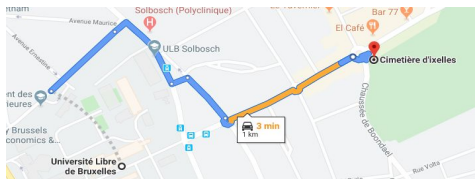


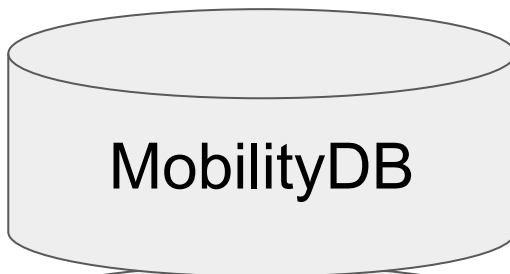


A Moving Feature Data Generator in MobilityDB

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MobilityDB: Architecture





MobilityDB

tgeompoint, tgeogpoint,
tint, tfloat, ttext, tbool



PostGIS

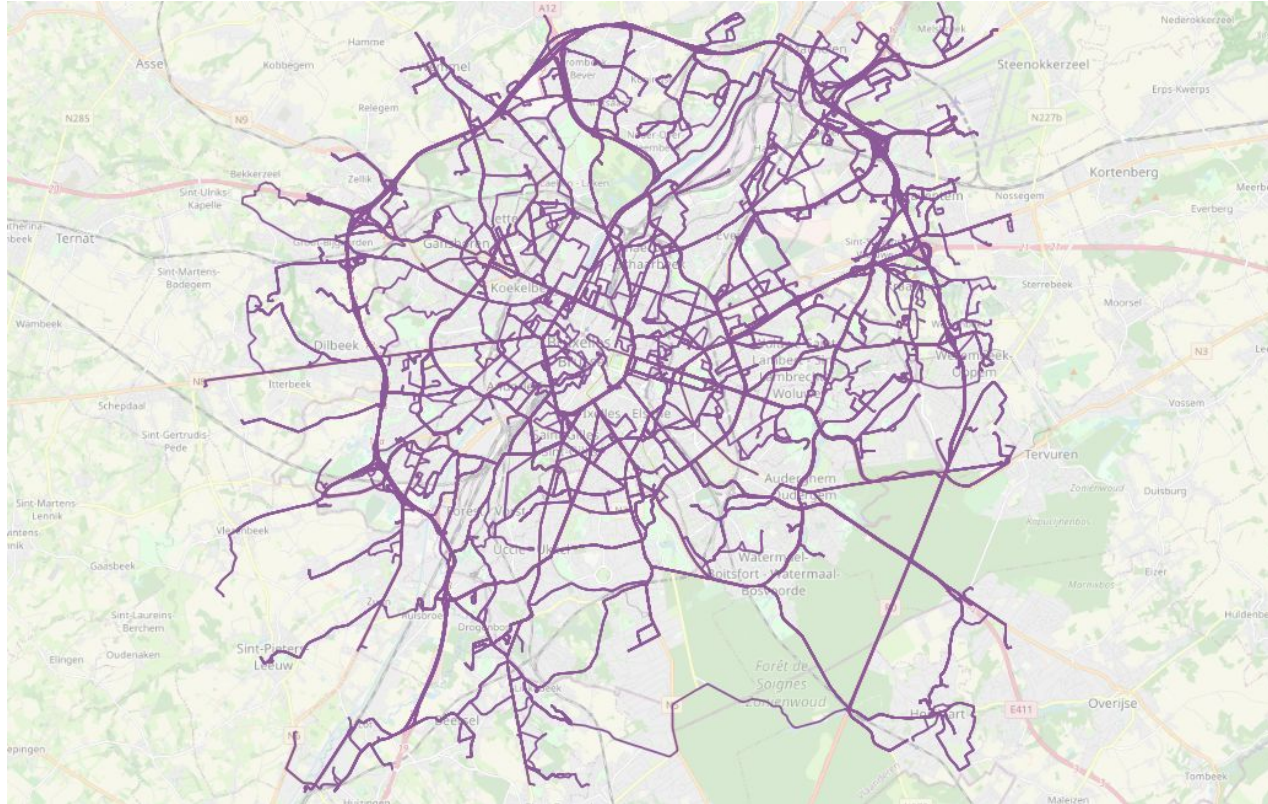
geometry, geography

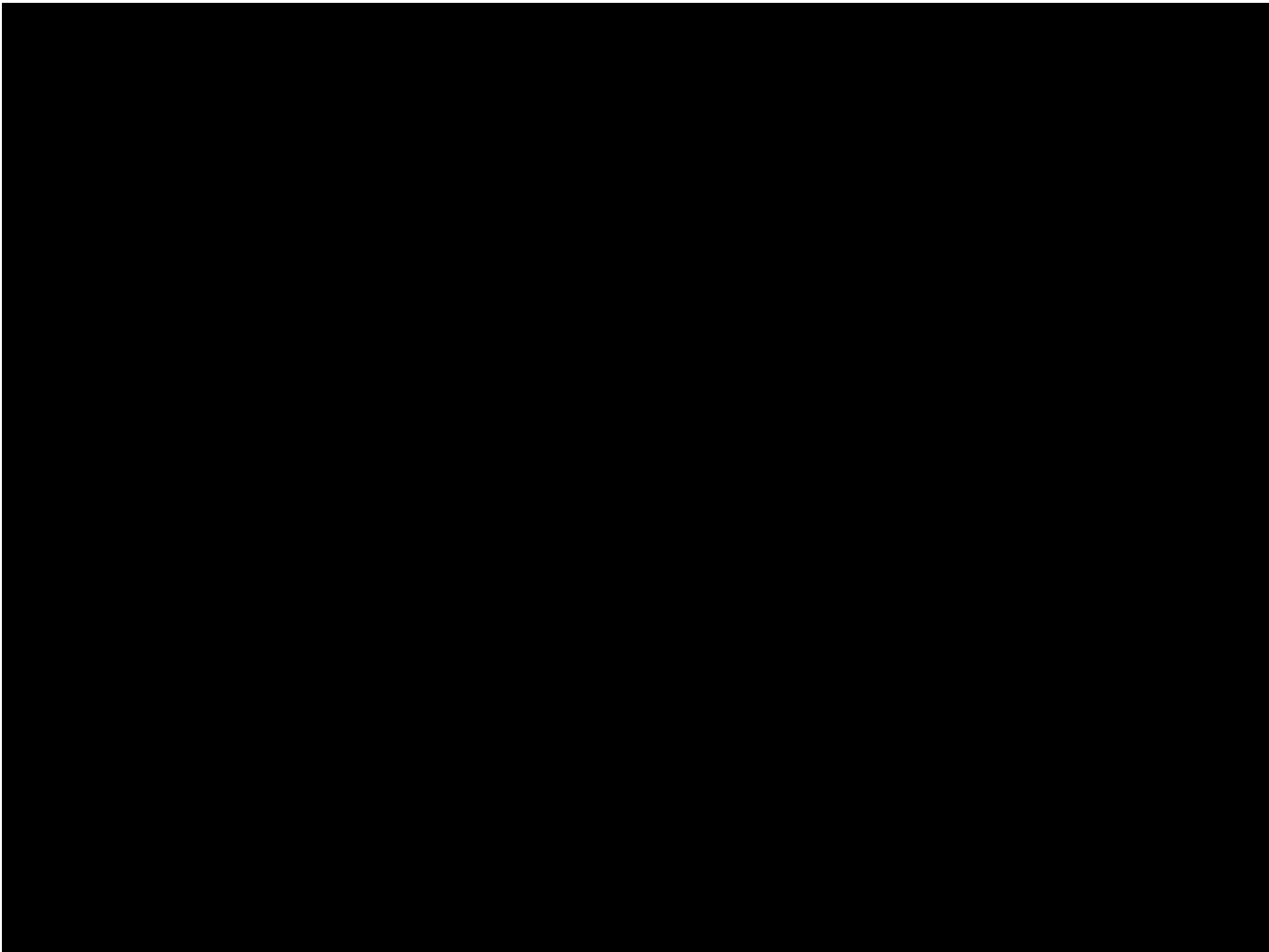


PostgreSQL

numeric, monetary, character,
data/time, boolean, enum,
arrays, range,
XML, JSON, ...

