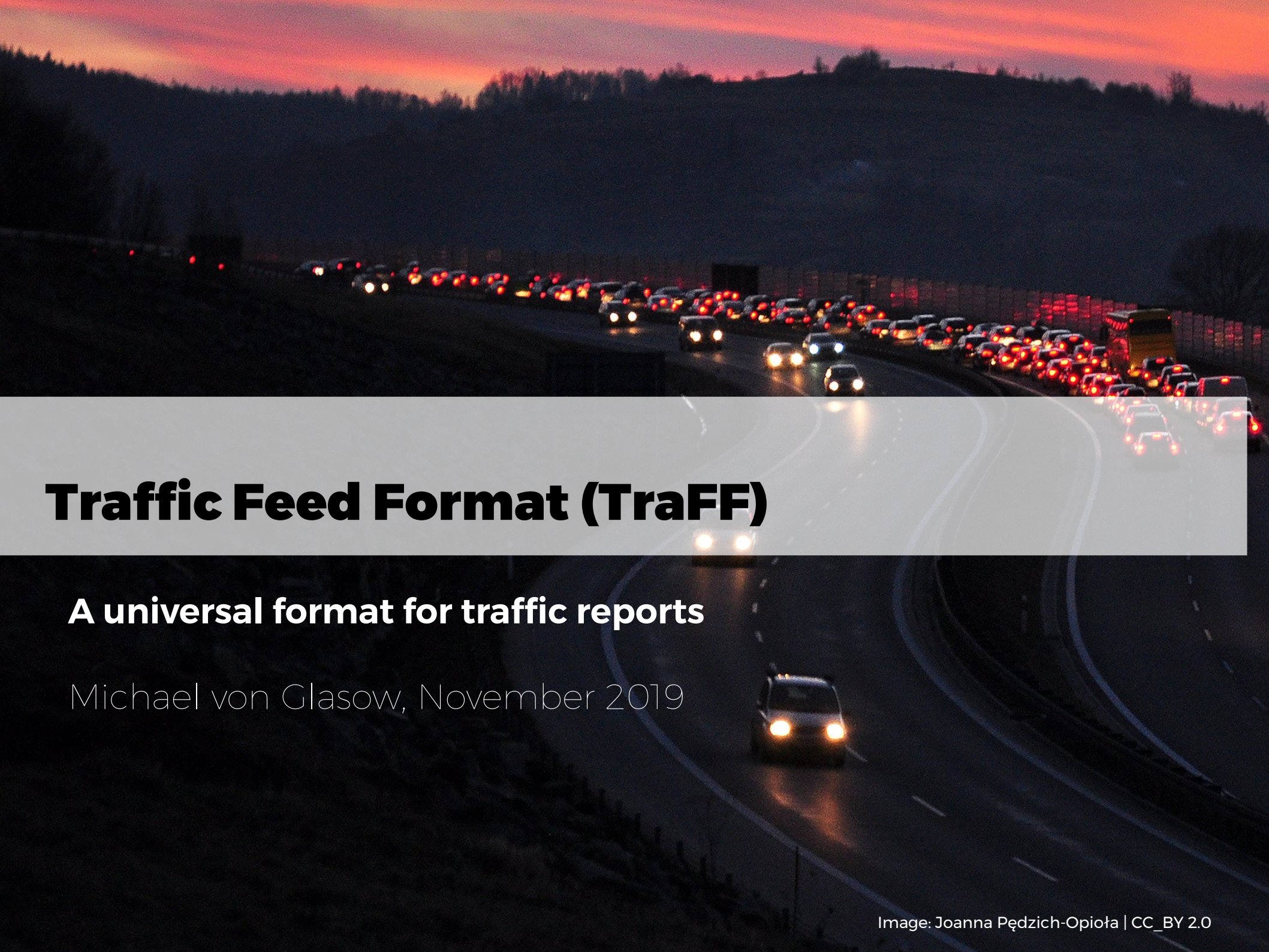
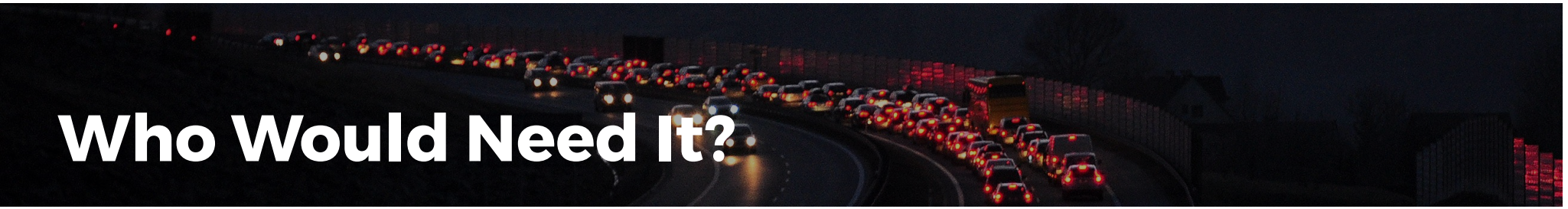


Traffic Feed Format (TraFF)

A universal format for traffic reports

Michael von Glasow, November 2019

Image: Joanna Pędzich-Opioła | CC_BY 2.0



Who Would Need It?

