

Maps Tech Talk



WIKIMEDIA
FOUNDATION

Hello, I am Mateus Santos

[meta/User:MSantos \(WMF\)](#)

[github/thesocialdev](#)



By Myleen Hollero - Myleen Hollero Photography, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=77903123>

History and context

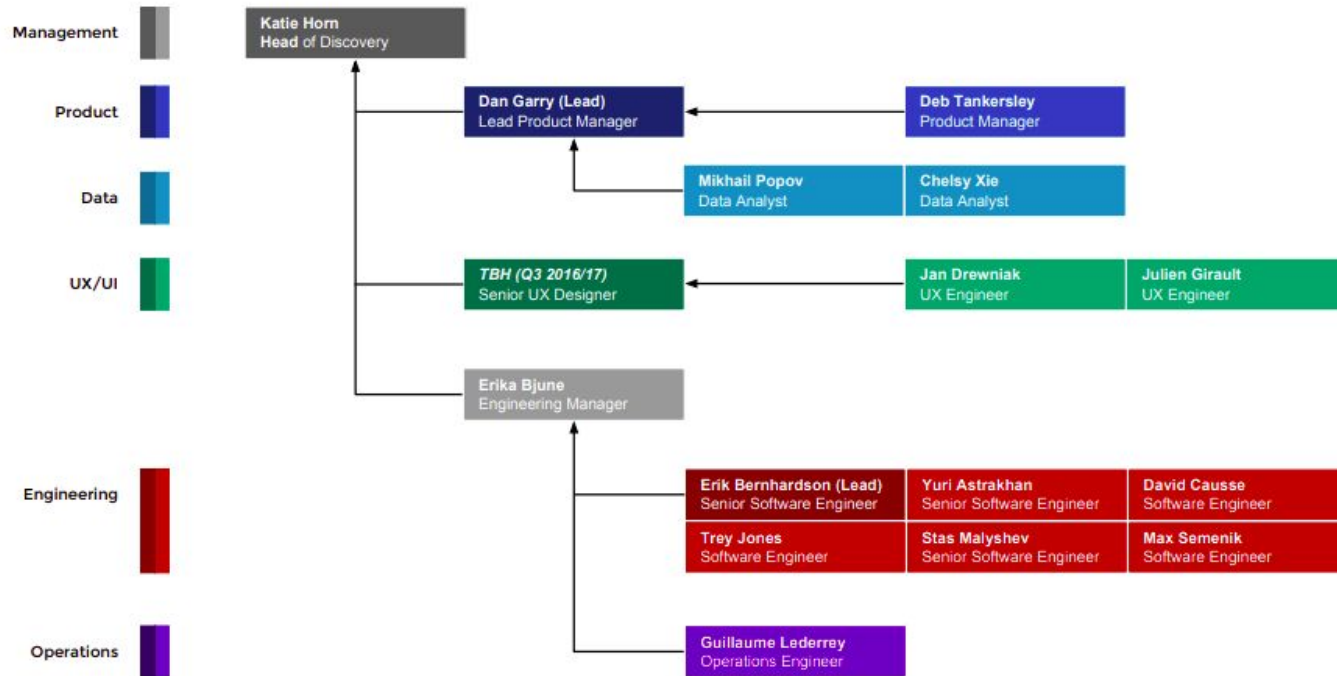
History and context

- Maps early stage
- The Discovery Team and the Maps stack
- Community wishlist 2017
- The former Collaboration Team and maps work in Q3-Q4/17-18
- Hand-off to ~~Reading~~ Product Infrastructure team Q1/18-19 and beginning of maintenance mode

Maps early stage

- The Maps as we know nowadays was started its development mid February, 2015 [1] and was released as beta in March 8, 2016. [2]
- The stable flag would be raised in May 2019[3], although the service was being used for many years

The Discovery team and Maps



A description of [Wikimedia Discovery's](#) narrative and roadmap for FY 2016/17 (July 2016 - June 2017). This presentation is a living document. The content and style can and will change over time, perhaps even drastically. This is especially true for the roadmap slide. *Caveat emptor.* :-) [4]

Collaboration Team

- Community Wishlist 2017
- [Map improvements 2018](#) [5]
- Community wishlist maps tasks turned to be bigger than the time scoped, so the Collaboration team focused on:
 - “Ensure that Kartographer and the associated maps technology stack are stable and can be easily maintained as maps gain a wider audience.”

