
django-vectortiles

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INSTALLATION

1.1 Requirements

- You need to install geodjango required libraries (See [here](#))

1.2 PostGIS 2.4+ backend usage

- You need a PostgreSQL database with PostGIS 2.4+ extension enabled. (See <https://docs.djangoproject.com/en/stable/ref/contrib/gis/install/postgis/>)
- You need to enable and use **django.contrib.gis.db.backends.postgis** database backend

```
pip install psycopg2
pip install django-vectortiles
```

1.3 Other database backend usages

```
pip install django-vectortiles[mapbox]
```

This will include sub-dependencies to generate vector tiles from mapbox_vector_tiles python library.

2.1 Simple model view

```
# in your app models.py
from django.contrib.gis.db import models

class Feature(models.Model):
    geom = models.GeometryField(srid=4326)
    name = models.CharField(max_length=250)

# in your view file
from django.views.generic import ListView
from vectortiles.postgis.views import MVTView
from yourapp.models import Feature

class FeatureTileView(MVTView, ListView):
    model = Feature
    vector_tile_layer_name = "features" # name for data layer in vector tile
    vector_tile_fields = ('name',) # model fields or queryset annotates to include in_
    ↪tile
    # vector_tile_content_type = "application/x-protobuf" # if you want to use custom_
    ↪content_type
    # vector_tile_queryset = None # define a queryset for your features
    # vector_tile_queryset_limit = None # as queryset could not be sliced, set here a_
    ↪limit for your features per tile
    # vector_tile_geom_name = "geom" # geom field to consider in qs
    # vector_tile_extent = 4096 # tile extent
    # vector_tile_buffer = 256 # buffer around tile

# in your urls file
from django.urls import path
from yourapp import views

urlpatterns = [
    ...
    path('tiles/<int:z>/<int:x>/<int:y>', views.FeatureTileView.as_view(), name="feature-
    ↪tile"),
    ...
]
```

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2.2 Related model view

```

# in your app models.py
from django.contrib.gis.db import models

class Layer(models.Model):
    name = models.CharField(max_length=250)

class Feature(models.Model):
    geom = models.GeometryField(srid=4326)
    name = models.CharField(max_length=250)
    layer = models.ForeignKey(Layer, on_delete=models.CASCADE, related_name='features')

# in your views.py file
from django.views.generic import DetailView
from vectortiles.mixins import BaseVectorTileView
from vectortiles.postgis.views import MVTView
from yourapp.models import Layer

class LayerTileView(MVTView, DetailView):
    model = Layer
    vector_tile_fields = ('name', )

    def get_vector_tile_layer_name(self):
        return self.get_object().name

    def get_vector_tile_queryset(self):
        return self.get_object().features.all()

    def get(self, request, *args, **kwargs):
        self.object = self.get_object()
        return BaseVectorTileView.get(self, request=request, z=kwargs.get('z'), x=kwargs.get('x'), y=kwargs.get('y'))

# in your urls file
from django.urls import path
from yourapp import views

urlpatterns = [
    ...
    path('layer/<int:pk>/tile/<int:z>/<int:x>/<int:y>', views.LayerTileView.as_view(),
    name="layer-tile"),
    ...

```

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2.3 Django Rest Framework

```
# in your views.py file
from vectortiles.rest_framework.renderers import MVTRenderer

class FeatureAPIView(BaseVectorTile, APIView):
    vector_tile_queryset = Feature.objects.all()
    vector_tile_layer_name = "features"
    vector_tile_fields = ('name', )
    vector_tile_queryset_limit = 100
    renderer_classes = (MVTRenderer, )

    def get(self, request, *args, **kwargs):
        return Response(self.get_tile(kwargs.get('x'), kwargs.get('y'), kwargs.get('z')))

# in your urls file
urlpatterns = [
    ...
    path('features/tiles/<int:z>/<int:x>/<int:y>', FeatureAPIView.as_view(),
        name="feature-tile-drf"),
    ...
]

# or extending viewset

class FeatureViewSet(BaseVectorTile, viewsets.ModelViewSet):
    queryset = Feature.objects.all()
    vector_tile_layer_name = "features"
    vector_tile_fields = ('name', )
    vector_tile_queryset_limit = 100

    @action(detail=False, methods=['get'], renderer_classes=(MVTRenderer, ),
            url_path='tiles/(?P<z>\d+)/(?P<x>\d+)/(?P<y>\d+)', url_name='tile')
    def tile(self, request, *args, **kwargs):
        return Response(self.get_tile(x=int(kwargs.get('x')), y=int(kwargs.get('y')),
        ↪z=int(kwargs.get('z'))))

# in your urls file
router = SimpleRouter()
router.register(r'features', FeatureViewSet, basename='features')

urlpatterns += router.urls
```

