

Leveraging the Mapillary Platform to Perform In-Office Listing

FedCASIC
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Overview

- What is Mapillary?
- Benefits of street level imagery
- Potential challenges of street level imagery
- Original Corylus
- Current Corylus
- Future Enhancements

What Is Mapillary?

- Mapillary (www.mapillary.com) is a crowd-sourced street-level imagery platform that scales and automates mapping using collaboration, cameras, and computer vision
- Based in Malmo, Sweden
- Launched in 2013
- Currently owned by Meta
- Similar to Google Street View
- In addition to raw imagery, Mapillary also provides labeled images for machine learning applications
- Capture and upload your own imagery
- Storage and access is free

Mapillary - Worldwide Coverage



Mapillary – Street level imagery



Capturing Mapillary Imagery



- Create an account
- Upload imagery to Mapillary
- If imagery is captured using smart phone, upload using Mapillary app

Mapillary – Viewing your Imagery

The screenshot shows the Mapillary web application interface. At the top, there is a browser address bar with the URL `mapillary.com/app/user/rti_gis?lat=-1.5046964&lng=29.6106801&z=17&pkKey=106062541544800`. Below the browser, the Mapillary logo and navigation icons are visible. The main area is a map showing a region with green shaded areas (National Parks) and blue water bodies (Lakes). A yellow line indicates a route, with a red dot marking the location of Musanze. A street view inset in the bottom left shows a person standing in front of a yellow and blue building. On the right side, there is a user profile section for 'rti_gis' and a list of imagery captures. A red circle highlights the 'IMAGERY LAYERS' toggle switch, which is currently turned on. The list of captures includes thumbnails, timestamps, and durations.

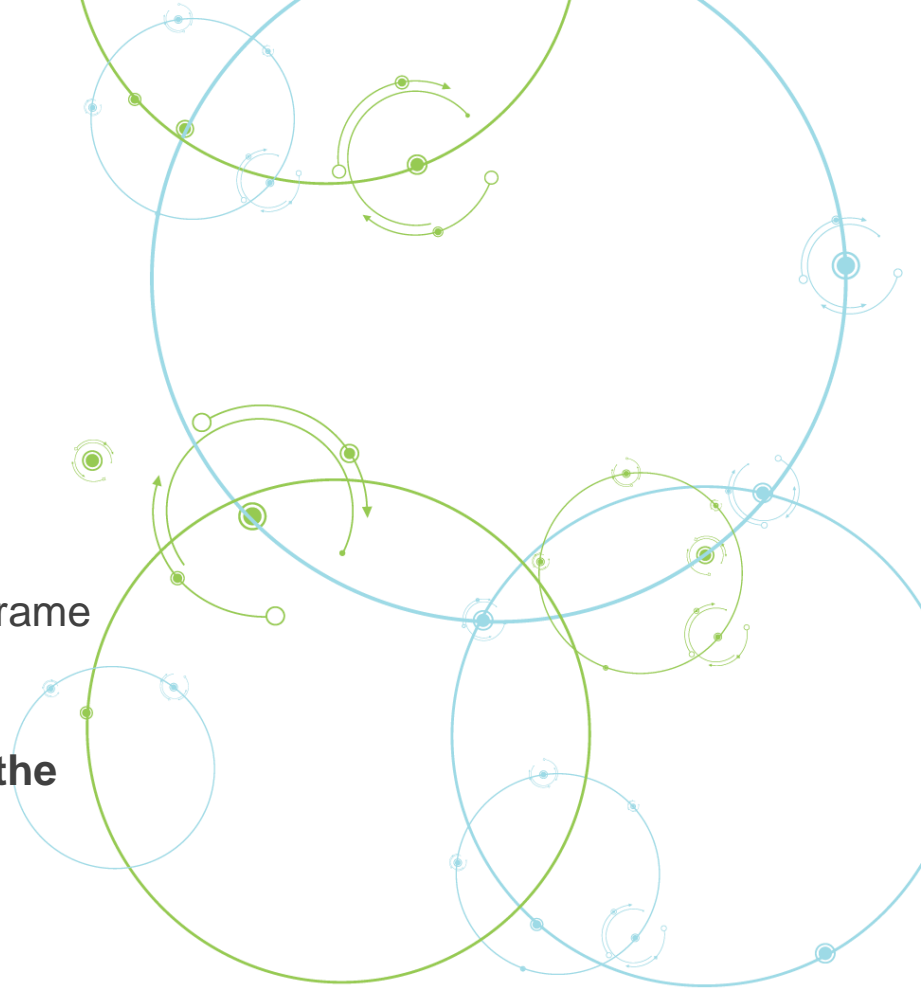
Thumbnail	Timestamp	Duration
	Feb 15, 2018 2:18 AM	05:00
	Feb 15, 2018 2:15 AM	0:00
	Feb 15, 2018 2:13 AM	1:00
	Feb 15, 2018 2:06 AM	1:10

