

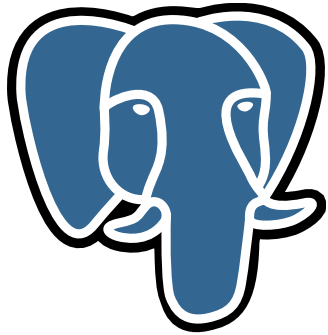


# 2D and 3D Rigid Temporal Geometries in MobilityDB

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# MobilityDB Architecture



- Numeric
- Character
- Date/Time
- ...

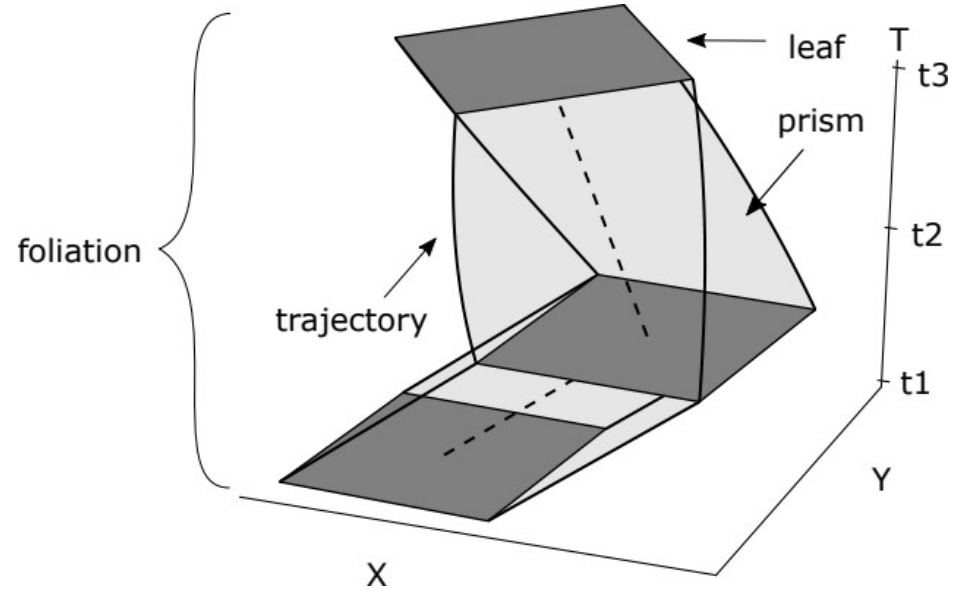
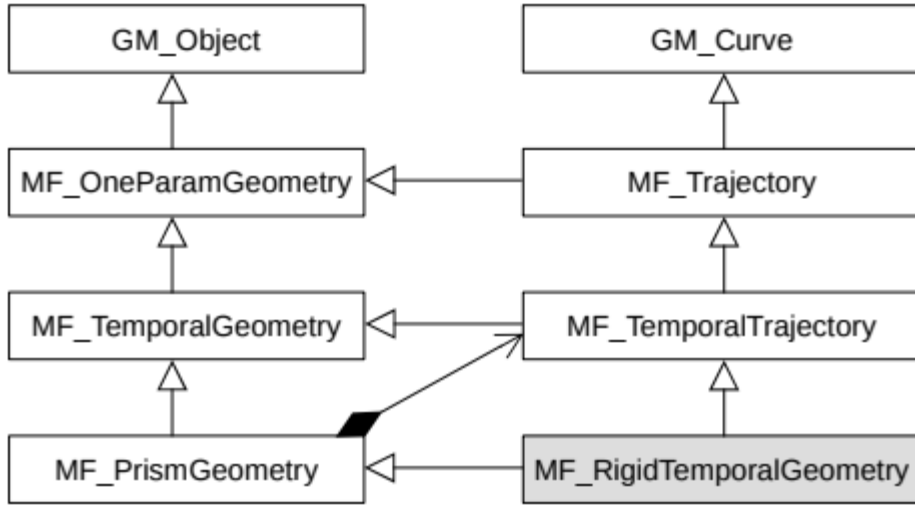


- Geometry
- Geography



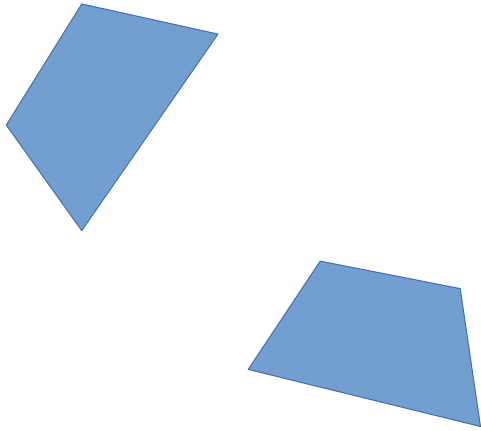
- Tgeompoint
- Tgeogpoint
- Tint
- Tfloat
- Ttext
- Tbool

