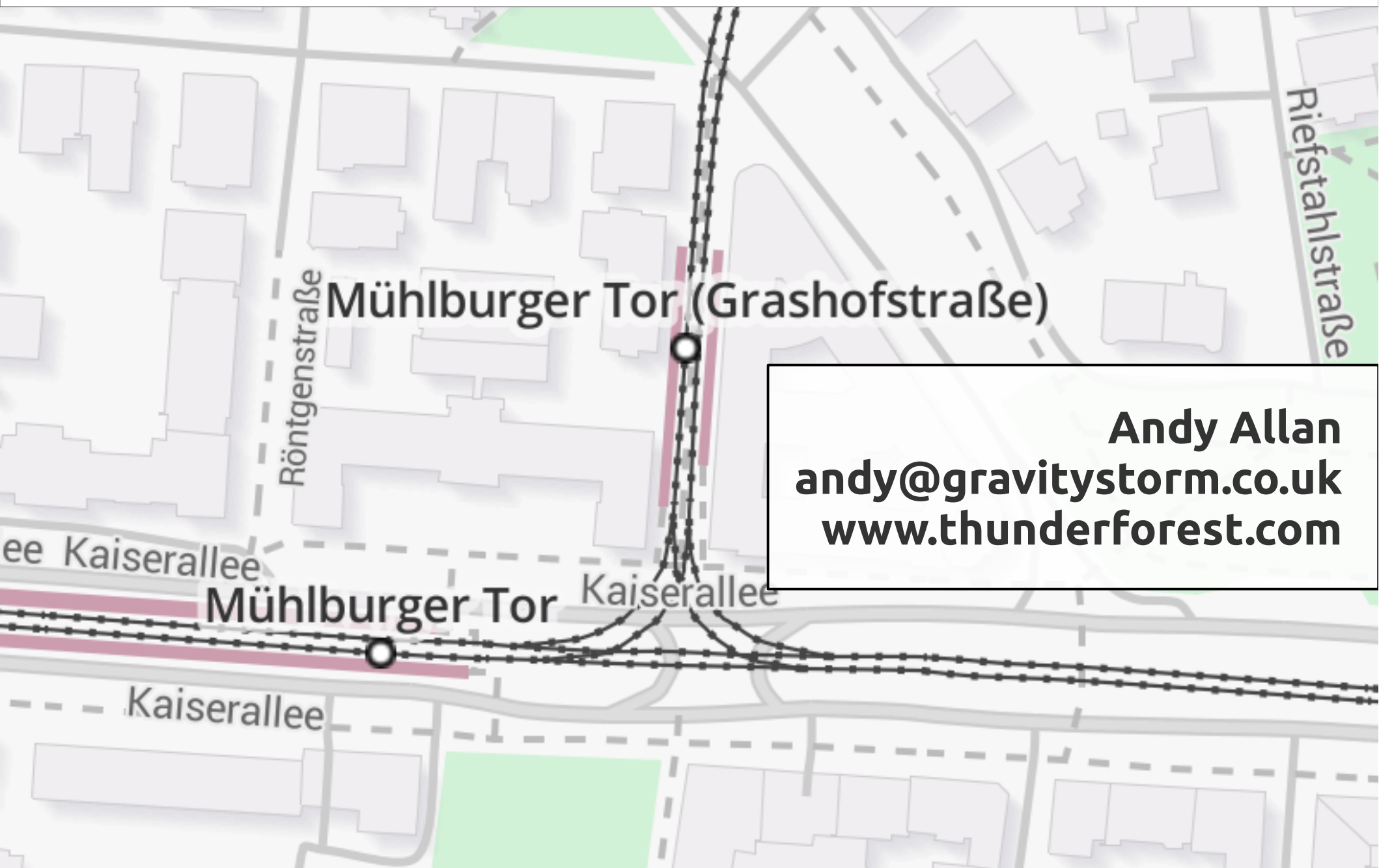


# Lightning Map Tiles



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**commit c37488f93b80eda1dd7aef8984bebbf11197504d**  
**Author: Andy Allan <andy@gravitystorm.co.uk>**  
**Date: Mon May 12 16:03:55 2014 +0100**

