bePelias: un géocodeur local basé sur BeStAddress

Vandy Berten – Smals Research – 25-09-2025

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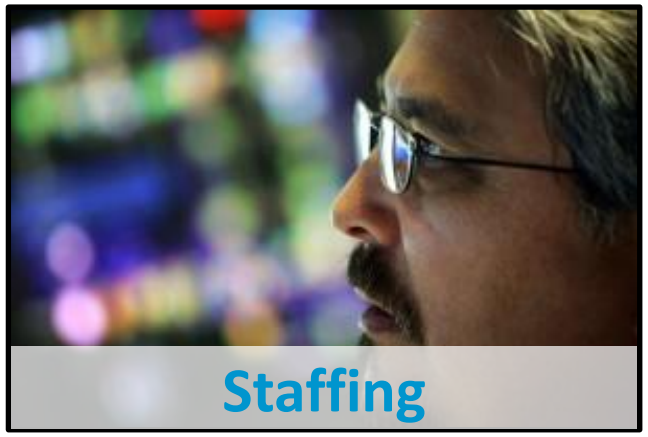
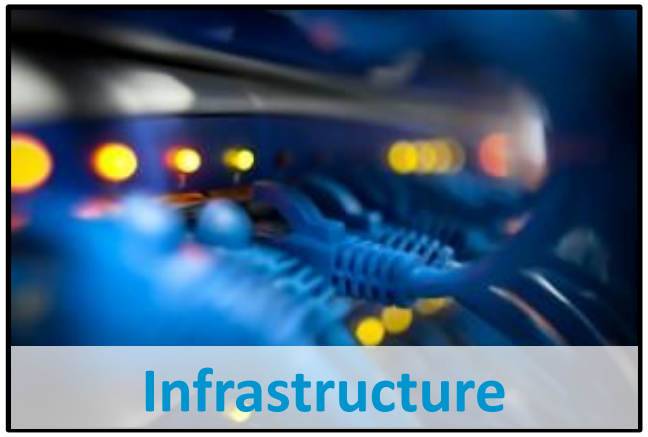
SUPPORT FOR E-GOVERNMENT


Knowhow


Development


Staffing


Infrastructure

g-cloud

top EMPLOYER BELGIË BELGIQUE
CERTIFIED EXCELLENCE IN EMPLOYEE CONDITIONS

WWW.SMALS.BE

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Geocoding: concept

Geocoding = (1) Address standardization + (2) Geolocation
Geocoder = API (Application Programming Interface)

"Av. Fonsny 20, 1060 Bruxelles"

```
{"street"   : "Avenue Fonsny",
 "housenbr": "20",
 "zipcode"  : "1060",
 "city"     : "Saint-Gilles",
 "country"  : "Belgique",
 "location": [50.8358,4.3361]}
```

Or polygon

(1) Address standardization:

- Data quality:
  - Standardization
  - Deduplication
  - Matching
- Auto-completion (type-ahead)
- …

(2) Geolocation:

- Visualization
- Controls
- Spatial (GIS) analytics
- …

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Geocoding: concept

Address standardization = Mapping
Geolocation = « side effect »/bonus

"Av. Fonsny 20, 1060 Bruxelles"

Street	Number	Zipcode	Locality	Location
…	…	…	…	…
Avenue Fonsny	20	1060	Saint-Gilles	50.8358, 4.3361
Avenue Fonsny	22	1060	Saint-Gilles	50.8359, 4.3358
…	…	…	…	…

```
{"street"   : "Avenue Fonsny",
 "housenbr": "20",
 "zipcode"  : "1060",
 "city"     : "Saint-Gilles",
 "country"  : "Belgique",
 "location": [50.8358,4.3361]}
```

Tools

- Cloud commercial providers:
  - Here we go
  - Bing maps
  - Google maps
  - TomTom
- Sometimes free in specific conditions

- Mainly 2 open-source/open-data solutions:
  - OpenStreetMap/Nominatim
  - Photon (OSM + ElasticSearch)
- On-premise possible for a specific region

BeSt Addresses

FOD Beleid & Ondersteuning
SPF Stratégie & Appui

- BeSt Addresses: BOSA project providing an authentic source for Belgian addresses
- Gathering regional authentic sources: UrbiS, Adressenregister (ex CRAB), ICAR
- Each address has a (stable) id which should be used in other applications
- Can be used either through file download (public) or via API (public/eGov)

https://bosa.belgium.be/fr/services/best-address-services

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Our constraints

- We needed a geocoding API:
  - Local/on-premise
  - Based on BeSt Address (SPF BOSA)
  - Not written from scratch
  - Accepting large volumes