then use <http://your-domain/features/tiles/{z}/{x}/{y}.pbf>

2.4 MapLibre Example

```

<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport"
    content="width=device-width, user-scalable=no, initial-scale=1.0, maximum-
    ↪scale=1.0, minimum-scale=1.0">
  <meta http-equiv="X-UA-Compatible" content="ie=edge">
  <title>MapBox / MapLibre example</title>
  <style>
    html, body {
      margin: 0;
      padding: 0;
    }
  </style>
  <link href='https://unpkg.com/maplibre-gl@2.4.0/dist/maplibre-gl.css' rel='stylesheet
  ↪' />
  {# <link href='https://watergis.github.io/maplibre-gl-legend/maplibre-gl-legend.
  ↪css' rel='stylesheet' />#}

</head>
<body>
<div id="map" style="width: 100%; height: 100vh"><div>
<script src='https://unpkg.com/maplibre-gl@2.4.0/dist/maplibre-gl.js'></script>
{#<script src="https://watergis.github.io/maplibre-gl-legend/maplibre-gl-legend.js"></
  ↪script>#}

<script>
  var map = new maplibregl.Map({
    container: 'map',
    hash: true,
    style: 'https://demotiles.maplibre.org/style.json', // stylesheet location
    center: [1.77, 44.498], // starting position [lng, lat]
    zoom: 8 // starting zoom
  });
  var nav = new maplibregl.NavigationControl({visualizePitch: true});
  map.addControl(nav, 'top-right');
  var scale = new maplibregl.ScaleControl({
    maxWidth: 80,
    unit: 'metric'
  });
  map.addControl(scale);
  map.on('load', function () {
    map.addSource('layers', {
      'type': 'vector',
      'url': '{% url "layer-tilejson" %}'
    });
    map.addLayer(
      {
        'id': 'background2',

```

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```

        'type': 'background',
        'paint': {
            'background-color': '#F8F4F0',
        }
    }
);

map.addLayer(
    {
        'id': 'foret_publique',
        'type': 'fill',
        'filter': ['==', ['geometry-type'], 'Polygon'],
        'source': 'layers',
        'source-layer': 'foret_publique',
        'paint': {
            'fill-color': '#64b646',
            'fill-opacity': 0.1
        }
    }
);

map.addLayer(
    {
        'id': 'parc_ou_reserve',
        'type': 'fill',
        'filter': ['==', ['geometry-type'], 'Polygon'],
        'source': 'layers',
        'source-layer': 'parc_ou_reserve',
        'paint': {
            'fill-color': '#64b646',
            'fill-opacity': 0.1
        }
    }
);

map.addLayer(
    {
        'id': 'troncon_hydrographique',
        'type': 'line',
        'source': 'layers',
        'source-layer': 'troncon_hydrographique',
        'paint': {
            'line-color': '#A7D4E8',
        }
    }
);

