

#FABCONSQLCON2026

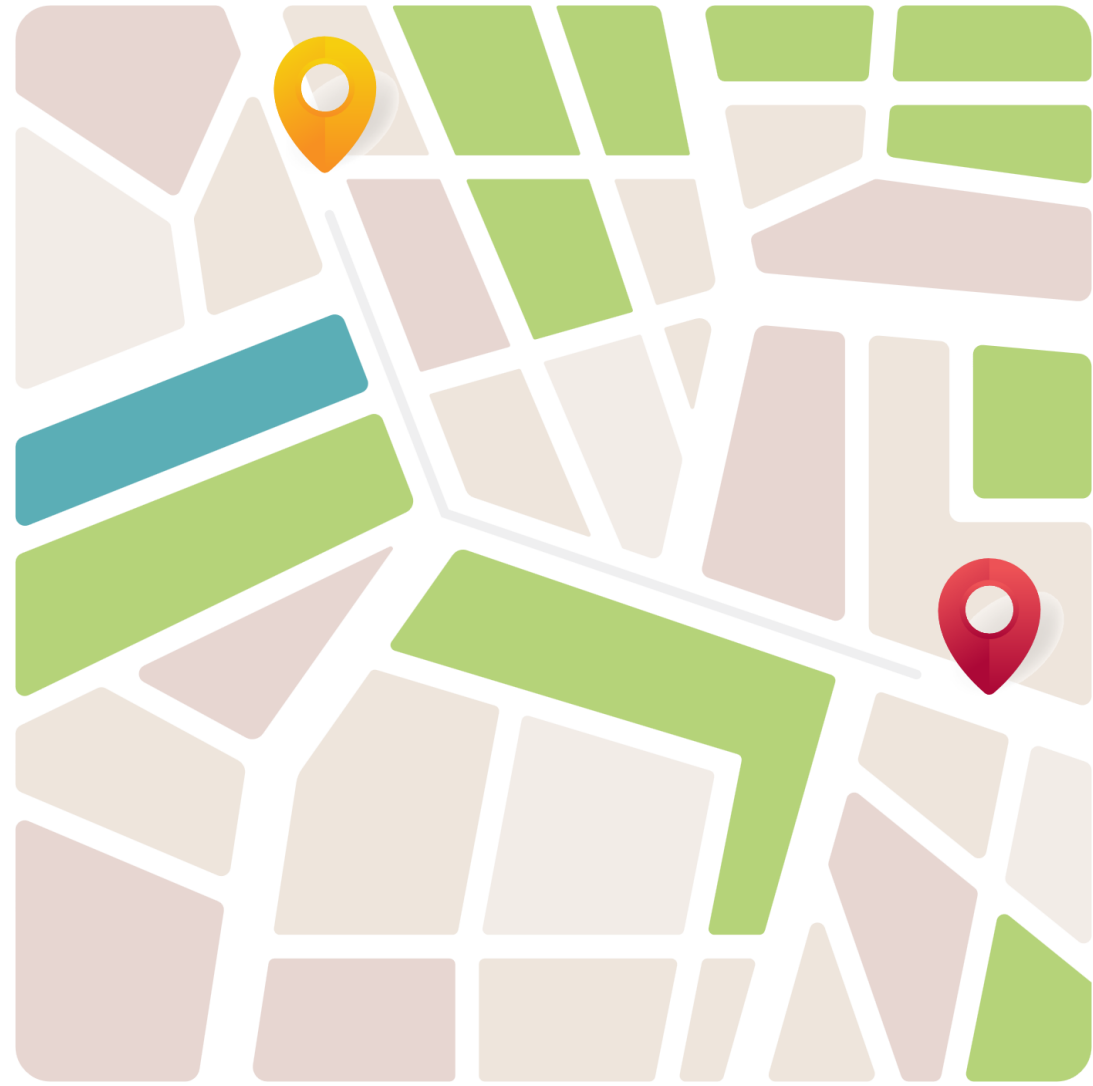
FABCON

Microsoft Fabric
COMMUNITY CONFERENCE

SQLCON

Microsoft SQL
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ATLANTA MARCH 16 - 20, 2026



Real-Time Intelligence Meets Location :

How Maps in Microsoft Fabric Transform your Analytics

James Dales

James Dales

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Objectives

Using real data, build a real-time solution to show location data on a map.

Include current locations, and recent history.

Detect when vehicles enter a location.

Add additional context to the map with reference layers.