Consumers:

- **Navigation systems**

  To guide drivers around congestions

- **Traffic maps**

  To give an overview of traffic flow

- **Long-term analysis**

  To develop a forecast model

- **Novel applications**

  Up to your imagination

Suppliers:

- **Infrastructure operators**

  City municipalities, traffic authorities

- **Crowdsourced services**

  Information shared between drivers

- **TMC Converters**

  Harness existing TMC networks

- **Other Converters**

  Integrate other existing services

Why Not Simply Use TMC?

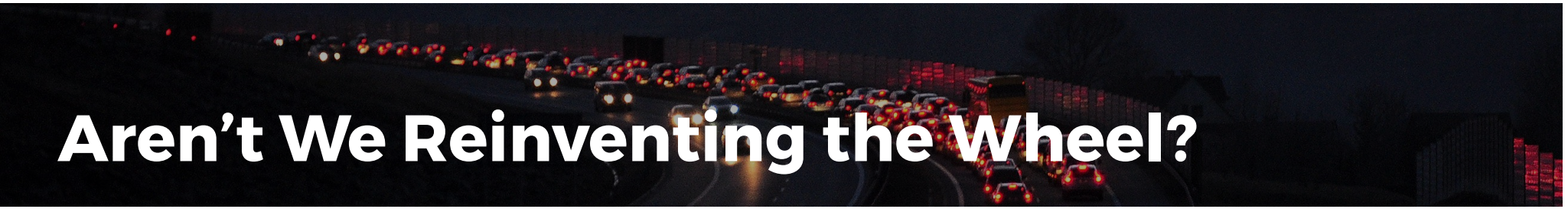
Until now, the OpenStreetMap community approach has been to import TMC location data into OSM and use TMC messages directly.

Pros:

- **Resolving TMC locations becomes trivial**

Cons:

- **TMC data needs to be maintained**
  Easily broken by inexperienced mappers
  Some data got completely removed in 2016/17
- **Searching by TMC location code is not very efficient**
- **Limited to TMC—does not work with other services**



Aren't We Reinventing the Wheel?

- We looked at the TMC, Waze and Bing formats
- Each has some great features
- But each also comes with major drawbacks
- None works well for us "as is"
- None has a significant open-source ecosystem —not much of a head start in using any of them

We're not reinventing the wheel.
We're inventing the rubber tire.

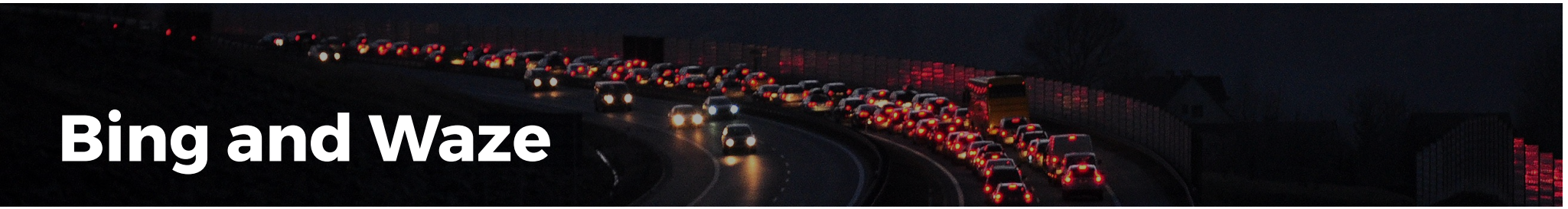
Traffic Message Channel (TMC)

The Good

- Low bandwidth usage
- Fully machine-parseable
- Large set of event codes
- Events can be combined
- Language-neutral

The Bad

- Complex binary format
- Bound to carrier medium
- Lookup tables required
- Limited set of locations
- Redundant event codes



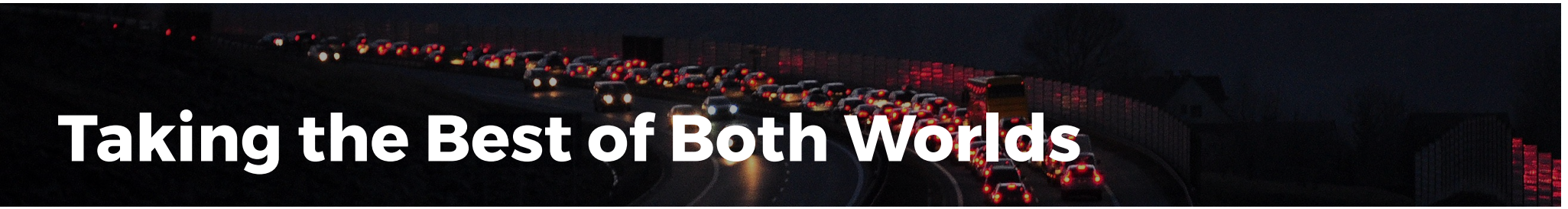
Bing and Waze

The Good

- Widespread data formats (XML, JSON)
- Self-contained messages
- Easy to parse by humans
- Transport-agnostic
- Can encode any location
- Moderate bandwidth usage