Community Wishlist 2017

Kartographer Improvements was the most voted item of the **community wishlist** [6] and the former Collaboration team worked on several tasks to accomplish that wish. A few tasks remain opened (7/14):

1. [T141304](#) - Only a part of MAKI symbols is available (**Stalled**)
2. [T141715](#) - Markers with white labels on light backgrounds (**Untriaged**)
3. [T141335](#) - Add maps support for marks with 3 digits (**Depends on #1**)
4. [T140092](#) - Multiple use of identical location markers
5. [T140087](#) - Introduction of a user-set count numbers or texts
6. [T140083](#) - Introduce a generic term "all" for show parameter (**Stalled**)
7. [T180909](#) - Adding nearby and layer controls in full-screen view
8. ~~[T140212](#) - Kartographer showing own position~~ (**Closed as duplicate of [T208713](#)**)



Current Stewards

- Product Infrastructure
 - Michael
 - Mateus
- Operations
 - Guillaume Lederrey

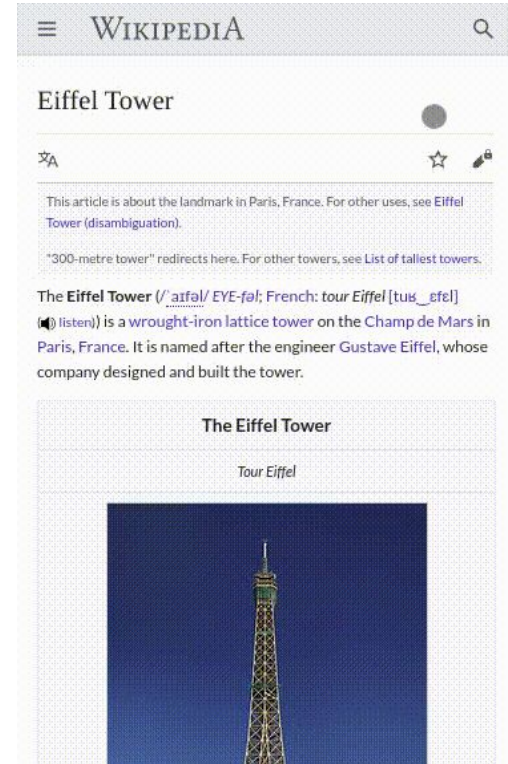
Maps as a Wikipedia product

Map as a product

- **Karographer Extension:** There are two main wiki pages where you can find how to use Maps in Wikipedia
 - [mw/Help:Extension:Kartographer](https://mw/help:Extension:Kartographer) [7]
 - mw/Extension:Kartographer [8]
- **Kartotherian Tile Server:** You can also find information about the tile server usage and policies
 - [Maps Terms of Use](#) [9]

Kartographer

- The Kartographer extension powers interactive and static maps on Wikimedia wikis



Leaflet (Mapbox's version)

- Leaflet is an open-source JavaScript library for mobile-friendly interactive maps
- It's very easy to customize and write plugins for it
- It's the engine behind Kartographer interactive maps
- Mapbox's Leaflet version is not maintained upstream



OSM Data

OSM Data

- OpenStreetMap is a map of the world, created by people like you and free to use under an open license.
- We used a set of plugins to load OSM data into the DB (osm2pgsql) and download the daily/hourly/minutely data from OSM (osmosis)

