

Extraction et évolution de contraintes d'intégrité dans les Géocommuns

Martin Bodin Ugo Comignani

Spades

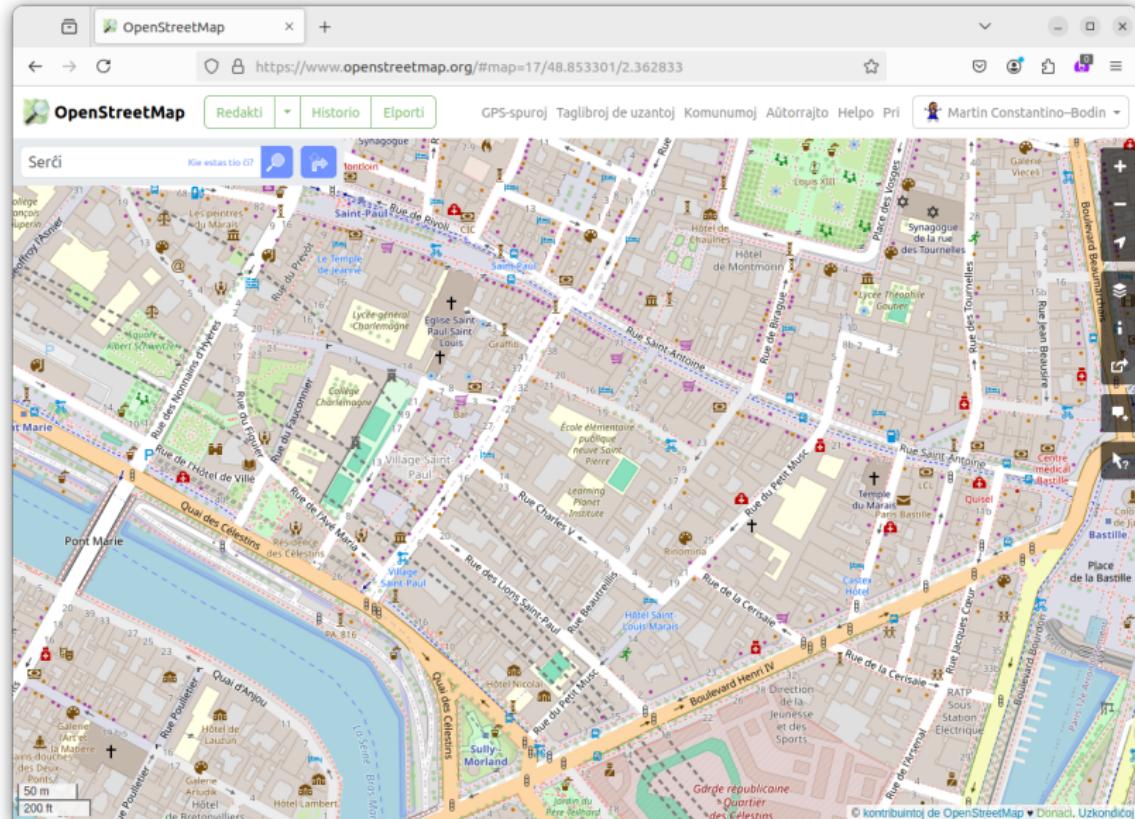
TyRex

Inria

6 Novembre 2024

OpenStreetMap

Le site openstreetmap.org



© Contributeurices OpenStreetMap

Le site openstreetmap.org

Nodo: 2284436566 | Ope X +

https://www.openstreetmap.org/node/2284436566#map=19/48.853191/2.362904&layers=D

OpenStreetMap Redakti Historio Elporti GPS-spuroj Taglibroj de uzantoj Komunumo Aŭtorajto Helpo Pri Martin Constantino-Bodin

Serĉi Kie estas Ici?

Nodo: 2284436566

Versio #7

filare piéton : passages piéton 4 e
Arrondissement

Redakta proksimume antaŭ 1 jaro de guigimapper2002
Šanĝaro #139570609
Pozicio: 48,853482; 2,3617138

Etikedoj

| | |
|-----------------------|--------------|
| crossing | uncontrolled |
| crossing:island | no |
| crossing:markings | zebra |
| crossing_ref | zebra |
| highway | crossing |
| tactile_paving | no |
| traffic_signals:sound | no |

Parto de

▼ 2 linioj
[Rue Saint-Paul \(186761809\)](#)

© kontribuintoj de OpenStreetMap ▾ Donaci, Uzkerdiĝo

OpenStreetMap est une base de données



Données
cartographiques



Schémas de données

```
highway      = crossing
crossing     = uncontrolled
crossing:markings = zebra
crossing:island = no
traffic_signals:sound = no
tactile_paving = no
crossing_ref   = zebra
```

Schémas de données

```
highway      = crossing
crossing     = uncontrolled
crossing:markings = zebra
crossing:island = no
traffic_signals:sound = no
tactile_paving = no
crossing_ref   = zebra
```

