



MBTA

**MBTA-REALTIME API FOR PERFORMANCE DATA
DOCUMENTATION (V 0.9.1)**

APRIL 14, 2016

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1. OVERVIEW

The current MBTA-realtime documentation available at <http://realtime.mbtta.com> provides information about how to access schedule, prediction, and alert information from the MBTA-realtime API. This document covers the new API calls that provide performance information for heavy rail and light rail modes only. These calls are only available in test (v2.1) at this time, and they will be added to the production API (v2) in the future. When these calls are moved to production, then information about the new calls will be included in the MBTA-realtime documentation available at <http://realtime.mbtta.com> and this document will be discontinued.

2. QUERIES

The table below lists the performance queries available through the MBTA-realtime test API. The performance queries are documented in full over the following pages. Examples and terminology are in JSON; for XML assume “object” means “element” and “property” means “attribute” unless otherwise stated.

Query	Returns
traveltimes	travel times and benchmark travel times, between an origin destination pair
dweltimes	dweltimes, for a stop
headways	departure headways and benchmark headways, for a stop
dailymetrics	daily top line metrics, for a route
currentmetrics	current (last hour and current service date until current time) top line metrics, for a route

2.1 Thresholds for Performance Measurement

threshold_id	threshold_type	threshold_name	Modes	Description
threshold_id_01	wait_time_headway_based	Headway	Heavy Rail, Light Rail	exceeds threshold if actual headway is greater than the scheduled headway
threshold_id_02	wait_time_headway_based	Big Gap	Heavy Rail, Light Rail	exceeds threshold if actual headway is greater than 1.5X the scheduled headway or the scheduled headway plus 3 minutes, whichever is smaller
threshold_id_03	wait_time_headway_based	2X Headway	Heavy Rail, Light Rail	exceeds threshold if actual headway is greater than 2X the scheduled headway
threshold_id_04	travel_time	delayed < 3 min.	Heavy Rail, Light Rail	exceeds threshold if actual travel time is delayed 3 minutes more than the scheduled travel time
threshold_id_05	travel_time	delayed < 6 min.	Heavy Rail, Light Rail	exceeds threshold if actual travel time is delayed 6 minutes more than the scheduled travel time
threshold_id_06	travel_time	delayed 10 min.	Heavy Rail, Light Rail	exceeds threshold if actual travel time is delayed 10 minutes more than the scheduled travel time Note: this threshold is a placeholder that is currently set at 10 minutes, but may be changed in the future

2.2 Performance Queries

2.2.1 TRAVELTIMES

This query will return a list of travel times as well as benchmark travel times between an origin-destination (O-D) pair during the time period defined in the call. Travel times are flagged if they are above certain thresholds compared to the benchmark travel times.

Special Parameters

Name	Description
from_stop	GTFS-compatible stop_id value for the origin stop for which travel times should be returned. Data type: String. Example: 70069
to_stop	GTFS-compatible stop_id value for the destination stop for which travel times should be returned. Data type: String. Example: 70075
route (optional)	GTFS-compatible route_id value for which travel times should be returned. If this is not included, travel times for all routes between the origin and destination stops will be returned. Data type: String. Example: Red
from_datetime	Start of the time period that the travel time (arrival time at the destination stop) should fall within; must be provided in epoch time. Data type: Integer, in epoch time. Example: 1429149600
to_datetime	End of the time period that the travel time (arrival time at the destination stop) should fall within; must be provided in epoch time. Data type: Integer, in epoch time. Example: 1429250399

Response Fields

Name	Description
travel_times	Root object of the feed
route_id	Property of "travel_times". String. The GTFS-compatible unique identifier for the route for which travel times are returned. Example: Red
direction	Property of "travel_times". String representation of a Bit (0 or 1). The GTFS-compatible direction value (1 or 0) for which travel times are returned. Example: 0
dep_dt	Property of "travel_times". String representation of an Integer. The actual departure time at the origin stop, in epoch time. Example: 1429177049