- Three options so far:
  - PhacochR (Obs. de la santé et du Social BXL + ULB/IGEAT) → Not an API (a batch R library)
  - BOSA API → Until recently, no fuzziness at all
  - Pelias + BeSt → Outdated/poor data, low robustness

Pelias

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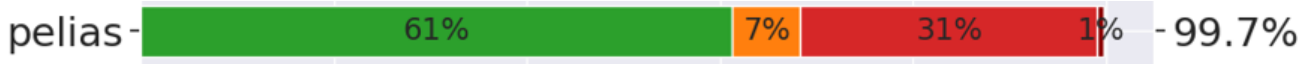
Pelias

- Open source: https://github.com/pelias/docker (projects > belgium)

- Data-source problems (in 2023):
  - Based on OpenAddresses.io version of BestAddress CSV files (https://batch.openaddresses.io/), but due to some incompatibility, not updated since Feb 2021
  - Pelias still uses an old OpenAddresses dataflow, deprecated mid-2021

- Poor data: partial best Id, no translation, no box numbers…

- Robustness problem:



  - If structured version doesn't work, sometimes unstructured version does (and vice-versa)
  - If none works, some simple transformations often allow matching:
    - {"postalcode": 1160, "locality": "Auderghem"} → {"postalcode": 1160}
    - Cleansing text, removing parenthesis in street, non-digits in housenumber…

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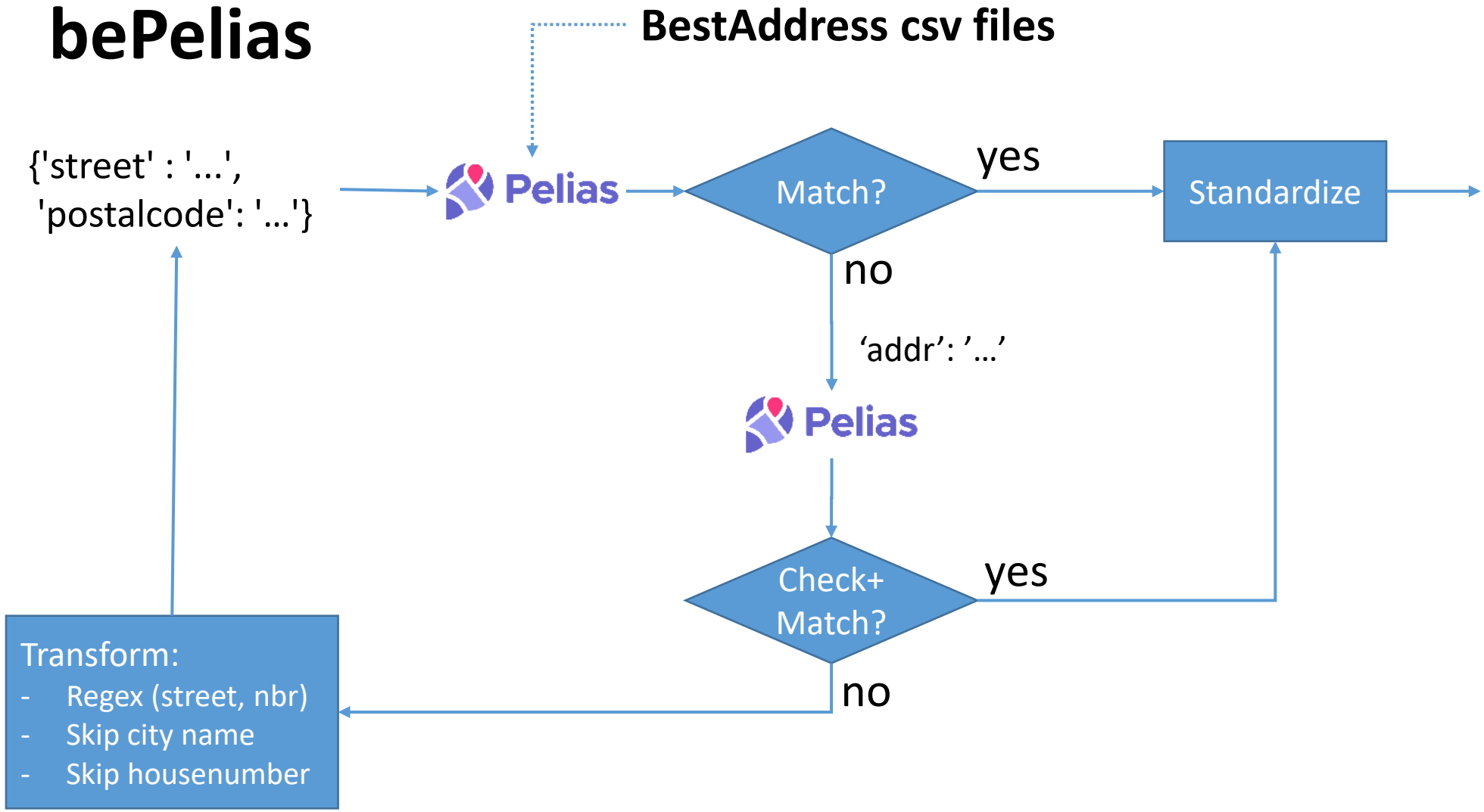
bePelias



