

Bicycle Routing and Analysis using Mapzen Turn-by-Turn and Isochrone

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10 January 2017

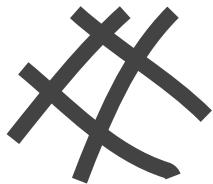


an open-source mapping lab

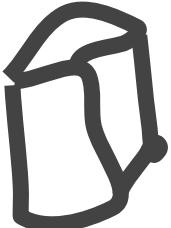
Mapzen builds open-source mapping tools and collaborates on open geodata initiatives.



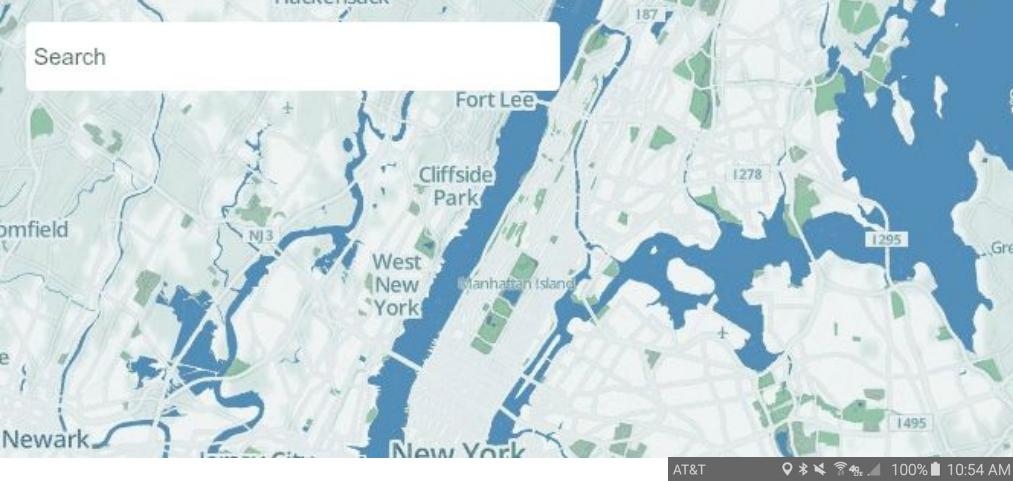
search + positioning



access + mobility

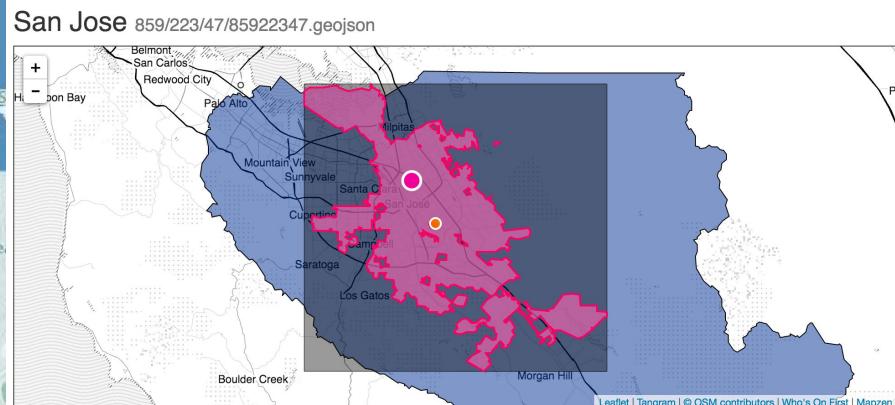
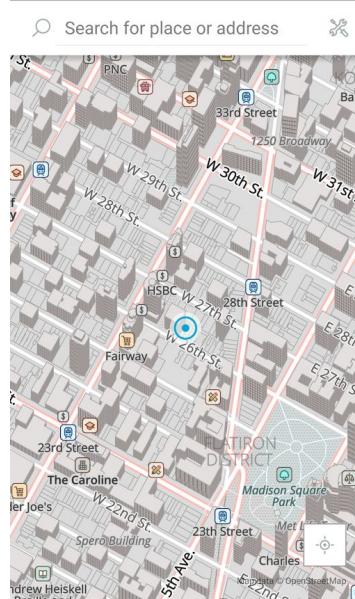


map + visualization



Mapzen Search geocoder

Eraser Map app
and LOST Android
location services



San Jose is a **locality** and its consensus geometry is derived from **quattroshapes**. Its label centroid is derived from **mapshaper**. Experimental: [screenshot this map](#) (will not include Who's On First data... yet)