Name	Description
arr_dt	Property of "travel_times". String representation of an Integer. The actual arrival time at the destination stop, in epoch time. Example: 1429177403
travel_time_sec	Property of "travel_times". String representation of an Integer. The actual travel time between the origin stop and the destination stop, in seconds. Example: 354
benchmark_travel_time_sec	Property of "travel_times". String representation of an Integer The scheduled average travel time (during the 30-minute time slice in which this travel time occurs) between the origin stop and the destination stop, in seconds. Example: 360
threshold_flag_1 (optional)	Property of "travel_times". String. Heavy Rail and Light Rail: 'threshold_id_04' if the difference between the travel_time_sec and the benchmark_travel_time_sec is above the threshold_id_04 (delayed > 3 min.) otherwise not returned Example: threshold_id_04
threshold_flag_2 (optional)	Property of "travel_times". String. Heavy Rail and Light Rail: 'threshold_id_05' if the difference between the travel_time_sec and the benchmark_travel_time_sec is above the threshold_id_05 (delayed > 6 min.) otherwise not returned Example: threshold_id_05
threshold_flag_3 (optional)	Property of "travel_times". String. Heavy Rail and Light Rail: 'threshold_id_06' if the difference between the travel_time_sec and the benchmark_travel_time_sec is above the threshold_id_06 (delayed > 10 min.) otherwise not returned Example: threshold_id_06 Note: this threshold is a placeholder that is currently set at 10 minutes, but may be changed in the future

Notes

Benchmark times are only available for service dates after June 29, 2015.

A maximum time span of 7 days is allowed between from_datetime and to_datetime.

Example

http://realtime.mbta.com/developer/api/v2.1/traveltimes?api_key=wX9NwuHnZU2ToO7GmGR9uw&format=json&from_stop=70172&to_stop=70182&from_datetime=1457454139&to_datetime=1457455262

```
{
  travel_times: [
    {
      route_id: "Green-D",
      direction: "1",
      dep_dt: "1457453760",
      arr_dt: "1457454560",
      travel_time_sec: "800",
      benchmark_travel_time_sec: "480",
      threshold_flag_1: "threshold_id_04"
    }
  ]
}
```

```

    },
    {
      route_id:"Green-D",
      direction:"1",
      dep_dt:"1457454105",
      arr_dt:"1457454658",
      travel_time_sec:"553",
      benchmark_travel_time_sec: "480"
    }
  ]
}

```

2.2.2 DWELLS

This query will return a list of dwell times at a stop during the time period defined in the call.

Special Parameters

Name	Description
stop	GTFS-compatible stop_id value for the stop for which dwell times should be returned. Data type: String. Example: 70069
route (optional)	GTFS-compatible route_id value for which dwell times should be returned. If this is not included, dwell times for all routes serving the stop will be returned. Data type: String. Example: Red
direction (optional)	GTFS-compatible direction_id value for which dwell times should be returned. If this is not included, dwell times for all directions for the stop will be returned. Data type: Integer. Example: 0
from_datetime	Start of the time period that the dwell time (departure time from the stop) should fall within; must be provided in epoch time. Data type: Integer, in epoch time. Example: 1429149600
to_datetime	End of the time period that the dwell time (departure time from the stop) should fall within; must be provided in epoch time. Data type: Integer, in epoch time. Example: 1429250399

Response Fields

Name	Description
dwell_times	Root object of the feed
route_id	Property of "dwell_times". String. The GTFS-compatible unique identifier for the route for which dwell times are returned. Example: Red

Name	Description
direction	Property of "dwell_times". String representation of a Bit (0 or 1). The GTFS-compatible direction value (1 or 0) for for which dwell times are returned. Example: 0
arr_dt	Property of "dwell_times". String representation of an Integer. The actual arrival time at the stop, in epoch time. Example: 1429177343
dep_dt	Property of "dwell_times". String representation of an Integer. The actual departure time from the stop, in epoch time. Example: 1429177430
dwell_time_sec	Property of "dwell_times". String representation of an Integer. The actual dwell time at the stop, in seconds. Example: 87

Note

A maximum time span of 7 days is allowed between from_datetime and to_datetime.