Kartotherian and Tilerator

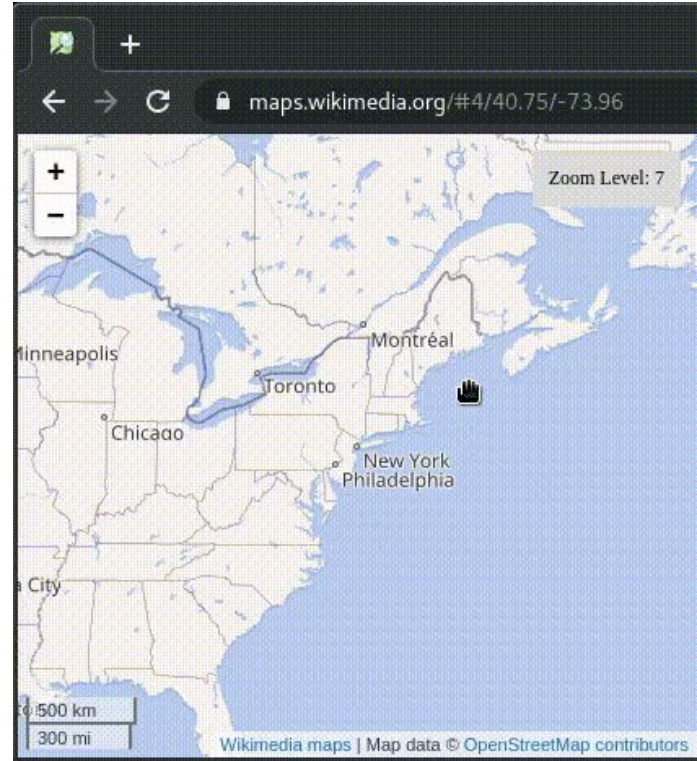
Mapnik

“mapnik combines pixel-perfect image output with lightning-fast cartographic algorithms, and exposes interfaces in C++, Python, and Node.”