(clé = valeur)^{*}

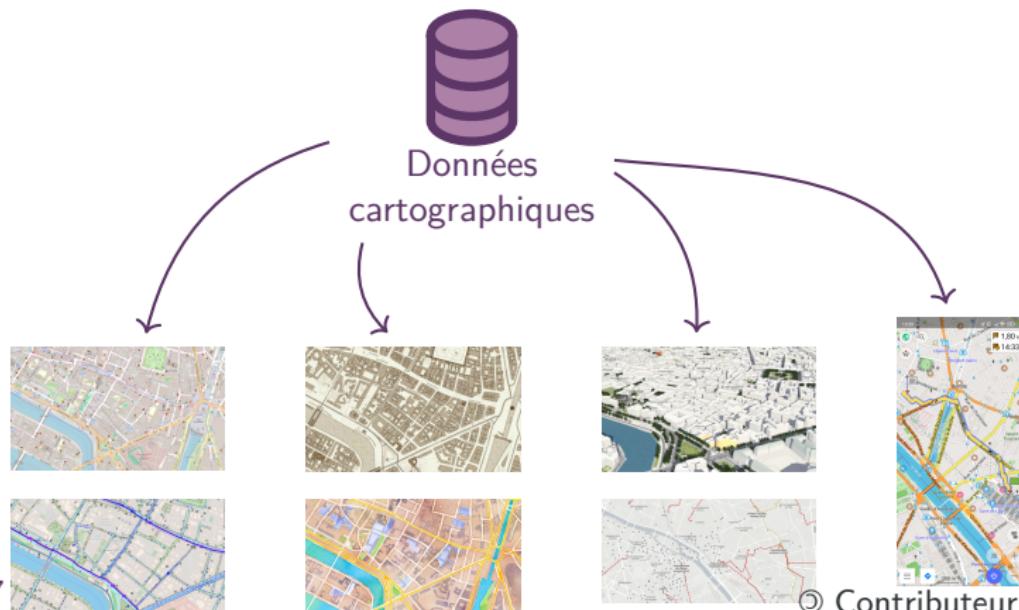
```
clé     $\stackrel{\text{def}}{=}$  string
valeur  $\stackrel{\text{def}}{=}$  string
```

Wiki OpenStreetMap

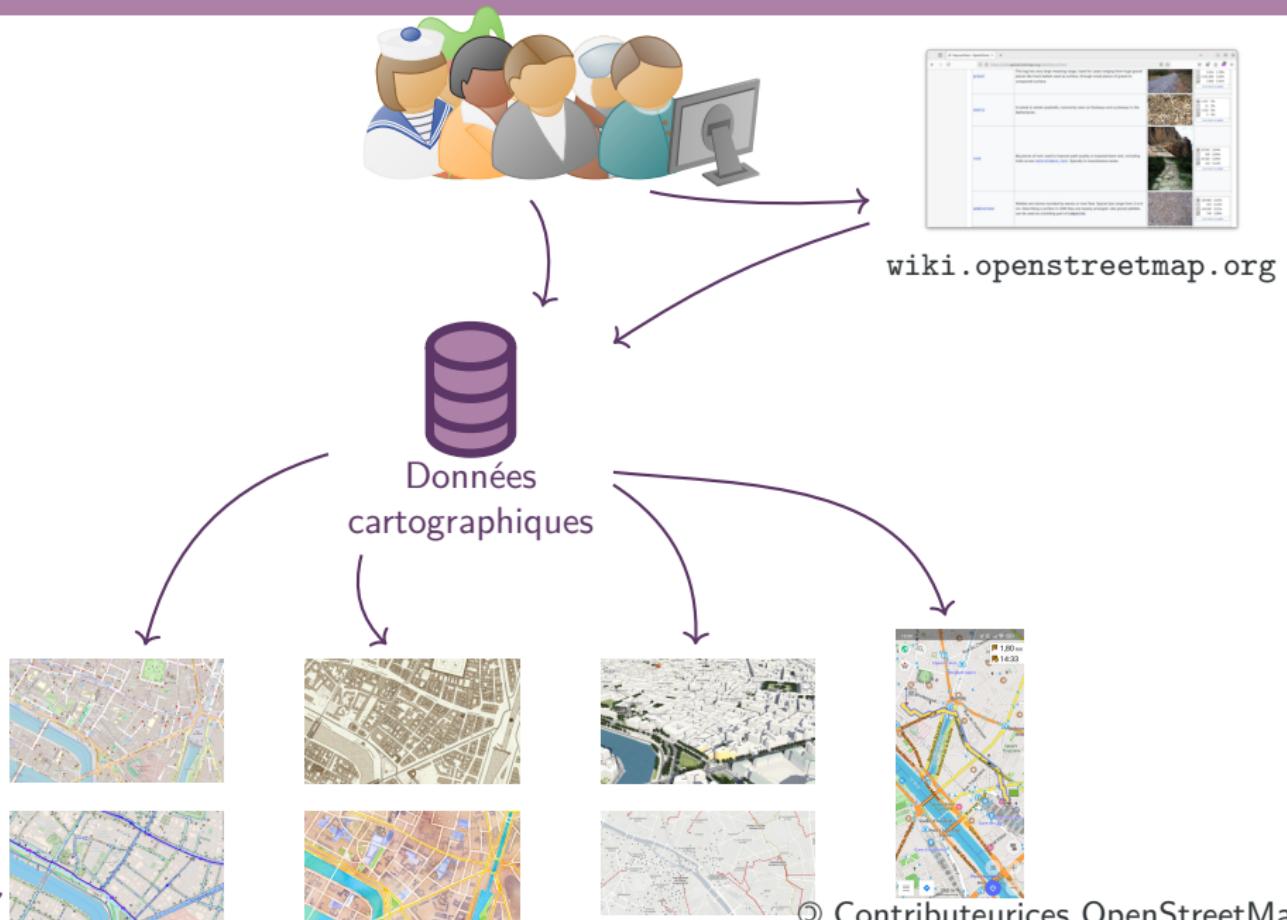
| | | This tag has very large meaning range. Used for cases ranging from huge gravel pieces like track ballast used as surface, through small pieces of gravel to compacted surface. |  | <input type="checkbox"/> 6 314 1.79% <input type="checkbox"/> 2 161 840 3.34% <input type="checkbox"/> 2 858 3.41% More details at taginfo |
|--|-----------------------------|---|--|---|
| | shells | Crushed or whole seashells; commonly seen on footways and cycleways in the Netherlands. |  | <input type="checkbox"/> 1 157 0% <input type="checkbox"/> 11 0% <input type="checkbox"/> 1 142 0% <input type="checkbox"/> 4 0% More details at taginfo |
| | rock | Big pieces of rock used to improve path quality or exposed bare rock, including trails across natural=bare_rock . Typically in mountainous areas. |  | <input type="checkbox"/> 25 542 0.04% <input type="checkbox"/> 165 0.05% <input type="checkbox"/> 25 262 0.04% <input type="checkbox"/> 115 0.14% More details at taginfo |
| | pebblestone | Pebbles are stones rounded by waves or river flow. Typical size range from 2 to 8 cm. Describing a surface in OSM they are loosely arranged. Like gravel pebbles can be used as a building part of compacted. |  | <input type="checkbox"/> 134 694 0.21% <input type="checkbox"/> 415 0.12% <input type="checkbox"/> 133 530 0.21% <input type="checkbox"/> 749 0.89% More details at taginfo |

