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Google Big Query

Thanks for being a valued Waze for Cities partner

Here's where you can learn all the tips and tricks for getting the most out of our integration with BigQuery.

Let's move forward together.

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BigQuery is a Google Cloud product that enables interactive analysis of large datasets working in conjunction with Google Cloud Storage. Waze for Cities partners can use BigQuery to analyze up to 1TB of Waze data free of charge each month. Optionally add a billing account to analyze even more data for a small cost. You can view the data and fields available to Waze partners [here](#).

Not a Waze for Cities partner? Apply [here](#).

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BigQuery & Waze Data Tips & Tricks

- Need a crash course on Google Cloud BigQuery? Take this Quickstart [here](#). For more advanced training on BIgQuery you can take [these trainings](#).
- The data dictionary for the Alerts, Jams, and Irregularities tables is available [here](#).
- Use [BigQuery's Geography functions](#) to query by geographic area. For example, [ST_INTERSECTS(geo,geo)](#) can be used to limit the results within a specified polygon:
  SELECT *
  FROM `[project].[data_set].[table]`
  WHERE ST_INTERSECTS(geo, ST_GEOGFROMTEXT("POLYGON((-81.69 40.90,-81.66 40.15,-80.59 40.17,-81.69 40.90))") IS TRUE
- [This lightweight tool](#) can be used to create or visualize geo points and polygons

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BigQuery Onboarding Steps

Step 1

Navigate to this link and log in with the account you used for the partner portal

Note: It is important that you use to the same account that you used to register within the Waze Partner Portal. Access to the data will be automatically granted to that account.

Step 2a

See video here

Create a new project by clicking "Create" and entering a project name.

This step may vary based on your account's previous interactions with Google Cloud. If you are asked to specify an organization when you create a project, please select an organization or select "No Organization."

If you are unable to create a new project or experience an error during the process, contact your organization's G Suite administrator for assistance.

1. *Need help looking for who your G Suite Admin is? Click here for instructions.*
2. *If your organization is a GCP user, great! Have you admin create you a GCP Project and have them grant you Project Editor permissions.*
3. *Once you have access to your project, click here to get started with GCP BigQuery and to access the CCP Dataset.*

[Optional] Step 2b

See video here

If you are prompted to enable the BigQuery API for your project, you can do so via this link.

If you are unable to enable the API or experience an error during the process, contact your organization's gSuite administrator for assistance.

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Step 3

Begin querying data, up to 1TB per month. Add a Google Cloud Billing Account in Step 4 to query above 1TB per month. For detailed instructions for querying data in BigQuery, tips & tricks, and sample queries, click here.

Waze partner tables are available in the following format: `waze-public-dataset.[data_set].[table]`:
- *[data_set] represents the data set name, which is in the following format: "partner_PortalOrganizationName".*
- *PortalOrganizationName = Common Name of Organization in the Partner Portal. All special characters and spaces are removed. Dataset name is case sensitive.*
- *If you aren't sure how your organization is named within the Waze Partner Portal, you can check here. Example:*
  - *Common Name of Organization from Partner Portal:*
    - ***Department of Motor Vehicles (DOTpb)***
  - *Data set name:*
    - ***partner_DepartmentofMotorVehiclesDOTpb***
- *[table] represents the name of the table in BigQuery. The three tables available to Waze partners are:*
  - *view_alerts_clustered*
  - *view_jams_clustered*
  - *view_irregularities_clustered*
- ***Example table:***
  - ***`waze-public-dataset.partner_ partner_DepartmentofMotorVehiclesDOTpb.view_alerts_clustered`***

[Optional] **Step 4**

Click "Upgrade" at the top of the BigQuery console to add a Google Cloud Billing Account and unlock the full potential of Waze for Cities Data.

You will incur a charge if you store data in a custom table or query more than 1TB of data each month. Pricing information is available here.

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Sample Queries for BigQuery

The following SQL statements are intended for use with Waze for Cities Data. All queries can be used in BigQuery. If you have questions, please reach out to the Waze for Cities team on the CCP Forum.

Analyzing COVID-19 Impact by Street

Tables: Jams

Link

Accident Reports over Time

Tables: Alerts

Description: This query can be used to understand where accidents occur through a city, which can help inform street redesigns, intersection reconfigurations, or additional enforcement in particular areas.

