



Real Time Transit API Reference

Version 2.0



METROPOLITAN
TRANSPORTATION
COMMISSION

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Section 1: Introduction

Purpose

This document outlines the design and usage of the Real-time Transit Data Services Application Programming Interface (API). This document contains the following sections:

- **Introduction** – an overview of this document including background about the RTT service, overview of the API, a description of the intended audience, and contact information.
- **Technical Overview** – a high-level discussion of the technical implementation of the API including tools, technologies, and protocols.
- **Service Definitions** – a detailed list of the service definitions for the Real-time Transit API.
- **Usage Scenario** – a simple scenario-based example of how to implement and use the API.
- **Appendix 1 - API Errors** – a list of errors that can incur upon execution of any of the services.

511 Background

511 is the San Francisco Bay Area's free traveler information service available on the phone by calling 511 and on the web at 511.org. The 511 service provides travelers with easy access to current and accurate traffic, transit, rideshare, and bicycling information. The Metropolitan Transportation Commission (MTC) operates the 511 service in partnership with the California Department of Transportation (Caltrans) District 4, the California Highway Patrol Golden Gate Division (CHP), and Bay Area transit agencies. MTC contracts with a third-party contractor ("511 Contractor") to provide the 511 service.

Real-time Transit API Overview

The RTT API is one of several different data feeds MTC makes available free-of-charge to the general public, media, public agencies, and commercial vendors to the extent feasible within the available funding. The RTT Contractor gathers and integrates information from a variety of sources, including (1) real-time transit data and (2) other available sources of information. This API provides access to real time transit data for application development. The API allows developers to create applications and tools that provide real time transit information based on a user-selected agencies and routes.

Audience

This document is intended for developers wishing to utilize the Real Time Transit API from within their web sites and applications. It is assumed that the reader has a firm grasp of their development tools and technologies and has had some experience with web service technologies including XML. Additionally, some familiarity with security and encryption technologies may be helpful.

Contact Information

For questions concerning the Real Time Transit API or if you create an app or tool from this data and want to showcase it on 511.org, please e-mail: developerresources@511.org.

Section 2: Technical Overview

The Real Time Transit Data Services are a collection of individual services, each providing a specific capability related to traveler information inquiry within the Transit system. Each service is implemented using simple web pages that accept query string parameters and return plain XML documents (referred to hereafter as “POX” for “Plain Old XML”).

A valid security token identifier is required to make requests to these services and must be supplied with each request. Section 3 provides a detailed overview on how to access these services. The token can be obtained at http://511.org/developer-resources_api-security-token_rtt.asp.

The services address common needs within the Transit system associated with Transit trip data management. The following table lists the service catalog items along with relevant information for each service:

Table 1 - List of 511 Real Time Transit Data Services

Service Name	EndPoint	Description
GetAgencies	http://services.my511.org/Transit2.0/GetAgencies.aspx	Retrieves a list of Agencies.
GetRoutesForAgencies	http://services.my511.org/Transit2.0/GetRoutesForAgencies.aspx	Retrieves a list of Routes for all Agencies.
GetRoutesForAgency	http://services.my511.org/Transit2.0/GetRoutesForAgency.aspx	Retrieves a list of Routes for a specific agency.
GetStopsForRoute	http://services.my511.org/Transit2.0/GetStopsForRoute.aspx	Retrieves a list of stop for a route.
GetStopsForRoutes	http://services.my511.org/Transit2.0/GetStopsForRoutes.aspx	Retrieves a list of stop for multiple routes.
GetNextDeparturesBySop Name	http://services.my511.org/Transit2.0/GetNextDeparturesByStopName.aspx	Retrieve a list of departure times for a particular stop, when stop name is supplied as a parameter.
GetNextDeparturesByStop Code	http://services.my511.org/Transit2.0/GetNextDeparturesByStopCode.aspx	Retrieve a list of Departure times for a particular stop, when stop code is supplied as a parameter

Note: It is advised that all the parameters being passed to these services while requesting data should be **HTTP encoded**.

Section 3: Service Definitions – Real Time Transit

Service Name: GetAgencies

Comments & Usage:

GetAgencies returns the list of agencies.