- Based on a new dataflow from BestAddress, by-passing OpenAddresses.io
- "Match?"= "is a building". If no transformer gives a building match →keep the best one
- If coords = 0,0 → call interpolation engine

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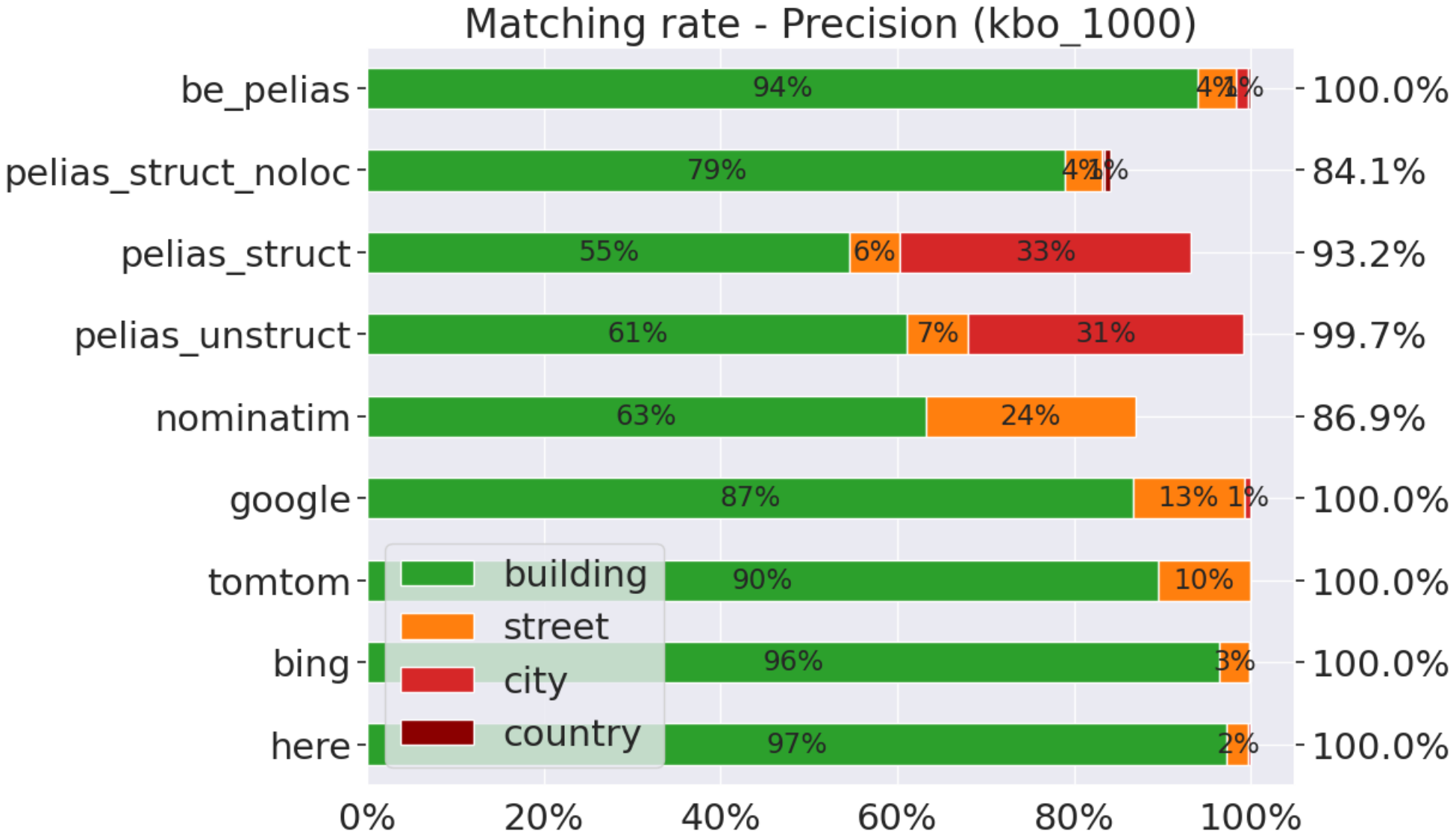
bePelias: Matching rate