Mapping in Fabric

Geospatial Processing



Data Engineering

- Notebooks with open source or ArcGIS



Databases

- Fabric SQL
- Data Warehouse
- Cosmos DB
- Snowflake



Real-time Intelligence

- KQL Database

Display & Analytics



Data Engineering

- Notebooks with open source or ArcGIS



Power BI

- Azure Maps
- ArcGIS for Power BI
- Custom visuals such as Icon Map



Real-time Intelligence

- Maps in Fabric
- Real-time Dashboard



Third-party workloads

- ArcGIS Maps for Fabric

Mapping in Fabric

Geospatial Processing



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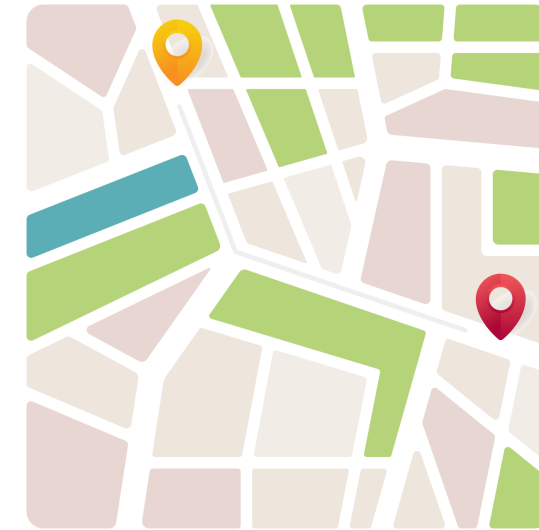
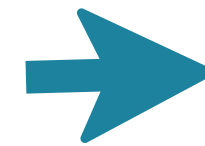
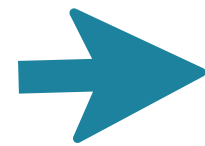
Third-party workloads

- ArcGIS Maps for Fabric



Image courtesy of Han Zeng

High Level Requirements



Data Source



MARTA is the public transit system in Atlanta

GTFS is a standard data format for sharing routes, stops schedules and live locations for transit information.

```
{
  "header": {
    "gtfs_realtime_version": "2.0",
    "incrementality": 0,
    "timestamp": 1772618198
  },
  "entity": [
    {
      "id": "1601",
      "is_deleted": false,
      "trip_update": null,
      "vehicle": {
        "trip": {
          "trip_id": "10928497",
          "start_time": "",
          "start_date": "20260304",
          "schedule_relationship": 0,
          "route_id": "32",
          "direction_id": 5
        },
        "position": {
          "latitude": 33.65011,
          "longitude": -84.32144,
          "bearing": 140,
          "odometer": 0,
          "speed": 22.352
        },
        "current_stop_sequence": 0,
        "current_status": 2,
        "timestamp": 1772618185,
        "congestion_level": 0,
        "stop_id": "",
        "vehicle": {
          "id": "2301",
          "label": "1601",
          "license_plate": "",
          "occupancy_status": 0,
          "occupancy_percentage": 0,
          "multi_carriage_details": [],
          "alert": null,
          "shape": null,
          "trip": null,
          "route": null,
          "stop": null
        }
      },
      "id": "1602",
      "is_deleted": false,
      "trip_update": null,
      "vehicle": {
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          "start_time": "",
          "start_date": "20260304",
          "schedule_relationship": 0,
          "route_id": "86",
          "direction_id": 11
        },
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          "longitude": -84.22454,
          "bearing": 260,
          "odometer": 0,
          "speed": 0.44704
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        "current_stop_sequence": 0,
        "current_status": 2,
        "timestamp": 1772618186,
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        "stop_id": "",
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          "label": "1602",
          "license_plate": "",
          "occupancy_status": 0,
          "occupancy_percentage": 0,
          "multi_carriage_details": [],
          "alert": null,
          "shape": null,
          "trip": null,
          "route": null,
          "stop": null
        }
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          "start_time": "",
          "start_date": "20260304",
          "schedule_relationship": 0,
          "route_id": "114",
          "direction_id": 5
        },
        "position": {
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          "longitude": -84.25526,
          "bearing": 132,
          "odometer": 0,
          "speed": 17.8816
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        "current_stop_sequence": 0,
        "current_status": 2,
        "timestamp": 1772618183,
        "congestion_level": 0,
        "stop_id": "",
        "vehicle": {
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          "label": "1603",
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          "occupancy_percentage": 0,
          "multi_carriage_details": [],
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          "route": null,
          "stop": null
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          "schedule_relationship": 0,
          "route_id": "126",
          "direction_id": 11
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          "bearing": 88,
          "odometer": 0,
          "speed": 0
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        "stop_id": "",
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          "label": "1606",
          "license_plate": "",
          "occupancy_status": 0,
          "occupancy_percentage": 0,
          "multi_carriage_details": [],
          "alert": null,
          "shape": null,
          "trip": null,
          "route": null,
          "stop": null
        }
      }
    ]
  ]
}
```

<https://gtfs-rt.itsmarta.com/TMGTFSTimeWebService/vehicle/vehiclepositions.json>

Data Source

Header

```
"header": {  
  "gtfs_realtime_version": "2.0",  
  "incrementality": 0,  
  "timestamp": 1772618198  
},
```