Example

http://realtime.mbta.com/developer/api/v2.1/dwells?api_key=wX9NwuHnZU2ToO7GmGR9uw&format=json&stop=70076&from_datetime=1457454139&to_datetime=1457454749

```
{
  dwell_times: [
    {
      route_id: "Red",
      direction: "1",
      arr_dt: "1457454384",
      dep_dt: "1457454455",
      dwell_time_sec: "71"
    },
    {
      route_id: "Red",
      direction: "1",
      arr_dt: "1457454675",
      dep_dt: "1457454749",
      dwell_time_sec: "74"
    }
  ]
}
```

2.2.3 HEADWAYS

This query will return a list of departure headways (between the 'current' and 'previous' departures) as well as benchmark headways at a stop during the time period defined in the call. The user can optionally specify headways between trips served by a particular route or between trips serving a particular destination. Headways are flagged if they are above certain thresholds compared to the benchmark headways.

Special Parameters

Name	Description
------	-------------

stop	GTFS-compatible stop_id for the stop for which headways should be returned. Data type: String. Example: 70069
to_stop (optional)	GTFS-compatible stop_id for the destination stop for which headways between trips serving a particular destination should be returned. If to_stop_id is specified, route can not be specified. Data type: String. Example: 70069
route (optional)	GTFS-compatible route_id value for which headways between trips serving a particular route should be returned. If route is specified, departure headways for only that route will be returned. If route is specified, to_stop can not be specified. Data type: String. Example: Red
from_datetime	Start of the time period that the headways ('current' departure time at the stop) should fall within; must be provided in epoch time Data type: Integer, in epoch time. Example: 1429149600
to_datetime	End of the time period that the headways ('current' departure time at the stop) should fall within; must be provided in epoch time. Data type: Integer in epoch time. Example: 1429250399

Response Fields

Name	Description
headways	Root object of the feed
route_id	Property of "headways". String. The GTFS-compatible unique identifier for the route for which headways are returned. Example: Red
prev_route_id	Property of "headways". String. The unique GTFS-compatible unique identifier for the previous departure's route. Example: Red
direction	Property of "headways". String representation of a Bit (0 or 1). The GTFS-compatible direction value (1 or 0) for for which headways are returned. Example: 0
current_dep_dt	Property of "headways". String representation of an Integer. The current actual departure time at the stop, in epoch time. Example: 1429177779
previous_dep_dt	Property of "headways". String representation of an Integer. The previous actual departure time at the stop, in epoch time. Example: 1429177530

Name	Description
headway_time_sec	Property of "headways". String representation of an Integer. The headway between the current departure and the previous departure at the stop, in seconds. Example: 449
benchmark_headway_time_sec	Property of "headways". String representation of an Integer. The average scheduled headway (during the 30-minute time slice in which this headway occurs) between the current departure and the previous departure at the stop, in seconds. Example: 270
threshold_flag_1 (optional)	Property of "headways". String 'threshold_id_01' if the difference between the headway_time_sec and the benchmark_headway_time_sec is above the threshold_id_01 (> Headway) otherwise not returned Example: threshold_id_01
threshold_flag_2 (optional)	Property of "headways". String 'threshold_id_02' if the difference between the headway_time_sec and the benchmark_headway_time_sec is above the threshold_id_02 (> Big Gap – defined as 1.5X the headway or the headway plus 3 minutes, whichever is smaller) otherwise not returned Example: threshold_id_02
threshold_flag_3 (optional)	Property of "headways". String 'threshold_id_03' if the difference between the headway_time_sec and the benchmark_headway_time_sec is above the threshold_id_03 (> 2X Headway) otherwise not returned Example: threshold_id_03

Notes

Benchmark times are only available for service dates after June 29, 2015.

A maximum time span of 7 days is allowed between from_datetime and to_datetime.

Example

http://realtime.mbta.com/developer/api/v2.1/headways?api_key=wX9NwuHnZU2To07GmGR9uw&format=json&stop=70076&from_datetime=1457455186&to_datetime=1457456986

```
{
  headways: [
    {
      route_id:"Red",
      prev_route_id:"Red",
      direction:"1",
      current_dep_dt:"1457455918",
      previous_dep_dt:"1457455185",
      headway_time_sec:"773",
      benchmark_headway_time_sec:"420",
      threshold_flag_1:"threshold_id_01",
      threshold_flag_2:"threshold_id_02"
    },
    {
      route_id:"Red",
      prev_route_id:"Red",
      direction:"1",
```

```

    current_dep_dt:"1457456181",
    previous_dep_dt:"1457455918",
    headway_time_sec:"263",
    benchmark_headway_time_sec:"420"
  }
}]

```

2.2.4 DAILYMETRICS

This query will return a list of the daily top line metrics for a route during the service dates defined in the call.