Properties — some notes about [sources](#) and [names](#)

[view raw](#)

wof

belongsto

North America [102191575](#)
United States [85633793](#)
California [85688637](#)
Santa Clara [102081673](#)

breaches

concordances

—
dbp:id [San_Jose%2C_California](#)
fb:id [en.san_jose](#)

Hierarchy

the **continent** of North America
the **country** of United States
the **region** of California
the **county** of Santa Clara
the **locality** of San Jose

Other

[See all the descendants of San Jose](#)
Raw data (GeoJSON)

Who's on First gazetteer



HOME HOW IT WORKS FEED REGISTRY PLAYGROUND NEWS & UPDATES

A COMMUNITY-EDITED DATA SERVICE



AGGREGATING TRANSIT NETWORKS



TRANSIT NETWORKS

ACROSS METROPOLITAN AND RURAL

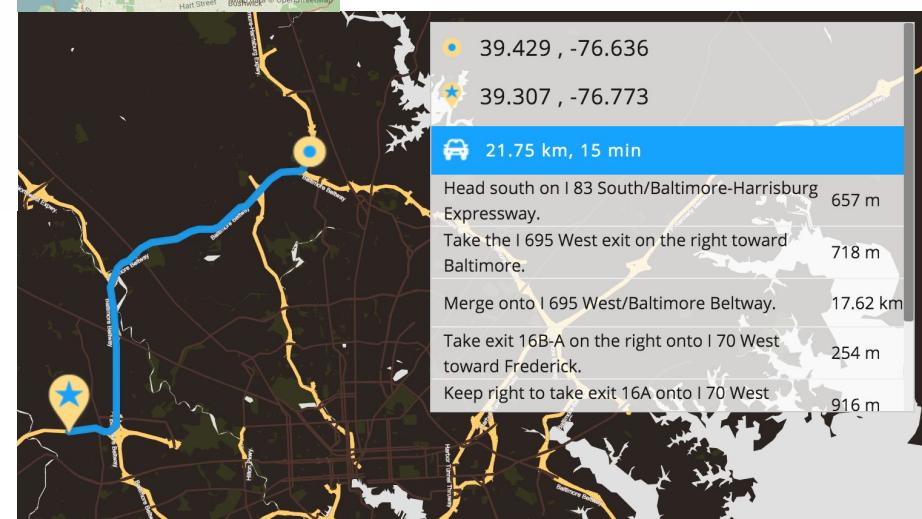


AND RURAL

AREAS AROUND THE WORLD.