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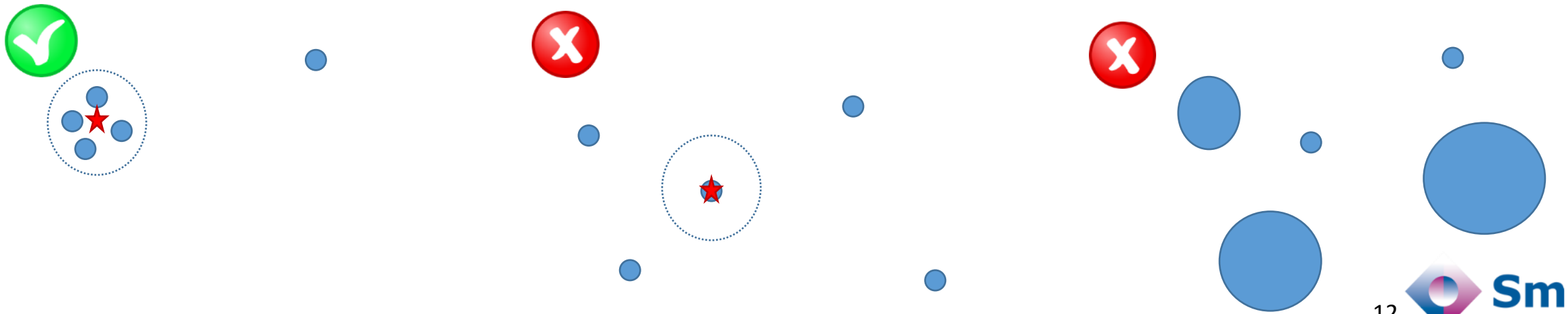
Performances

- Giving an answer does not make this answer to be correct!
- Ideal situation: testing against a reference address list. But:
  - Building such a list is complex!
  - List will be (intrinsically) biased

→ We propose a methodology based on a “majority vote”

Methodology

- Collect a (not too clean) address dataset → 1 000 addresses from KBO
- Send this dataset to several coders → here, bing, nominatim, google…
- Use median point for each address as reference, with some conditions:
  - Enough (precise) matches → 957 with ≥ 3/7 “building” matches
  - Enough answers close to median → 932 with ≥ 3/7 within 100 m
- Compute misc. stats about « distance to median point »