Help us understand how you use Mapillary in this 3 minute survey!

Get started

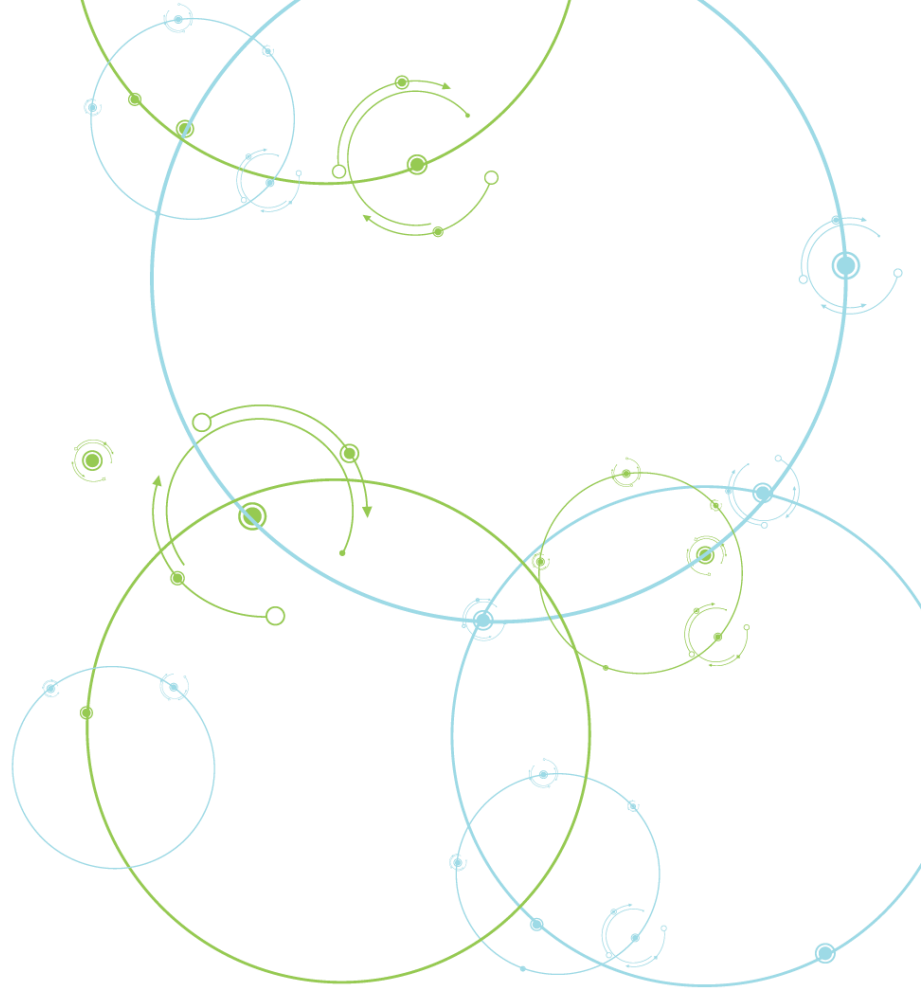
Benefits of Street Level Imagery

- Ability to remotely gather assets
 - Existence and condition
 - Transportation
 - Roads, sidewalks, parking, bike lanes
 - Utilities
 - Power, water, storm sewers
 - Other features
 - Trees, graffiti, garbage collection
- Household/building enumeration for sampling frame development
 - Residential and commercial
- **Return to the image instead of returning to the field**
 - Verification and QC are easier
- Use as an input to object detection models