map.addLayer(
    {
        'id': 'surface_hydrographique',

```

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```

        'type': 'fill',
        'filter': ['==', ['geometry-type'], 'Polygon'],
        'source': 'layers',
        'source-layer': 'surface_hydrographique',
        'paint': {
            'fill-color': '#A7D4E8',
            'fill-opacity': 1
        }
    }
};
map.addLayer(
    {
        'id': 'troncon_de_voie_ferree',
        'type': 'line',
        'source': 'layers',
        'source-layer': 'troncon_de_voie_ferree',
        "filter": [
            "all",
            ["==", "$type", "LineString"],
            ["!=", "nature", "Voie de service"],
        ],
        "paint": {
            "line-color": "#bbb",
            "line-width": {"base": 1.4, "stops": [[14, 0.4], [15, 0.75], [20, 1.5],
↪2]]}
        }
    }
);
map.addLayer(
    {
        'id': 'troncon_de_voie_ferree_hatching',
        'type': 'line',
        'source': 'layers',
        'source-layer': 'troncon_de_voie_ferree',
        "filter": [
            "all",
            ["==", "$type", "LineString"],
            ["!=", "nature", "Voie de service"],
        ],
        "paint": {
            "line-color": "#bbb",
            "line-dasharray": [0.2, 8],
            "line-width": {"base": 1.4, "stops": [[14.5, 0], [15, 3], [20, 8]]}
        }
    }
);
map.addLayer(
    {
        'id': 'troncon_de_voie_ferree_service',

```

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        'type': 'line',
        'source': 'layers',
        'source-layer': 'troncon_de_voie_ferree',
        "filter": [
            "all",
            ["==", "$type", "LineString"],
            ["==", "nature", "Voie de service"],
        ],
        "paint": {
            "line-color": "hsla(0, 0%, 73%, 0.77)",
            "line-width": {"base": 1.4, "stops": [[14, 0.4], [20, 1]]}
        }
    }
);
map.addLayer(
    {
        'id': 'troncon_de_voie_ferree__service_hatching',
        'type': 'line',
        'source': 'layers',
        'source-layer': 'troncon_de_voie_ferree',
        "filter": [
            "all",
            ["==", "$type", "LineString"],
            ["==", "nature", "Voie de service"],
        ],
        "paint": {
            "line-color": "hsla(0, 0%, 73%, 0.68)",
            "line-dasharray": [0.2, 8],
            "line-width": {"base": 1.4, "stops": [[14.5, 0], [15, 2], [20, 6]]}
        }
    }
);
map.addLayer(
    {
        'id': 'troncon_de_route',
        'type': 'line',
        'source': 'layers',
        'source-layer': 'troncon_de_route',
        "filter": [
            "all",
            ["==", "$type", "LineString"],
            ["!=", "nature", "Type autoroutier"],
            ["!=", "nature", "Bretelle"],
        ],
        'layout': {
            'line-cap': 'round',
            'line-join': 'round'
        },
        'paint': {
            'line-opacity': 1,

```

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```

        'line-color': ['match', ['get', 'nature'], // get the property
            'Type autoroutier', '#FF0000', // if 'GP' then yellow
            'XX', 'black', // if 'XX' then black
            'white'],
        'line-width': {"base": 1.2, "stops": [[13.5, 0], [14, 2.5], [20, 11.
→5]]}
    }
}
);
map.addLayer(
{
    'id': 'autoroute',
    'type': 'line',
    'source': 'layers',
    'source-layer': 'troncon_de_route',
    "filter": [
        "all",
        ["==", "$type", "LineString"],
        ["==", "nature", "Type autoroutier"],
    ],
    'layout': {
        'line-cap': 'round',
        'line-join': 'round'
    },
    'paint': {
        'line-opacity': 1,
        'line-color': '#fc8',
        'line-width': {"base": 1.2, "stops": [[6.5, 0], [7, 0.5], [20, 18]]}
    }
}
);
map.addLayer(
{
    'id': 'autoroute_bretelles',
    'type': 'line',
    'source': 'layers',
    'source-layer': 'troncon_de_route',
    "filter": [
        "all",
        ["==", "$type", "LineString"],
        ["==", "nature", "Bretelle"],
    ],
    "layout": {"line-cap": "round", "line-join": "round"},
    "paint": {
        "line-color": "#fc8",
        "line-width": {
            "base": 1.2,
            "stops": [[12.5, 0], [13, 1.5], [14, 2.5], [20, 11.5]]
        }
    }
}
);