**Transport from a hailstorm server.**

# The Road to Vector Tiles!

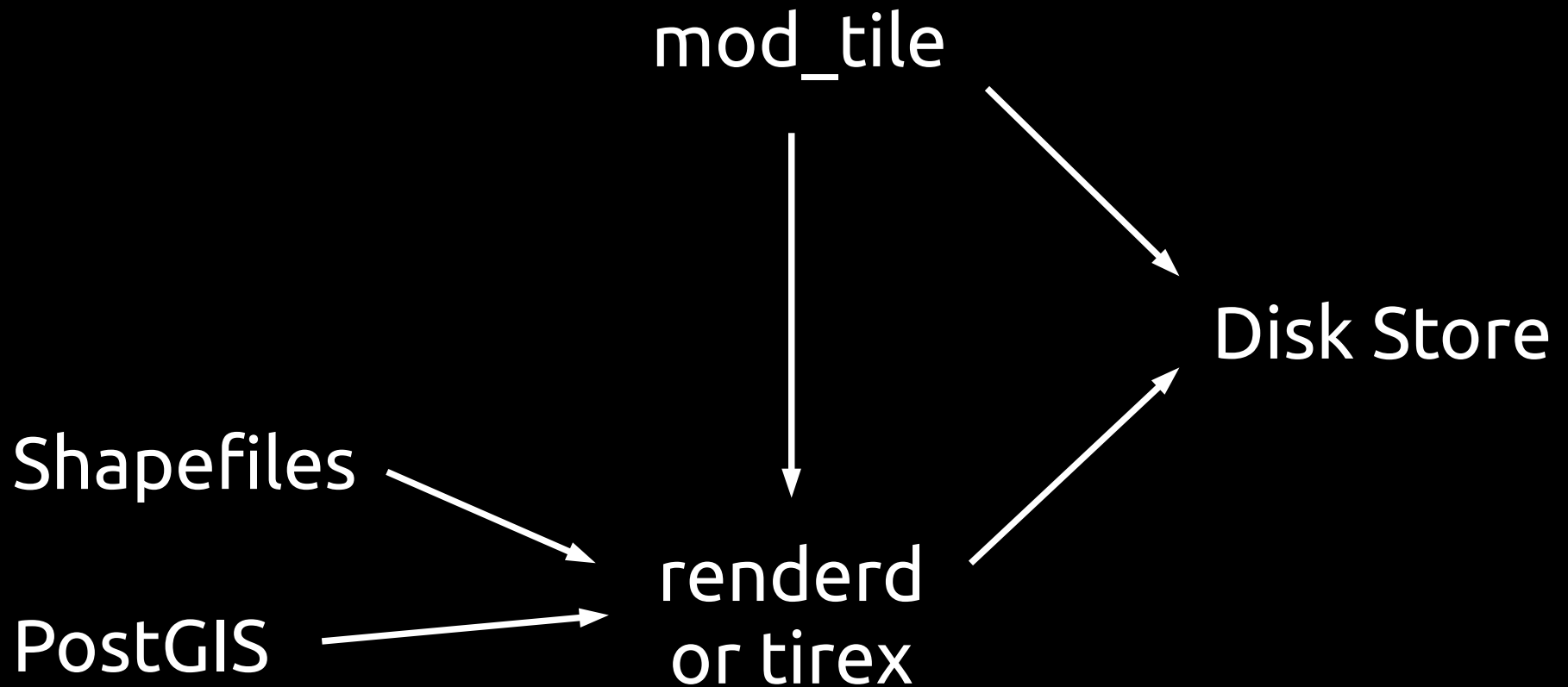


# The Road to Vector Tiles!



Background

mod\_tile



# mod\_tile Advantages

simple, well documented setup

very reliable

stylesheets work with other software

stylesheets work with other projections

one step data → images

you're running one map style

you're running one server

# mod\_tile Drawbacks

lots of rasters on disk

multiple stylesheets need multiple disk stores

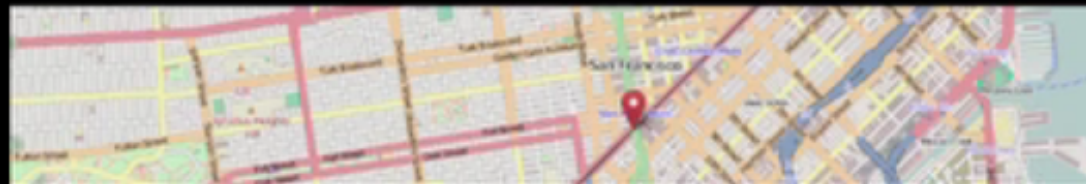
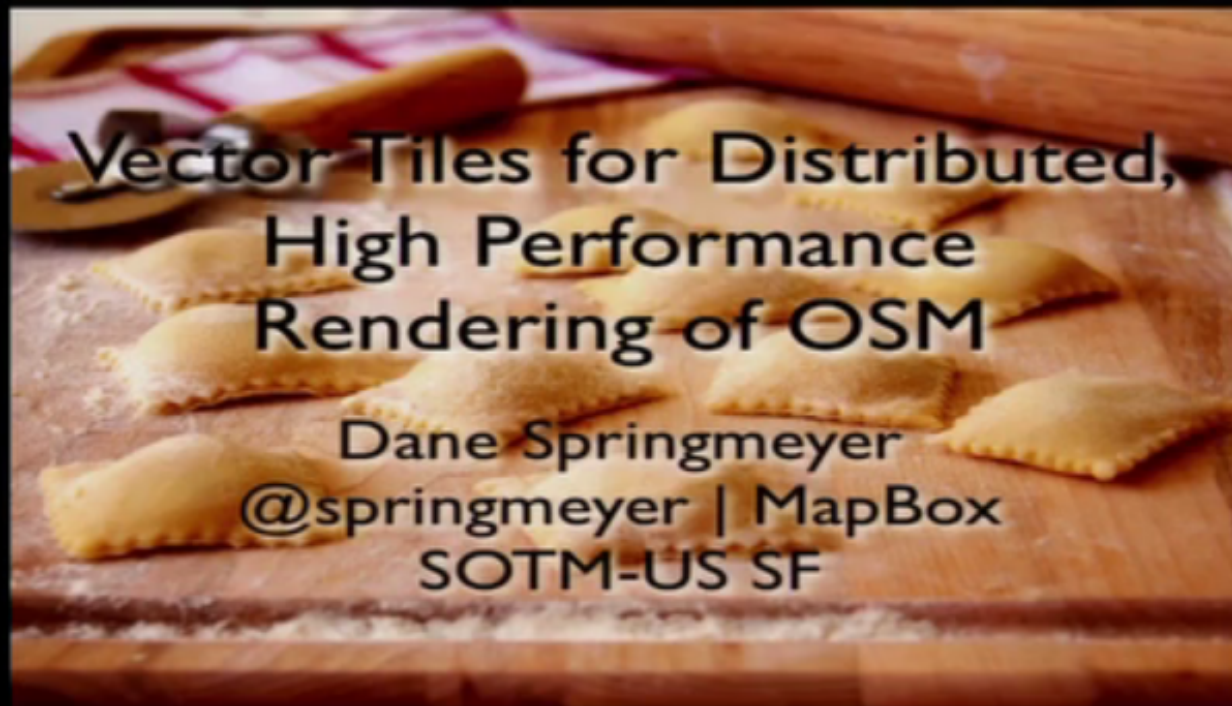
tricky to scale one style horizontally

mid zoom levels often slow

user requests trigger database calls

# Vector Tiles

# State of the Map US 2013



Dane Springmeyer - Vector Tiles for Distributed, High Performance Rendering of OSM



**Tilemill 2**



```
? ae... bo... bu... bu... gr... pa... pl... rai... ro... style w... +  
1 #aeroway[aeroway = 'runway'][zoom >= 11] {  
2   line-color: ● #ccd;  
3   line-width: 2;  
4   [zoom >= 12] { line-width: 7; }  
5   [zoom >= 14] { line-width: 18; }  
6 }  
7  
8 #aeroway[aeroway = 'taxiway'][zoom >= 11] {  
9   line-color: ● #ccd;  
10  line-width: 1;  
11  [zoom >= 14] { line-width: 4; }  
12  [zoom >= 15] { line-width: 6; }  
13 }  
14  
15 /* Make this the same as normal buildings, for now */  
16 #buildings[aeroway = 'terminal'][zoom >= 14] {  
17   ::over {  
18     line-color: ● #cfcccf;  
19     polygon-fill: ● #f0eef0;  
20     line-width: 1;  
21   }  
22 }  
23
```



```
1 #aeroway[aeroway = 'runway'][zoom >= 11] {
2   line-color: ● #ccd;
3   line-width: 2;
4   [zoom >= 12] { line-width: 7; }
5   [zoom >= 14] { line-width: 18; }
6 }
7
8 #aeroway[aeroway = 'taxiway'][zoom >= 11] {
9   line-color: ● #ccd;
10  line-width: 1;
11  [zoom >= 14] { line-width: 4; }
12  [zoom >= 15] { line-width: 6; }
13 }
14
15 /* Make this the same as normal buildings, for now */
16 #buildings[aeroway = 'terminal'][zoom >= 14] {
17   ::over {
18     line-color: ● #cfcccf;
19     polygon-fill: ● #f0eef0;
20     line-width: 1;
21   }
22 }
23
```