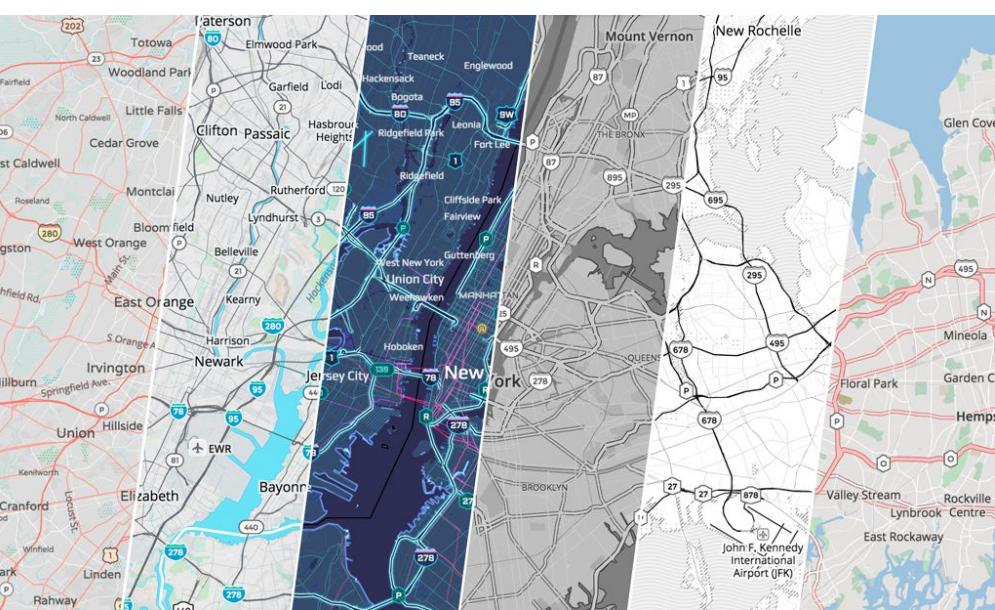
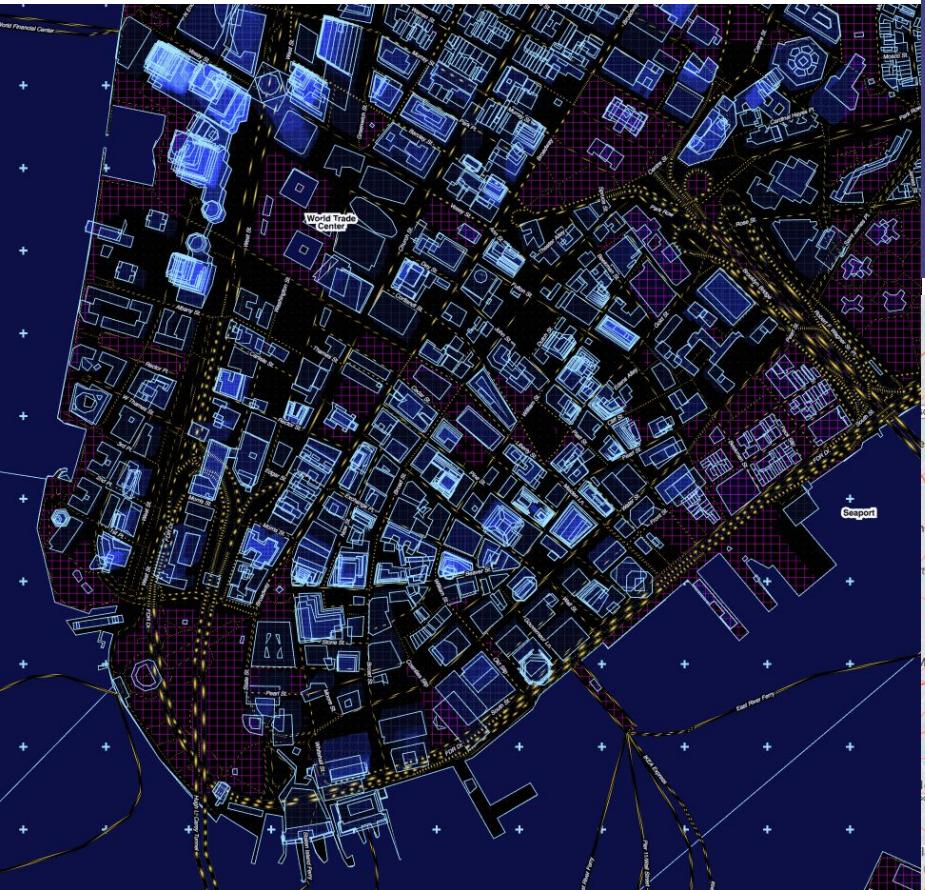