Query:
SELECT
  date(ts) as date,
  EXTRACT(hour from ts) as hour,
  EXTRACT(DAYOFWEEK from ts) as day_of_week,
  country,
  city,
  street,
  type,
  subtype,

```
  geo
FROM `[project].[data_set].[table]`
WHERE type = "ACCIDENT"
```
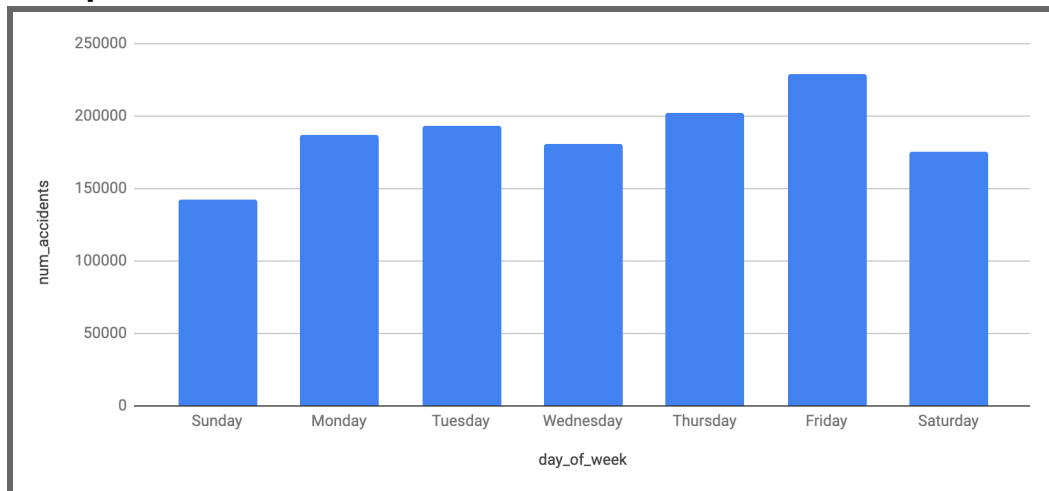
Number of Accidents by Day of Week

Table: Alerts

Description: The following query provides the number of accidents by day of week for the past 31 days.

```
SELECT
  EXTRACT(DAYOFWEEK from ts) as day_of_week,
  country,
  city,
  street,
  type,
  COUNT(DISTINCT uuid) as n_alerts
FROM `[project].[data_set].[table]`
WHERE type = "ACCIDENT"
AND date(ts) >= DATE_SUB(CURRENT_DATE(),INTERVAL 31 DAY)
AND city IS NOT NULL
AND street IS NOT NULL
GROUP BY 1,2,3,4,5
ORDER BY day_of_week ASC, n_accident_reports DESC
```

Example Visualization

Average Delay by Road

Tables: Jams

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Description: The following query provides the average delay (in minutes) by date and hour.

Query:
SELECT
  extract(date from ts) as date,
  extract(hour from ts) as hour,
  country,
  city,
  street,
  ROUND(avg(delay),2) / 60 as avg_delay_minutes

FROM `[project].[dataset].[view]`
GROUP BY 1,2,3,4,5

Locations of Potholes over Time

Table: Alerts

Description: This query can be used to understand where potholes occur through a city, which can help inform both short and long term street improvement projects.

Query:
SELECT
  DATE(ts) AS date,
  country,
  city,
  street,
  type,
  subtype,
  geo
FROM
  `[project].[dataset].[view]`
WHERE
  subtype = 'HAZARD_ON_ROAD_POT_HOLE'

Reported Hazards over Time

Description: This query can be used to understand what Hazard Subtypes occur most frequently, and in which cities and streets those occurrences are, which can help inform remediation efforts.

Table: Alerts

Query:
```
SELECT
  DATE(ts) AS date,
  country,
  city,
  street,
  type,
  subtype,
  COUNT(subtype) as count_of_subtype
FROM
  `[project].[dataset].[view]`
WHERE
  type = 'WEATHERHAZARD'
GROUP BY
  1,2,3,4,5,6
ORDER BY
  count_of_subtype DESC
```

Traffic Jam Severity (level) by City

Tables: Jams

Description: This query groups streets by the severity of traffic jams and by day and hour.

Query:
```
SELECT
  EXTRACT(date from ts) as date,
  EXTRACT(hour from ts) as hour,
  country,
  city,
  level,
  COUNT(distinct street) as num_streets
FROM `[project].[data_set].[table]`
GROUP BY 1,2,3,4,5
```

Length and Duration of Traffic Jam by City and Street

Tables: Jams

Description: This query groups streets by the length (in meters) and delay (in minutes) of traffic jams and by city and street.