<https://mapnik.org/>

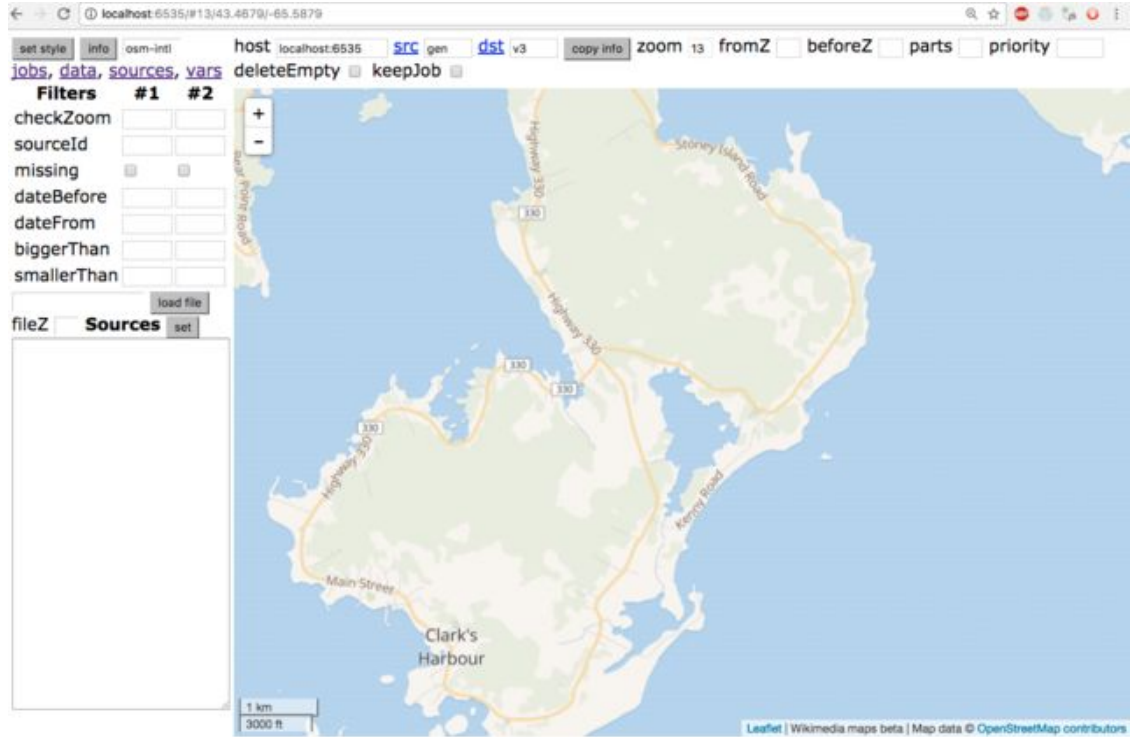
Kartotherian

- Maps nodejs server for vector-based tiles and snapshots, designed for Wikipedia and other sites. It ties together a number of MapBox components for vector and raster rendering based on Mapnik 3, and uses service runner for scalability, performance monitoring and stability.



Tilerator

- Tilerator is a multiprocessor, cluster-enabled admin tool, that allows pre-generation and re-generation of vector-tiles.



http://localhost:6535/oid?zoom=13&x=26838y=2995&generatorId=gen&storageId=v3
["2-13; 1 tile at [2683,2995] (x=13536847); gen=v3"]

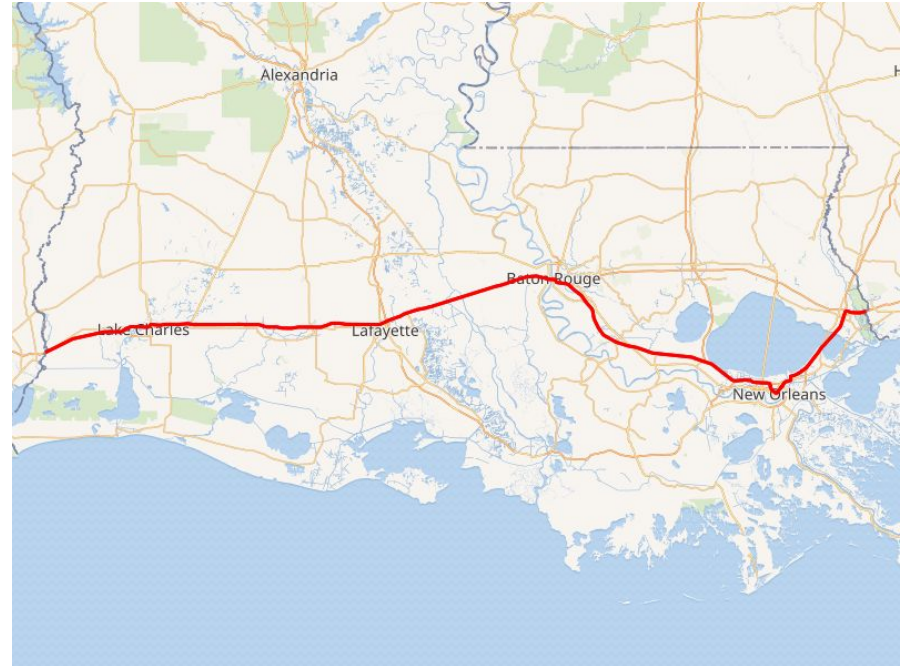
<https://wikitech.wikimedia.org/w/index.php?curid=419924>



WIKIMEDIA
FOUNDATION

Snapshot

- Snapshot is a service within kartotherian that create static images of the map.

