "511.org/101000",
      "updated": "2014-03-01T00:02:26Z",
      "roads": [
        {
          "url": "/traffic/roads/511.org/27806",
          "name": "I-80 E",
          "direction": "E",
          "from": "I-80 E @ US-101 N",
          "to": "I-80 E @ US-101 S"
        }
      ],
      "geography": {
        "type": "LineString",
        "crs": {
          "type": "name",
          "properties": {
            "name": "urn:ogc:def:crs:EPSG::4326"
          }
        },
        "coordinates": [
          [
            -122.404864000001,
            37.7652169999907
          ],
          [
            -122.404845999559,
            37.7656680001378
          ],
          [
            -122.404845999559,
            37.7658099999282
          ],
          [
            -122.404847340744,
            37.7658323486383
          ],
          [
            -122.40485499978,
            37.7659599998307
          ],
          [
            -122.404864000001,
            37.7661239997168
          ],
          [
            -122.404875999696,
            37.7662550001007
          ],
```

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          [
            -122.404898000336,
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          [
            -122.404971999956,
            37.7672470002245
          ],
          [
            -122.405079000086,
            37.7683539997627
          ],
          [
            -122.40509499998,
            37.7685189998567
          ],
          [
            -122.405201391052,
            37.7696187060879
          ]
        ]
      },
      "current_speed": 10,
      "current_travel_time": 184,
      "historical_speed": 8,
      "historical_travel_time": 209,
      "historical_traffic_conditions_url":
"/traffic/traffic_segments/511.org/101000/historical_conditions"
    },
    {
       "url": "/traffic/traffic_segments/511.org/101001",
      "jurisdiction_url": "http://api.511.org/jurisdictions/511.org/",
      "id": "511.org/101001",
      "updated": "2014-03-01T00:02:26Z",
      "roads": [
        {
          "url": "/traffic/roads/511.org/27806",
          "name": "I-80 E",
          "direction": "E",
          "from": "I-80 E @ US-101 S",
          "to": "I-80 E @ 7TH ST"
        }
      ],
      "geography": {
        "type": "LineString",
        "crs": {
          "type": "name",
          "properties": {
            "name": "urn:ogc:def:crs:EPSG::4326"
          }
        },
        "coordinates": [
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          ],
          [
            -122.40520200011,
            37.7696249997055
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            37.7698909998891
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            -122.405265999684,
            37.77000100031
          ],
          [
            -122.405300000019,
            37.7701320002169
          ],
          [
            -122.405366999966,
            37.7703250003021
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            37.7705149997466
          ],
          [
            -122.405505000058,
            37.7706130001289
          ],
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            37.7706959997351
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            -122.405628000082,
            37.7707909997519
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            37.7709469997314
          ],
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            -122.405787999916,
            37.7710240001507
          ],
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            -122.405844999817,
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          ],
          [
            -122.405910000114,
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          [
            -122.405994999605,
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            37.771316999796
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          [
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          [
            -122.40616000036,
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            37.7722249997612
          ],
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            -122.406510999989,
            37.7723929997993
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            -122.406519000385,
            37.7724329996507
          ],
          [
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            37.77257299967
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          [
            -122.406551000172,
            37.7726260001205
          ],
          [
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            -122.406562999867,
            37.7727320001973
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            -122.40656799989,
            37.7728839998145
          ],
          [
            -122.406567000065,
            37.7728990000168
          ],
          [
            -122.40656600024,
            37.7729140002159
          ],
          [
            -122.406542999776,
            37.7733400003417
          ],
          [
            -122.406526999882,
            37.7734340000322
          ],
          [
            -122.406495000095,
            37.7735680002607
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            -122.406447000415,
            37.7737230002962
          ],
          [
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            37.7738539999996
          ],
          [
            -122.40631500017,
            37.7740470003104
          ],
          [
            -122.406257000444,
            37.7741649997262
          ],
          [
            -122.406222000284,
            37.774235999663
          ],
          [
            -122.406121000002,
            37.7744240001966
          ],
          [
            -122.406029999765,
            37.7745800003216
          ],
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          [
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          [
            -122.405850999665,
            37.7748489996823
          ],
          [
            -122.405760533926,
            37.7749698621549
          ]
        ]
      },
      "current_speed": 10,
      "current_travel_time": 235,
      "historical_speed": 26,
      "historical_travel_time": 106,
      "historical_traffic_conditions_url":
"/traffic/traffic_segments/511.org/101001/historical_conditions"
    }
  ],
  "pagination": {
      "next_url": "/traffic/traffic_segments/?api_key={api_key}&limit=2&offset=2",
      "offset": 0
   },
  "meta": {
    "url": "/traffic/traffic_segments/?api_key={api_key}&limit=2&offset=0",
    "up_url": "/",
    "version": "v1"
  }
}
```


B.1.6 Example Historical Traffic Conditions Response (JSON)


```
 {
  "historical_traffic_conditions": [
    {
      "traffic_segment_url": "/traffic/traffic_segments/511.org/101000",
      "day": 1,
      "time": "00:00",
      "historical_speed": 92,
      "historical_travel_time": 19
    },
    {
      "traffic_segment_url": "/traffic/traffic_segments/511.org/101000",
      "day": 1,
      "time": "00:15",
      "historical_speed": 96,
      "historical_travel_time": 17
    },
    {
      "traffic_segment_url": "/traffic/traffic_segments/511.org/101000",
      "day": 1,
      "time": "00:30",
      "historical_speed": 89,
      "historical_travel_time": 19
    },
],
```

```
  "pagination": {
      "next_url":
"/traffic/traffic_segments/511.org/101000/historical_conditions?api_key={api_key}&limit=3
&offset=3",
     "offset": 0
   },
  "meta": {
    "url":
"/traffic/traffic_segments/511.org/101000/historical_conditions?api_key={api_key}}&limit=
3&offset=0",
    "up_url": "/traffic/traffic_segments/511.org/101000",
    "version": "v1"
  }
}
```