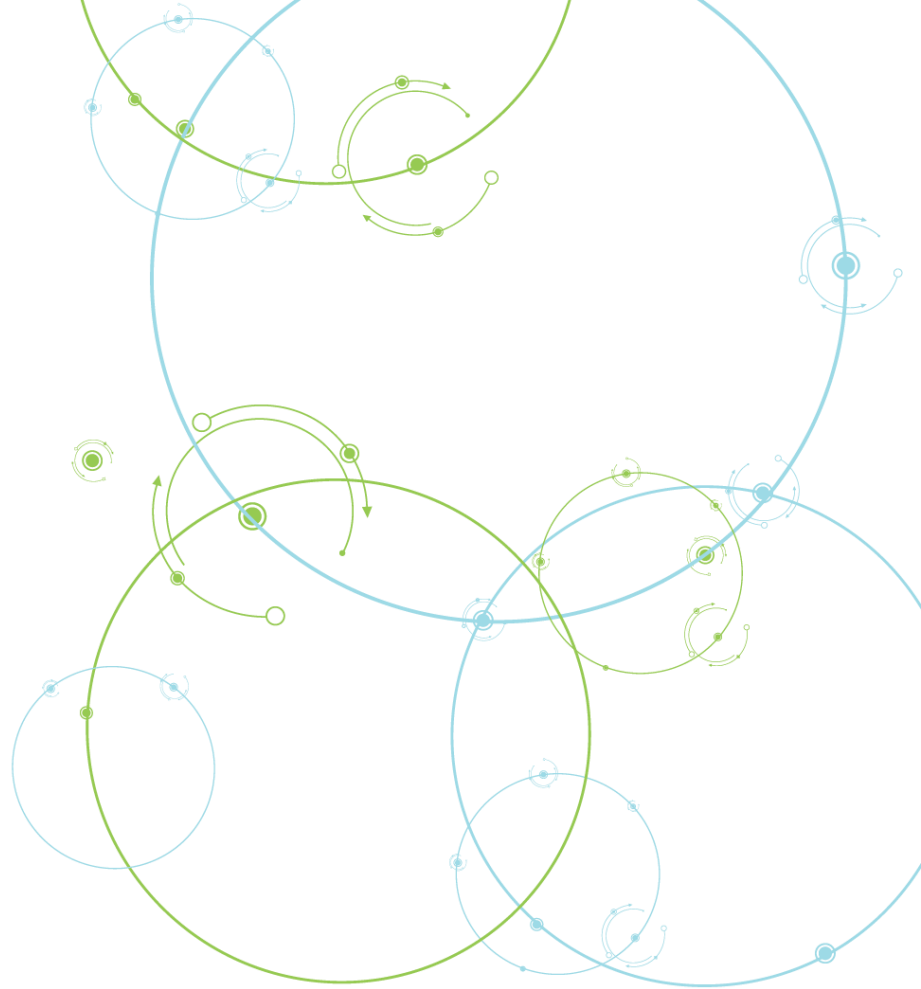
Potential Challenges of Street Level Imagery

- Image resolution
 - insufficient
- Image currency
 - too old
- Image coverage
 - Crowd sourced imagery does not exist in some areas
- To overcome these, obtain and upload your own imagery
 - Obtain a camera
 - Map out the study area(s)
 - Train staff to obtain imagery