Untitled

Settings

Save as



z16 + - 🔍 📍 ✕

?	Layers	Visibility	Delete
📍	roads shape		
📍	Buildings shape		
📍	railways shape		

+ New layer

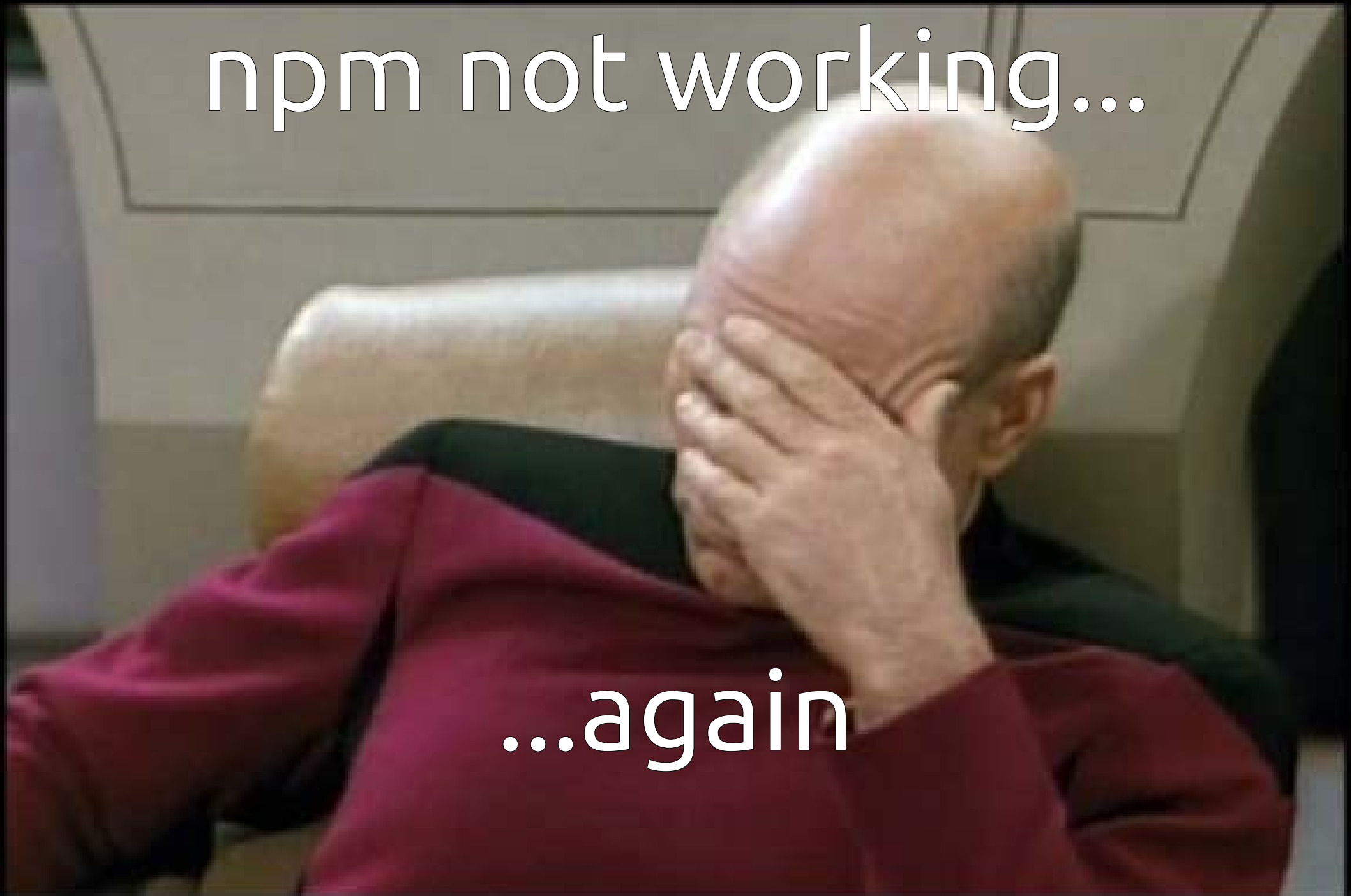
NodeJS



<b>Language</b>	<b>Packager</b>	<b>Control File</b>	<b>Lock File</b>
Ruby	Bundler	Gemfile	Gemfile.lock
NodeJS	npm	package.json	???

npm not working...

...again



tilelive.js

node-mbtiles

tilelive-file

tilelive-http

tilelive-tilejson

tilelive-mapnik

tilelive-bridge

tilelive-vector



# Thunderforest Lightning

# The Goals

All tiles all the time

Multiple styles

On-the-fly rendering if possible

Steady disk usage on db machines

Easily scalable, independent front-ends

Continuous updates from OpenStreetMap

# The Constraints

Minimise use of novel tech (e.g. nodejs!)

Bare-metal or VM based – no AWS, Azure etc

Best use of limited manpower

# The Components

Vtiler

Hailstorm

Weatherman

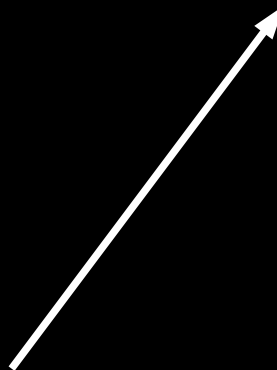
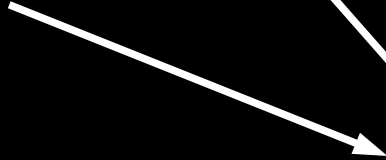
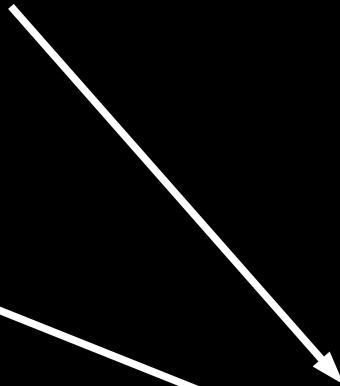
# vtiler