To return the agencies list, make a request to the service URL, using a currently valid security token as the token parameter. XML will be returned as noted in the example below, providing the agencies listing.

The **HasDirection** attribute specifies if routes for an agency are configured with direction information, e.g. a route in SF-MUNI runs in two directions, whereas routes in BART operate in single direction meaning two directions between two end stations are considered as two separate routes. This information is critical in formulating your query parameters when requesting information from subsequent API's.

Mode specifies agency's primary mode of service.

Service URL:

<http://services.my511.org/Transit2.0/GetAgencies.aspx>

Query Parameters:

- token – the valid security token used for making service calls

Example Usage:

<http://services.my511.org/Transit2.0/GetAgencies.aspx?token=123-456-789>

Returns:

List of agencies

Example XML Returned:

```
<?xml version="1.0" ?>
- <RTT>
- <AgencyList>
  <agency name="BART" hasDirection="false" mode="Rail" />
  <agency name="SF-MUNI" hasDirection="true" mode="Bus" />
  <agency name="WESTCAT" hasDirection="true" mode="Bus" />
</AgencyList>
</RTT>
```

Exceptions & Errors:

- Invalid credentials passed in with service URL (see Appendix 1 for errors)
- Token required (see Appendix 1 for errors)

Service Name: GetRoutesForAgency

Comments & Usage:

GetRoutesForAgency returns the list of routes for a specific agency.

To return the route list, make a request to the service URL, using a currently valid security token and the agency name derived from the GetAgencies service as the token parameters. XML will be returned as noted in the example below, providing the route listing for the agency provided.

Service URL:

<http://services.my511.org/Transit2.0/GetRoutesForAgency.aspx>

Query Parameters:

- token – the valid security token used for making service calls
- agencyName – Agency name provided by GetAgencies. Valid parameter values are available through the GetAgencies service.

Example Usage:

<http://services.my511.org/Transit2.0/GetRoutesForAgency.aspx?token=123-456-789&agencyName=BART>

Returns:

List of routes.

Example XML Returned:

```

- <RTT>
- <AgencyList>
  - <Agency Name="BART" HasDirection="False" Mode="Rail">
    - <RouteList>
      <Route Name="24th St. Mission" Code="587" />
      <Route Name="Bayfair" Code="367" />
      <Route Name="Concord" Code="886" />
      <Route Name="Daly City" Code="747" />
      <Route Name="Dublin/Pleasanton" Code="920" />
      <Route Name="Embarcadero" Code="1354" />
      <Route Name="Fremont" Code="917" />
      <Route Name="Millbrae" Code="764" />
      <Route Name="Montgomery" Code="703" />
      <Route Name="Pittsburg/Bay Point" Code="908" />
      <Route Name="Richmond" Code="379" />
      <Route Name="SF Airport" Code="864" />
      <Route Name="SF Airport then Millbrae" Code="831" />
      <Route Name="SF Airport then Pittsburg/Bay Point" Code="1567" />
      <Route Name="South San Francisco" Code="1235" />
      <Route Name="Union City" Code="228" />
    </RouteList>
  </Agency>
</AgencyList>
</RTT>

```

Exceptions & Errors:

- Invalid credentials passed in with service URL (see Appendix 1 for errors)
- Invalid agencyName passed in with service URL (see Appendix 1 for errors)
- Token Required (see Appendix 1 for errors)
- agencyName Required (see Appendix 1 for errors)

Service Name: GetRoutesForAgencies

Comments & Usage:

GetRoutesForAgencies returns list of routes for specified agencies.

To return the route list, make a request to the service URL, using a currently valid security token and the agency names derived from the GetAgencies service. XML will be returned as noted in the example below, providing the route listing for chosen agencies.

Service URL:

http://services.my511.org/Transit2.0/GetRoutesForAgencies.aspx?token=123-456-789&agencyNames=AgencyName|AgencyName....

Query Parameters:

- token – the valid security token used for making service calls
- agencyNames – valid list of agency names separated by '|'. Valid agency names can be obtained from the GetAgencies service.