```

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```

map.addLayer(
  {
    'id': 'terrain_de_sport',
    'type': 'fill',
    'filter': ['==', ['geometry-type'], 'Polygon'],
    'source': 'layers',
    'source-layer': 'terrain_de_sport',
    'paint': {
      'fill-color': '#E0EDD8',
      'fill-opacity': 1
    }
  }
);
map.addLayer(
  {
    'id': 'batiment',
    'type': 'fill',
    maxzoom: 16,
    'filter': ['==', ['geometry-type'], 'Polygon'],
    'source': 'layers',
    'source-layer': 'batiment',
    'paint': {
      'fill-color': '#F1EAD8',
      'fill-opacity': 0.8
    }
  }
);
map.addLayer(
  {
    'id': 'batiment-contours',
    'type': 'line',
    minzoom: 14,
    maxzoom: 16,
    'filter': ['==', ['geometry-type'], 'Polygon'],
    'source': 'layers',
    'source-layer': 'batiment',
    'layout': {
      'line-cap': 'round',
      'line-join': 'round'
    },
    'paint': {
      'line-opacity': 0.8,
      'line-color': '#D6C3AC',
      'line-width': 2,
    }
  }
);
map.addLayer(
  {

```

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```

        'id': 'batiment-3D',
        'filter': ['==', ['geometry-type'], 'Polygon'],
        minzoom: 16,
        'source': 'layers',
        'source-layer': 'batiment',
        'type': 'fill-extrusion',
        'paint': {
            'fill-extrusion-color': '#F1EAD8',

            // Use an 'interpolate' expression to
            // add a smooth transition effect to
            // the buildings as the user zooms in.
            'fill-extrusion-height': [
                'interpolate',
                ['linear'],
                ['zoom'],
                15,
                0,
                15.05,
                ['get', 'hauteur']
            ],
            'fill-extrusion-base': [
                'interpolate',
                ['linear'],
                ['zoom'],
                15,
                0,
                15.05,
                2.5
            ],
            'fill-extrusion-opacity': 0.6
        }
    }
);

map.addLayer(
{
    'id': 'commune',
    'type': 'line',
    'filter': ['==', ['geometry-type'], 'Polygon'],
    'source': 'layers',
    'source-layer': 'commune',
    'layout': {
        'line-cap': 'round',
        'line-join': 'round'
    },
    'paint': {
        'line-opacity': 0.4,
        'line-color': '#3636a8',
        'line-width': 0.5,
        'line-dasharray': [10, 10]
    }
}

```

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```

    }
  );
  map.addLayer(
    {
      'id': 'departement',
      'type': 'line',
      'filter': ['==', ['geometry-type'], 'Polygon'],
      'source': 'layers',
      'source-layer': 'departement',
      'layout': {
        'line-cap': 'round',
        'line-join': 'round'
      },
      'paint': {
        'line-opacity': 0.8,
        'line-color': '#479c47',
        'line-width': 0.8
      }
    }
  );
  map.addLayer(
    {
      'id': 'region',
      'type': 'line',
      'filter': ['==', ['geometry-type'], 'Polygon'],
      'source': 'layers',
      'source-layer': 'region',
      'layout': {
        'line-cap': 'round',
        'line-join': 'round'
      },
      'paint': {
        'line-opacity': 0.9,
        'line-color': '#b12929',
        'line-width': 1
      }
    }
  );
  map.addLayer(
    {
      "id": "commune_border",
      "type": "symbol",
      "source": "layers",
      "source-layer": "commune",
      "minzoom": 13,
      "layout": {
        "symbol-placement": "line",
        "symbol-spacing": 350,
        "text-field": "{nom}",

```

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```

        "text-font": ["Noto Sans Italic"],
        "text-letter-spacing": 0.2,
        "text-max-width": 5,
        "text-rotation-alignment": "map",
        "text-size": 10
    },
    "paint": {
        "text-color": "#3636a8",
        "text-halo-color": "rgba(255,255,255,0.7)",
        "text-halo-width": 1
    }
}
);
map.addLayer(
{
    "id": "commune_nom",
    "type": "symbol",
    "source": "layers",
    "source-layer": "commune_centre",
    "minzoom": 10,
    "maxzoom": 12,
    "layout": {
        "symbol-placement": "point",
        "symbol-spacing": 350,
        "text-field": "{nom}",
        "text-font": ["Noto Sans Italic"],
        "text-letter-spacing": 0.2,
        "text-max-width": 5,
        "text-rotation-alignment": "map",
        "text-size": 14
    },
    "paint": {
        "text-color": "#3636a8",
        "text-halo-color": "rgba(255,255,255,0.7)",
        "text-halo-width": 1.5
    }
}
);
map.addLayer(
{
    "id": "eau_nom",
    "type": "symbol",
    "source": "layers",
    "source-layer": "troncon_hydrographique",
    "minzoom": 13,
    "layout": {
        "symbol-placement": "line",
        "symbol-spacing": 350,
        "text-field": "{nom}",
        "text-font": ["Noto Sans Italic"],
        "text-letter-spacing": 0.2,
        "text-max-width": 5,