wiki.openstreetmap.org

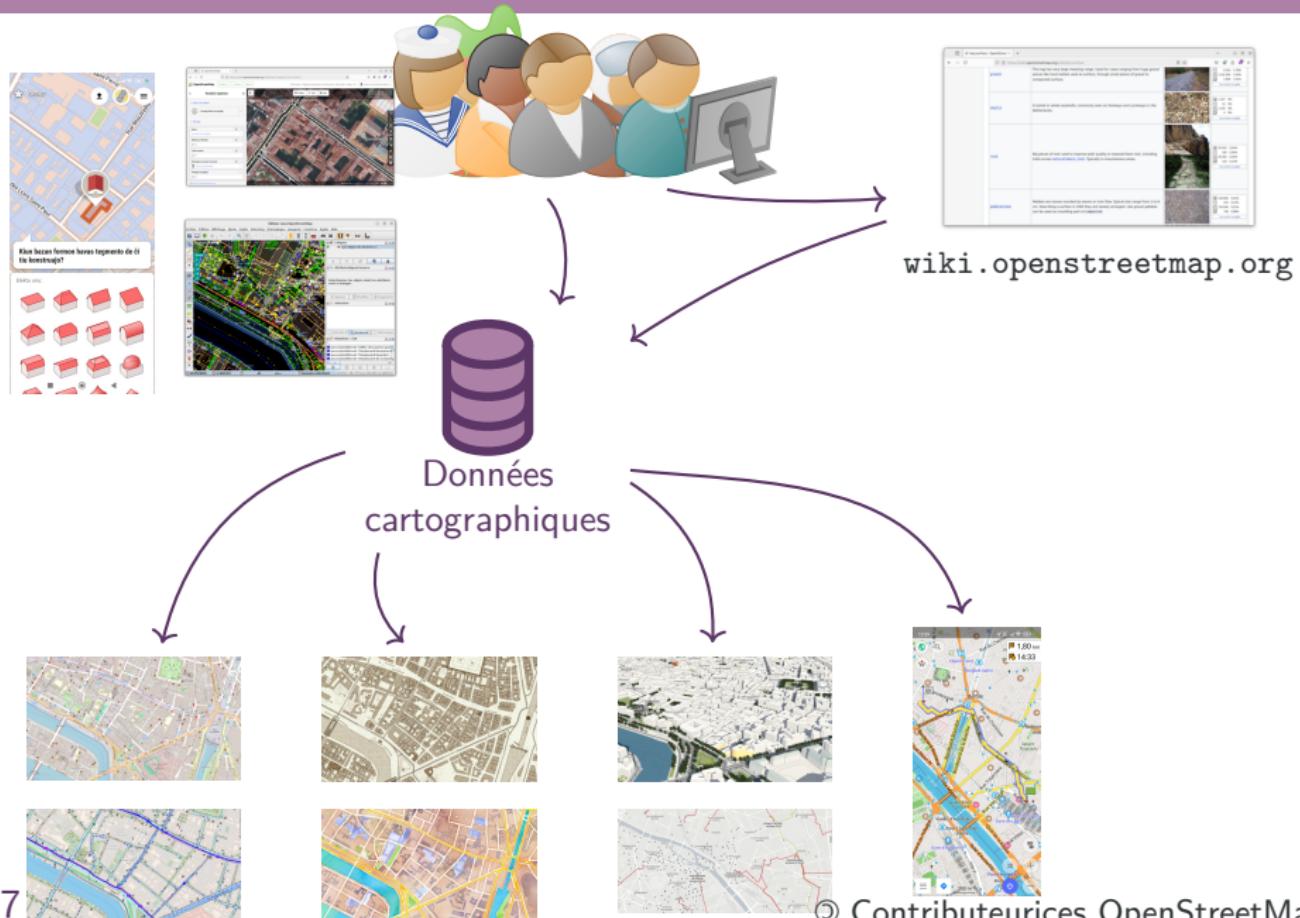
La communauté OpenStreetMap



La communauté OpenStreetMap



La communauté OpenStreetMap



crossing_ref

- zebra



- pelican



- pegasus



- toucan



- puffin



- tiger



crossing_ref

- zebra



- toucan



- pelican

- puffin

Évolution des pratiques

crossing = pelican

⋮

crossing = traffic_signals

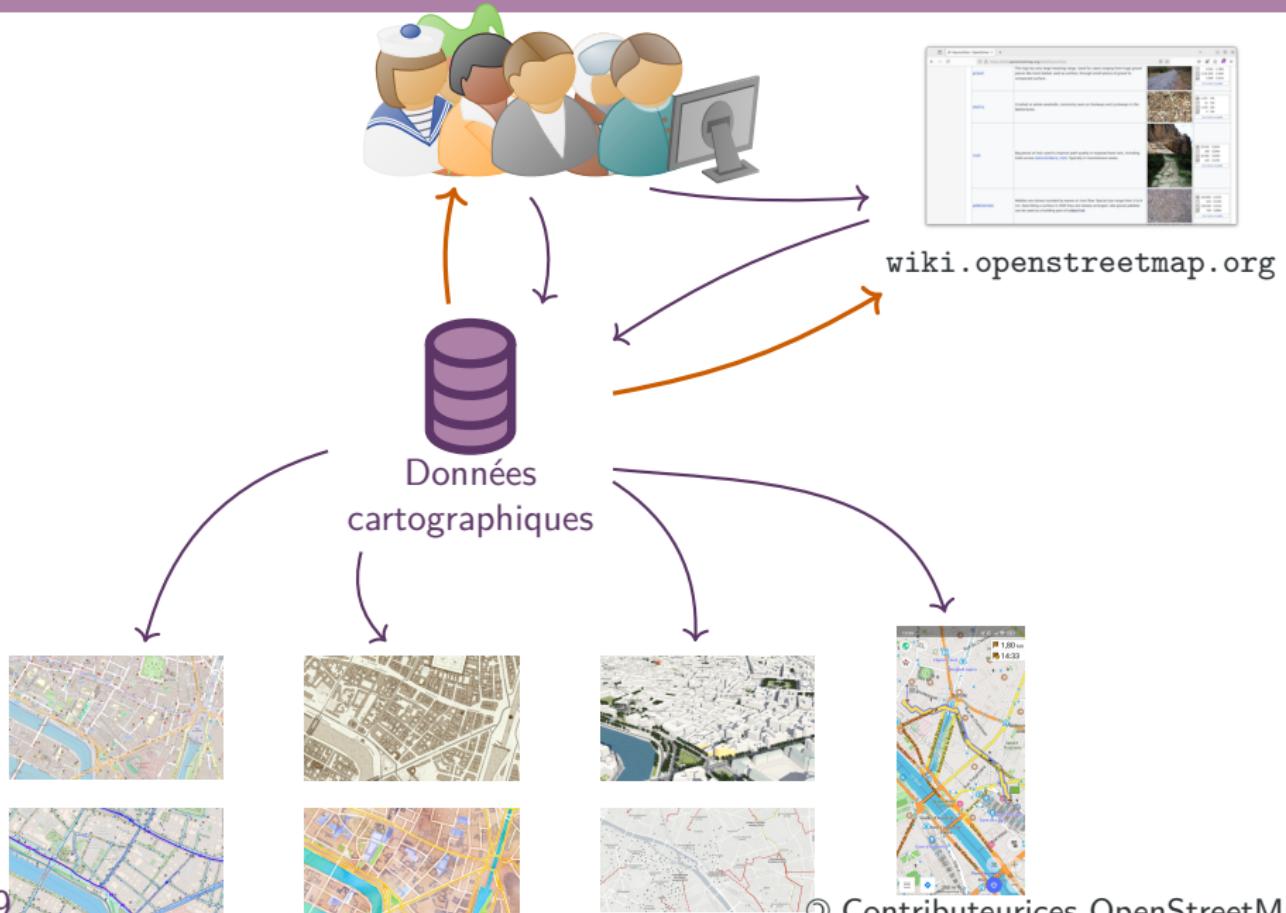
crossing:markings = dots

button_operated = yes

traffic_signals:sound = yes



L'usage prime



Contraintes d'intégrité

Incohérences dans la base de données

Fautes de frappe

corrsing = unmarked \rightsquigarrow crossing = unmarked

Clés dépréciées

crossing = traffic_signals

crossing = pelican \rightsquigarrow crossing:markings = dots

crossing:signals = yes

crossing_ref = pelican

Clés incompatibles

crossing = unmarked

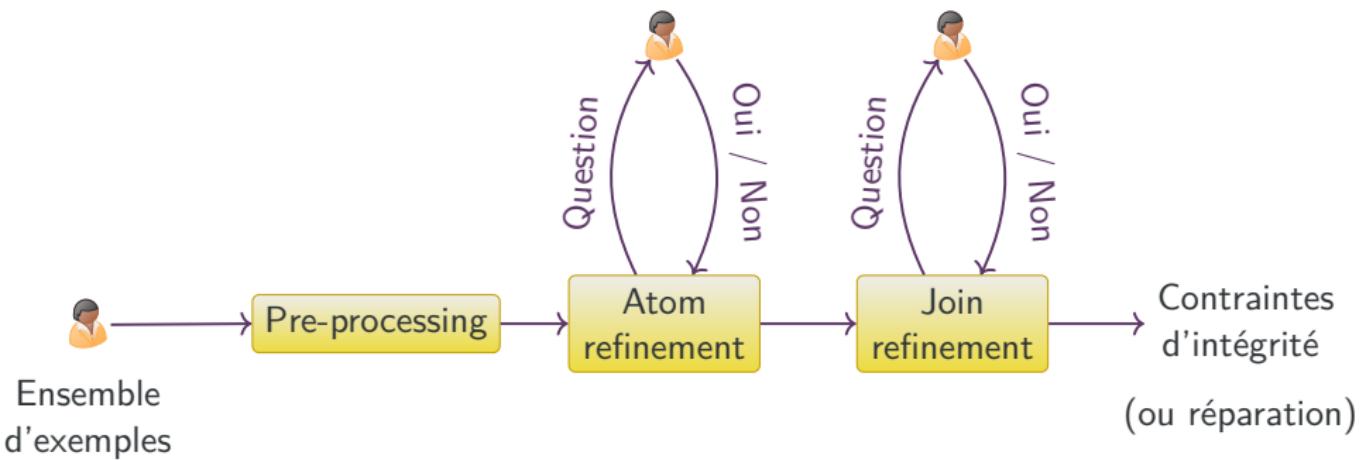
highway = motorway

Incohérences entre objets

sidewalk = no à côté de footway = sidewalk

Interactive mapping specification and repairing framework

Travaux antérieurs



Interactive mapping specification and repairing framework

Exemple

| Company: | | |
|------------------|-------------|-------------|
| <i>IdCompany</i> | <i>Name</i> | <i>Town</i> |