Data Source

Entity (Array)

```
{
  "id": "1601",
  "is_deleted": false,
  "trip_update": null,

  "vehicle": {
    "trip": {
      "trip_id": "10928497",
      "start_time": "",
      "start_date": "20260304",
      "schedule_relationship": 0,
      "route_id": "32",
      "direction_id": 5
    },

    "position": {
      "latitude": 33.65011,
      "longitude": -84.32144,
      "bearing": 140,
      "odometer": 0,
      "speed": 22.352
    },

    "current_stop_sequence": 0,
    "current_status": 2,
    "timestamp": 1772618185,
    "congestion_level": 0,
    "stop_id": "",

    "vehicle": {
      "id": "2301",
      "label": "1601",
      "license_plate": ""
    },
    "occupancy_status": 0,
    "occupancy_percentage": 0,
    "multi_carriage_details": []
  }
}
```

Data Source

Entity (Array)

```
{
  "id": "1601",
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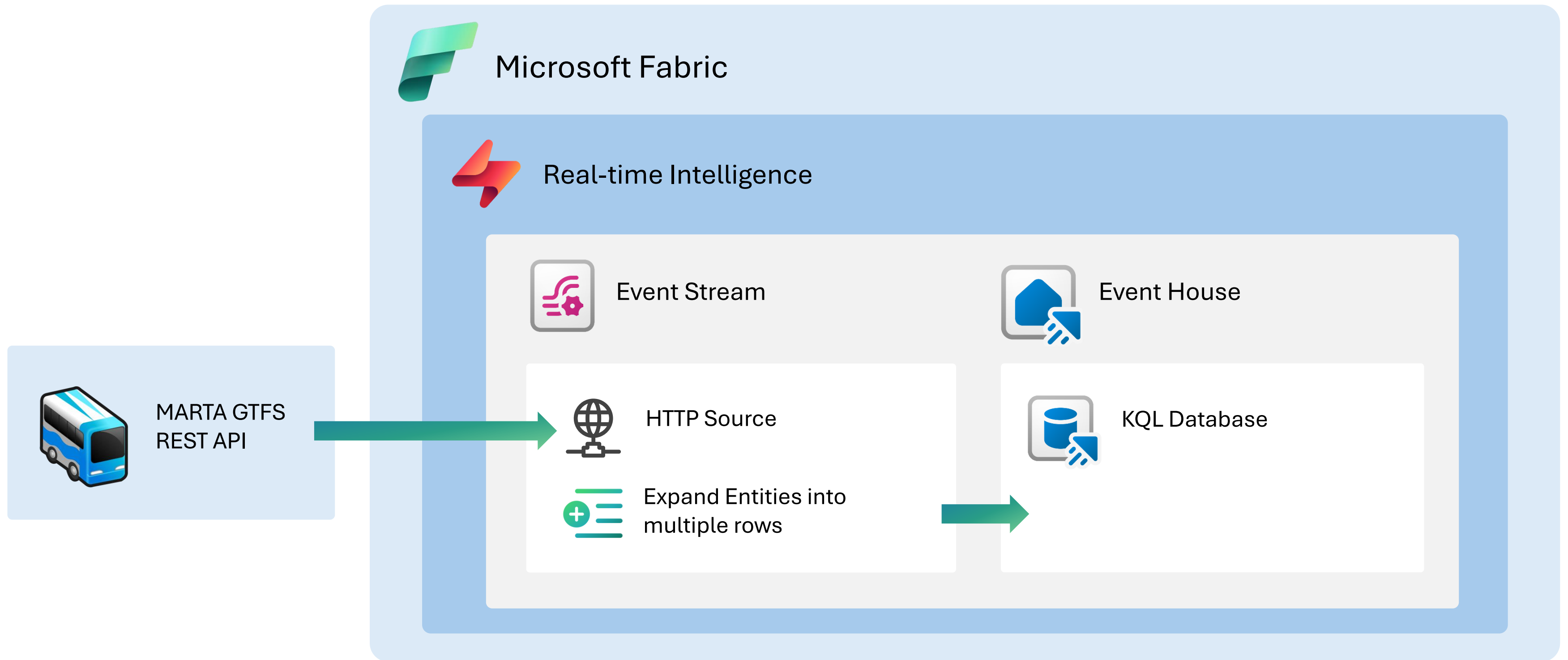
  "vehicle": {
    "trip": {
      "trip_id": "10928497",
      "start_time": "",
      "start_date": "20260304",
      "schedule_relationship": 0,
      "route_id": "32",
      "direction_id": 5
    },
```

```
"position": {
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},

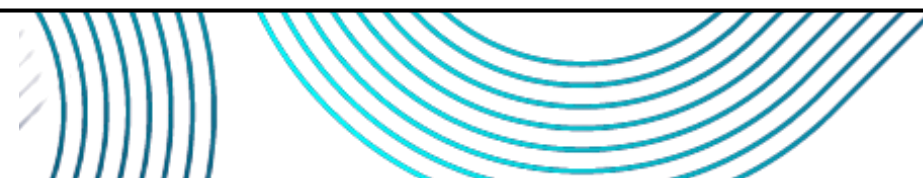
"current_stop_sequence": 0,
"current_status": 2,
"timestamp": 1772618185,
"congestion_level": 0,
"stop_id": "",
```

