

Spatial Optimisation

with OSRM and R

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Exegetic Analytics
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What can I see in Toulouse?

Within different time intervals?

With my running shoes on?



Building OSRM

```
# First make sure that you have the necessary infrastructure.  
sudo apt update  
sudo apt install -y git cmake build-essential jq htop  
sudo apt install -y liblua5.2-dev libboost-all-dev \  
    libprotobuf-dev libtbb-dev \  
    libstxxl-dev libbz2-dev  
  
# Grab the source directly from the repository on GitHub.  
git clone https://github.com/Project-OSRM/osrm-backend.git  
walking  
# Create a build folder and then run cmake to generate Makefiles.  
cd osrm-backend/  
mkdir build  
cd build/  
cmake ..  
  
# Next initiate the build. This will take some time!  
make  
  
# When the build completes, make the install target.  
sudo make install
```

Getting the OpenStreetMap Data

OpenStreetMap Edit History Export GPS Traces User Diaries Copyright Help About Log In Sign Up

Search Where is this? Go

Export

43.6293
1.3740
1.5037
43.5717

Manually select a different area

licence
OpenStreetMap data is licensed under the [Open Data Commons Open Database License \(ODbL\)](#).

Export

If the above export fails, please consider using one of the sources listed below:

Overpass API
Download this bounding box from a mirror of the OpenStreetMap database

Planet OSM
Regularly-updated copies of the complete OpenStreetMap database

Geofabrik Downloads
Regularly-updated extracts of continents, countries, and selected cities

Other Sources
Additional sources listed on the OpenStreetMap wiki

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Preparing the data

Extracting the map

- car
- bike
- foot

```
osrm-extract map.xml -p profiles/foot.lua
```



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Creating the hierarchy

```
osrm-contract map.xml.osrm
```

Launching the service

```
osrm-routed map.xml.osrm
```



How long and far to walk from here to the Capitole?

```
curl "http://127.0.0.1:5000/route/v1/walking/1.434562,43.611834;1.443372,43.604478" | jq

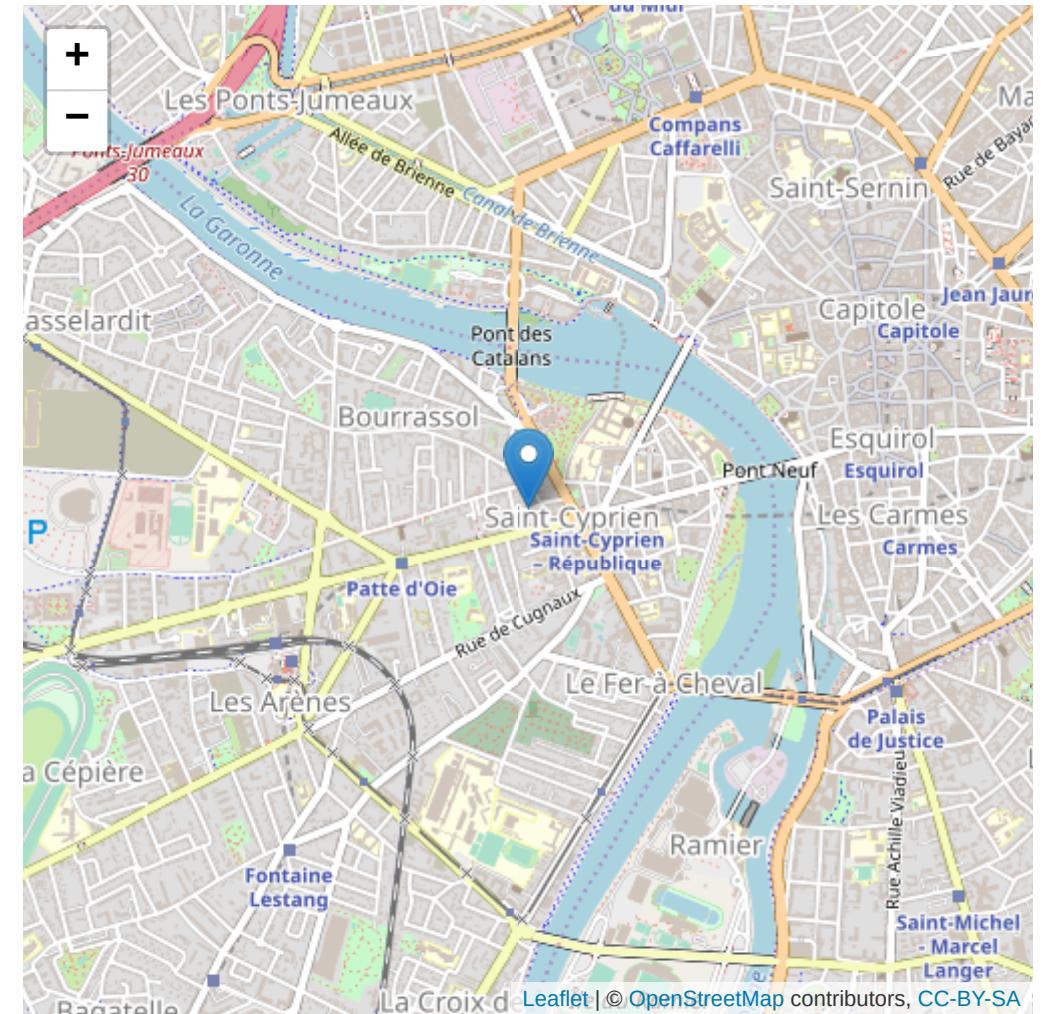
{
  "code": "Ok",
  "waypoints": [
    {
      "hint": "rF0BgK5dAYCwAQAA3AAAAAAAAAAAAA_25wQu2E80EAAAAAAAALABAADcAAAAAAAAABAAAxQ",
      "distance": 22.597897,
      "location": [
        1.43482,
        43.611913
      ],
      "name": "Esplanade Compans Caffarelli"
    },
    {
      "hint": "IxMAgNvgAIA9AQAAPQEAAAAAAA2VswQhh7L0IAAAAAAAAD0BAAA9AQAAAAAAAABAAAAkg",
      "distance": 33.50137,
      "location": [
        1.442962,
        43.604431
      ],
      "name": "Place du Capitole"
    }
  ]
}
```