| C1 | AA | Paris |
| C2 | Ev | Lyon |

| Flight: | | |
|------------------|----------------|------------------|
| <i>Departure</i> | <i>Arrival</i> | <i>IdCompany</i> |
| Lyon | Paris | C1 |
| Paris | Lyon | C2 |

| Travel Agency: | | |
|-----------------|-------------|-------------|
| <i>IdAgency</i> | <i>Name</i> | <i>Town</i> |
| A1 | TC | L.A. |

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| Carrier: | | |
|-----------|-------------|-------------|
| <i>Id</i> | <i>Name</i> | <i>Town</i> |
| Id1 | AA | Paris |
| Id2 | Ev | Lyon |
| Id3 | TC | L.A. |

| Departure: | | |
|-------------|------------------|--|
| <i>Town</i> | <i>IdCarrier</i> | |
| Lyon | Id1 | |
| Paris | Id2 | |

| Arrival: | | |
|-------------|------------------|--|
| <i>Town</i> | <i>IdCarrier</i> | |
| Paris | Id1 | |
| Lyon | Id2 | |

$\exists \text{id1}, \text{id2}, \text{id3},$
 $\text{Carrier}(\text{id1}, \text{aa}, \text{paris})$
 $\wedge \text{Company}(\text{c1}, \text{aa}, \text{paris})$
 $\wedge \text{Departure}(\text{lyon}, \text{id1})$
 $\wedge \text{Arrival}(\text{paris}, \text{id1})$
 $\wedge \text{Carrier}(\text{id2}, \text{ev}, \text{lyon})$
 $\wedge \text{Flight}(\text{lyon}, \text{paris}, \text{c1}) \Rightarrow$