Shapefiles

PostGIS

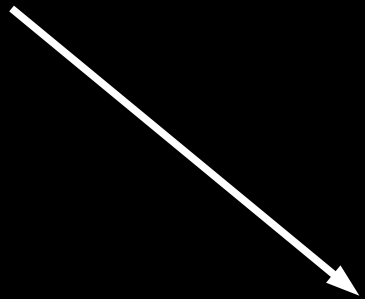
Network

Disk

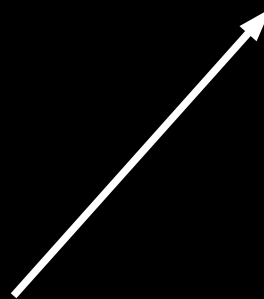


# hailstorm

Network



Disk



raster tiles

raster tiles

raster tiles

# weatherman

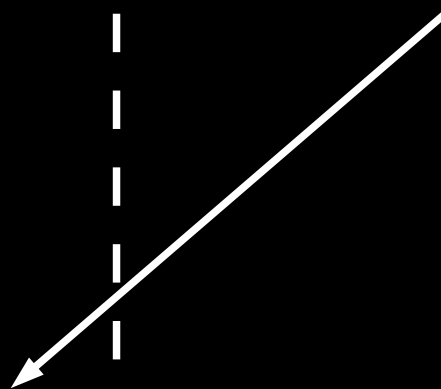