# Rigid Temporal Geometries

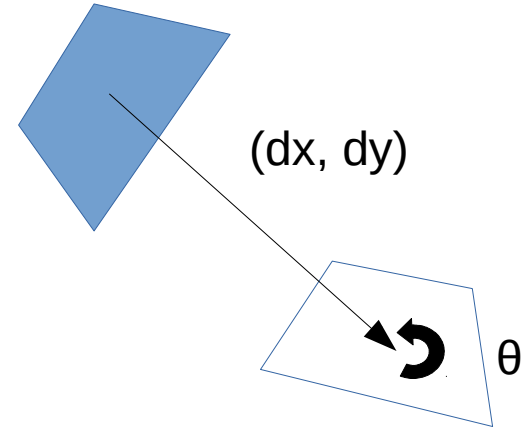


# Data Model

$(G_0@t_0, G_1@t_1, \dots, G_n@t_n)$



$(G_0@t_0, T_1@t_1, \dots, T_n@t_n)$

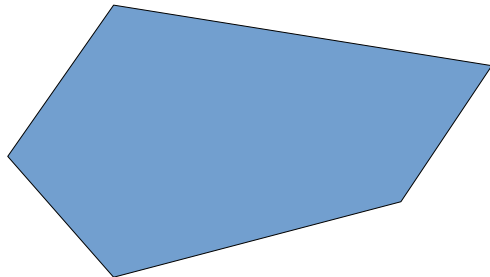


# Data Model

## 2D Geometries

$(dx, dy, \theta)$

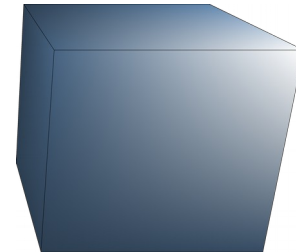
- Polygon
- 2D Translation
- 1 Rotation Angle



## 3D Geometries

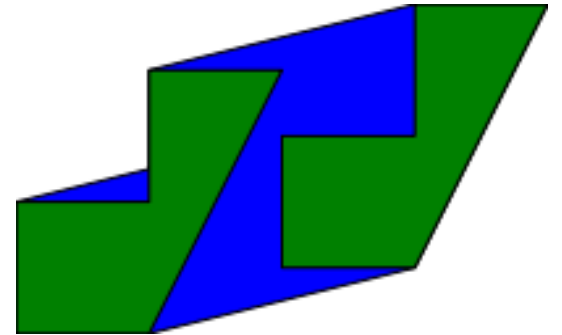
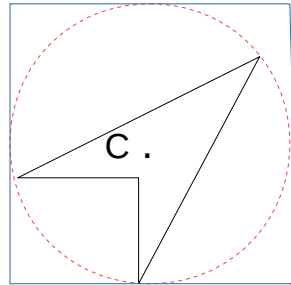
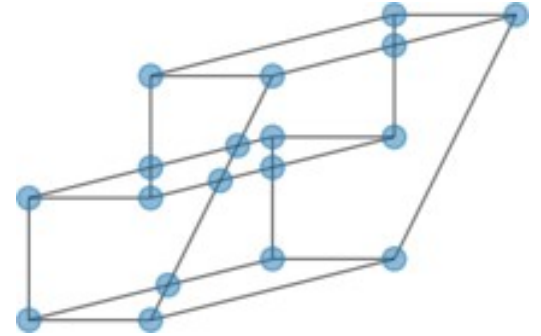
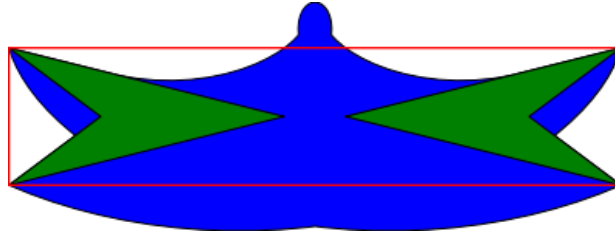
$(dx, dy, dz, W, X, Y, Z)$

- Polyhedron
- 3D Translation
- 1 Rotation Quaternion



# Data Management Algorithms

- Encoder
- Decoder
- Linear Interpolation
- Bounding Box
- Normalization
- Traversed Area