 $\wedge \text{Flight}(\text{paris}, \text{lyon}, \text{c2})$
 $\wedge \text{TravelAgency}(\text{a1}, \text{tc}, \text{la})$
 $\wedge \text{Arrival}(\text{lyon}, \text{id2})$
 $\wedge \text{Carrier}(\text{id3}, \text{tc}, \text{la})$

Interactive mapping specification and repairing framework

Exemple

| Company: | | |
|------------------|-------------|-------------|
| <i>IdCompany</i> | <i>Name</i> | <i>Town</i> |
| C1 | AA | Paris |
| C2 | Ev | Lyon |

| Flight: | | |
|------------------|----------------|------------------|
| <i>Departure</i> | <i>Arrival</i> | <i>IdCompany</i> |
| Lyon | Paris | C1 |
| Paris | Lyon | C2 |

| Travel Agency: | | |
|-----------------|-------------|-------------|
| <i>IdAgency</i> | <i>Name</i> | <i>Town</i> |
| A1 | TC | L.A. |

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| Carrier: | | |
|-----------|-------------|-------------|
| <i>Id</i> | <i>Name</i> | <i>Town</i> |
| Id1 | AA | Paris |
| Id2 | Ev | Lyon |
| Id3 | TC | L.A. |

| Departure: | | |
|-------------|------------------|--|
| <i>Town</i> | <i>IdCarrier</i> | |
| Lyon | Id1 | |
| Paris | Id2 | |

| Arrival: | | |
|-------------|------------------|--|
| <i>Town</i> | <i>IdCarrier</i> | |
| Paris | Id1 | |
| Lyon | Id2 | |