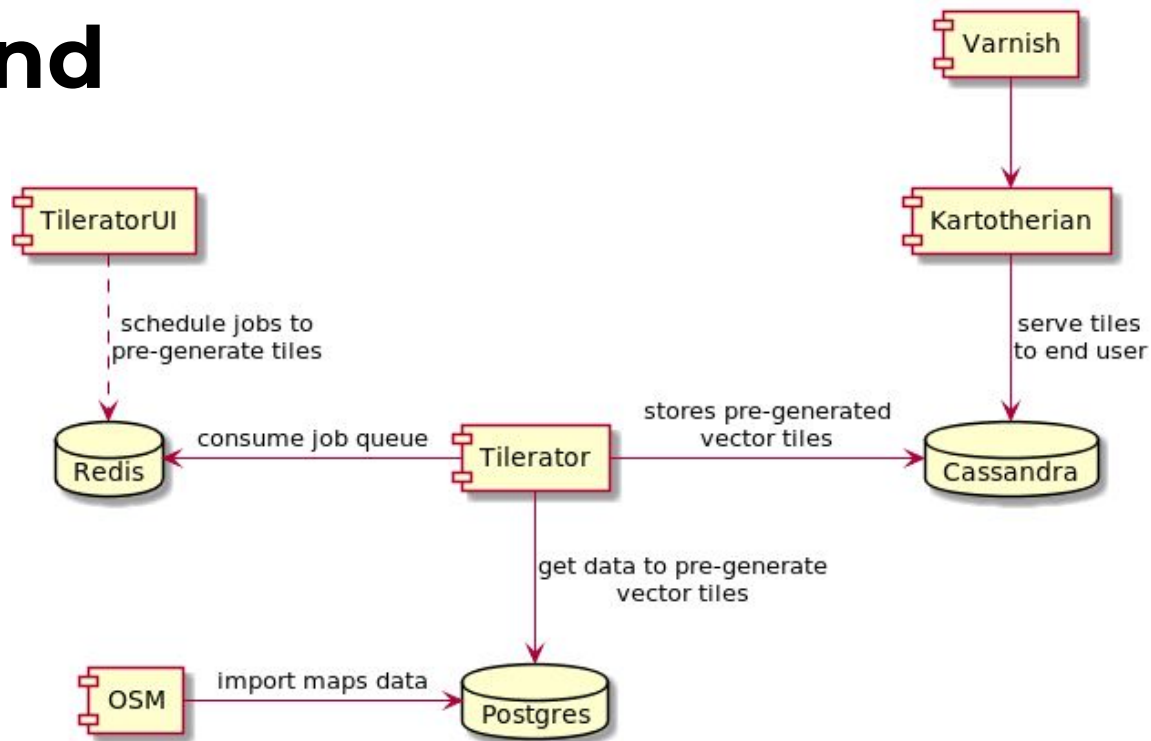


https://maps.wikimedia.org/img/osm-intl,8,30,2038,-91.6714,800x600.png?lang=en&domain=commons.wikimedia.org&title=Data%3AInterstate+10+in+Louisiana.map&groups=_0b14bbbc7b1151bfc4e6e13a1cf4c4751081634c