Example Usage:

http://services.my511.org/Transit2.0/GetRoutesForAgencies.aspx?token=123-456-789&agencyNames=BART|SF-MUNI|WESTCAT

Returns:

List of routes for specified agencies

Example XML Returned:

```
- <RTT>
- <AgencyList>
- <Agency Name="BART" HasDirection="False" Mode="Rail">
- <RouteList>
  <Route Name="24th St. Mission" Code="587" />
  <Route Name="Bayfair" Code="367" />
  <Route Name="Concord" Code="886" />
  <Route Name="Daly City" Code="747" />
  <Route Name="Dublin/Pleasanton" Code="920" />
  <Route Name="Embarcadero" Code="1354" />
  <Route Name="Fremont" Code="917" />
  <Route Name="Millbrae" Code="764" />
  <Route Name="Montgomery" Code="703" />
  <Route Name="Pittsburg/Bay Point" Code="908" />
  <Route Name="Richmond" Code="379" />
  <Route Name="SF Airport" Code="864" />
  <Route Name="SF Airport then Millbrae" Code="831" />
  <Route Name="SF Airport then Pittsburg/Bay Point" Code="1567" />
  <Route Name="South San Francisco" Code="1235" />
  <Route Name="Union City" Code="228" />
</RouteList>
</Agency>
- <Agency Name="WESTCAT" HasDirection="True" Mode="Bus">
- <RouteList>
- <Route Name="10 GEMS AND BIRDS" Code="10">
- <RouteDirectionList>
  <RouteDirection Code="LOOP" Name="LOOP" />
</RouteDirectionList>
</Route>
+ <Route Name="11 CROCKETT RODEO" Code="11">
+ <Route Name="12 TREES AND FLOWERS" Code="12">
+ <Route Name="15 VIEWPOINTE" Code="15">
+ <Route Name="16 PINOLE VALLEY" Code="16">
+ <Route Name="17 BAYVIEW" Code="17">
+ <Route Name="18 TARA HILLS" Code="18">
+ <Route Name="19 HILLTOP HERCULES" Code="19">
+ <Route Name="30Z MARTINEZ LINK" Code="30Z">
+ <Route Name="C3 CONTRA COSTA COLLEGE" Code="C3">
+ <Route Name="JL JL" Code="JL">
+ <Route Name="JPX JPX" Code="JPX">
+ <Route Name="JR JR" Code="JR">
+ <Route Name="JX JX" Code="JX">
+ <Route Name="LYNX LYNX" Code="LYNX">
</RouteList>
</Agency>
```

Exceptions & Errors:

- Invalid credentials passed in with service URL (see Appendix 1 for errors)
- Token Required (see Appendix 1 for errors)

Service Name: GetStopsForRoute

Comments & Usage:

GetStopsForRoute returns list of stops for a particular route.

To return the stop list, make a request to the service URL, using a currently valid security token and routeIDF. routeIDF is a combination of Agency Name, Route Code and Route Direction Code separated by a '~'.

XML will be returned as noted in the example below, providing the stop listing for route specified by the routeIDF.

Service URL:

<http://services.my511.org/Transit2.0/GetStopsForRoute.aspx?token=123-456-789&routeIDF=AgencyName~RouteCode~RouteDirectionCode>.

Query Parameters:

- token – the valid security token used for making service calls
- routeIDF – combination of Agency, Route Code and or Route Direction Code separated by a '~'.

Example Usage:

For non-directional Agency:

<http://services.my511.org/Transit2.0/GetStopsForRoute.aspx?token=123-456-789&routeIDF=BART~917>

For directional Agency:

<http://services.my511.org/Transit2.0/GetStopsForRoute.aspx?token=123-456-789&routeIDF=SF-MUNI~10~Inbound>

Returns:

List of stops for a route.