How long and far to walk from here to the Capitole?

```
"routes": [
  {
    "legs": [
      {
        "steps": [],
        "weight": 824.4,
        "distance": 1142.2,
        "summary": "",
        "duration": 824.4
      }
    ],
    "weight_name": "duration",
    "geometry": "m}diGsfwGp@]_@gBrCyA|@Ah@_@jHiCxAmA|AsErAyBjAsCvN_R?o@lAO",
    "weight": 824.4,
    "distance": 1142.2,
    "duration": 824.4
  }
]
```

The osrm R package

```
install.packages('osrm')
```

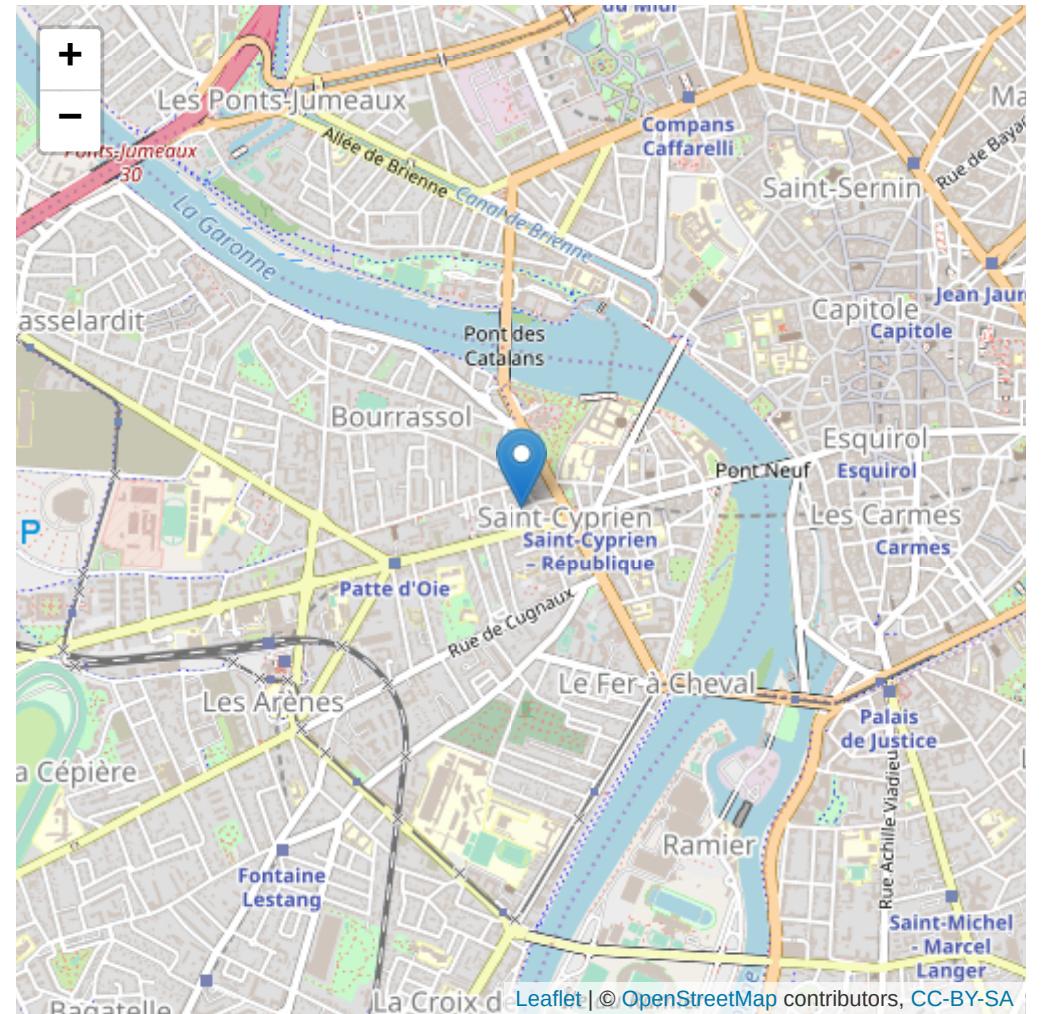


The osrm R package

```
install.packages('osrm')
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What can I see from my Airbnb with my running shoes on?

isochrone = a line connecting points relating to the same travel time.

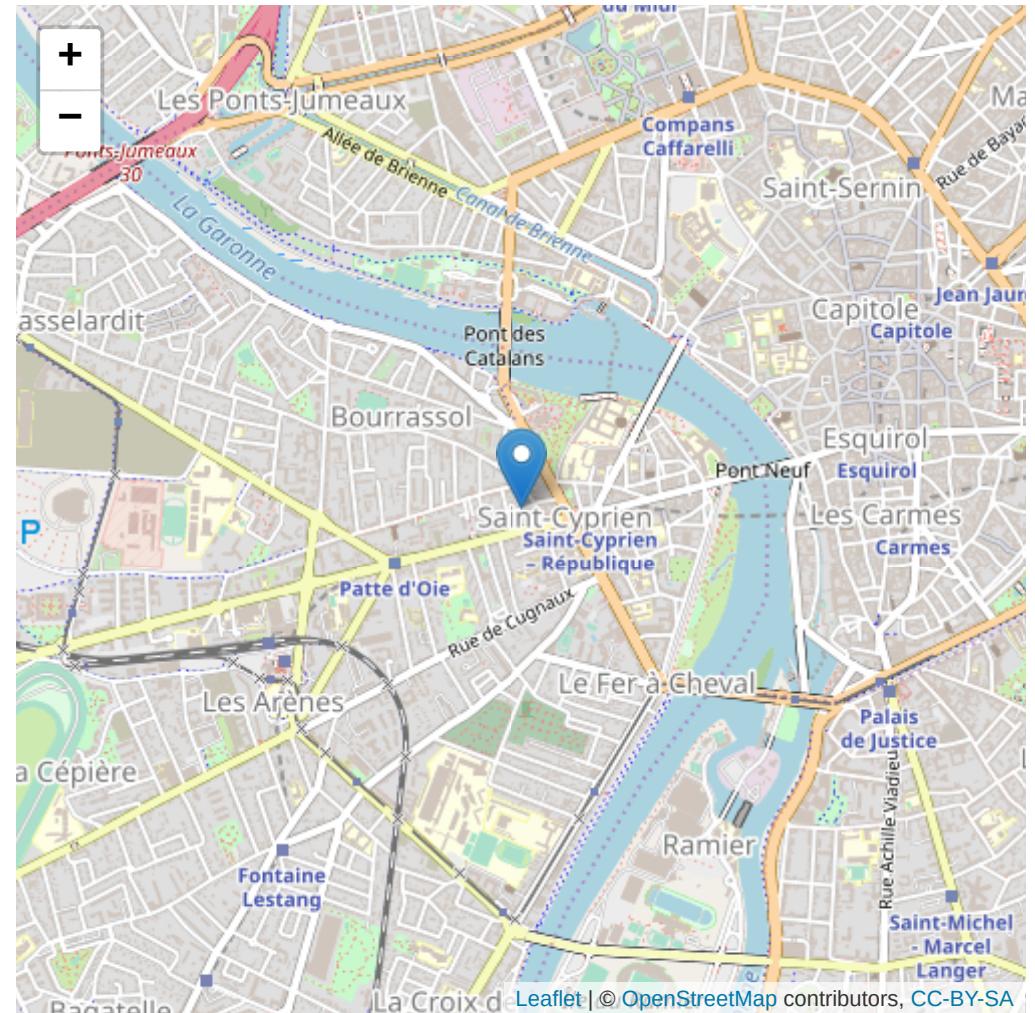


The osrm R package