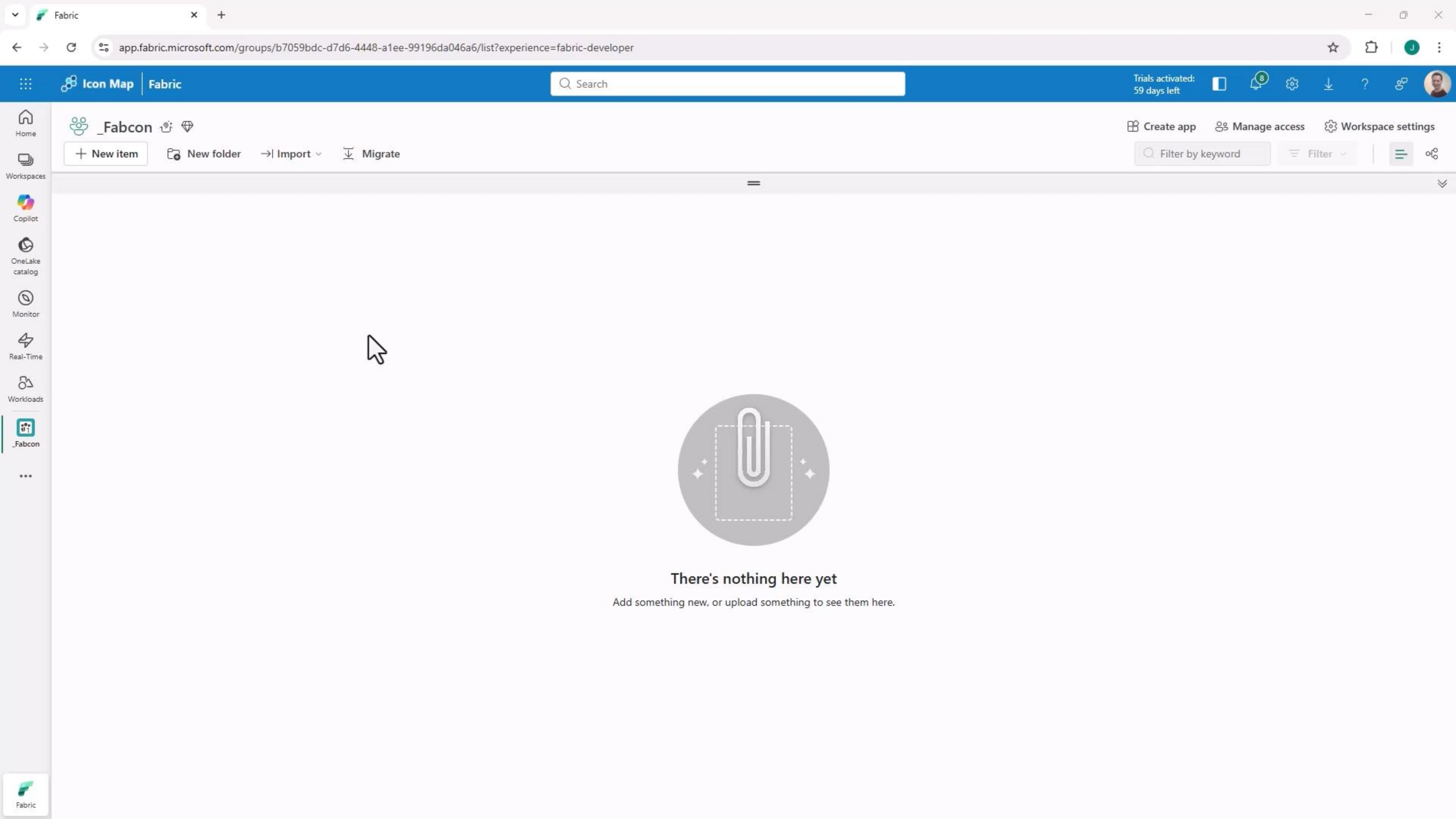
```
"vehicle": {
  "id": "2301",
  "label": "1601",
  "license_plate": ""
},
"occupancy_status": 0,
"occupancy_percentage": 0,
"multi_carriage_details": []
}
```