weatherman-vtiler



vtiler



statefiles



weatherman-hailstorm



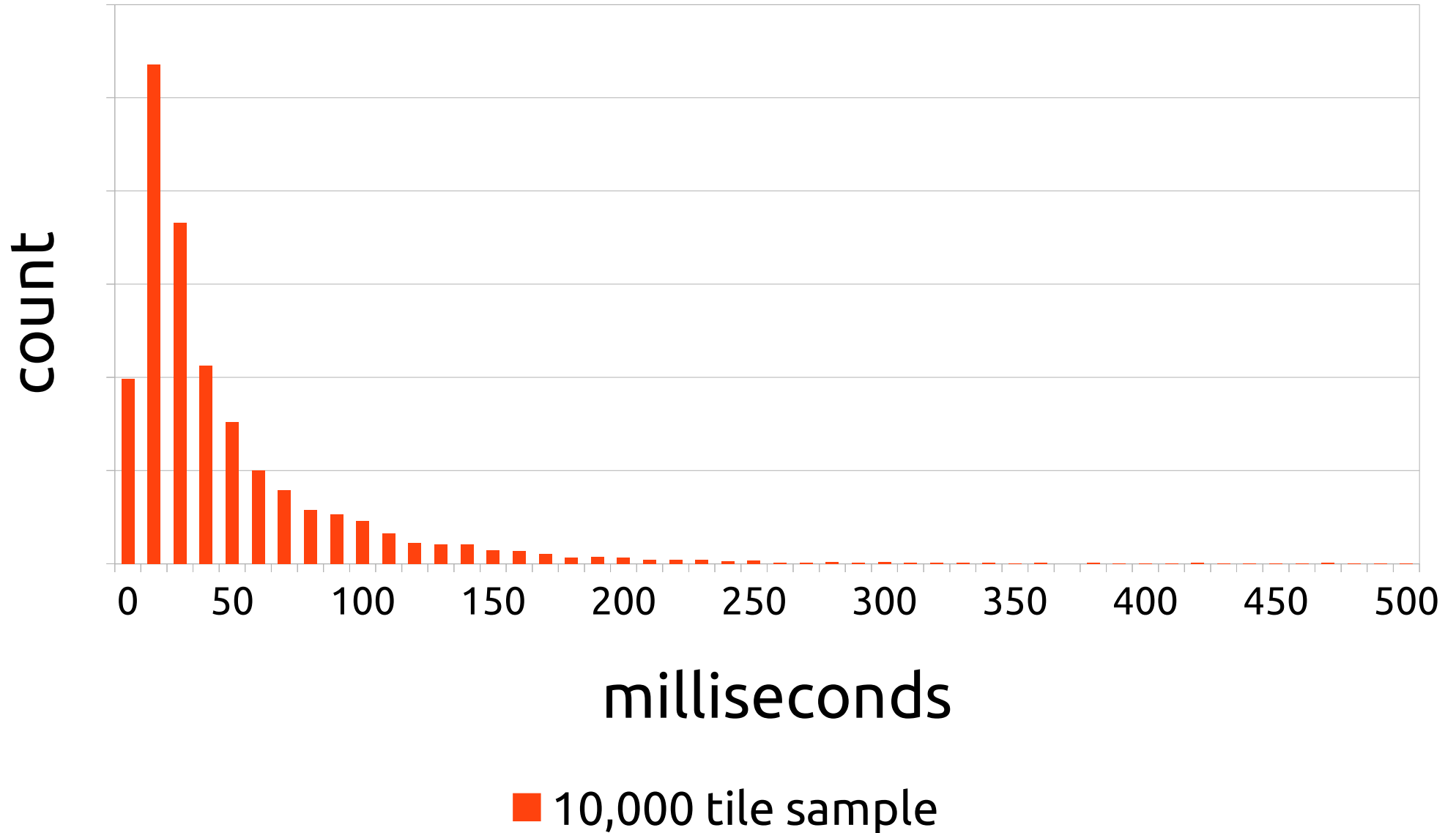
hailstorm



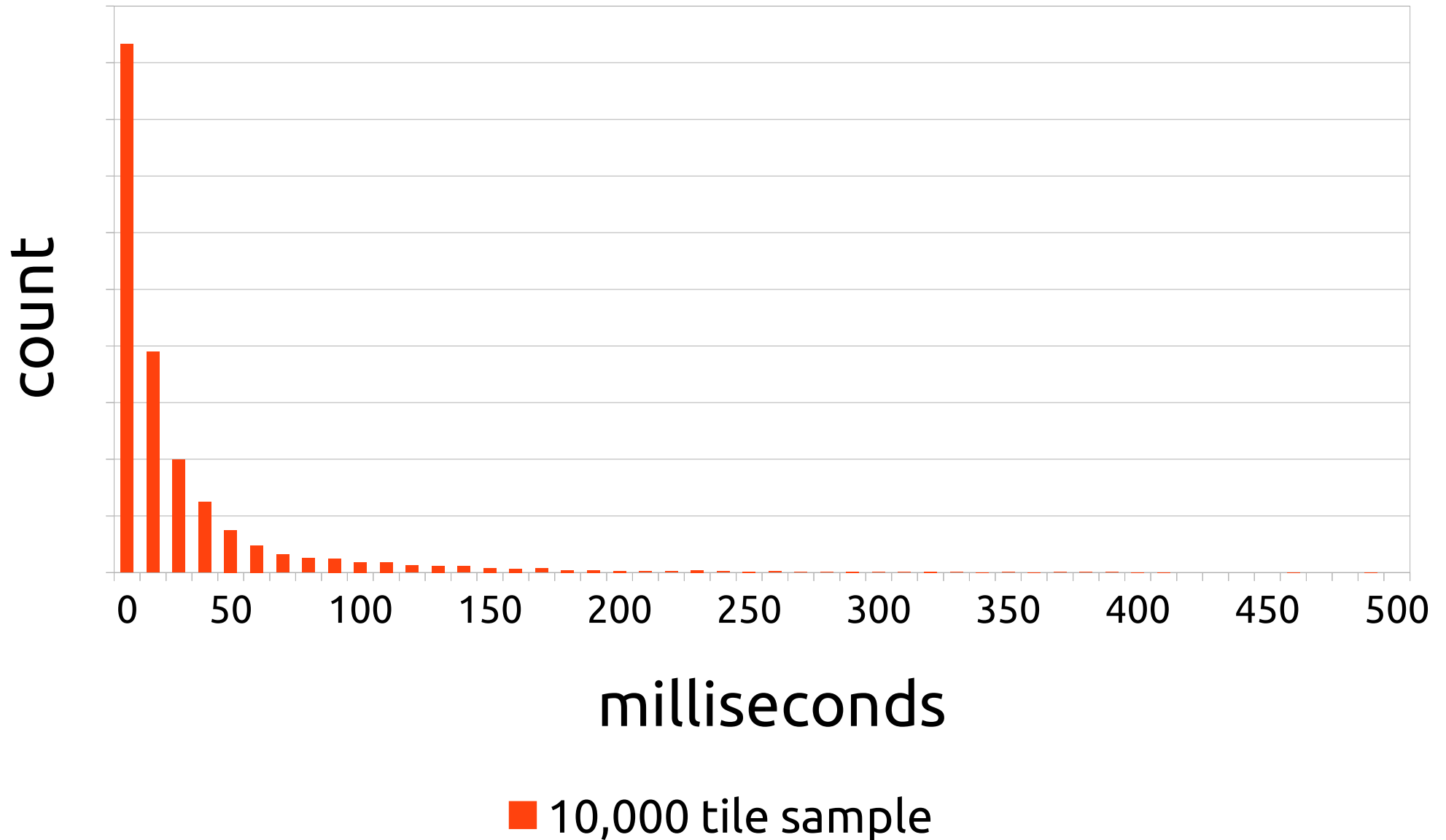
# The Results



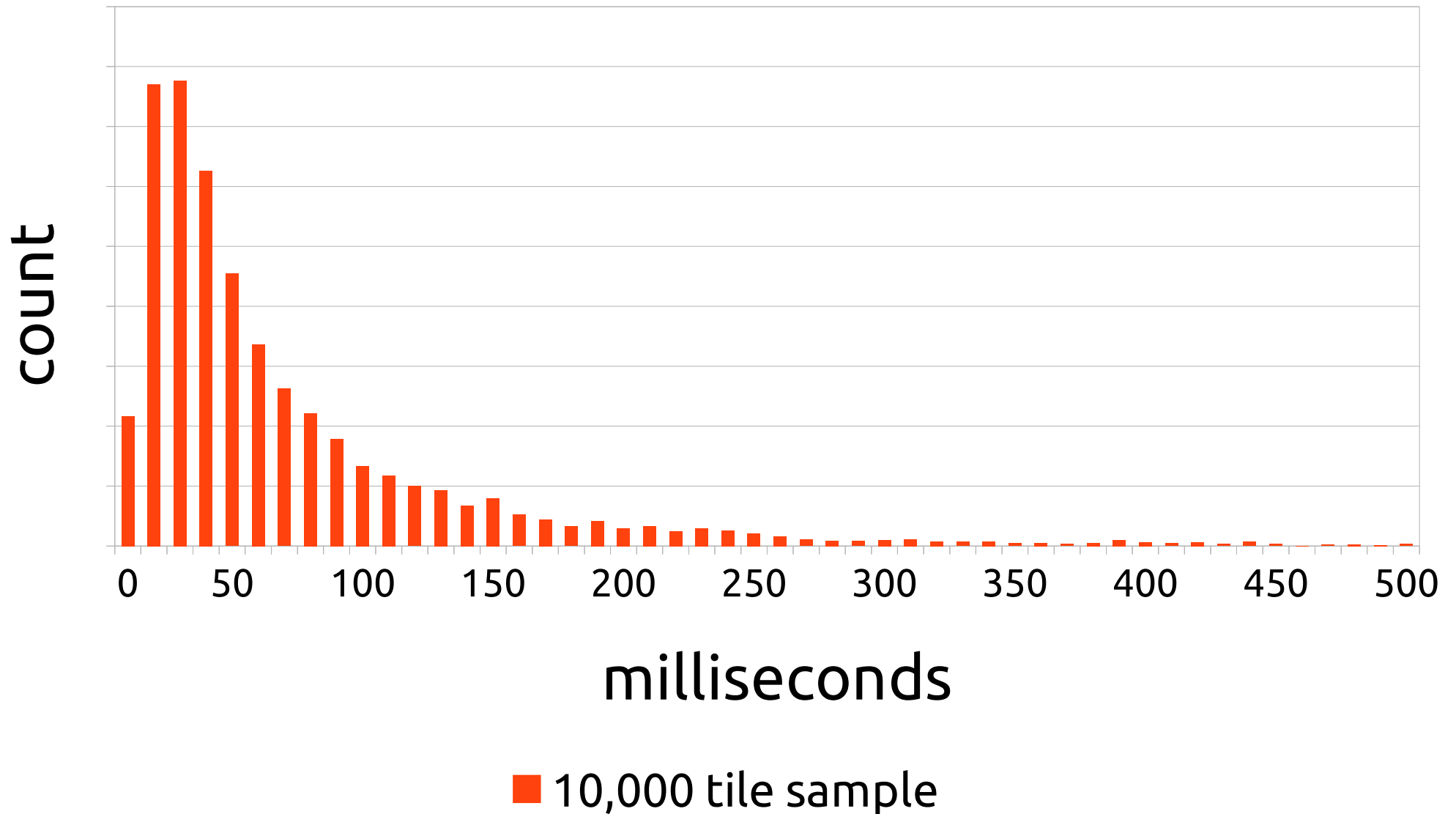
# Rendering Time (10ms Buckets)



