MBTA

MBTA-REALTIME GTFSRT DOCUMENTATION (V 2.0)

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1. MBTA OPEN DATA OVERVIEW

The MBTA publishes the following data feeds about its service:

- **GTFS Schedule.** The full schedule of all MBTA service in the industry's leading format.
- **MBTA-realtime API.** Full-featured easy-to-use RESTful API with alert, vehicle location, and arrival prediction data (as well as access to schedule data).
- **GTFS-realtime.** Alert, vehicle location, and arrival-prediction data in a new standard format. Best for retrieving data for the whole system at once in a relatively small package, but must be extrapolated using GTFS data to be meaningful.
- **NextBus API.** MBTA bus location and prediction data is available through NextBus's industry-leading API. (Bus only.)
- **RSS alerts.** An easy way to add alert information to anything with an RSS reader.

Concepts, keys and IDs are consistent across data feeds wherever possible. This list does not include several older standalone real-time data feeds, which are deprecated.

This document covers GTFS-realtime. GTFS, the MBTA-realtime API, and the RSS alert feed documentation are available at http://realtime.mbta.com . NextBus API documentation is available from NextBus.

1.1 Use of MBTA data

Access to the MBTA GTFS-realtime feeds is governed by the language in the MassDOT Developers License Agreement (http://www.eot.state.ma.us/developers/) in addition to the following conditions:

- The MBTA reserves the right to suspend the data feed, modify the feed, or modify elements of the feed at any time at the MBTA's sole and absolute discretion.
- The MBTA does not guarantee any technical support of any kind to users.
- No user may execute polling commands more often than every 10 seconds. A user that polls more often than that or otherwise overtaxes the MBTA's system may be suspended or terminated from the data feed.

1.2 Getting help

More documentation is available at http://realtime.mbta.com .

The MBTA is happy to answer developer questions at developer@mbta.com . Developers are also encouraged to join the MBTA Developers discussion forum at https://groups.google.com/forum/?fromgroups#!forum/massdotdevelopers .

2. GTFS-REALTIME OVERVIEW

GTFS-realtime is a standard developed by Google for delivering realtime data. The data are in the Protocol Buffer format and need to be combined with General Transit Feed Specification (GTFS) schedule data to be meaningful. (MBTA's GTFS files are available in a ZIP file at (http://www.mbta.com/uploadedfiles/MBTA_GTFS.zip)

2.1 Format Documentation

The GTFS-realtime specification is detailed at https://developers.google.com/transit/gtfs-realtime/. The Protocol Buffer format is detailed at http://code.google.com/p/protobuf/.

2.2 Accessing the Feed

MBTA provides the following GTFS-realtime feeds:

- Service Alerts – this feed includes all service alerts and is available at http://developer.mbta.com/lib/GTRTFS/Alerts/Alerts.pb.
- Trip Updates – this feed includes trip progress and arrival predictions, currently for MBTA bus, heavy rail and commuter rail routes, and is available at http://developer.mbta.com/lib/GTRTFS/Alerts/TripUpdates.pb.
- Vehicle Positions – this feed includes vehicle positions, currently for MBTA bus, heavy rail and commuter rail routes, and is available at http://developer.mbta.com/lib/GTRTFS/Alerts/VehiclePositions.pb.

The MBTA's older bus-only GTFS-realtime trip updates and vehicle positions feeds at http://developer.mbta.com/lib/GTRTFS/Passages.pb and http://developer.mbta.com/lib/GTRTFS/Vehicles.pb are deprecated. Developers using them should transition to the new feeds.

2.3 Relationship with Other MBTA Data Feeds

Due to the nature of the format, GTFS-realtime has to be combined with the MBTA's GTFS schedule data for most applications.

Generally the vehicle location, arrival prediction, and alert data available in GTFS-realtime is the same as is available in the MBTA-realtime API. In the case of vehicle positions and arrival predictions, GTFS-realtime provides an efficient means to get data about all MBTA service at once; the MBTA-realtime API does not. In the case of alerts the relationship is more nuanced -- either feed is an appropriate way to retrieve all alerts, and MBTA-realtime provides more feeds and richer information. Also note that escalator outages are available in the MBTA-realtime API but filtered out of the GTFS-realtime API. (Elevator outages are present in both.)

2.4 Tips

In the alerts table, an activity_period with no end time can be considered "until further notice."