Example XML Returned:


```

- <RTT>
- <AgencyList>
  - <Agency Name="BART" HasDirection="False" Mode="Rail">
    - <RouteList>
      - <Route Name="Fremont" Code="917">
        - <StopList>
          <Stop name="CIVIC CENTER" StopCode="11" />
          <Stop name="Powell St" StopCode="13" />
          <Stop name="Montgomery St" StopCode="15" />
          <Stop name="EMBARCADERO" StopCode="17" />
          <Stop name="WEST OAKLAND" StopCode="19" />
          <Stop name="FREMONT" StopCode="21" />
          <Stop name="UNION CITY" StopCode="24" />
          <Stop name="SOUTH HAYWARD" StopCode="26" />
          <Stop name="HAYWARD" StopCode="28" />
          <Stop name="Bay Fair" StopCode="30" />
          <Stop name="SAN LEANDRO" StopCode="32" />
          <Stop name="Coliseum-Oakland Airport" StopCode="34" />
          <Stop name="FRUITVALE" StopCode="36" />
          <Stop name="LAKE MERRITT" StopCode="38" />
          <Stop name="RICHMOND" StopCode="40" />
          <Stop name="EL CERRITO DEL NORTE" StopCode="42" />
          <Stop name="EL CERRITO PLAZA" StopCode="44" />
          <Stop name="NORTH BERKELEY" StopCode="46" />
          <Stop name="Downtown Berkeley" StopCode="48" />
          <Stop name="ASHBY" StopCode="50" />
          <Stop name="MACARTHUR" StopCode="64" />
          <Stop name="19th St-Oakland" StopCode="66" />
          <Stop name="Oakland City Center-12th St" StopCode="68" />
          <Stop name="DALY CITY" StopCode="91" />
          <Stop name="BALBOA PARK" StopCode="93" />
          <Stop name="GLEN PARK" StopCode="95" />
          <Stop name="24th St-Mission" StopCode="97" />
          <Stop name="16th St-Mission" StopCode="99" />
        </StopList>
      </Route>
    </RouteList>
  </Agency>

```

Exceptions & Errors:

- Invalid credentials passed in with service URL (see Appendix 1 for errors)
- Token Required (see Appendix 1 for errors)
- routeIDF Required (see Appendix 1 for errors)
- Invalid routeIDF (see Appendix 1 for errors)

Service Name: GetStopsForRoutes
--

Comments & Usage:

GetStopsForRoutes returns list of stops for multiple routes.

To return the stop list, make a request to the service URL, using a currently valid security token and routeIDFs. routeIDF is a combination of Agency, Route Code and Route Direction separated by a '~'. For multiple routeIDF, separate the routeIDF by '|' (e.g. routeIDF|routeIDF|routeIDF). XML will be returned as noted in the example below, providing the stop listing for multiple routes specified.

Service URL:

<http://services.my511.org/Transit2.0/GetStopsForRoutes.aspx?token=123-456-789&routeIDF=AgencyName~RouteCode~RouteDirection|AgencyName~RouteCode~RouteDirection>.

Query Parameters:

- token – the valid security token used for making service calls
- routeIDF – combination of Agency, Route Code and Route Direction separated by a '~'.

Example Usage:

<http://services.my511.org/Transit2.0/GetStopsForRoutes.aspx?token=123-456-789&routeIDF=WestCAT~10~LOOP|BART~917>

Returns:

List of stops for multiple routes.