```
install.packages('osrm')
```

What can I see from my Airbnb with my running shoes on?

isochrone = a line connecting points relating to the same travel time.



Running time isochrones to explore Toulouse

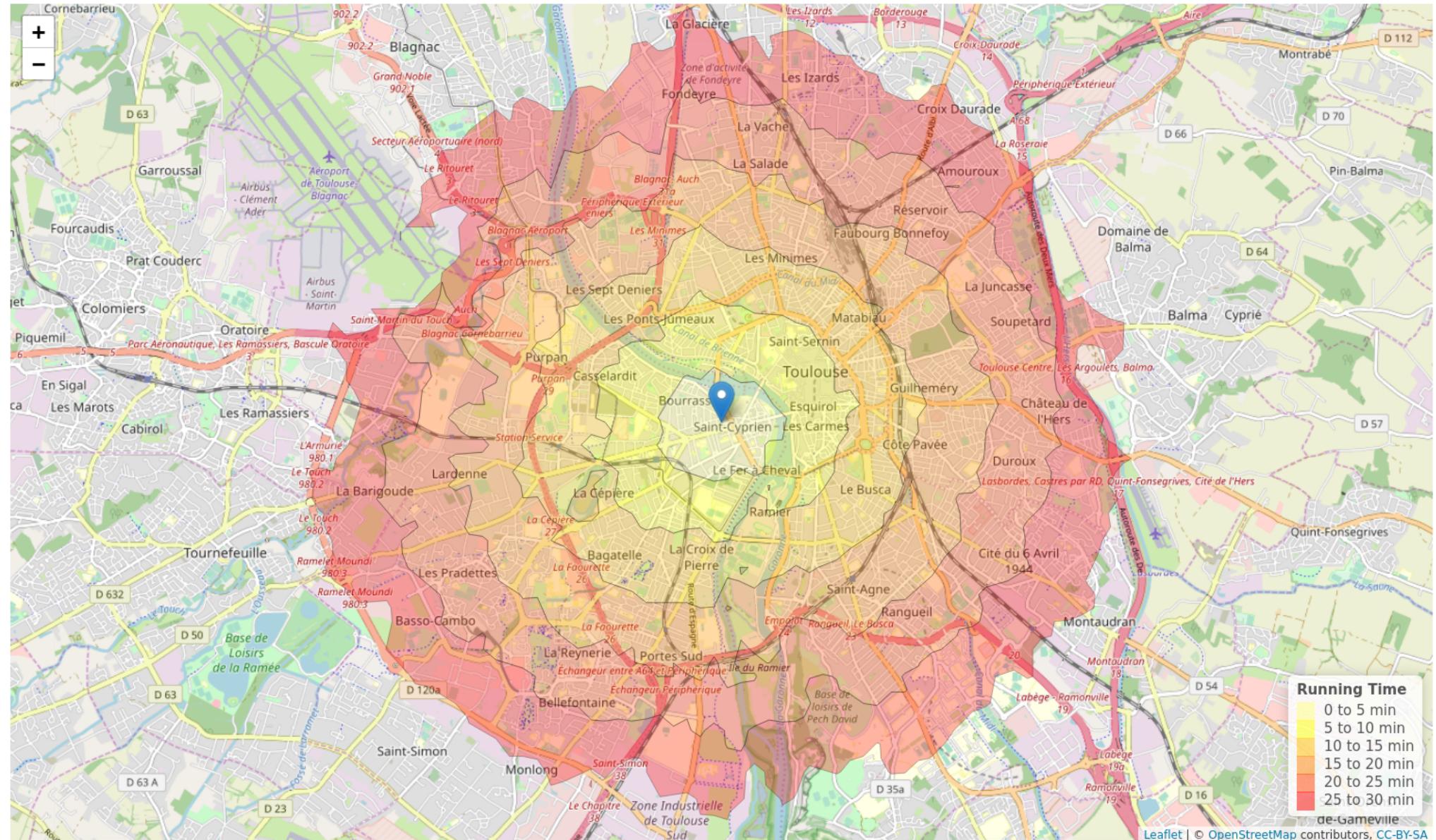
```
# Libraries
library(osrm)
library(leaflet)
library(tidyverse)