Ingestion Architecture



Create the Event Stream and Event House





Query the latest bus positions

```
let base =
  BusPositions
  | extend e = todynamic(ArrayValue_entity)
  | extend vehicle_ts_epoch = tolong(e.vehicle.timestamp);
let last_feed_ts_epoch = toscalar(base | summarize max(vehicle_ts_epoch));
let window_start = last_feed_ts_epoch - 120;
base
| where vehicle_ts_epoch between (window_start .. last_feed_ts_epoch)
| extend
  vehicle_id = tostring(e.vehicle.vehicle.id),
  trip_id     = tostring(e.vehicle.trip.trip_id),
  route_id    = tostring(e.vehicle.trip.route_id),
  latitude    = todouble(e.vehicle.position.latitude),
  longitude   = todouble(e.vehicle.position.longitude),
  speed_mps   = todouble(e.vehicle.position.speed),
  bearing     = todouble(e.vehicle.position.bearing),
  occupancy_percentage = toint(e.vehicle.occupancy_percentage),
  vehicle_ts  = unixtime_seconds_todatetime(vehicle_ts_epoch)
| where isnotempty(vehicle_id) and isnotnull(latitude) and isnotnull(longitude)
| summarize arg_max(vehicle_ts_epoch, *) by vehicle_id
| project vehicle_id, latitude, longitude, speed_mps, bearing, route_id, trip_id, occupancy_percentage, vehicle_ts
| order by route_id asc, vehicle_id asc
```

Create the query

Fabric

app.fabric.microsoft.com/groups/b7059bdc-d7d6-4448-a1ee-99196da046a6/list?experience=fabric-developer

Icon MapFabric

Search

Trial activated: 58 days left

10

Home

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Copilot

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Monitor

Real-Time

Workloads

_Fabcon

+ New item

New folder

Import

Migrate

Create deployment pipeline

Create app

Manage access

Workspace settings

Filter by keyword

Filter

Name

Status

Type

Task

Owner

Refreshed

Next refresh

Endorsement

Sensitivity

Included in app

Marta

Eventstream

—

James Dales

—

—

—

—

Marta

Eventhouse

—

James Dales

—

—

—

—

Marta

KQL Database

—

James Dales

—

—

—

—

Fabric

Ready to view on a map

Power BI

app.powerbi.com/groups/b7059bdc-d7d6-4448-a1ee-99196da046a6/list?experience=power-bi

Icon Map

Power BI

_Fabcon

Search

Trial activated: 57 days left

23

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Create deployment pipeline

Create app

Manage access

Workspace settings

Filter by keyword

Filter (3)

_Fabcon

Filtered results

Clear all

Type: Eventstream X KQL Database X

Workload: Real-Time Intelligence X

	Name	Status	Location	Type	Task	Owner	Refreshed	Next refresh	Endorsement	Sensitivity	Included in app
	Marta		_Fabcon	Eventstream	—	James Dales	—	—	—	—	
	Marta		_Fabcon	Eventhouse	—	James Dales	—	—	—	—	
	Marta		_Fabcon	KQL Database	—	James Dales	—	—	—	—	

Power BI

Show recent history as a linestring

Power BI

app.powerbi.com/groups/b7059bdc-d7d6-4448-a1ee-99196da046a6/list?experience=power-bi

Search

Trials activated: 57 days left

23

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Create

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OneLake catalog

Apps

Workspaces

_Fabcon

Marta

Atlanta_RT_Map

Power BI

_Fabcon

+ New item

New folder

→ Import

⇅ Migrate

Create deployment pipeline

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Filter by keyword

Filter (3)