# Disk Fetching Time (10ms Buckets)



# Combined Fetching and Rendering





Mühlburger Tor (Grashofstraße)

Mühlburger Tor

Röntgenstraße

Südliche Hildapromenade

Helmholtzstraße

Röntgenstraße

Grashofstraße

Südliche Hildapromenade

Südliche Hildapromenade

Riefstahlstraße

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Kaiserallee

Nottinghamanlage

Lessingstraße

Sachs-Straße



Mühlburger Tor (Grashofstraße)

Mühlburger Tor Kaiserallee

Kaiserallee

Röntgenstraße

Kaiserallee

hstraße

Riefstahlstraße

Stab



Schwabstraße

Poststraße

Klosestraße

Bahnhofstraße

Weg B

Weg B

Am Stadtgarten

Poststraße

Bahnhofsvorplatz

Karlsruhe Hauptbahnhof

55

62

50

50

62

10

44

44

10

47

44

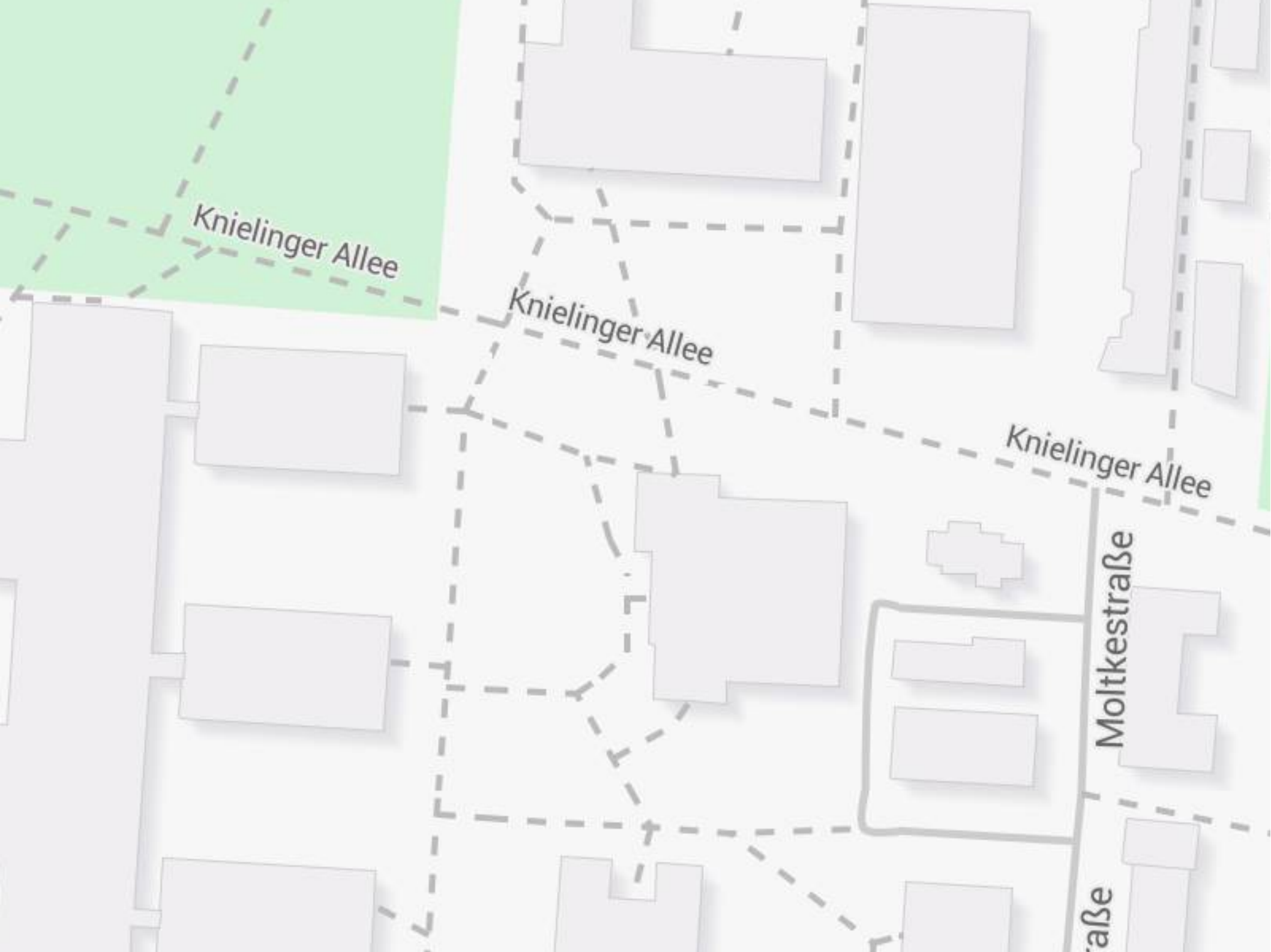
Knielinger Allee

Knielinger Allee

Knielinger Allee

Moltkestraße

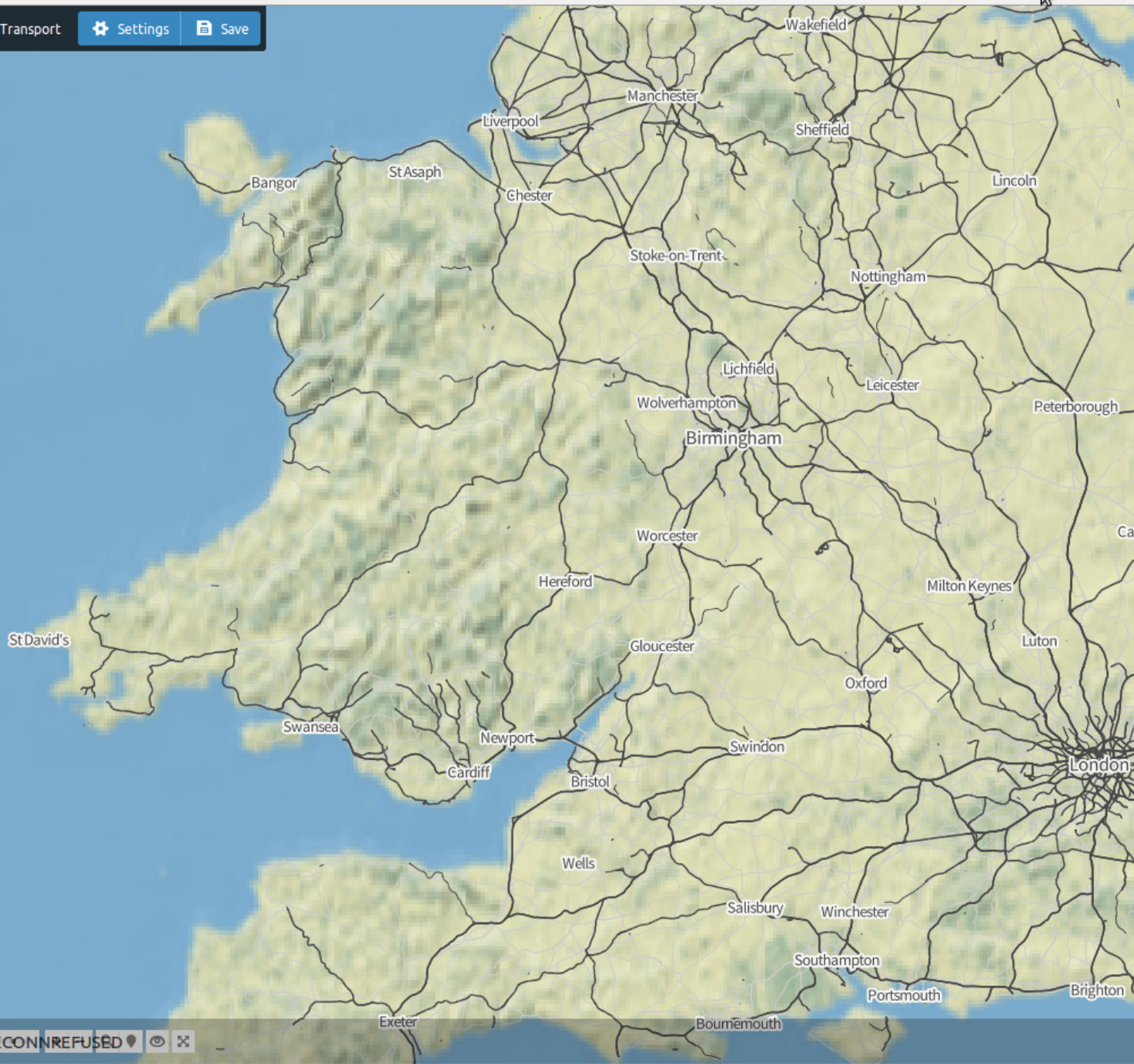
straße





Knielinger Allee

# The Future


Transport
Settings
Save