Special Parameters

Name	Description
route	GTFIS-compatible route_id value for which metrics should be returned. Multiple route_ids can be input separated by commas. Data type: String. Example: Red
from_service_date	Start service date for which daily metrics should fall within; must be provided in YYYY-MM-DD format. Example: 2016-03-08
to_service_date	End service date for which daily metrics should fall within; must be provided in YYYY-MM-DD format. Example: 2016-03-08

Response Fields

Name	Description
daily_metrics	Root object of the feed
service_date	Property of "daily_metrics". String. The service date for the metric. Example: 2016-03-08
route_id	Property of "daily_metrics". String. The GTFIS-compatible unique identifier for the route for which metrics are returned. Example: Red
threshold_id	Property of "daily_metrics". String. The identifier for the threshold. Example: threshold_id_01
threshold_type	Property of "daily_metrics". String. The type of threshold: wait_time_headway_based, travel_time. Example: wait_time_headway_based
threshold_name	Property of "daily_metrics". String. The name of the threshold: 'Headway', 'Big Gap', '2X Headway', 'delayed < 3 min.', 'delayed < 6 min.', 'delayed < 10 min.'. Example: Headway

Name	Description
metric_result	Property of "daily_metrics". String representation of a float The result of the passenger weighted metric, e.g. percent of passengers delayed longer than the benchmark headway Example: 0.9750
metric_result_trip	Property of "daily_metrics". String representation of a float The result of the metric, not weighted by passengers, e.g. percent of trips with headway longer than the benchmark headway Example: 0.9990

Notes

A maximum time span of 30 days is allowed between from_service_date and to_service_date. The from_service_date and to_service_date must be for dates in the past, i.e. not today. Service dates start at 3:30AM.

Passenger weights are estimated for each day and time period from the MBTA's Origin-Destination Matrix.

Example

http://realtime.mbta.com/developer/api/v2.1/dailymetrics?api_key=wX9NwuHnZU2To07GmGR9u&format=json&route=red&from_service_date=2016-03-07&to_service_date=2016-03-07

```
{
  daily_metrics:[
    {
      service_date:"2016-03-07",
      route_id:"Red",
      threshold_id:"threshold_id_01",
      threshold_type:"wait_time_headway_based",
      threshold_name:"Headway",
      metric_result:"0.8705",
      metric_result_trip:"0.6725"
    },
    {
      service_date:"2016-03-07",
      route_id:"Red",
      threshold_id:"threshold_id_02",
      threshold_type:"wait_time_headway_based",
      threshold_name:"Big Gap",
      metric_result:"0.9477",
      metric_result_trip:"0.8825"
    },
    {
      service_date:"2016-03-07",
      route_id:"Red",
      threshold_id:"threshold_id_03",
      threshold_type:"wait_time_headway_based",
      threshold_name:"2X Headway",
      metric_result:"0.9824",
      metric_result_trip:"0.9693"
    },
    {
      service_date:"2016-03-07",
      route_id:"Red",
      threshold_id:"threshold_id_04",
      threshold_type:"travel_time",
      threshold_name:"delayed < 3 min.",

```

```

        metric_result:"0.9515",
        metric_result_trip:"0.9391"
    },
    {
        service_date:"2016-03-07",
        route_id:"Red",
        threshold_id:"threshold_id_05",
        threshold_type:"travel_time",
        threshold_name:" delayed < 6 min.",
        metric_result:"0.9904",
        metric_result_trip:"0.9866"
    },
    {
        service_date:"2016-03-07",
        route_id:"Red",
        threshold_id:"threshold_id_06",
        threshold_type:"travel_time",
        threshold_name:" delayed < 10 min.",
        metric_result:"0.9997",
        metric_result_trip:"0.9987"
    }
  ]}

```

2.2.5 CURRENTMETRICS

This query will return a list of the current (last hour and current service date until current time) top line metrics for a route.