Example XML Returned:

```
- <RTT>
- <AgencyList>
- <Agency Name="WESTCAT" HasDirection="True" Mode="Bus">
- <RouteList>
- <Route Name="10 GEMS AND BIRDS" Code="10">
- <RouteDirectionList>
- <RouteDirection Code="LOOP" Name="LOOP">
- <StopList>
  <Stop name="FALCON WAY AND SPARROW DR" StopCode="233" />
  <Stop name="REFUGIO VALLEY AND COUNTRY RUN" StopCode="235" />
  <Stop name="HERCULES MIDDLE AND HIGH SCHOOL" StopCode="2174" />
  <Stop name="TURQUIOSE DR AND CINNABAR AVE" StopCode="2175" />
  <Stop name="TURQUIOSE DR AND JADE CT" StopCode="2176" />
  <Stop name="TURQUIOSE DR AND DIAMOND CT" StopCode="2177" />
  <Stop name="PHEASANT DR AND TANAGER WAY" StopCode="2178" />
  <Stop name="REFUGIO VALLEY PARK" StopCode="2181" />
  <Stop name="TURQUIOSE DR AND SYCAMORE AVE" StopCode="25060" />
  <Stop name="TURQUIOSE DR AND CRYSTAL CIR" StopCode="25061" />
  <Stop name="CINNABAR WAY AND OBSIDAN WAY" StopCode="25062" />
  <Stop name="OBSIDIAN WAY AND PERIDOT CT" StopCode="25063" />
  <Stop name="TURQUIOSE DR AND OBSIDAN WAY" StopCode="25064" />
  <Stop name="TURQUIOSE DR AT RESERVOIR" StopCode="25065" />
  <Stop name="PHEASANT DR AND MALACHITE" StopCode="25066" />
  <Stop name="TANAGER WAY AND MEADOWLARK WAY" StopCode="25067" />
  <Stop name="SPARROW DR AND STARLING AVE" StopCode="25068" />
  <Stop name="FALCON WAY AND FINCH CT" StopCode="25069" />
  <Stop name="FALCON WAY AND WREN CT" StopCode="25070" />
  <Stop name="FALCON WAY AT 454" StopCode="25071" />
  <Stop name="FALCON WAY AND REFUGIO VALLEY" StopCode="25072" />
  <Stop name="REFUGIO VALLEY AT COMMUNITY CENTER" StopCode="25073" />
  <Stop name="REFUGIO VALLEY AT SWIM CENTER" StopCode="25074" />
  <Stop name="HERCULES TRANSIT CENTER" StopCode="25501" />
</StopList>
</RouteDirection>
</RouteDirectionList>
</Route>
</RouteList>
</Agency>
- <Agency Name="BART" HasDirection="False" Mode="Rail">
- <RouteList>
- <Route Name="Fremont" Code="917">
- <StopList>
  <Stop name="CIVIC CENTER" StopCode="11" />
  <Stop name="Powell St" StopCode="13" />
  <Stop name="Montgomery St" StopCode="15" />
  <Stop name="EMBARCADERO" StopCode="17" />
  <Stop name="WEST OAKLAND" StopCode="19" />
  <Stop name="FREMONT" StopCode="21" />
</StopList>
```

Exceptions & Errors:

- Invalid credentials passed in with service URL (see Appendix 1 for errors)
- Token Required (see Appendix 1 for errors)
- routeIDF Required (see Appendix 1 for errors)
- Invalid routeIDF (see Appendix 1 for errors)

Service Name: GetNextDeparturesByStopName
--

Comments & Usage:

GetNextDeparturesByStopName returns list of Departure Times for a stop, when requested via Stop Name.

To return the departure time list, make a request to the service URL, using a currently valid security token, Agency Name and Stop Name.

XML will be returned as noted in the example below, providing the departure times for all routes departing from the specified stop.

When predictions are not available for a route, the service will return empty DepartureTimeList element in the XML. User may choose to still display the route with an appropriate message such as “No predictions available” or remove the route.

Service URL:

<http://services.my511.org/Transit2.0/GetNextDeparturesByStopName.aspx?token=123-456-789&agencyName&stopName>

Query Parameters:

- token – the valid security token used for making service calls
- agencyName – Agency name provided by GetAgencies. Valid parameter values are available through the GetAgencies service.
- stopName – Stop Name provided by GetStopsForRoutes or GetStopsForRoute.

Example Usage:

<http://services.my511.org/Transit2.0/GetNextDeparturesForStopName.aspx?token=123-456-789&agencyName=BART&stopName=Fremont>

Returns:

List of routes with departure times, departing this stop within the next 90 minutes.