# Standard Operations

## ISO 19141

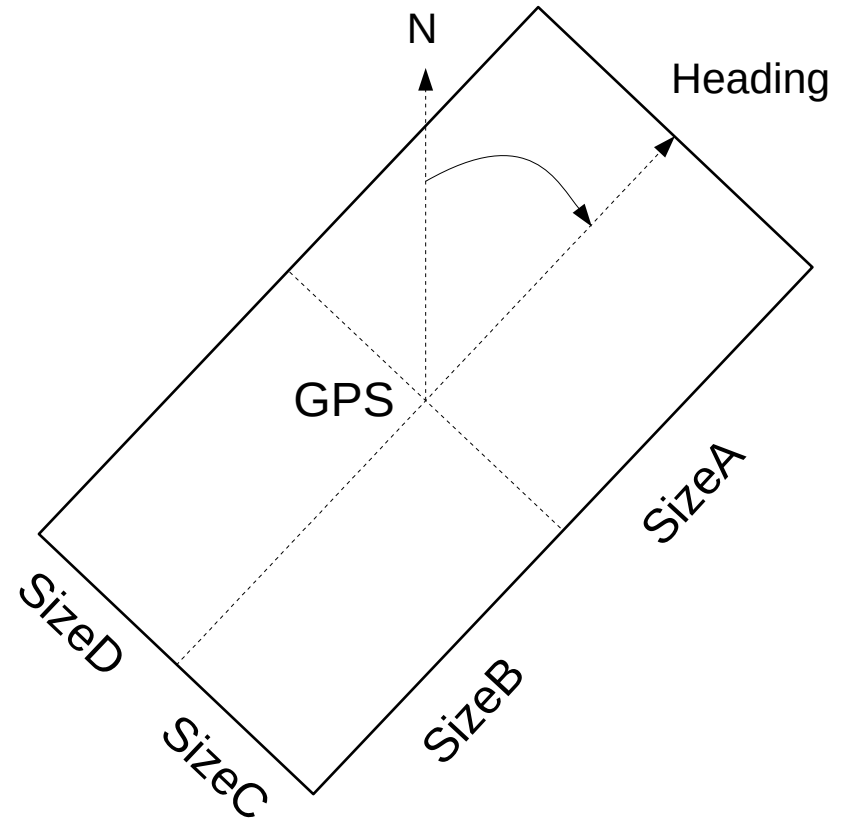
- GeometryAtTime
- Trajectory
- StartTime
- EndTime
- NearestApproach
- Intersection
- RotationAtTime

## MobilityDB

- valueAtTimestamp
- trajectory
- startTimestamp
- endTimestamp
- nearestApproachDistance
- N/A
- angleAtTimestamp /  
quaternionAtTimestamp

# Use Case with AIS Data

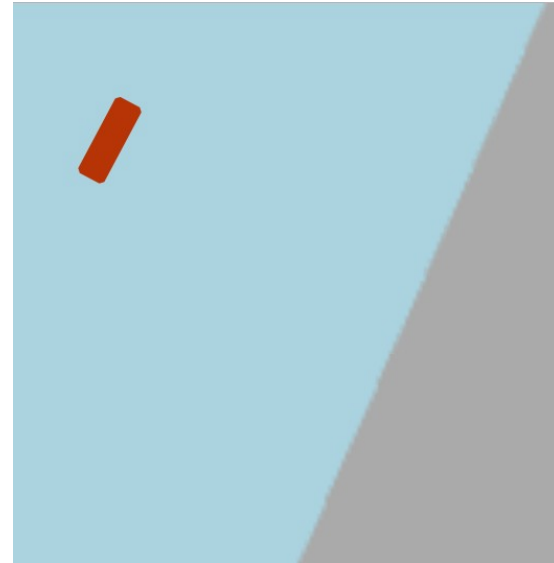
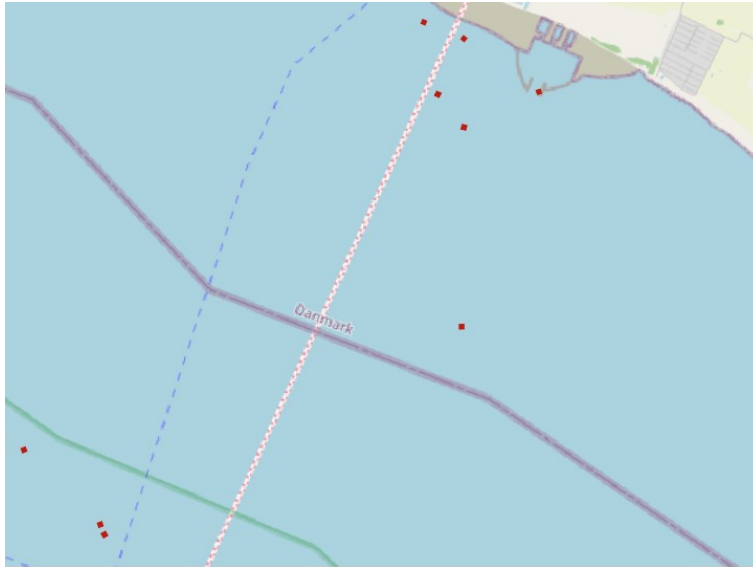
T	Timestamp from the AIS base station
MMSI	Maritime Mobile Service Identity (id of the vessel)
x	X coordinate of the GPS
y	Y coordinate of the GPS
heading	Heading of the vessel (in {0, . . . , 359})
sizea	Length from the GPS to the bow
sizeb	Length from the GPS to the stern
sizec	Length from the GPS to the starboard side
sized	Length from the GPS to the port side





# Use Case with AIS Data

Data Type	Loading Time	Table Size
Temporal Point	51 Seconds	300 MB
Temporal Polygon	2 Minutes 27 Seconds	208 MB



Thank you for listening !

Questions?