_Fabcon

Filtered results

Clear all

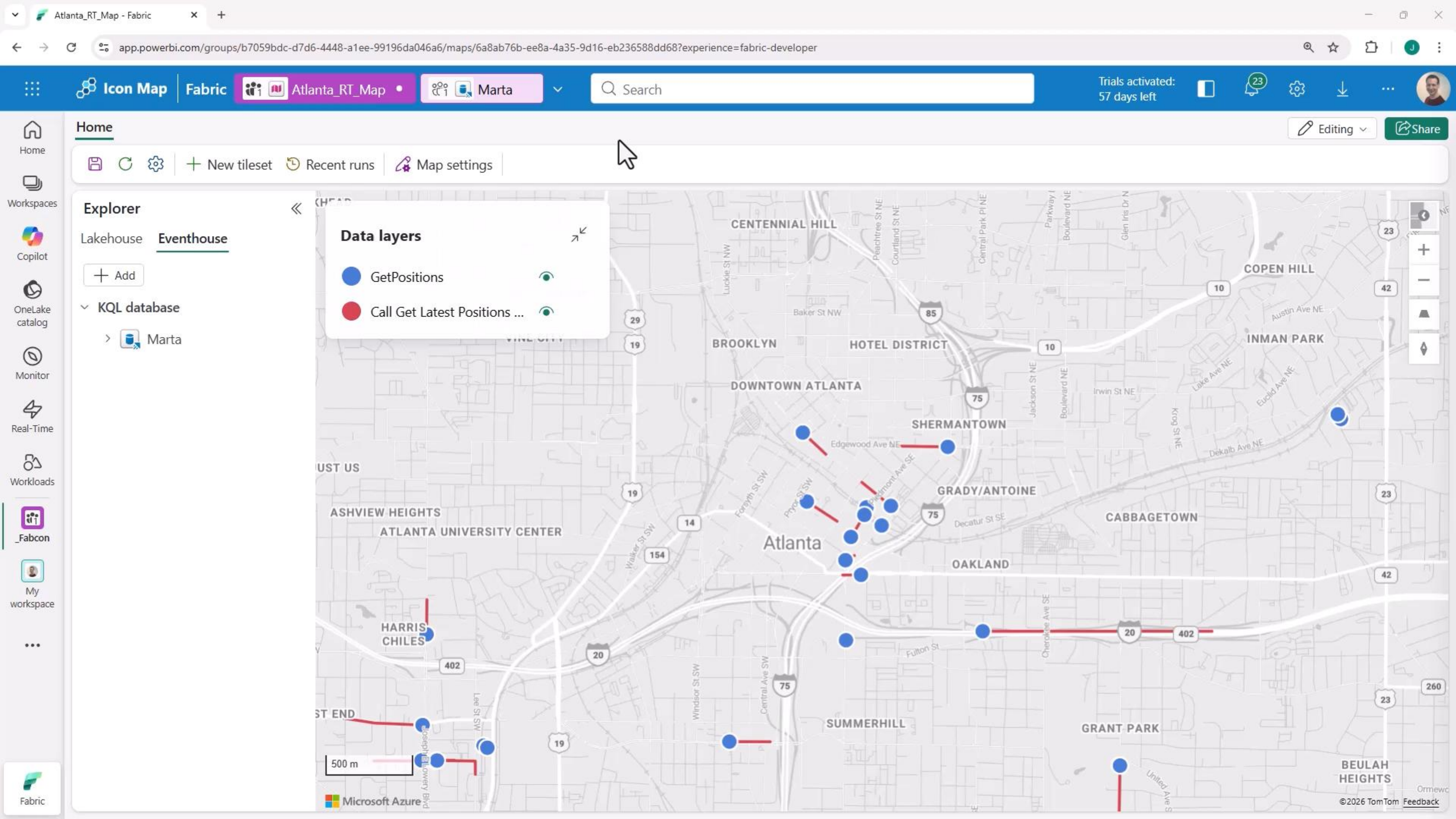
Type: Eventstream

KQL Database

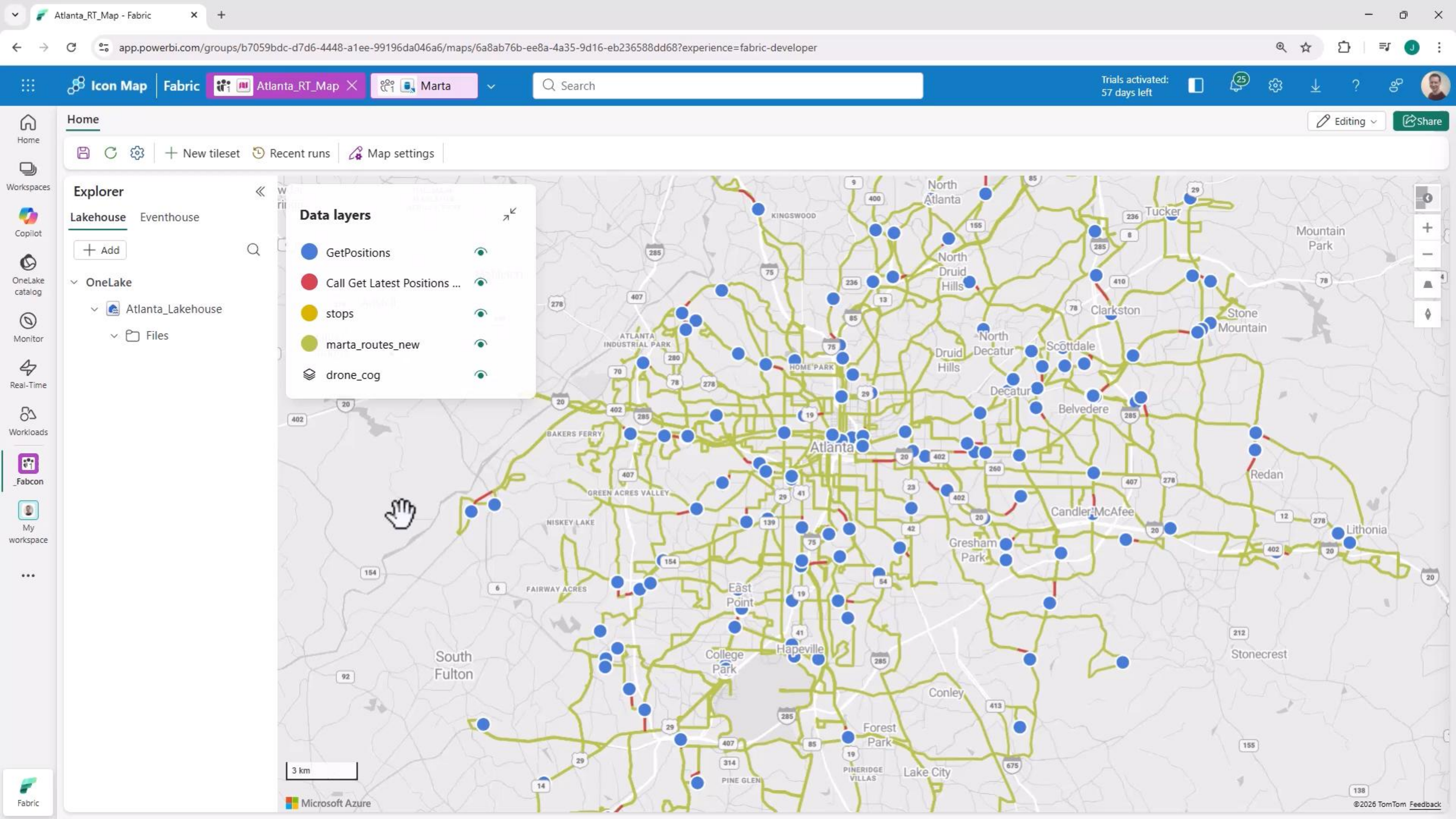
Workload: Real-Time Intelligence

	Name	Status	Location	Type	Task	Owner	Refreshed	Next refresh	Endorsemer	Sensitivity	Included in app
	Marta		_Fabcon	Eventstream	—	James Dales	—	—	—	—	
	Marta		_Fabcon	Eventhouse	—	James Dales	—	—	—	—	
	Marta		_Fabcon	KQL Datab...	—	James Dales	—	—	—	—	

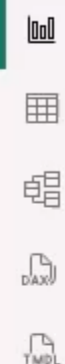
Add additional context to the map



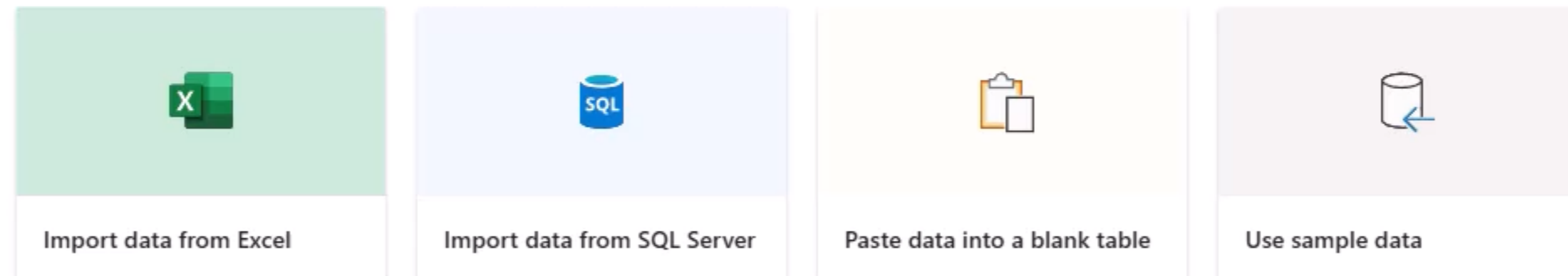
Detect Neighborhoods



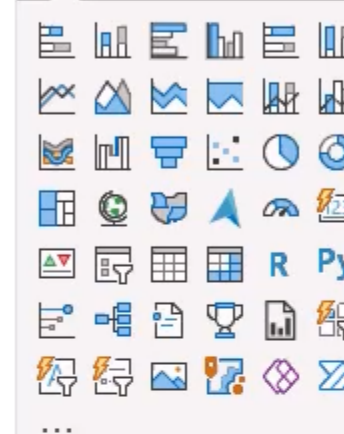
Surface in Power BI



Once loaded, your data will appear in the **Data** pane.



Get data from another source →



Values

Add data fields here

Drill through

Cross-report ☐ Off

Keep all filters

Add drill-through fields here

Use Custom Visuals for Additional Capabilities

atlanta_buses - Power BI

app.powerbi.com/groups/b7059bdc-d7d6-4448-a1ee-99196da046a6/reports/7a3a1520-d7e0-4f73-9825-5264839f8b2a/20193ad51b3d161a09b8?experience=power-bi

Icon Mapatlanta_buses

Search

Trials activated: 57 days left

Home

FileExportShareExploreSubscribeSet alertMonitorEdit

History5

Map

Map showing Atlanta bus routes and locations. Includes a scale bar (1 mi) and a legend for bus types (e.g., 162, 295, 832, 155, 49).