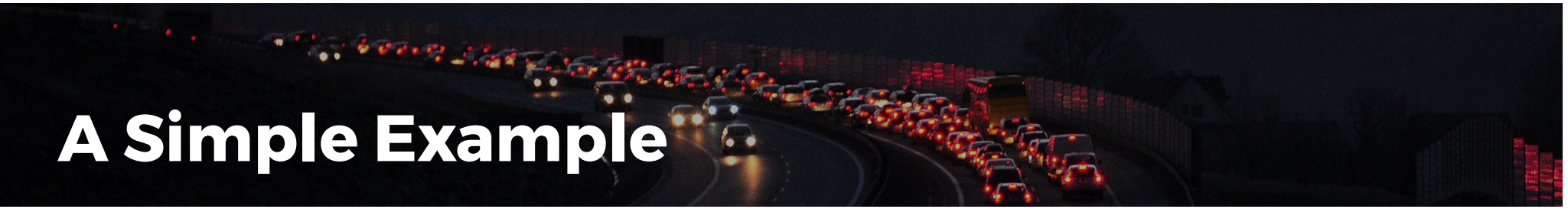
The Bad

- Few event codes
- Information in prose
- Limited machine parseability
- Presentation bound to one language



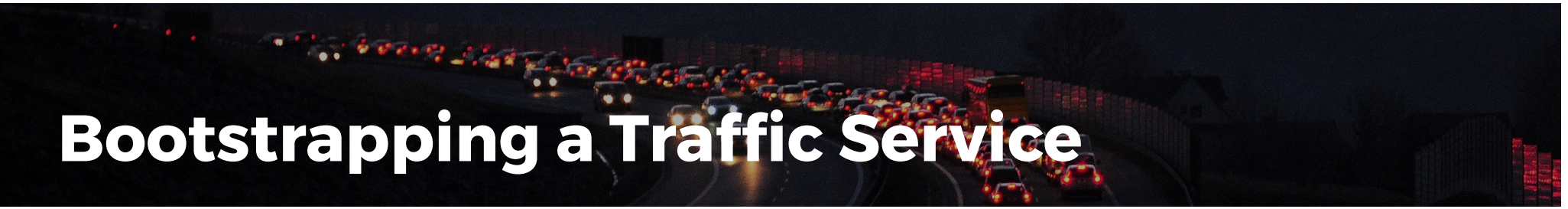
Taking the Best of Both Worlds

- **Build upon a well-established data format**
  XML: parsers are widely available
- **Be carrier-agnostic, require moderate bandwidth**
  Any carrier that supports Unicode data at ~56k will do
- **Support arbitrary locations**
  Latitude/longitude pairs can represent any point on earth
- **Allow for human parsing of data**
  XML with self-explanatory labels for attributes and values
- **Do not rely on frequently changing external data**
  Self-explanatory labels for attribute values; no location table needed
- **Allow for detailed information**
  Any combination of ~500 event and ~200 qualifier codes
- **Be language-neutral**
  No prose descriptions needed (or even defined so far)



A Simple Example

```
<feed subscription_id="4A282F0CAD31">
  <message id="tmc:5.1.1:5.1.1327.n.1"
      receive_time="2017-02-15T21:01:28+01:00"
      update_time="2017-02-15T21:07:00+01:00"
      expiration_time="2017-02-15T21:22:00+01:00">
    <events>
      <event class="CONGESTION"
          type="CONGESTION_SLOW_TRAFFIC"/>
    </events>
    <location road_class="MOTORWAY" road_is_urban="false"
        road_ref="A4" fuzziness="LOW_RES">
      <from junction_name="Trezzo">+45.59612 +9.50253</from>
      <to junction_name="Dalmine">+45.64412 +9.62081</to>
    </location>
  </message>
</feed>
```



Bootstrapping a Traffic Service

- **Start with a TMC converter**
  Locally on the device, to avoid intellectual property issues
- **Get navigation software projects on board**
  Increases visibility
- **Start a cloud service**
  Initially with converted data from open data portals
- **Add intelligence to the service**
  Process multiple messages with overlapping locations into one
- **Turn the service into a crowdsourced one**
  Allow users to report traffic conditions
- **Get authorities to participate**
  Those that make data available to OSM might be willing to do the same for traffic data

Potential Data Sources

- **Compare vehicle speed to posted limit**
  Low speeds may indicate traffic problems (when in doubt, ask user to confirm)
- **Manual entry**
  Drivers/passengers can report obstructions on nearby roads manually
- **OSM Mappers**
  Many folks tag long-term roadworks on OSM—why not submit the data to us? With a suitable tagging scheme, this could even be imported from OSM
- **Dash camera image analysis**
  Recognize variable-message signs and analyze them for traffic information (e.g. congestion ahead)
- **Web camera image analysis**
  Analyze web cam (or dash cam) images for traffic density and speed
- **Authorities**
  Those that make data available to OSM might be willing to share traffic data