Query:
```
SELECT
  country,
  city,
  street,
  round(avg(length),2) as average_length_meters,
  round(avg(delay)/60,2) as average_delay_minutes
FROM `[project].[data_set].[table]`
GROUP BY 1,2,3
```

Comparison between Average Free Flow Speed and Average Speed in an Irregularity

Tables: Irregularities

Description: This query compares average free flow speed against the average speed within an irregularity.

Query:
```
SELECT
  EXTRACT(date from updateDateTS) as date,
  EXTRACT(hour from updateDateTS) as hour,
  country,
  city,
  street,
  startNode,
  endNode,
  length as length_meters,
  geoWKT,
  avg(regularSpeed) as avg_regular_speed,
  avg(speed) as avg_irregularity_speed
FROM `[project].[data_set].[table]`
GROUP BY 1,2,3,4,5,6,7,8,9
```

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Locations of Floods over Time

Table: Alerts

Description: This query can be used to understand where floods occur through a city, which can help inform both short and long term infrastructure improvement projects.

Query:
```
SELECT
  DATE(ts) AS date,
  country,
  city,
  street,
  type,
  subtype,
  geo
FROM
  `[project].[dataset].[view]`
WHERE
  subtype = 'HAZARD_WEATHER_FLOOD'
```
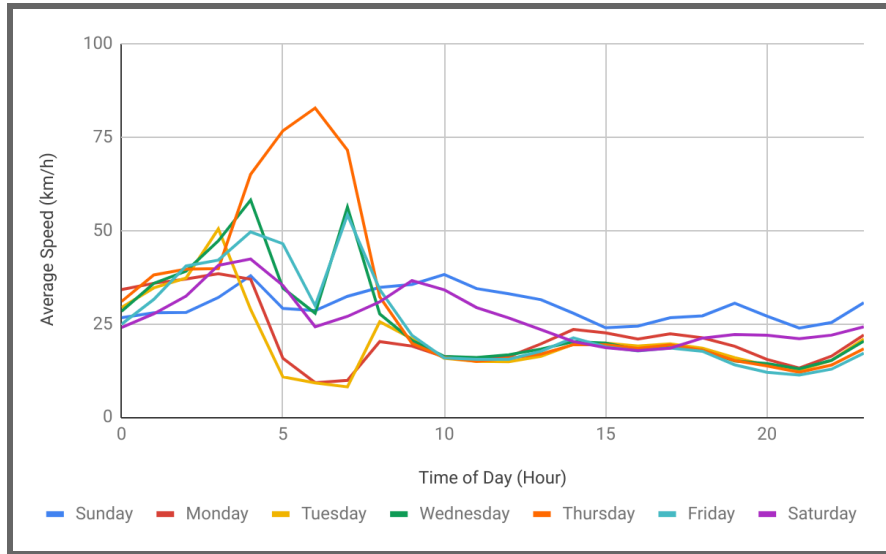
Average Speed by Day and Hour

Table: Irregularities

Description: This query can be used to understand average traffic speeds for a city (and street) by day of the week and hour of day, which can help monitor traffic flows.

Query:
```
SELECT
  EXTRACT(date from updateDateTS) as date,
  EXTRACT(hour from updateDateTS) as hour,
  EXTRACT(DAYOFWEEK from updateDateTS) as day_of_week,
  country,
  city,
  street,
  avg(regularSpeed) as avg_regular_speed
FROM
`[project].[dataset].[view]`
WHERE WHERE ST_DWITHIN(geo, ST_GEOGFROMTEXT("POLYGON((XXXXX))", 100) IS TRUE
GROUP BY 1,2,3,4,5,6
```

Example Visualization

Average Freeflow Speed

Table: Irregularities

Description: This query can be used to understand average freeflow speed for a street within a city, which can determine which roads do or don't flow well.

Query:
SELECT
  country,
  city,
  street,
  avg(regularSpeed) as avg_regular_speed
FROM
`waze-public-dataset.iadb_latam_pilot.irregularities_latam`
WHERE city = '[city]'
AND street = '[street]'
GROUP BY 1,2,3

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Support

If you need further assistance, feel free to explore the following resources:

1. Send us an email to ccp@waze.com
2. Contact your fellow partners by accessing the [forum](#)
3. Find answers in our [Help Center](#)