Example XML Returned:

```

- <RTT>
- <AgencyList>
  - <Agency Name="BART" HasDirection="False" Mode="Rail">
    - <RouteList>
      - <Route Name="Daly City" Code="747">
        - <StopList>
          - <Stop name="Fremont" StopCode="21">
            - <DepartureTimeList>
              <DepartureTime>10</DepartureTime>
              <DepartureTime>25</DepartureTime>
            </DepartureTimeList>
          </Stop>
        </StopList>
      </Route>
      - <Route Name="Fremont" Code="917">
        - <StopList>
          - <Stop name="Fremont" StopCode="21">
            <DepartureTimeList />
          </Stop>
        </StopList>
      </Route>
      - <Route Name="Richmond" Code="379">
        - <StopList>
          - <Stop name="Fremont" StopCode="21">
            - <DepartureTimeList>
              <DepartureTime>19</DepartureTime>
              <DepartureTime>34</DepartureTime>
            </DepartureTimeList>
          </Stop>
        </StopList>
      </Route>
      - <Route Name="Union City" Code="228">
        - <StopList>
          - <Stop name="Fremont" StopCode="21">
            <DepartureTimeList />
          </Stop>
        </StopList>
      </Route>
    </RouteList>
  ..

```

Exceptions & Errors:

- Invalid credentials passed in with service URL (see Appendix 1 for errors)
- Token Required (see Appendix 1 for errors)
- agencyName is Required (see Appendix 1 for errors)
- stopName is Required (see Appendix 1 for errors)

Service Name: GetNextDeparturesByStopCode
--

Comments & Usage:

GetNextDeparturesByStopCode returns list of Departure Times for a stop, when requested via Stop Code.

Note: This service will provide departure times only for the routes departing in the direction associated with the specified Stop Code.

To return the departure time list, make a request to the service URL, using a currently valid security token and stopcode.

When predictions are not available for a route, the service will return empty DepartureTimeList element in the XML. User may choose to still display the route with an appropriate message such as “No predictions available” or remove the route.

Service URL:

<http://services.my511.org/Transit2.0/GetNextDeparturesByStopCode.aspx?token=123-456-789&stopcode>.

Query Parameters:

- token – the valid security token used for making service calls
- stopcode – Stop Code of a particular stop. Valid Stop Codes can be obtained through GetStopsForRoutes or GetStopsForRoute services.

Example Usage:

<http://services.my511.org/Transit2.0/GetNextDeparturesByStopCode.aspx?token=123-456-789&stopcode=13546>

Returns:

List of routes with departure times, departing this stop within the next 90 minutes.

Example XML Returned:

```
- <RTT>
- <AgencyList>
- <Agency Name="SF-MUNI" HasDirection="True" Mode="Bus">
- <RouteList>
- <Route Name="1-California" Code="1">
- <RouteDirectionList>
- <RouteDirection Code="Inbound" Name="Inbound to Downtown">
- <StopList>
- <Stop name="32nd Ave and California St" StopCode="13546">
- <DepartureTimeList>
  <DepartureTime>3</DepartureTime>
</DepartureTimeList>
</Stop>
</StopList>
</RouteDirection>
</RouteDirectionList>
</Route>
- <Route Name="1AX-California A Express" Code="1AX">
- <RouteDirectionList>
- <RouteDirection Code="Inbound" Name="Inbound to Downtown">
- <StopList>
- <Stop name="32nd Ave and California St" StopCode="13546">
  <DepartureTimeList />
</Stop>
</StopList>
</RouteDirection>
</RouteDirectionList>
</Route>
</RouteList>
</Agency>
</AgencyList>
</RTT>
```

Exceptions & Errors:

- Invalid credentials passed in with service URL (see Appendix 1 for errors)
- Token Required (see Appendix 1 for errors)
- stopcode Required (see Appendix 1 for errors)
- Invalid stopcode (see Appendix 1 for errors)

Appendix 1 – API Errors

Below are the listings of errors that can be incurred upon execution of any of the services described above.

Token Required

`<TransitServiceError>Token is required</transitServiceError>`

Invalid Token

`<TransitServiceError>Invalid credentials</transitServiceError>`

Agency Required

`<TransitServiceError> Agency is required </transitServiceError>`

Invalid Agency

`<transitServiceError>The Agency name is Invalid</transitServiceError>`

Invalid RouteIDF

`<TransitServiceError>Invalid routeIDF</transitServiceError>`

RouteIDF Required

`<TransitServiceError> routeIDF is required </transitServiceError>`

StopCode Required

`<TransitServiceError>stopCode is required </transitServiceError>`