```

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```

        "text-rotation-alignment": "map",
        "text-size": 14
    },
    "paint": {
        "text-color": "#74aee9",
        "text-halo-color": "rgba(255,255,255,0.7)",
        "text-halo-width": 1.5
    }
}
);
// Create a popup, but don't add it to the map yet.
var popup = new maplibregl.Popup({
    closeButton: false,
    closeOnClick: false
});

map.on('mouseenter', 'commune_nom', function (e) {
    // Change the cursor style as a UI indicator.
    map.getCanvas().style.cursor = 'pointer';
    console.log(e.features);
    var coordinates = e.features[0].geometry.coordinates.slice();
    var description = `${e.features[0].properties.nom} (${e.features[0].
↪properties.population} hab.)`;

    // Ensure that if the map is zoomed out such that multiple
    // copies of the feature are visible, the popup appears
    // over the copy being pointed to.
    while (Math.abs(e.lngLat.lng - coordinates[0]) > 180) {
        coordinates[0] += e.lngLat.lng > coordinates[0] ? 360 : -360;
    }

    // Populate the popup and set its coordinates
    // based on the feature found.
    popup.setLngLat(coordinates).setHTML(description).addTo(map);
});

map.on('mouseleave', 'city-centroid', function () {
    map.getCanvas().style.cursor = '';
    popup.remove();
});
}
);
</script>
</body>
</html>

```


CHANGELOG

3.1 1.0.0.a1

**** Breaking changes ****

- Refactor PostGIS and Python (old named MapBox) backends usage. Use setting to set (default postgis)
- No DetailView anymore. As Tile can have many layers, declare VectorLayer on MTVView (one or many).
- Features
 - Native MVTRenderer for django-rest-framework
- Quality
 - Black-ified
 - iSort-ed
- Documentation
 - Add DRF and MapLibre examples

3.2 0.2.0 (2022-10-17)

- Possibly breaking change: * Base Mixin method get_tile use now class attributes for extent / buffer or clip_geom. Remove this parameters in your sub class method if needed.
- Bug fixes: * Correct usage for vector_tile_extent / vector_tile_buffer and vector_tile_clip_geom * Clipped geom is now working for mapbox
- Support Python 3.10 and django 4.1

3.3 0.1.0 (2021-02-25)

First beta release

- Add attribute to limit features in tile (unable to use a sliced queryset)

3.4 0.0.3 (2021-02-18)

- Delete useless Envelope transformation because django implicitly transform on intersects lookup (thanks to StefanBrand)
- Avoid useless queryset evaluation in some cases (thanks to StefanBrand)

3.5 0.0.2 (2021-02-12)

- Fix required 'fields' key in tilejson. Will be filled later
- Fix generated subquery to deal with DateField (thanks to StefanBrand)

3.6 0.0.1 (2020-10-22)

First Release

- **Generate Vector Tiles from django models**
 - in python
 - with PostGIS
- Generate associated TileJSON
- Default views to handle Vector tiles and tilejson

INDICES AND TABLES

- `genindex`
- `modindex`
- `search`