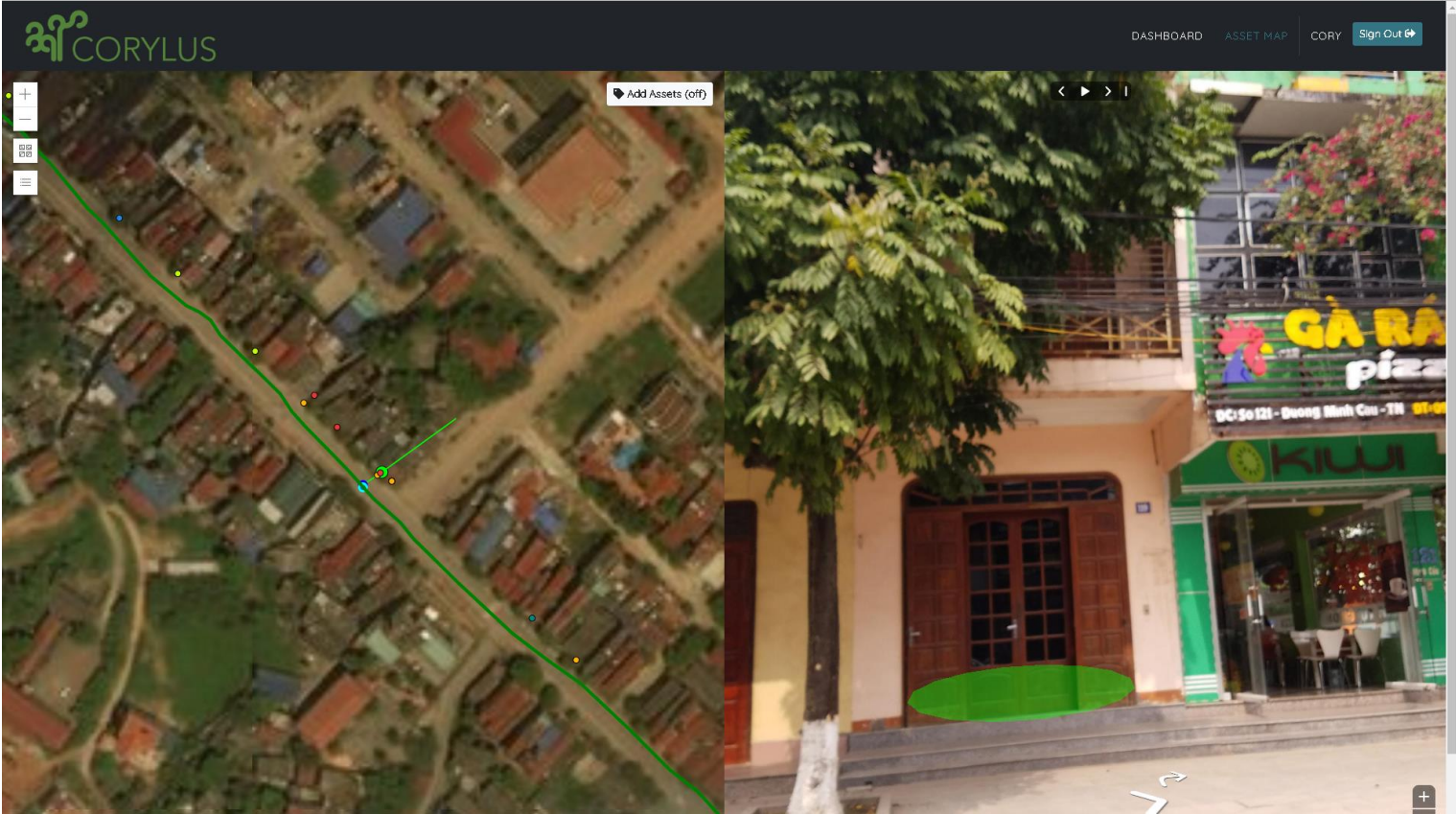


Original Corylus

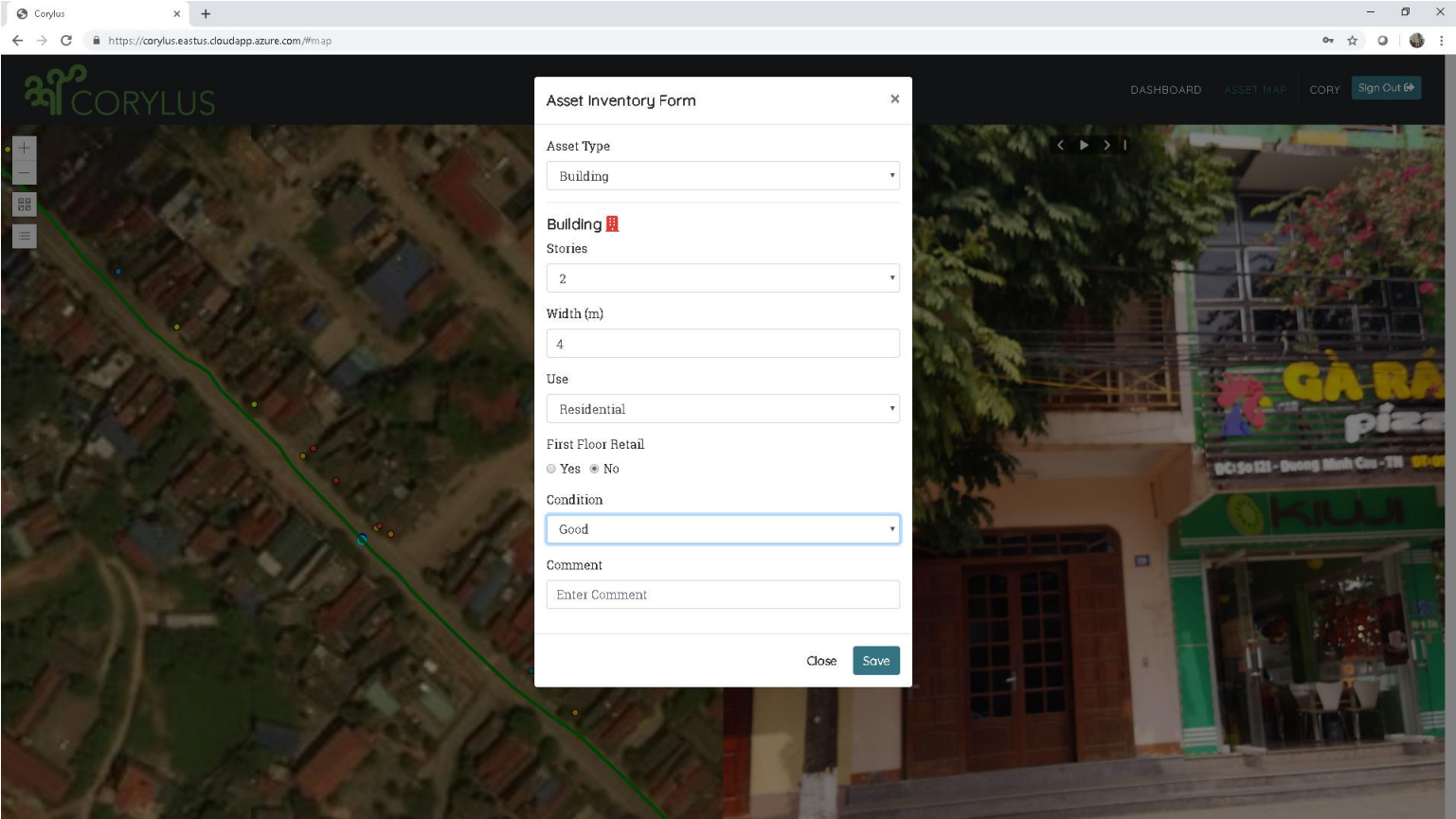
- RTI developed Corylus as an asset collection tool
- Web-based
- Used Mapillary as the source of street view imagery
 - Collected our own project specific imagery
- Used ESRI as source of aerial imagery




Original Corylus



Original Corylus



Original Corylus




[DASHBOARD](#)
[ASSET MAP](#)
[CORY](#)
[Sign Out](#)

Select Asset Type: Building

📍
📷
🗑️

Id	Stories	Width (m)	Use	First floor retail	Condition
2a0558f3-ad89-47a...	2	5	Residential	false	Good
91fbfec7-da3e-478...	2	5	Retail	true	Good
870ef730-ec05-42e...	More		Mixed	true	Fair
1d1586e6-1ece-485...	1		Retail	true	Good
6919fd06-d247-489...	3	4	Retail	true	