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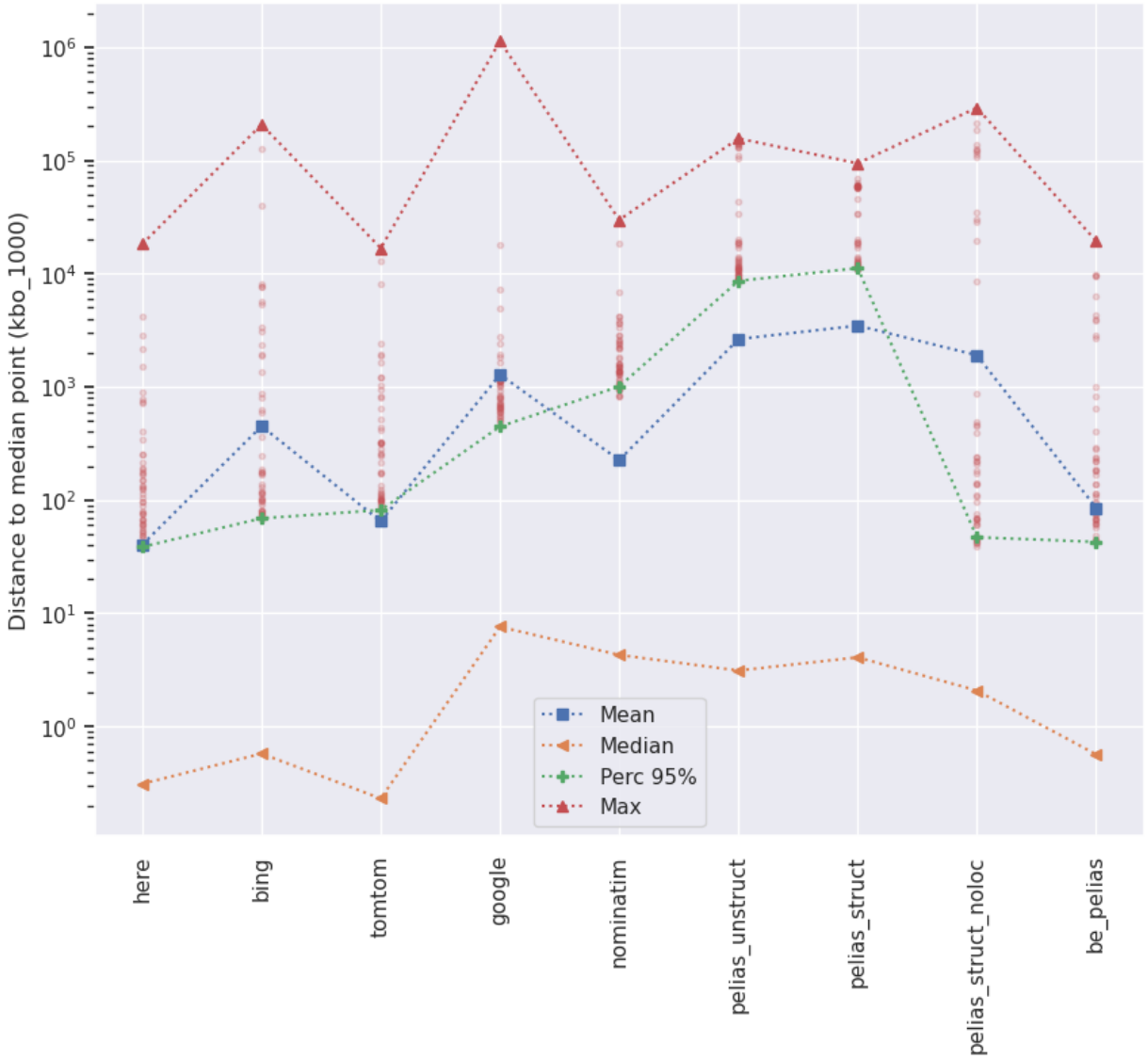
Distance to median point

OS/on-prem



The lower the better!

! No stats if no building level results
→ « bad » geocoders are even worse

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Deployment

- Available on https://github.com/SmalsResearch/bePelias/
- Docker + Python + FastAPI
- Deploy :
  - `./scripts/build.sh` `# Build pelias & bepelias docker images (~30 minutes)`
  - `./scripts/feed.sh` `# Prepare files from Bosa and load them (~1h30)`
  - `./scripts/run.sh` `# Run Pelias and bePelias API (with default parameters)`
- Many variants (one region, update data, two-machines build…)
- Live (test) instance available on request
- Unstructured mode available

Call

https://[host:IP]/REST/bepelias/v1/geocode?streetName=**Avenue+Fonsny**&houseNumber=**20**&postCode=**1060**&postName=**Saint-Gilles**


```
{   items: [{
        bestId:       "https://databrussels.be/id/address/219307/7",
        street:       {name: {fr: "Avenue Fonsny",   nl: "Fonsnylaan"},
                       id: "https://databrussels.be/id/streetname/4921/2"},
        municipality: {name: {fr: "Saint-Gilles",    nl: "Sint-Gillis"},
                       code: "21013",
                       id: "https://databrussels.be/id/municipality/21013/14"},
        postalInfo:   {name: {fr: "Saint-Gilles",    nl: "Sint-Gillis"},
                       postalCode: "1060"},
        housenumber:  "20",
        status:       "current",
        coordinates:  {lat: 50.83583,  lon: 4.33845},
        precision:    "address"}],
    total: 1,
    callType: "struct",
    inAddr: {address:    "Avenue Fonsny, 20",
             locality:   "",
             postalcode: "1060"},
    peliasCallCount: 3,
    transformers: "clean;no_city",
    self: "..." }
```


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OpenAPI

bePelias API 1.0.0 OAS 3.1

/REST/bepelias/v1/openapi.json

A service that allows geocoding (postal address cleansing and conversion into geographical coordinates), based on Pelias and BestAddresses.

```
Code available on https://github.com/SmalsResearch/bePelias/
```