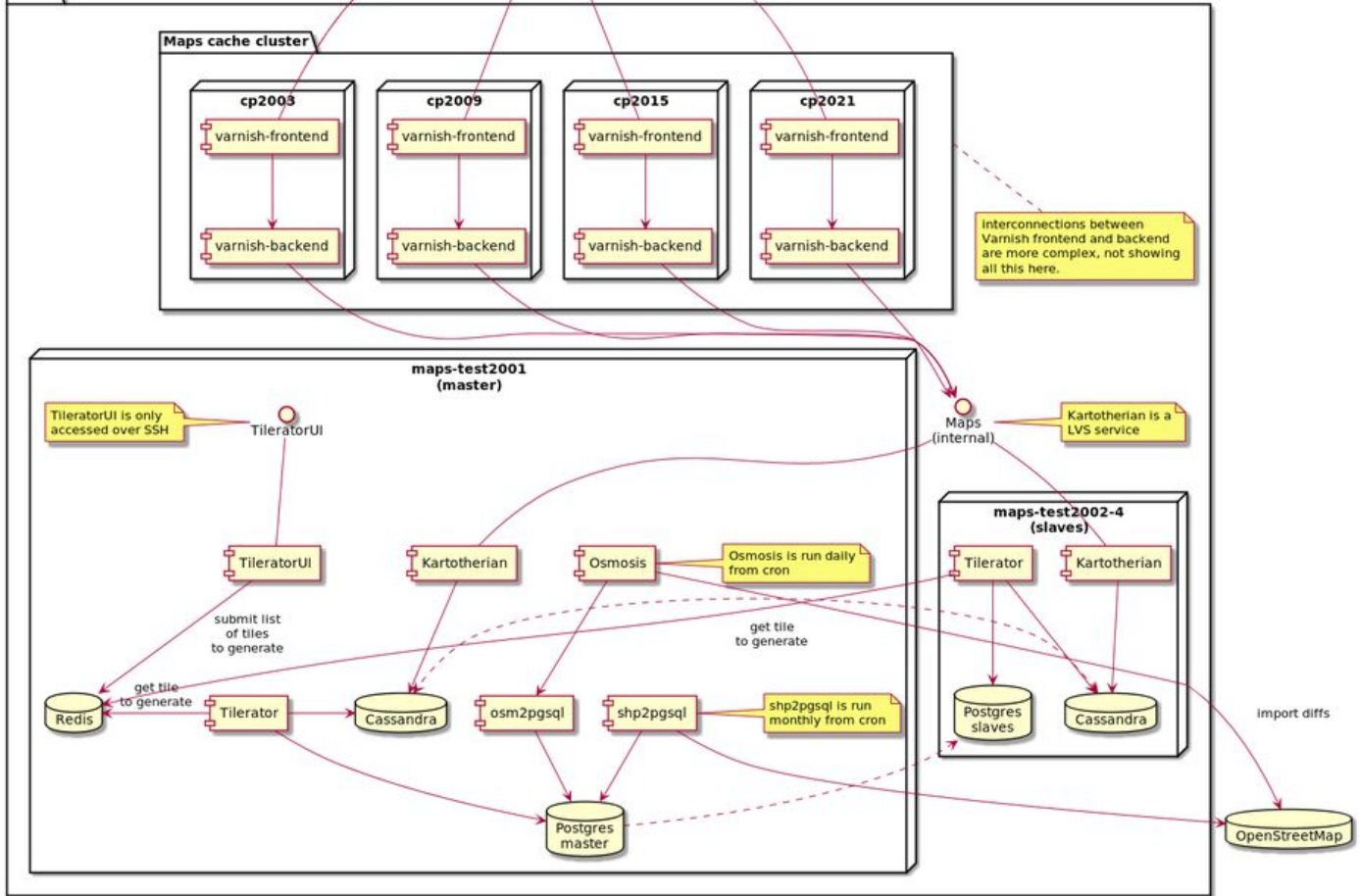
Geoshapes

- Geoshapes is a service within kartotherian that can extract external data from Wikidata and Commons and make it available as GeoJSON.

Backend



codfw



Maps is awesome and complex

Maintenance mode and state of Maps in Q1/18-19



WIKIMEDIA
FOUNDATION



By United Artists - ebay, Public Domain,
<https://commons.wikimedia.org/w/index.php?curid=29131104>

State of Maps

Q1/18-19

- kartootherian
- kartographer
- tilerator
- osm-bright.tm2
- osm-bright.tm2source
- meddo
- brighmed



Kartootherian and Tilerator, has a tree dependency of ~190 repositories each. On github there were 38 repositories under the Kartootherian and Wikimedia organizations. Kartootherian was not properly mirrored in gerrit.

State of Maps Q1/18-19

- kartootherian
- kartographer
- tilerator
- **osm-bright.tm2**
- osm-bright.tm2source
- **brighmed**
- meddo



Current Style: A fork of Mapbox's style of the same name, intended for Kartootherian. This style relies on the osm-bright.tm2source datasource.

New Style: This is a style based on the cartography of Mapbox's OSM Bright, for use with Meddo vector tiles.