Transitland open
transit data service



Valhalla
routing engine

Vector tiles + Tangram mapping engine + styles



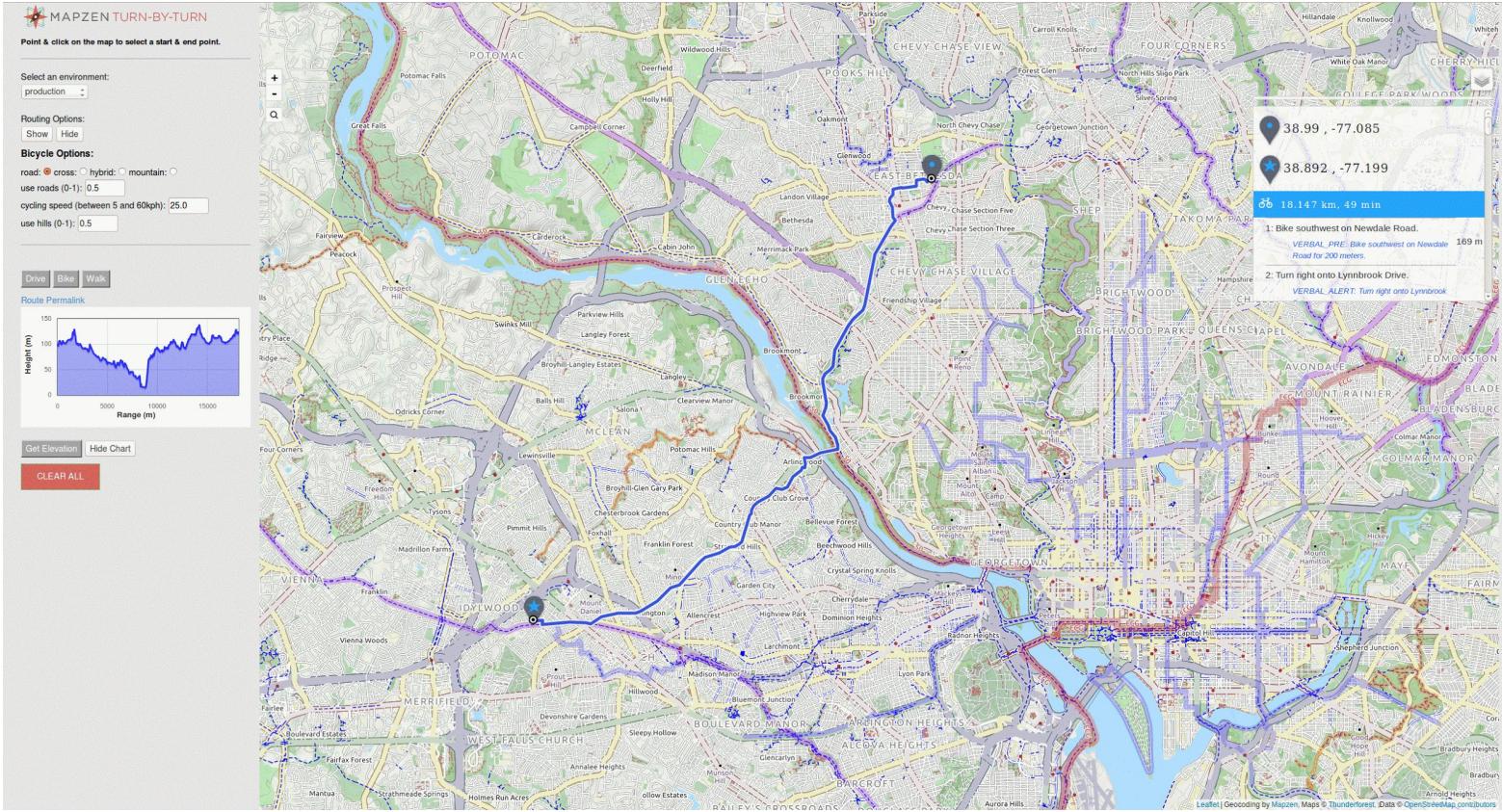
Valhalla: Open-source software, open data

- Global, multi-modal routing using open source data
 - OpenStreetMap
 - Transitland (open public transit data)
 - Mapzen elevation service (from public sources)
- Dynamic, run-time costing
 - Flexible
 - Extensible
- Hierarchical routing graph tiles
 - Optimize memory use
 - Off-line routing capabilities
- Improved guidance
 - Clear and concise, with verbal prompts
 - Focus on mobile navigation applications



<https://github.com/valhalla>

Valhalla for bicycle routing



Bicycle Routing Options

- Bicycle type: Road, Cross, Hybrid/City, Mountain
 - Alters default speed and surface types that are allowed
- cycling_speed (on flat roads)
 - Modulated based on surface and grade to estimate time along route
- use_roads factor (0-1)
 - How willing is the cyclist to use roads?
 - Lower values favor cycleways, roads with bike lanes low speed roads
- use_hills factor (0-1)
 - How willing is the cyclist to use hills?
 - Lower values avoids hilly roads if flatter paths are nearby