Special Parameters

Name	Description
route	GTFIS-compatible route_id value for which metrics should be returned. Multiple route_ids can be input separated by commas. Data type: String. Example: Red

Response Fields

Name	Description
current_metrics	Root object of the feed
route_id	Property of "current_metrics". String. The GTFIS-compatible unique identifier for the route for which metrics are returned. Example: Red
threshold_id	Property of "current_metrics". String. The identifier for the threshold Example: threshold_id_01
threshold_type	Property of "current_metrics". String. The type of threshold: wait_time_headway_based, travel_time Example: wait_time_headway_based

Name	Description
threshold_name	Property of "current_metrics". String. The name of the threshold: The name of the threshold: 'Headway', 'Big Gap', '2X Headway', 'delayed < 3 min.', 'delayed < 6 min.', 'delayed < 10 min.' Example: Headway
metric_result_last_hour	Property of "current_metrics". String representation of a float The result of the passenger weighted metric over the last hour, e.g. percent of passengers delayed longer than the benchmark headway Example: 0.9750
metric_result_current_day	Property of "current_metrics". String representation of a float The result of the passenger weighted metric from the start of the service date until the current time, e.g. percent of passengers delayed longer than the benchmark headway Example: 0.9750
metric_result_trip_last_hour	Property of "current_metrics". String representation of a float The result of the metric over the last hour, not weighted by passengers, e.g. percent of trips with headway longer than the benchmark headway Example: 0.9990
metric_result_trip_current_day	Property of "current_metrics". String representation of a float The result of the metric from the start of the service date until the current time, not weighted by passengers, e.g. percent of trips with headway longer than the benchmark headway Example: 0.9990

Notes

Passenger weights are estimated for each day and time period from the MBTA's Origin-Destination Matrix.

Example

http://realtime.mbta.com/developer/api/v2.1/currentmetrics?api_key=wX9NwuHnZU2To07GmGR9uw&format=json&route=red

```
{
  current_metrics:[
    {
      route_id:"Red",
      threshold_id:"threshold id 01",
      threshold_type:"wait_time_headway_based",
      threshold_name:"Headway",
      metric_result_last_hour:"0.8077",
      metric_result_current_day:"0.8322",
      metric_result_trip_last_hour:"0.5223",
      metric_result_trip_current_day:"0.9271"
    },
    {
      route_id:"Red",
      threshold_id:"threshold id 02",
      threshold_type:"wait_time_headway_based",
      threshold_name:"Big Gap",
      metric_result_last_hour:"0.9150",
      metric_result_current_day:"0.9235",
      metric_result_trip_last_hour:"0.7560",

```

```
    metric_result_trip_current_day:"0.8150"
  },
  {
    route_id:"Red",
    threshold_id:"threshold_id_03",
    threshold_type:"wait_time_headway_based",
    threshold_name:"2X Headway",
    metric_result_last_hour:"0.9844",
    metric_result_current_day:"0.9746",
    metric_result_trip_last_hour:"0.9694",
    metric_result_trip_current_day:"0.9510"
  },
  {
    route_id:"Red",
    threshold_id:"threshold_id_04",
    threshold_type:"travel_time",
    threshold_name:"delayed < 3 min.",
    metric_result_last_hour:"0.9846",
    metric_result_current_day:"0.9136",
    metric_result_trip_last_hour:"0.9473",
    metric_result_trip_current_day:"0.9127",
  },
  {
    route_id:"Red",
    threshold_id:"threshold_id_05",
    threshold_type:"travel_time",
    threshold_name:" delayed < 6 min.",
    metric_result_last_hour:"0.9994",
    metric_result_current_day:"0.9800",
    metric_result_trip_last_hour:"0.9976",
    metric_result_trip_current_day:"0.9805"
  },
  {
    route_id:"Red",
    threshold_id:"threshold_id_06",
    threshold_type:"travel_time",
    threshold_name:" delayed < 10 min.",
    metric_result_last_hour:"0.9999",
    metric_result_current_day:"0.9970",
    metric_result_trip_last_hour:"0.9998",
    metric_result_trip_current_day:"0.9957"
  }
  ]}
```

3. ABOUT THIS DOCUMENT

3.1 Version History

Version #	Date	Change Author	Description of Change
0.9	2016/03/28	Laura Riegel	Original draft of document
0.9.1	2016/04/14	Laura Riegel	Updated Notes section of daily_metrics call to define service dates and limit to dates in the past