BerlinMOD Data Generator





Running The BerlinMOD Generator

1. Download MobilityDB docker image
<https://github.com/ULB-CoDE-WIT/MobilityDB>
2. CREATE DATABASE
3. CREATE EXTENSION MobilityDB CASCADE;
4. CREATE EXTENSION pgRouting;
5. Add the street map to the database, PostGIS
6. `psql -d brussels -f brussels_preparedata.sql`
7. `psql -d brussels -f berlinmod_datagenerator_batch.sql`
8. `psql -d brussels`
`-c 'select berlinmod_generate(scaleFactor := 0.005)'`

Exporting The Generated Moving Features

MF-CSV

@stboundedby,urn:ogc:def:crs:EPSG::3857,2D,469840 6577282.5,501087.90 6607599.5,
2020-06-01 08:00:33.061+02 2020-06-05 02:23:26.389336+02,absolute

@columns,mfidref,trajectory,source,xsd:integer,target,xsd:integer

@foliation,Sequential

1 2020-06-01 1,2020-06-01 09:16:30.978+02,2020-06-01 09:16:32.478+02,
478314.07,6588603.79,478310.99,6588607.73,16292,33901

1 2020-06-01 1,2020-06-01 09:16:32.478+02,2020-06-01 09:16:35.178+02,
478310.99,6588607.73,478301.75,6588619.54,16292,33901

1 2020-06-01 1,2020-06-01 09:16:35.178+02,2020-06-01 09:16:37.860192+02,
478301.75,6588619.54,478299.24,6588622.76,16292,33901

...

MF-CSV

- Possible to add temporal gaps
- Big-sized, redundant format t1, t2, pos1, pos2
- Single @stboundedby ? Is it possible to do to have one per object ?
- Only one id column. Composite ids ?
- No temporal attributes
- (Interpolation= none) cannot be represented

Why Temporal Gaps Are Important

- The non-stop parts of the moving feature
- The highway parts of the trip
- Missing signal (tunnel)

MF-XML

```
-<mf:MovingFeatures xsi:schemaLocation="http://www.opengis.net/movingfeatures/1.0/mf-xmlcore.xsd" xmlns:mf="http://schemas.opengis.net/movingfeatures/1.0/mf-xmlcore.xsd" >  
  +<mf:sTBoundedBy offset="absolute"></mf:sTBoundedBy>  
  +<mf:member></mf:member>  
  +<mf:member></mf:member>  
  +<mf:member></mf:member>  
  +<mf:member></mf:member>  
  +<mf:member></mf:member>  
  +<mf:foliation></mf:foliation>  
  +<mf:foliation></mf:foliation>  
  +<mf:foliation></mf:foliation>  
  +<mf:foliation></mf:foliation>  
  +<mf:foliation></mf:foliation>  
</mf:MovingFeatures>
```

MF-XML

- Possible to add temporal gaps
- Interpolation none can be represented
- Big-sized, redundant format t1, t2, pos1, pos2
- Temporal attributes share the same time partitioning of trajectory
- Only one id column. Composite ids ?
- (Interpolation= none) cannot be represented
- Misc: Foliation has a confusing meaning !

MF-JSON

```
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "temporalGeometry": {
        "type": "MovingGeometryCollection",
        "prisms": [
          {
            "type": "MovingPoint",
            "datetimes": [],
            "coordinates": [],
            "interpolation": ""
          },
          {
            "type": "MovingPoint",
            "datetimes": [],
            "coordinates": [],
            "interpolation": ""
          }
        ]
      }
    }
  ]
}
```

MF-JSON

- Possible to add temporal gaps
- Interpolation none can be represented
- Compact-sized
- Temporal attributes are independent from temporal geometry
- Multiple ways to represent the same thing
- Only one id column. Composite ids ?
- No explicit way to encode temporal gaps. Workaround is needed

File Size

Original Data	MF-CSV	MF-XML	MF-JSON
78 MB 1.5 k 1700 trip	300 MB (4x), 55 MB zip 2M rows	500 MB (6.5x), 62 MB zip 4M XML tags	122 MB (1.5x), 40 MB zip 20K JSON tags

Summary Assessment

- Only MovingPoint has been assessed
- The three exchange formats have different concepts
- JSON is the most compact and expressive
- Considerable effort to read and implement
- CSV and XML are excessively big
- JSON leaves room for own interpretations

Thanks for listening !

Questions ?