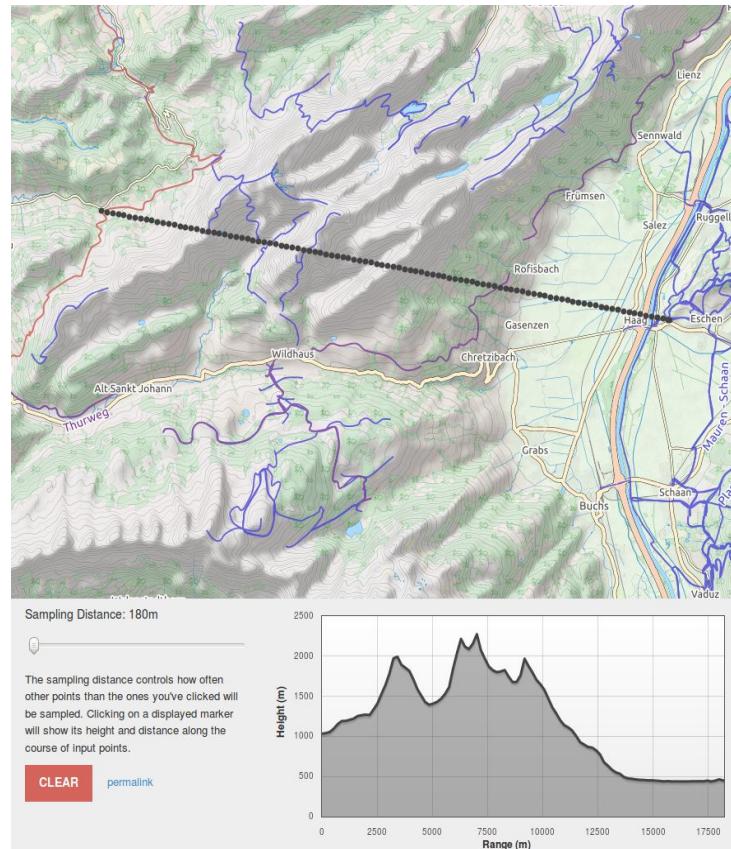
OpenStreetMap inputs for bicycling routing

- OSM has extensive bicycle tagging that Valhalla uses for bicycle routing:
 - Cycleways - dedicated bicycle paths
 - Bike lane tagging
 - Bicycle access tagging can be complex, e.g. oneway can be opposite that of automobiles!
 - Bicycle Network “relations” - is a road part of a designated bicycle network
 - Surface tagging - smoothness / roughness of a road/path
- <http://wiki.openstreetmap.org/wiki/Bicycle>