$\exists \text{id1}, \text{id2}, \text{id3},$
 $\text{Carrier}(\text{id1}, \text{aa}, \text{paris})$
 $\wedge \text{Departure}(\text{lyon}, \text{id1})$
 $\wedge \text{Arrival}(\text{paris}, \text{id1})$
 $\wedge \text{Carrier}(\text{id2}, \text{ev}, \text{lyon})$
 $\wedge \text{Departure}(\text{paris}, \text{id2})$
 $\wedge \text{Arrival}(\text{lyon}, \text{id2})$
 $\wedge \text{Carrier}(\text{id3}, \text{tc}, \text{la})$

Split-reduction

$\{\exists \text{id1}, \text{Carrier}(\text{id1}, \text{aa}, \text{paris}) \wedge \text{Departure}(\text{lyon}, \text{id1}) \wedge \text{Arrival}(\text{paris}, \text{id1});$
 $\exists \text{id2}, \text{Carrier}(\text{id2}, \text{ev}, \text{lyon}) \wedge \text{Departure}(\text{paris}, \text{id2}) \wedge \text{Arrival}(\text{lyon}, \text{id2});$
 $\exists \text{id3}, \text{Carrier}(\text{id3}, \text{tc}, \text{la})\}$

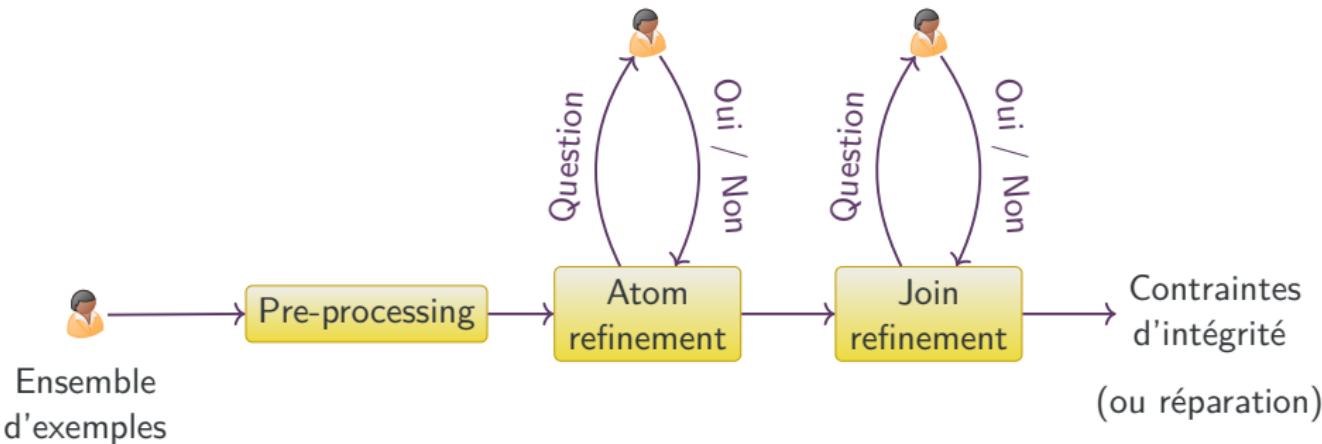
Removing superfluous atoms

$\text{Company}(\text{c1}, \text{aa}, \text{paris}) \wedge \text{Company}(\text{c2}, \text{ev}, \text{lyon})$
 $\wedge \text{Flight}(\text{lyon}, \text{paris}, \text{c1}) \wedge \text{Flight}(\text{paris}, \text{lyon}, \text{c2}) \wedge \text{TravelAgency}(\text{a1}, \text{tc}, \text{la})$
 $\Rightarrow \exists \text{id1}, \text{Carrier}(\text{id1}, \text{aa}, \text{paris}) \wedge \text{Departure}(\text{lyon}, \text{id1}) \wedge \text{Arrival}(\text{paris}, \text{id1})$