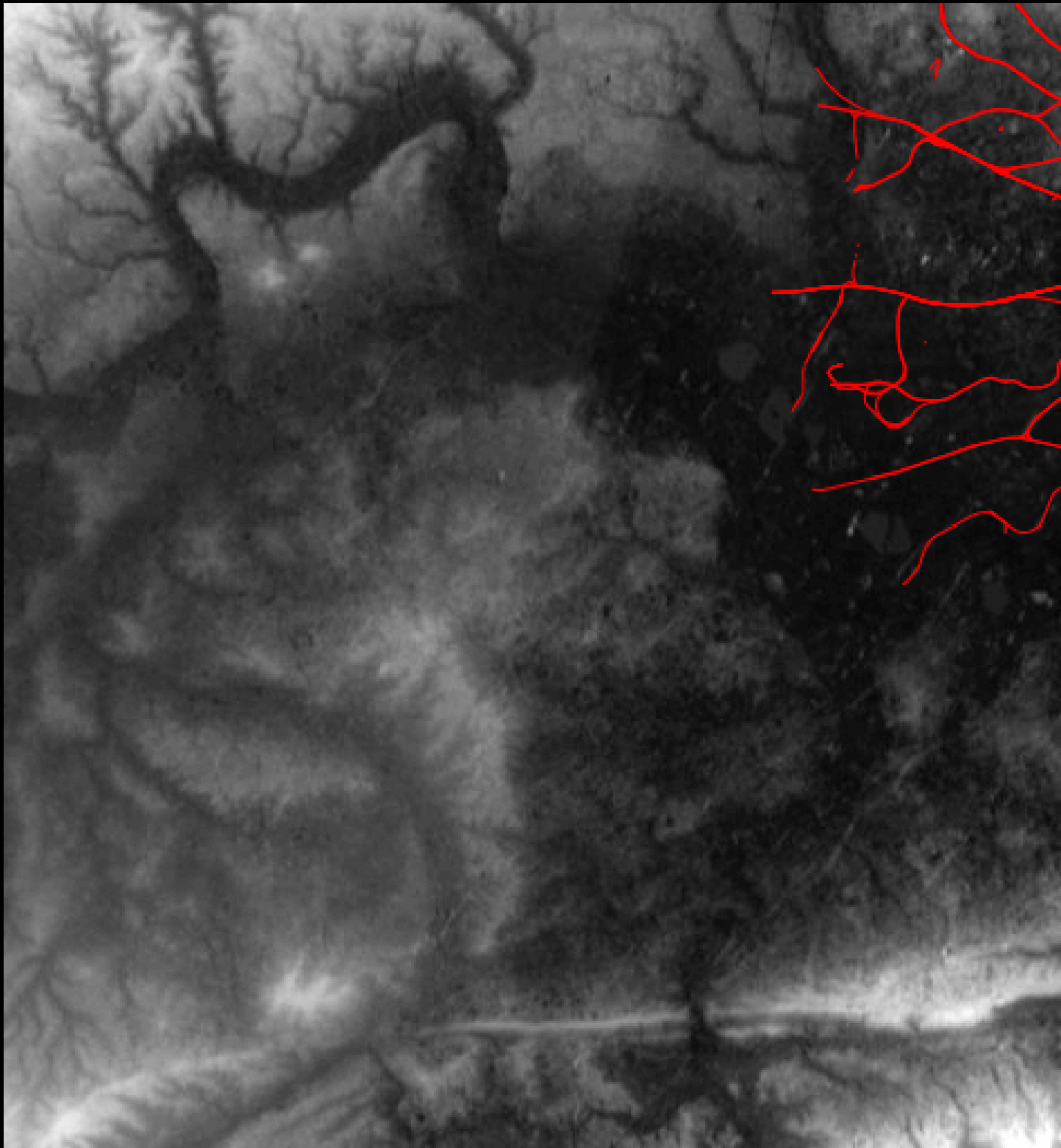




aer...
bou...
buil...
buses gre...
paths pl

```

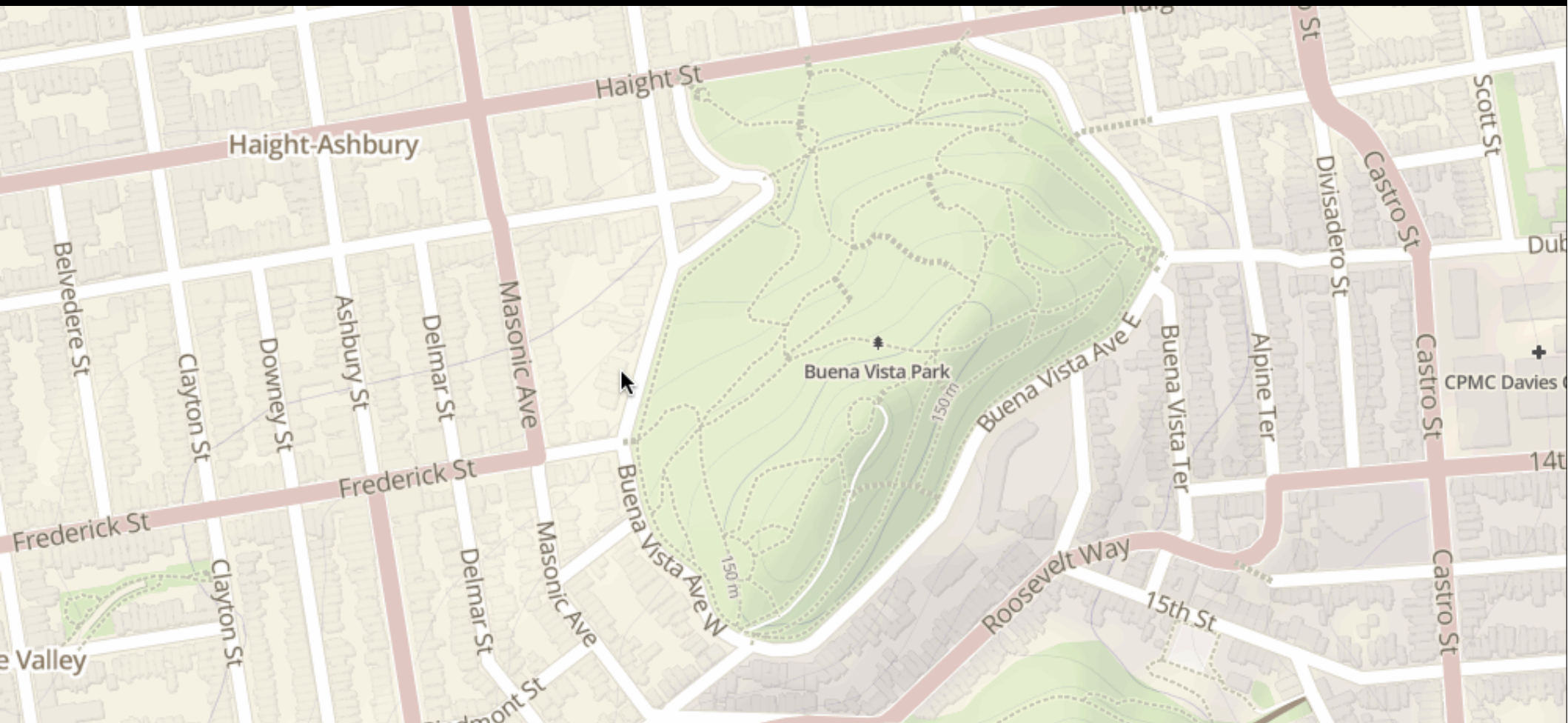
1 Map {
2   background-color: #addeff;
3 }
4
5 #ferries[zoom >= 11] {
6   line-color: #9999ff;
7   line-width: 1.2;
8   line-dasharray: 6,6;
9   line-cap: round;
10 }
11
12 @book-fonts: "Source Sans Pro Regular";
13 @bold-fonts: "Source Sans Pro Bold";
14 @oblique-fonts: "Source Sans Pro Italic";
15
16 @railway-main: #444;
17 @railway-main2: #fff;
18 @railway-tunnel: #aaa;
19 @railway-light: #444;
20
21 @railway-station-size: 14;
22
23 @place-halo-fill: #f7f7f7;
24
25 #natural-earth {
26   raster-opacity: 1.0;
27 }
28

```



# Onboard Rendering





Haight-Ashbury

Haight St

Buena Vista Park

Belvedere St

Clayton St

Downey St

Ashbury St

Delmar St

Masonic Ave

Buena Vista Ave W

Roosevelt Way

Buena Vista Ter

Alpine Ter

Divisadero St

Castro St

Castro St

Castro St

Scott St

Du...