1
2
3
4



Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community Powered by Esri

Summary of Building Assets by Attribute

Stories: 2
Total: 6

Stories: 3
Total: 5

Use Retail
Total: 7

Use Residential
Total: 3

Condition: Good
Total: 10

Condition: Fair
Total: 4

Condition: Poor
Total: 3

Stories: More
Total: 5

Stories: 1
Total: 2

Use Mixed
Total: 5

Use...
Total: 1

Use...
Total: 1

Condition: Poor
Total: 1

Width (m):
Total: 7

Width...
Total: 2

W...
T...

First Floor Retail: True
Total: 13

First...
Total: 3

Comment
Total: 13

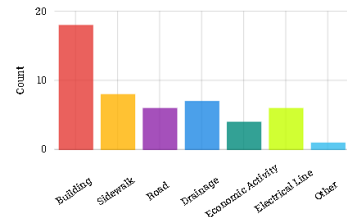
Width (m): 5
Total: 5

Width...
Total: 1

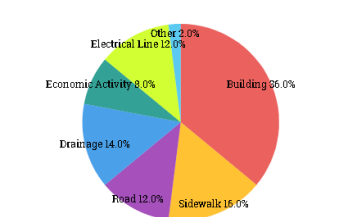
W...
T...

First...
Total: 2

Total Assets By Type



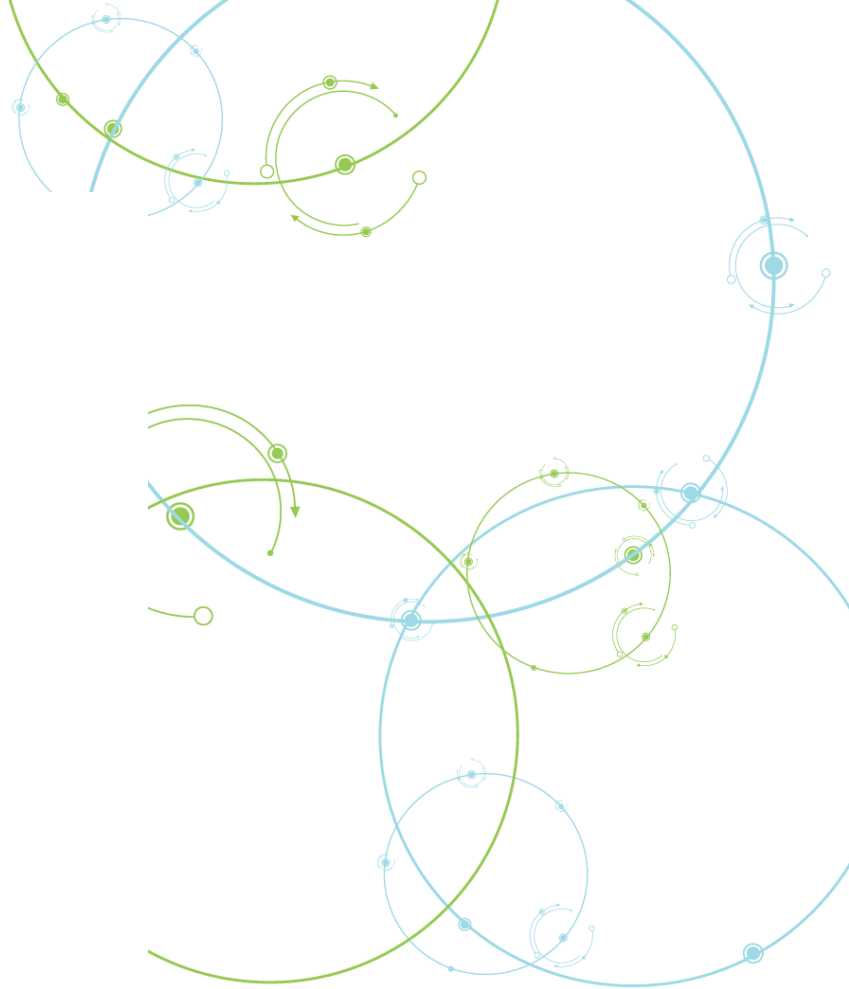
Asset Type	Count
Building	18
Sidewalk	8
Road	6
Drainage	7
Economic Activity	4
Electrical Lines	6
Chair	1