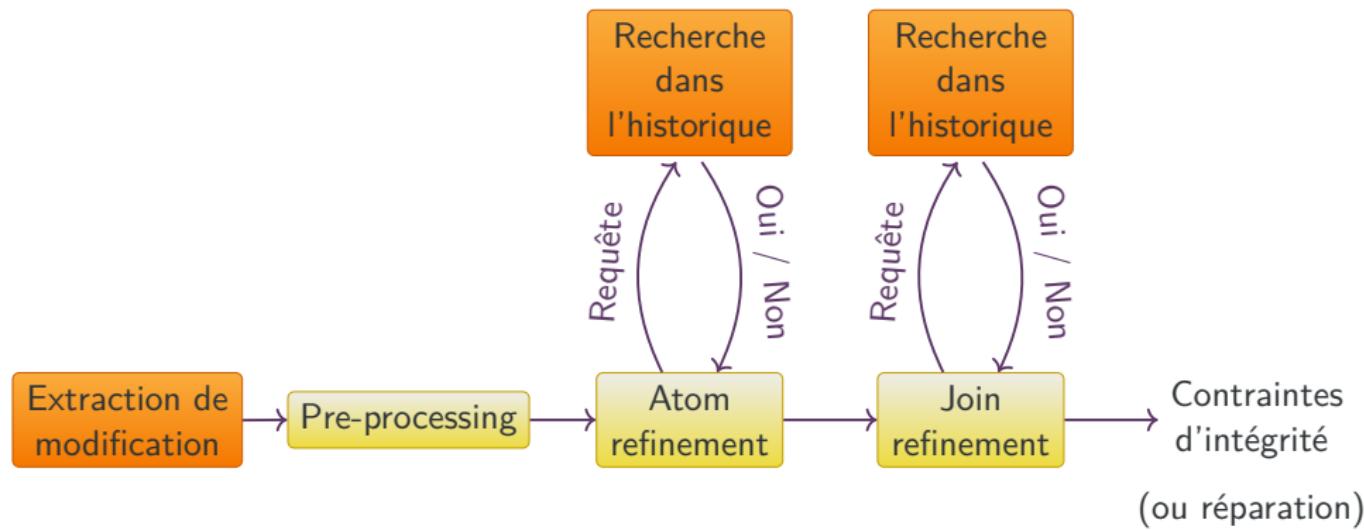
Join refinement

$\text{Company}(\text{c1}, \text{aa}, \text{paris}_1) \wedge \text{Flight}(\text{lyon}, \text{paris}_2, \text{c1}) \Rightarrow \exists \text{id1}, \text{Carrier}(\text{id1}, \text{aa}, \text{paris}_3) \wedge \text{Departure}(\text{lyon}, \text{id1}) \wedge \text{Arrival}(\text{paris}_4, \text{id1})$

Remplacer les questions par une recherche dans l'historique



Remplacer les questions par une recherche dans l'historique



Interagir avec la communauté

Que faire des contraintes inférées ?

- Les ajouter sur le wiki,
- Automatiquement modifier la base de donnée.

Que faire des contraintes inférées ?

- Les ajouter sur le wiki,
- Automatiquement modifier la base de donnée.
- Les proposer à la communauté.

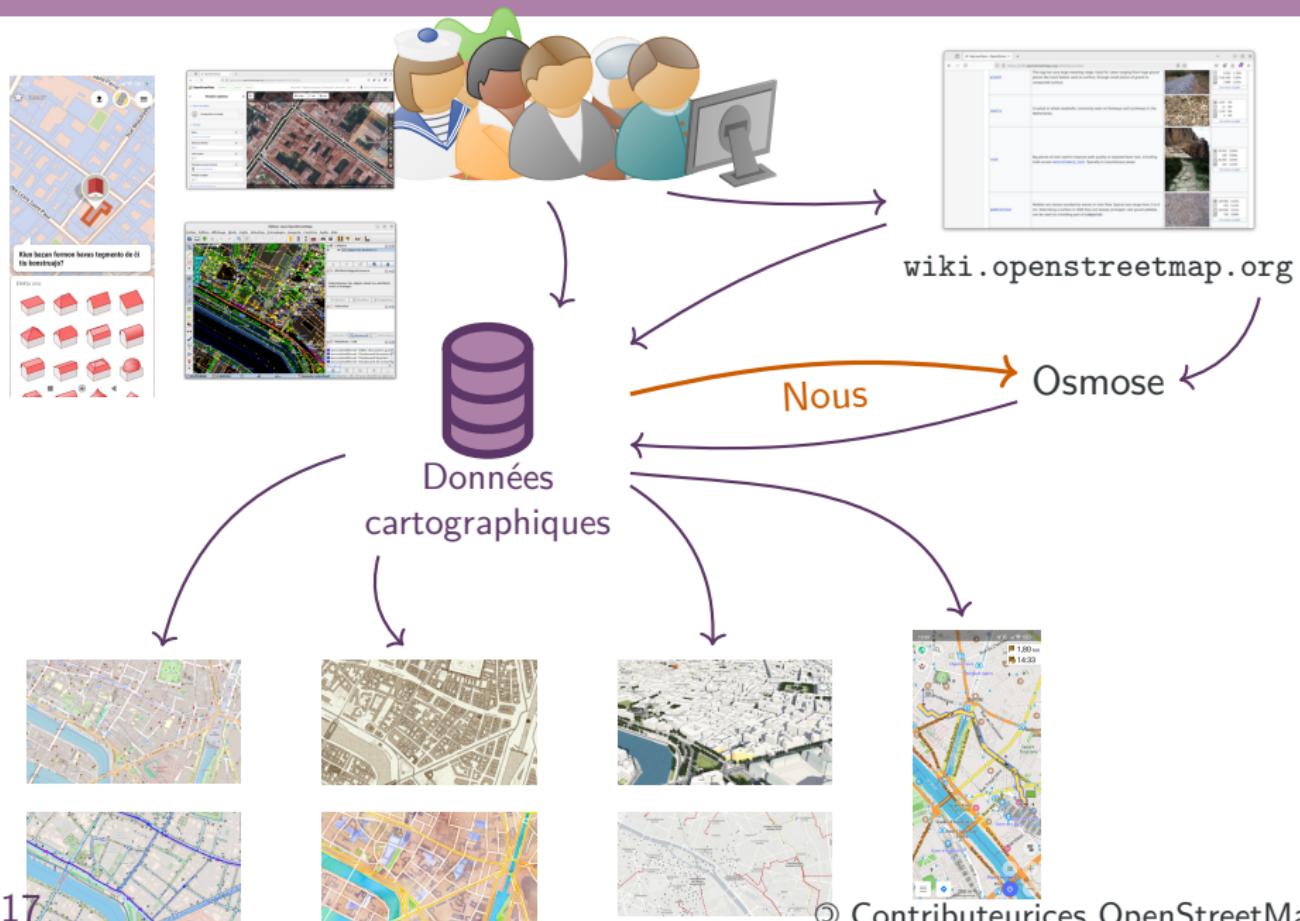
The screenshot shows the Osmose web interface for analyzing OpenStreetMap data. On the left, there's a sidebar with filters for 'Gravité' (High), 'Avec correction', and 'Thème'. Below these are lists of structural and attribute validation rules. A central map of Paris highlights specific areas with green markers. A callout box over one of these markers displays detailed inferred attribute values:

