



## **Differences and similarities between CDS-M and MDS metrics**

# Foreword

In this document we explore the differences and similarities between CDS-M and MDS metrics. These differences and similarities will be important for making the decision on whether MDS metrics can fulfil the goals set for CDS-M, and what additional adaptations might be necessary.

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# 1 Organizational differences

One of the design principles behind CDS-M is that it should be designed by a working group that has representatives from both Business and Government. The idea is that a public-private partnership, where business can influence the design, is integral for the successful adaption of a standard.

MDS metrics is part of the MDS<sup>1</sup> set of standards, and is governed by the Open Mobility Foundation (OMF). The OMF currently has a very US-centric governance, focusing on micro-mobility and enforcement, and has a high threshold (licenses of \$10k or more) for private partnership to be involved in the process.

In order to successfully adapt and use MDS metrics for our purposes, we need to make sure that the public-private partnership is made easier. One possible solution would be to form a working group representing both private and public members in Europe, and give this working group a voice in governance of the MDS standards that are relevant.

# 2 Technical differences and similarities

The main reason for considering adoption of MDS metrics instead of CDS metrics is that, at the core, both standards have the same goal: to provide mobility data aggregated over time and space. The rationale behind the aggregation step is that it supports detecting general trends in data on which the public sector can plan and build policy, but protects privacy by not showing individual samples. However, there are differences that need to be assessed (and potentially addressed) in order to make sure that MDS metrics and other related MDS standards can fulfil the role and requirements set by CDS-M.

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<sup>1</sup> <https://github.com/openmobilityfoundation/mobility-data-specification/>

## 2.1 Underlying data

MDS metrics is an API specification for retrieving calculated metrics on micro-mobility data. It is designed to work on other MDS data feeds such as the MDS-Provider or MDS-Agency APIs. MDS-Agency and MDS-Provider both use a level of detail that is very high and cannot be used for general purposes, according to European GDPR laws.<sup>2</sup>

In order to be able to use MDS metrics in accordance with GDPR, we need to extend the MDS metrics' API to consume an aggregated data feed from transport operators. This data feed will be similar in format to the one provided for retrieval.

## 2.2 MDS-Geography

MDS-Geography is the MDS-defined standard for describing geographical features such as municipal boundaries and mobility hubs. In our assessment, the geography standard can fulfil our similar requirements.

One remark is that we might need the ability to add certain fields that are specific to Europe, such as NETEX-defined identifiers for certain regions. This could easily be done using an optional field and, given the partnership with OMF, it might be something to add to the standard.

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<sup>2</sup> Only allowed in very specific cases where it can be shown that the level of detail is required.

## 2.3 Netex and other European standards

Europe has a large number of (often mandatory) data standards that already exist, such as NETEX<sup>3</sup> (Technical Standard for exchanging Public Transport schedules) and SIRI<sup>4</sup> (European interface standard for exchanging information about real-time public transport). MDS is not developed with European standards in mind, and does not comply with these standards. Since NETEX and SIRI are complex standards in their own right, it will take further effort to define which exact parts of NETEX and SIRI (and possibly other standards) might be relevant for our use case, and how CDS-M or MDS need to be adapted to comply with these standards.

## 2.4 Data types

MDS specification uses data type definitions that can potentially differ from those used in other European standards. A good example is the use Moped versus Step in the modality definition. European standards such as TOMP-API also propose additional modality subdivisions, such as different bike types.

A side-by-side comparison is required to see exactly which data type definitions differ, and further discussion is required on how to deal with the differences.

## 2.5 Request Metrics

MDS has a list of core metrics,<sup>5</sup> such as average trip duration, total trip duration and standard deviation trip duration. This list contains some metrics, such as an event count, that are not relevant for our use case – they are directly related to the MDS-agency standard, which we currently do not plan to use due to potential conflicts with the GDPR. On the other hand, CDS-M has some required metrics, such as unique number of users per period and asset availability, that are not in MDS metrics.

The MDS metric API allows to pick exactly which core metrics one wants to provide as a service. Adding extra metric definitions based on the requirements set out in CDS-M looks to be straightforward, provided that all other differences are resolved.

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<sup>3</sup> <http://netex-cen.eu/>

<sup>4</sup> <http://www.transmodel-cen.eu/standards/siri/>

<sup>5</sup> [https://github.com/openmobilityfoundation/mobility-data-specification/blob/release-1.1.0/metrics/core\\_metrics.md](https://github.com/openmobilityfoundation/mobility-data-specification/blob/release-1.1.0/metrics/core_metrics.md)

## 2.6 Data Reaction

MDS metrics contain measures to prevent re-identification, the process where aggregated results can be used to identify individual samples, thus endangering privacy. To prevent this, k-anonymity is used, setting minimum boundaries on the number of samples used in aggregation. If a query returns less than 10 trips in an aggregation, MDS metrics returns '-1' results, indicating too few samples in the aggregation. This concept is very similar to the design of CDS-M, with the only difference that we have not defined the minimum number of samples.

## 3 Conclusion

There are two main challenges when adapting MDS metrics instead of CDS-M. The first is that we do not plan to use traditional MDS data feeds (agency or provider) and therefore need to extend the API in order to receive data from Transport operators. The second is that European standards and definitions differ from those used in MDS. This will require changes in either the MDS specifications or in our requirements, a process that will likely still take time to research and discuss.