State of Maps

Q1/18-19

- kartoherian
- kartographer
- tilerator
- osm-bright.tm2
- **osm-bright.tm2source**
- brighmed
- **meddo**



Current Style: Data source for osm-bright.tm2 using custom scripts for OSM data load into our database

New Style: Data source using cleartables (Paul Norman) as an abstraction layer for loading OSM data

Kartotools

github.com/thesocialdev/kartotools

- A small collection of tools that used at some point to investigate specific problems related to maps, the highlights are:
 - Some `jq` commands to read kartotherian logs
 - A script to check for dependency deprecation through all dependencies of kartotherian and tilerator
 - A set of scripts to indentify Mapnik slow queries in PostgreSQL

Kartodock

github.com/thesocialdev/kartodock

- A docker-compose setup to run and install Maps stack with one command
 - Includes: Cassandra, Redis, PostgreSQL + Postgis, Tilerator and Kartotherian, Mapbox-studio classic (for style manipulation and debug)
 - Also supports OSM pg2sql and imposm3 (WIP) scripts to download OSM data locally
- My first setup took about 2 weeks + onboarding. Kartodock setup the environment for you in 30 minutes, depending on the size of the OSM data you choose, including download time.



Technical Debt

Technical Debt stats before

- Outdated dependencies
 - Kartotherian: 52%
 - Tilerator: 62%
- New style not deployed yet
- Some “prototype code” was never removed
- Not a volunteer friendly project

Technical Debt stats now

- **Outdated dependencies**
 - Kartotherian: ~57% (5% increase)
 - Tilerator: ~63% (1% increase)

Technical Debt stats now

- **New style not deployed yet**
 - And shouldn't, the technology involved (CartoCSS) is becoming outdated fast and losing grounds for mapbox-gl-styles

Technical Debt stats now

- **Not a volunteer friendly project**
 - We did some work to mitigate this problem and improve the development experience
 - Made kartotherian “monorepo”
 - Moved the maintained source code to gerrit
 - Documented processes
 - Created a docker-compose environment to run the full stack easily

Technical Debt stats now

- We forked third-party packages due to lack of activity or incompatibility with our infrastructure:
 - node-mapnik: at 3.7.2 so we could have node 10
 - Forked packages to pin mapnik version

Technical Debt stats now

- We forked third-party packages due to lack of activity or incompatibility with our infrastructure:
 - node-mapnik: at 3.7.2 so we could have node 10
 - Forked packages to pin mapnik version

Maps achievements so far

- ✓ OS migration to debian stretch and full planet tile re-generation [10]
- ✓ Migration to node 10
- ✓ Moved kartotherian to gerrit and implemented the CI pipeline
 - Kartotherian didn't have CI tests running before
- ✓ Operations improved processes documentation and scripts
- Status of the project: **Maintenance**

More than regular maintenance

- What can be done in the project to improve maintenance?
 - Infrastructure modernization;
 - Kubernetes;
 - Re-architecture of the critical modules in the stack to improve maintainability; and
 - More documentation!

**Shout out to the
volunteers helping
with maps!**



WIKIMEDIA
FOUNDATION

Sources

1. <https://github.com/kartotherian/kartotherian/commit/1a79ec57b217faff4049640dfc2928beaf94ad63>
2. <https://www.mediawiki.org/w/index.php?title=Extension:Kartographer&direction=next&oldid=2073233>
3. <https://www.mediawiki.org/w/index.php?title=Extension:Kartographer&oldid=3226183>
4. https://www.mediawiki.org/w/index.php?title=File:Discovery_narrative_FY_2016-17.pdf&page=5
5. https://www.mediawiki.org/wiki/Map_improvements_2018
6. https://meta.wikimedia.org/wiki/2017_Community_Wishlist_Survey/Miscellaneous/Kartographer_improvements
7. <https://www.mediawiki.org/wiki/Help:Extension:Kartographer>
8. <https://www.mediawiki.org/wiki/Extension:Kartographer>
9. https://foundation.wikimedia.org/wiki/Maps_Terms_of_Use
10. https://www.mediawiki.org/wiki/Wikimedia_Maps/Tile_generation_report



Thank you!