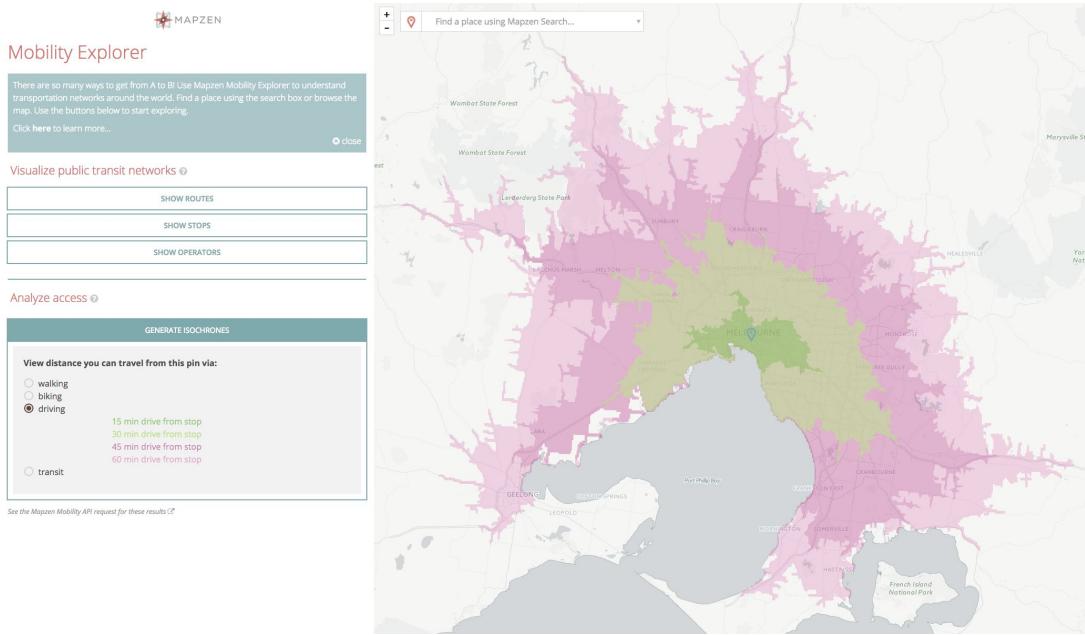


Elevation inputs for bicycle routing

- One project, three output products:
 - Provides elevations for Valhalla routing graph
 - API for querying elevation profiles
 - Provides terrain tile set on S3
- (sponsored by AWS Public Data Sets program)
- <https://mapzen.com/blog/moving-on-up/>
- <https://mapzen.com/blog/terrain-tile-service/>



Mapzen Isochrone Service



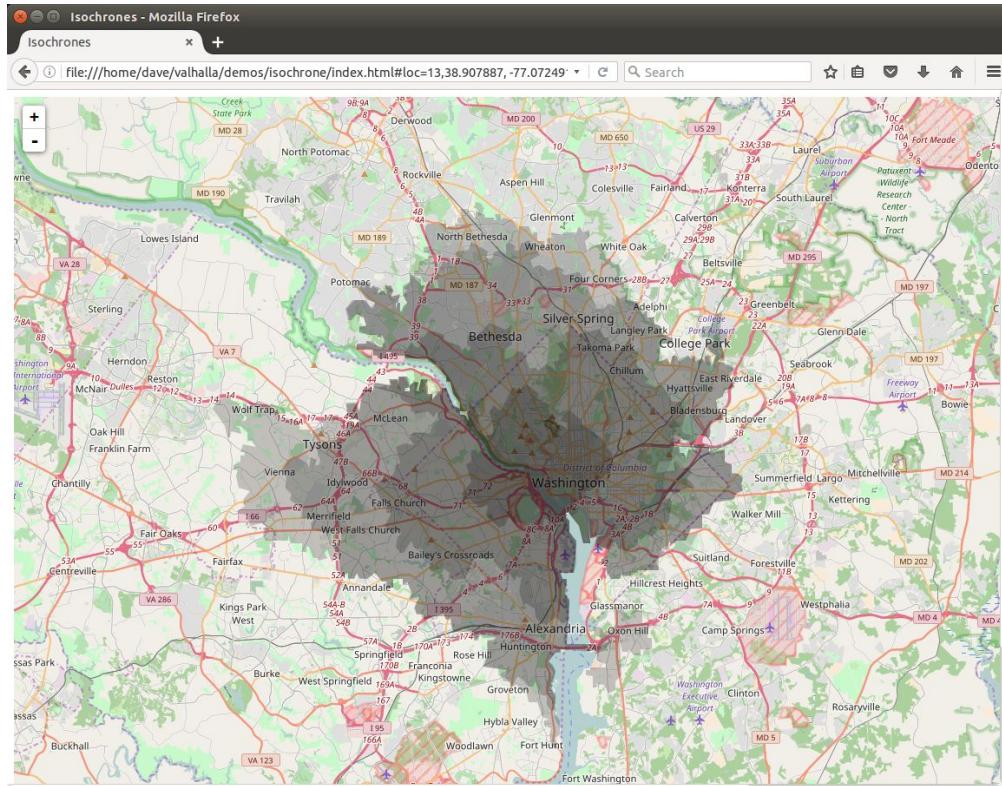
- <https://mapzen.com/blog/introducing-isochrone-service/>
- <https://mapzen.com/documentation/mobility/isochrone/api-reference/>