Average Speed (mph)

0.004.9922.35

Average Occupancy %

0.009.31140

Buses per Neighborhood

Downtown	6
Harland Terrace	5
Kirkwood	4
Midtown	4
Fort McPherson	3
Sylvan Hills	3
Berkeley Park	2
East Atlanta	2
Lindbergh/Morosgo	2
Southwest	2
West End	2
Adamsville	1

Buses per Route

Candler Road	6
Buford Highway	5
Campbellton Road	5
Peachtree Road / Buckhead	5
Piedmont Road / Sandy Springs	5
Camp Creek / South Fulton Parkway	4
Memorial Drive	4
Metropolitan Parkway	4
Morrow / Jonesboro	4
Old National Highway	4
Rainbow Drive / South DeKalb	4
Washington Road / Fairburn	4

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Filters

Sound off.
The mic is all yours.
Influence the product roadmap.

Join the Fabric User Panel



Share your feedback directly with our
Fabric product group and researchers.

<https://aka.ms/JoinFabricUserPanel>

Join the SQL User Panel



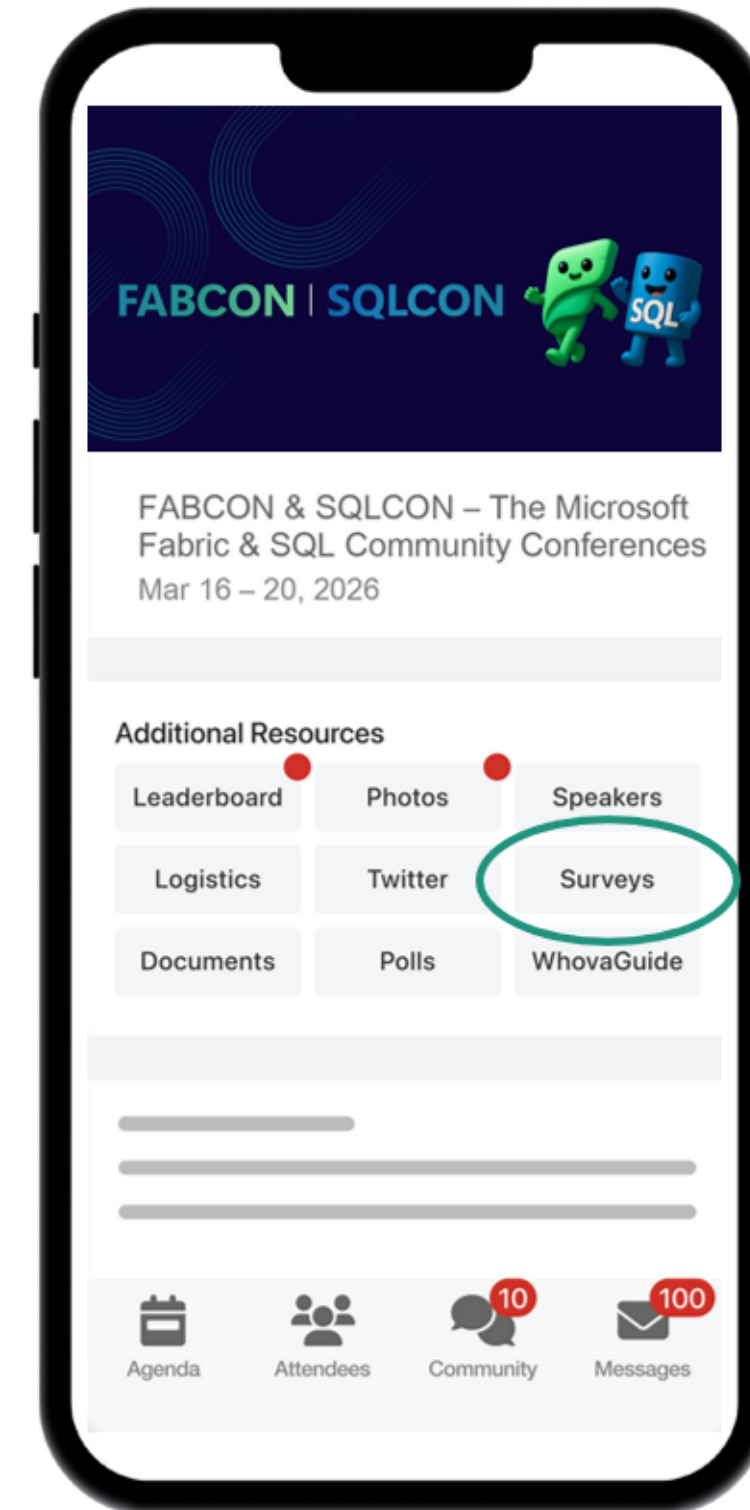
Influence our SQL roadmap and ensure
it meets your real-life needs

<https://aka.ms/JoinSQLUserPanel>

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