Vandy BERTEN - Website
Send email to Vandy BERTEN

Servers
/REST/bepelias/v1

default

GET	`/geocode`	Geocode
GET	`/geocode/unstructured`	Geocode Unstructured
GET	`/reverse`	Geocode Reverse
GET	`/searchCity`	Search City
GET	`/id/{bestid}`	Get By Id
GET	`/health`	Health

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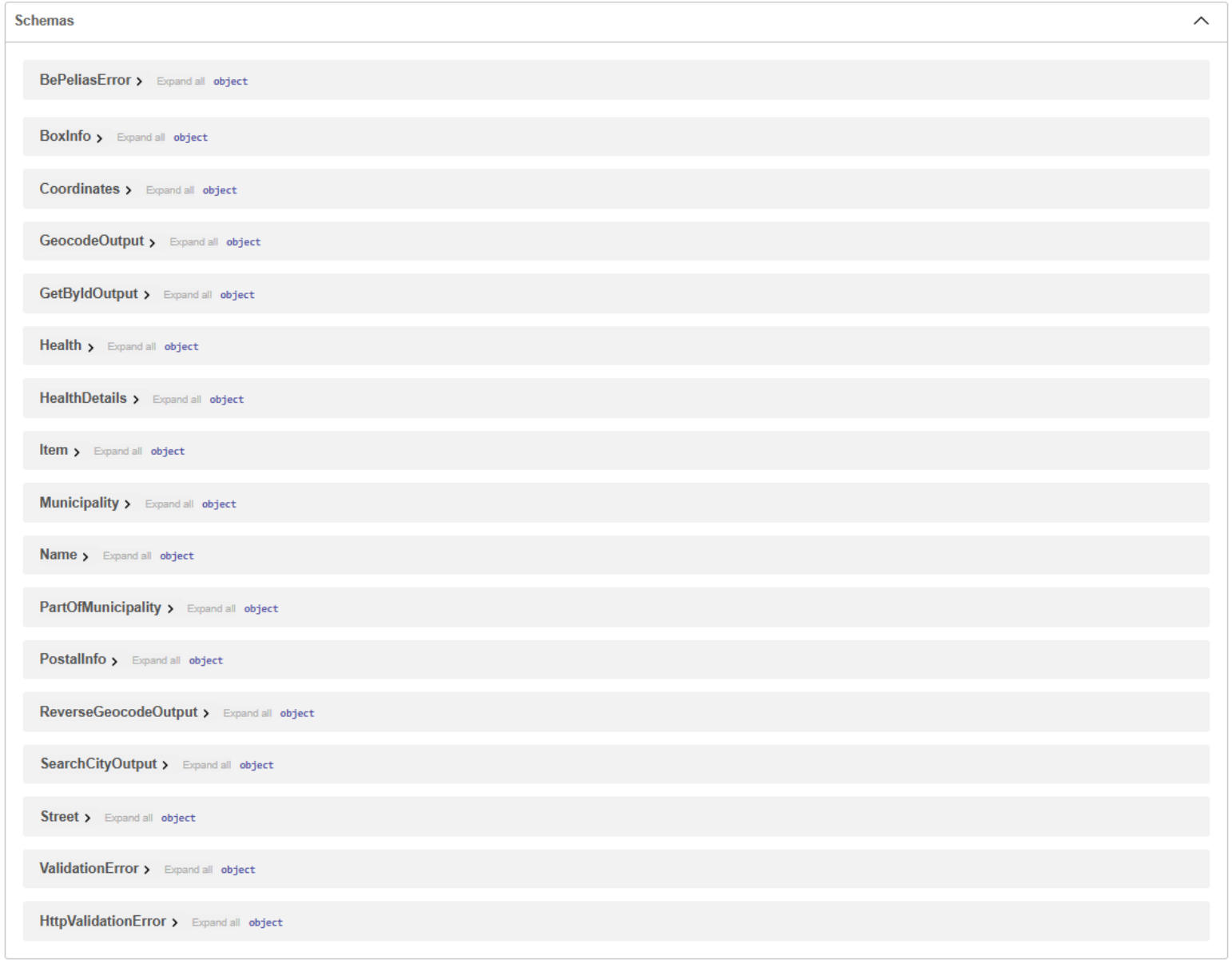
OpenAPI



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Conclusions

- bePelias: on-premise geocoder (REST API) based on BeSt Address (Belgium)
- Simple deployment
- Similar performance as main cloud actors
- Only for addresses (not for « Smals, Saint-Gilles » or « Resto à Ixelles »)

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