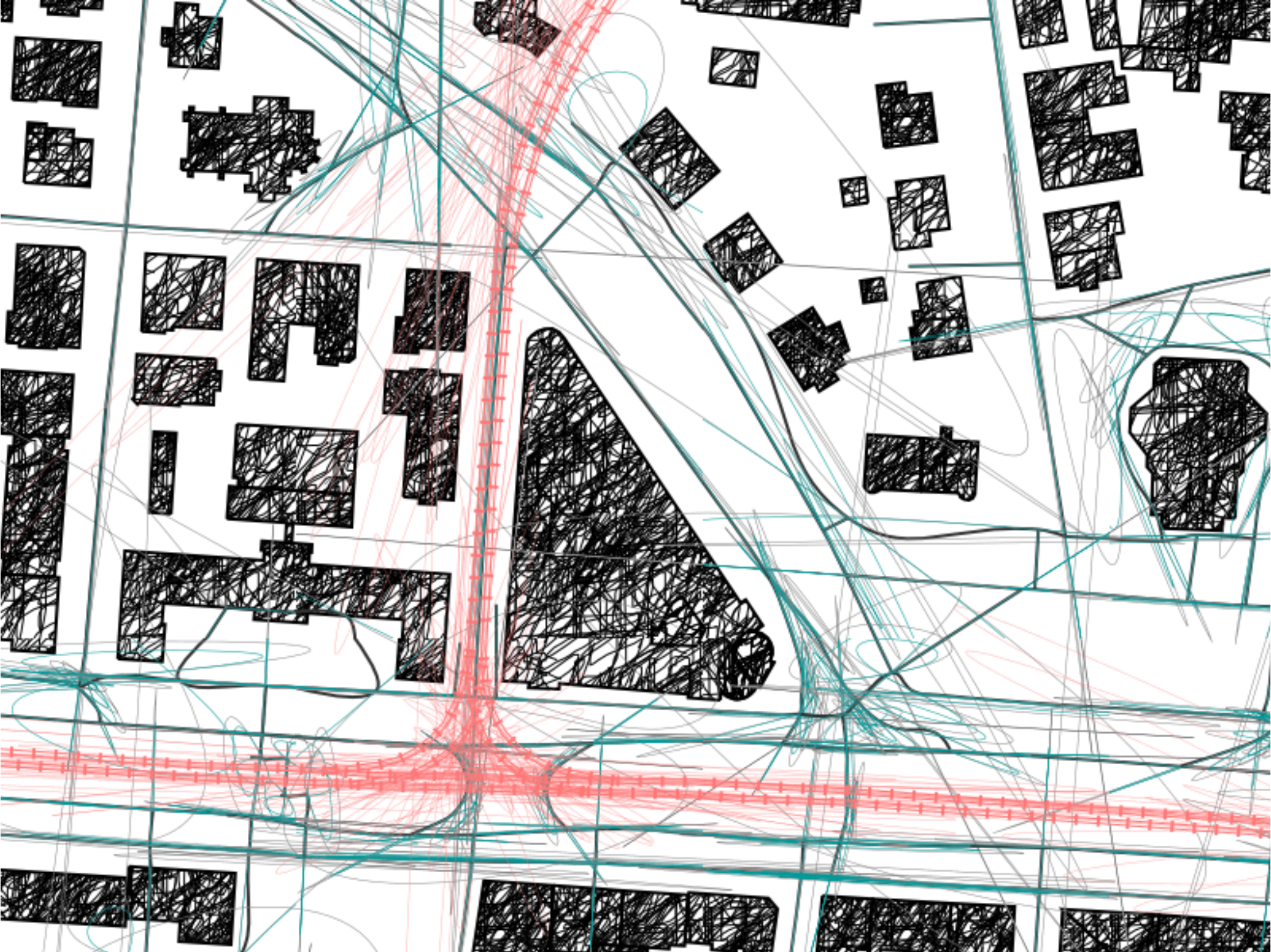
CPMC Davies

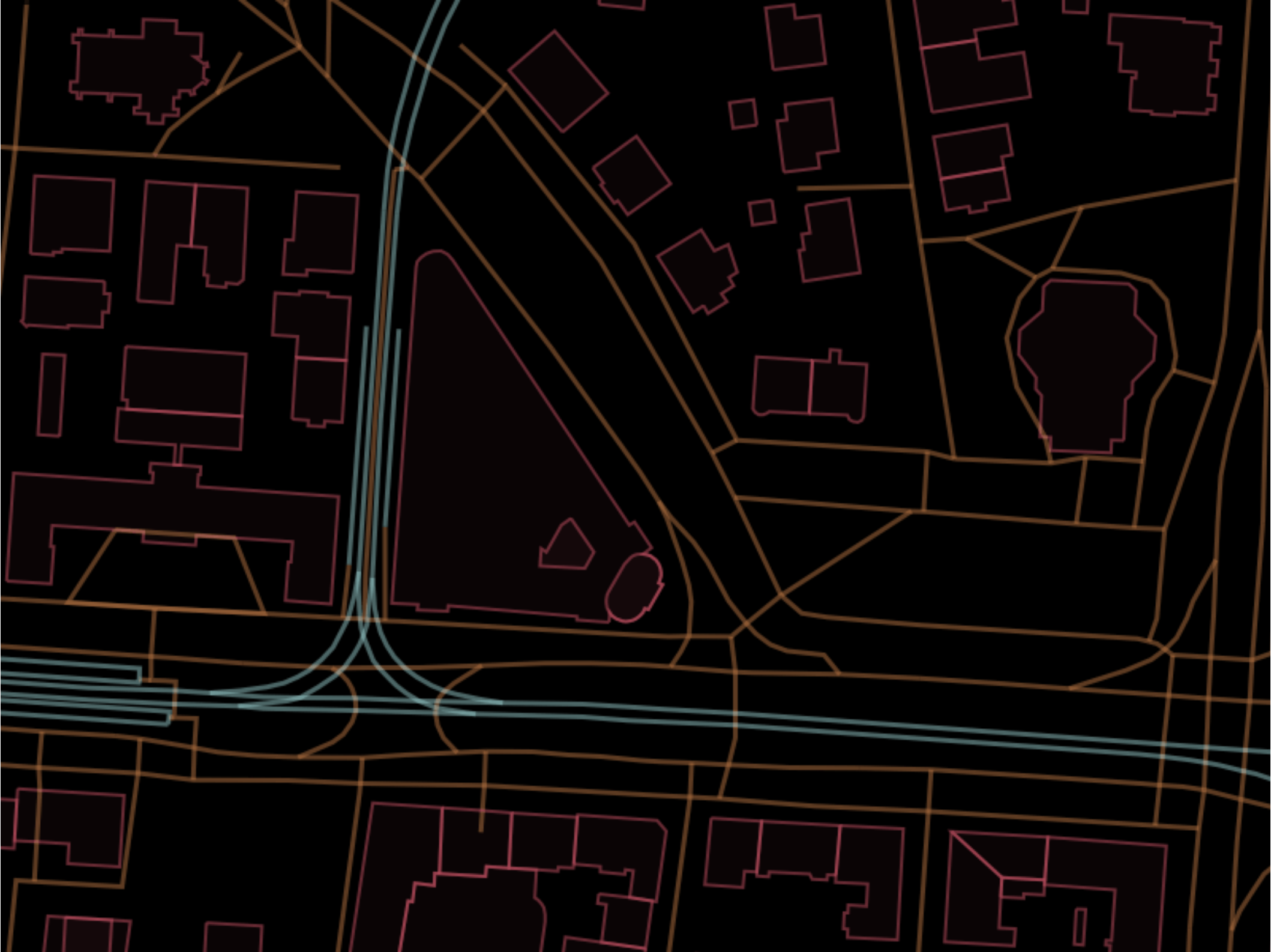
14th

15th St

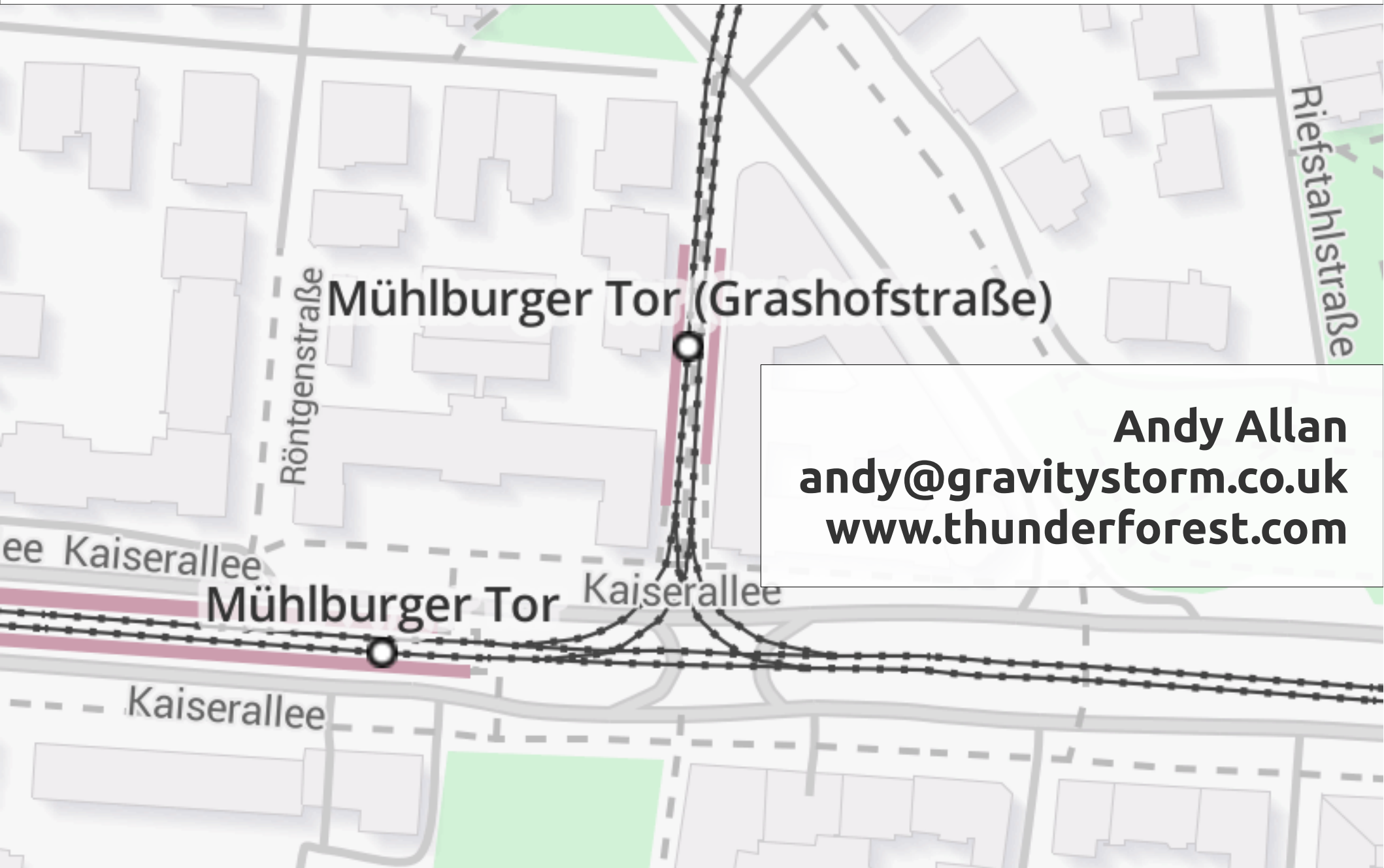
e Valley

Let's Talk!





# Thank you!



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