Asset Type	Percentage
Building	96.0%
Sidewalk	16.0%
Road	12.0%
Drainage	14.0%
Economic Activity	8.0%
Electrical Lines	12.0%
Other	2.0%

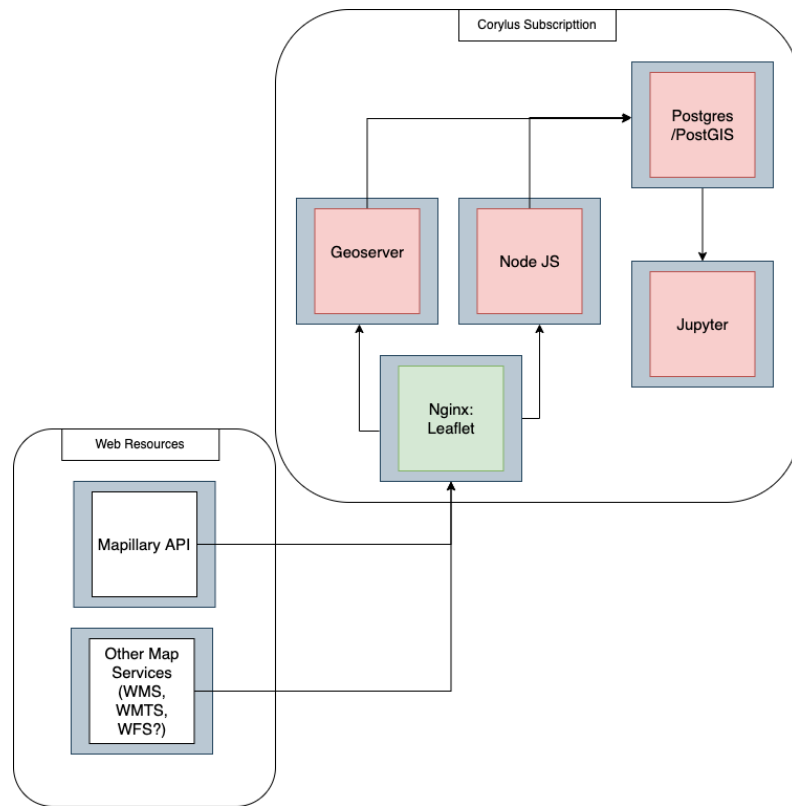
Current Corylus

- Keeps the same core functionality
- Modernizing the architecture
- Sits inside the Merge computing environment
 - Web-based, log in from anywhere
 - Distributed teams can collaborate
- Generic application to collect/edit
 - Assets
 - Building locations
 - Image labeling
- Supports both horizontal and vertical imagery
- Create/edit points and polygons
- Supports specific roles



Corylus Architecture

- Small footprint
- Does not require high powered computing
- Most of project data is housed locally within Merge
- Image data hosted by Mapillary
- Connects via Mapillary API
- Kubernetes handles communication, security, and automatic scaling
- Can easily create new instances of Corylus for multiple projects



Corylus - Roles

Corylus User	Corylus Role
Super User	Super user access for setting up projects within Merge.
Project Admin	Responsible for setting up the project and adding project users and roles.
Project Manager	Responsible for assigning users, monitoring/managing progress through the case load and workflow, QA/QC of user's work.
Project User (Coder)	Responsible for doing the survey, data collection, or data verification. Geographic area managed by User id.

Future Enhancements

- Streamlining core functionality
- Automating workflows
- Increasing flexibility to handle different kinds of projects
- Include drone imagery
 - Crop identification
 - Solar installations
- Satellite and computer vision model training data





Thank you

Contact: Jamie Cajka | email: jcajka@rti.org

Questions or comments?