Combinaison d'attributs
Ajouter l'attribut "school:FR"
way 252752292 nom est
name = Ateliers des beaux-arts de la ville de Paris - Centre Sevigné
amenity = school
contact:street = Rue de Sevigné
contact:postcode = 75003
contact:phonenum = 48
osm-shape (2-zone from zone détails)

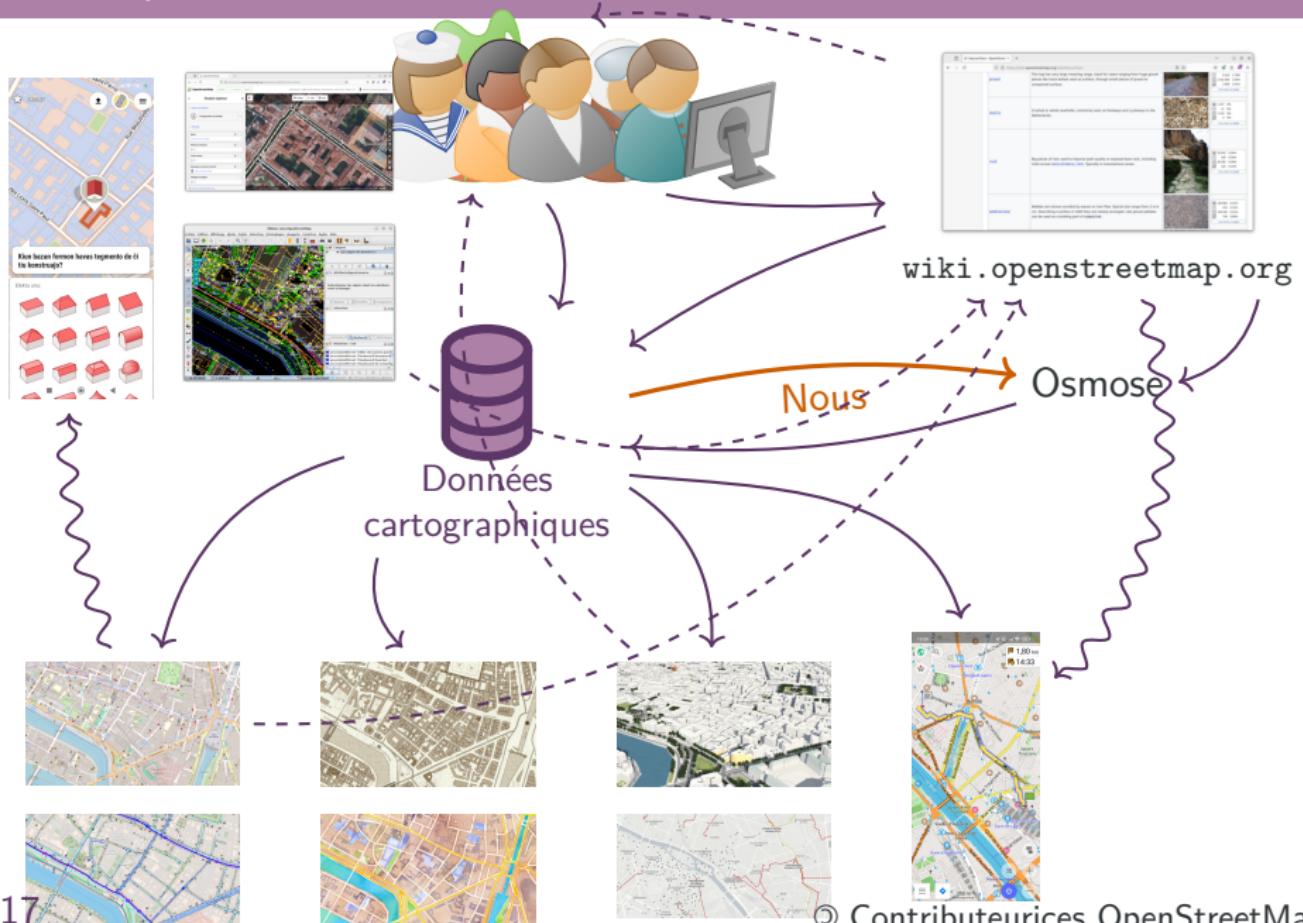
The map also features a legend for different marker types and a scale bar indicating 100 m.

osmose.openstreetmap.fr

Inférer des règles pour la communauté



Merci pour votre attention



1 OpenStreetMap

2 Contraintes d'intégrité

3 Interagir avec la communauté