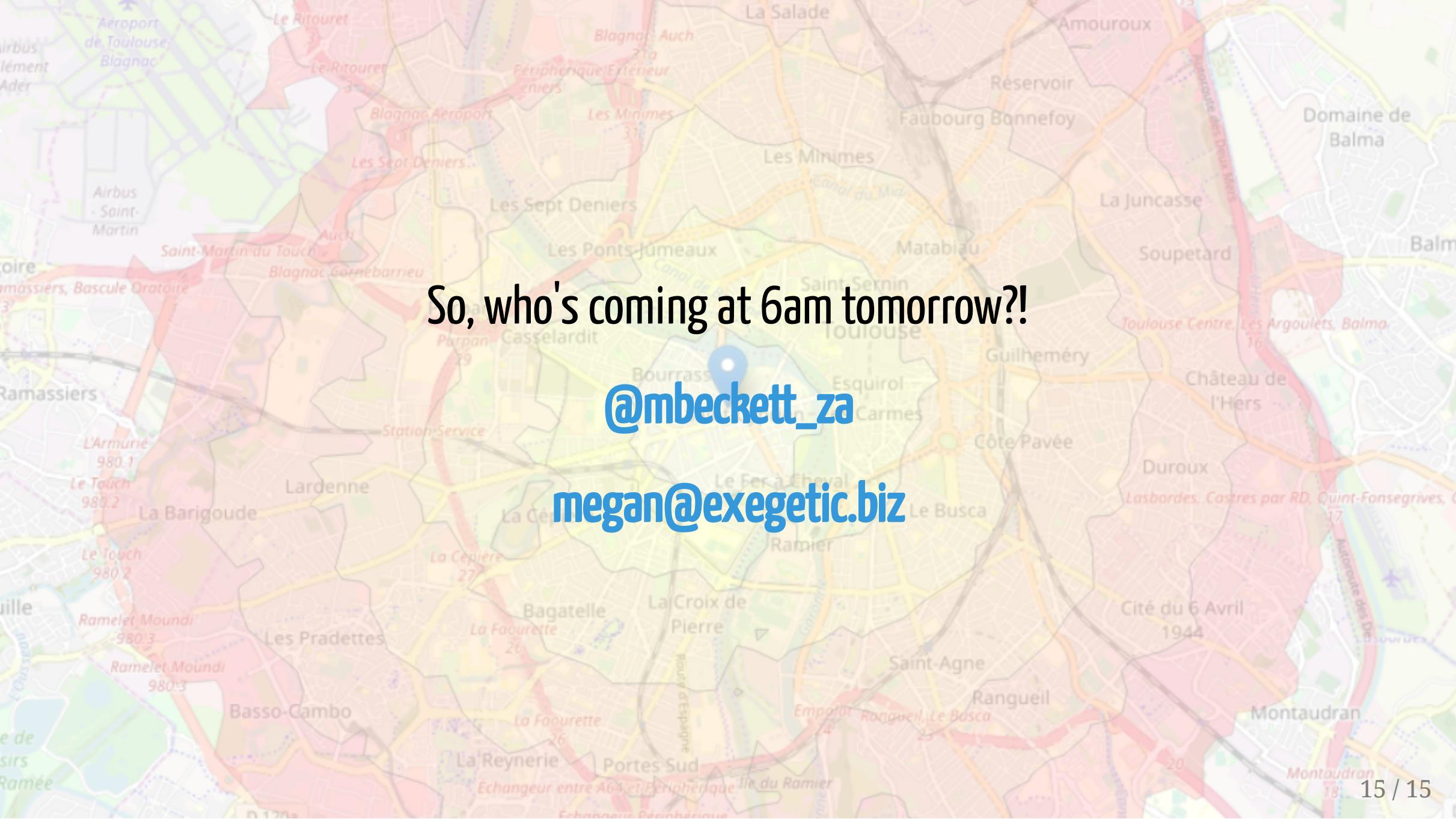
# osrm server
options(osrm.server = "http://127.0.0.1:5000/")

# Set location
loc <- c(1.42, 43.59)

# Generate isochrone
iso <- osrmIsochrone(loc, breaks = seq(from = 0, to = 30, by = 5), res = 400)

# Plot with Leaflet
leaflet(data = iso) %>%
  setView(lng = 1.42, lat = 43.59, zoom = 13) %>%
  addTiles() %>%
  addMarkers(lng = 1.42, lat = 43.59, popup = "My Airbnb") %>%
  addPolygons()
```





So, who's coming at 6am tomorrow?!

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