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3. FEED SAMPLES

3.1 Sample of the Service Alerts Feed

```
header {
  gtfs_realtime_version: "1.0"
  timestamp: 1367888430
}
entity {
  id: "780"
  alert {
    active_period {
      start: 1368261000
      end: 1368426600
    }
    informed_entity {
      agency_id: "1"
      route_id: "CR-Fitchburg"
      route_type: 2
      stop_id: "Porter Square"
    }
    cause: CONSTRUCTION
    effect: NO_SERVICE
    header_text {
      translation {
        text: "Porter Square Station
               closed from Sat May 11,
               2013 through Sun May 12,
               2013 due to
               construction"
        language: "en"
      }
    }
    description_text {
      translation {
        text: "Affected
               services:\r\nFitchburg/S
               outh Acton Line"
        language: "en"
      }
    }
  }
}
```

```
entity {
  id: "783"
  alert {
    active_period {
      start: 1368046800
      end: 1368108000
    }
    informed_entity {
      agency_id: "1"
      stop_id: "Ruggles"
    }
    cause: MAINTENANCE
    effect: OTHER_EFFECT
    header_text {
      translation {
        text: "Elevator 849 RUGGLES -
               Commuter Rail Platform
               to Lobby out of service
               from Wed May 08, 2013 at
               05:00 PM to Thu May 09,
               2013 at 10:00 AM due to
               electrical work"
        language: "en"
      }
    }
    description_text {
      translation {
        text: "Please contact station
               personnel or conductor
               for assistance. For
               inbound commuter rail
               riders, please disembark
               at Back Bay and return
               to Ruggles via the
               Orange Line. \r\n\r\nFor
               outbound customers,
               please take the Orange
               Line to Back Bay and
               board the commuter rail
               at Back Bay. Please
               contact station
               personnel for
               assistance."
        language: "en"
      }
    }
  }
}
```

3.2 Sample of the Trip Updates Feed

```
header {
  gtfs_realtime_version: "1.0"
  incrementality: FULL_DATASET
  timestamp: 1400527482
}
entity {
  id: "1400527482_22559683"
  trip_update {
    trip {
      trip_id: "22559683"
      start_date: "20140519"
      schedule_relationship: SCHEDULED
      route_id: "903_"
    }
    stop_time_update {
      stop_sequence: 17
      arrival {
        time: 1400527524
      }
      departure {
        time: 1400527524
      }
      stop_id: "70004"
    }
    stop_time_update {
      stop_sequence: 18
      arrival {
        time: 1400527621
      }
      departure {
        time: 1400527621
      }
      stop_id: "70002"
    }
    vehicle {
      id: "1224"
      label: "1224"
    }
    timestamp: 1400527479
  }
}
```

```
entity {
  id: "1400527482_CR-Fairmount-CR-
      Weekday-Fairmount-Dec13-765"
  trip_update {
    trip {
      trip_id: "CR-Fairmount-CR-
                Weekday-Fairmount-Dec13-
                765"
      schedule_relationship: SCHEDULED
      route_id: "CR-Fairmount"
    }
    stop_time_update {
      stop_sequence: 1
      arrival {
        time: 1400527200
      }
      departure {
        time: 1400527200
      }
      stop_id: "South Station"
    }
    vehicle {
      id: "1703"
      label: "1703"
    }
    timestamp: 1400527409
  }
}
entity {
  id: "1400527482_23083840"
  trip_update {
    trip {
      trip_id: "23083840"
      start_date: "20140519"
      schedule_relationship: SCHEDULED
      route_id: "108"
    }
    stop_time_update {
      stop_sequence: 28
      arrival {
        delay: 120
      }
      stop_id: "9033"
    }
    vehicle {
      id: "y0748"
      label: "0748"
    }
  }
}
```

3.3 Sample of the Vehicle Positions Feed

```
header {
  gtfs_realtime_version: "1.0"
  incrementality: FULL_DATASET
  timestamp: 1400527482
}
entity {
  id: "1400527482_1224"
  vehicle {
    trip {
      trip_id: "22559683"
      start_date: "20140519"
      schedule_relationship: SCHEDULED
      route_id: "903_"
    }
    position {
      latitude: 42.32085
      longitude: -71.10164
      bearing: 210
    }
    timestamp: 1400527477
    vehicle {
      id: "1224"
      label: "1224"
    }
  }
}
entity {
  id: "1400527482_1703"
  vehicle {
    trip {
      trip_id: "CR-Fairmount-CR-
                Weekday-Fairmount-Dec13-
                765"
      schedule_relationship: SCHEDULED
      route_id: "CR-Fairmount"
    }
    position {
      latitude: 42.34549
      longitude: -71.05837
      bearing: 206
      speed: 13
    }
    timestamp: 1400527409
    vehicle {
      id: "1703"
    }
  }
}
```

```
entity {
  id: "1400527482_v2031"
  vehicle {
    trip {
      trip_id: "22803953"
      start_date: "20140519"
      schedule_relationship: SCHEDULED
      route_id: "34"
    }
    position {
      latitude: 42.2900963
      longitude: -71.124176
      bearing: 0
      odometer: 0
      speed: 0
    }
    current_stop_sequence: 26
    timestamp: 1400527364
    stop_id: "638"
    vehicle {
      id: "v2031"
      label: "2031"
    }
  }
```

4. ABOUT THIS DOCUMENT

4.1 Version History

Version #	Date	Change Author	Description of Change
2.0	2014/08/04	Dave Barker	• Reorganized documentation into separate documents for GTFS, GTFS-realtime, MBTA-realtime API, and RSS.