Mapzen Isochrone Service

→ Beginner cyclist

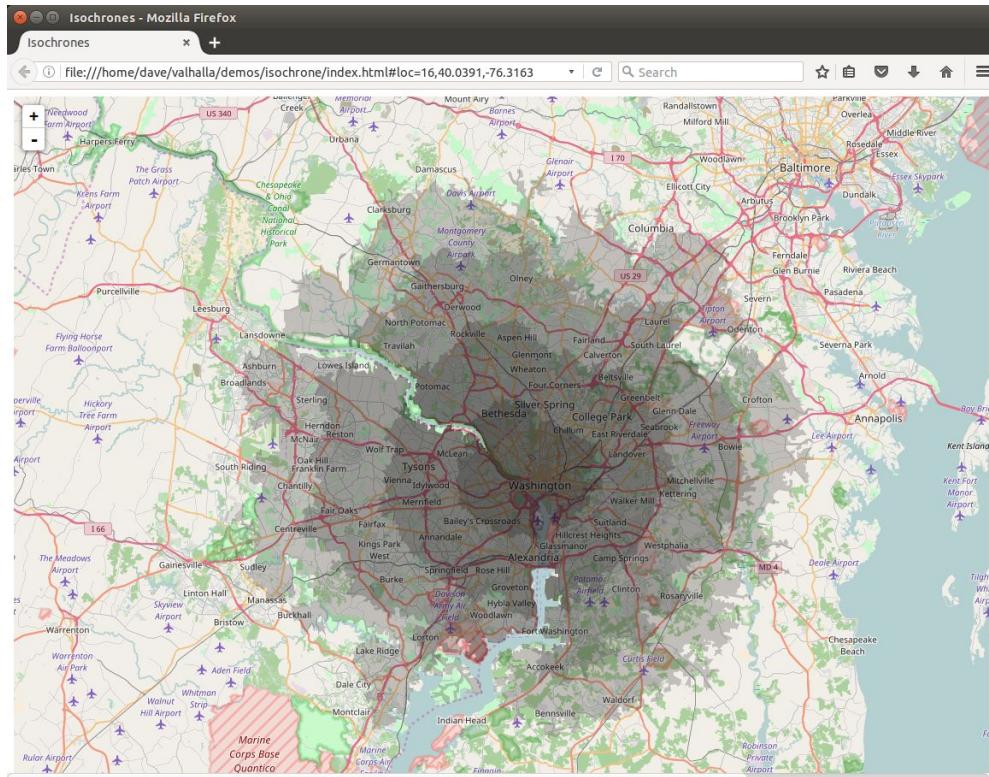
- 15 KPH
- use_roads = 0
- use_hills = 0

→ 30,60,90,120 minute
contours



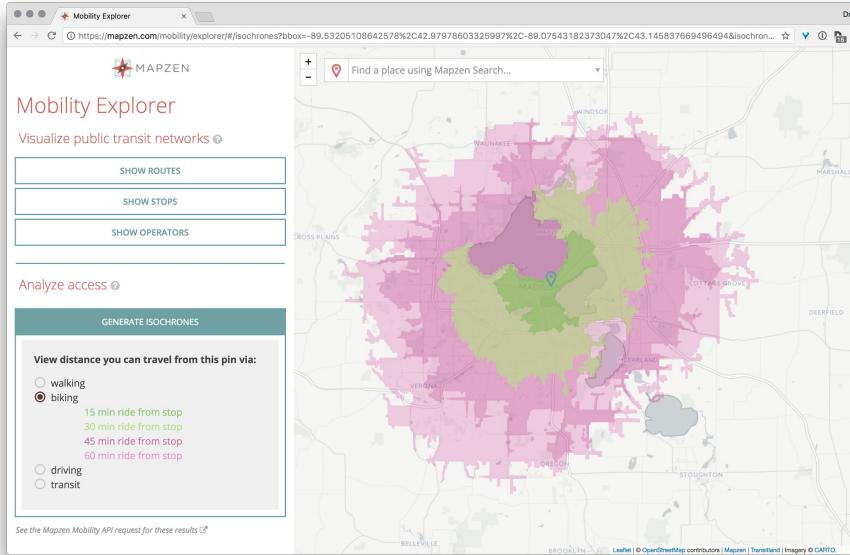
Mapzen Isochrone Service

- Experienced cyclist
 - 25 KPH
 - use_roads = 1
 - use_hills = 1
- 30,60,90,120 minute contours



Future support for cyclists

- Adding costing options “bicycle stress” for both routing and analysis
- More bicycle costing options in Mapzen Mobility Explorer:



Thank You

- Try Mapzen Mobility Explorer web app: <https://mapzen.com/mobility/explorer>
- Sign up for a free API developer key for Turn-by-Turn, Isochrone, and Elevation services:
<https://mapzen.com/developers>
- Find the Valhalla code: <https://github.com/valhalla>
- Contact us with any questions!
 - hello@mapzen.com
 - <https://mapzen.com>