Pre-Procurement | Procurement | Implementation

Mobility Data Interoperability Principles (MDIP) Translation Guide

As we've explored in MDIP Fact Sheet, the Mobility Data Interoperability Principles (MDIP) allow technologies to communicate by creating a common "language" to exchange information. Interoperability is how different components speak to each other without extra 'translation' layers. Without interoperability, agencies risk making their technology implementations more complicated, inefficient, costly and risk vendor lock-in.

This guide can help you procure a product that will work for you today and in the future, even in a changing technology landscape. It will summarize best practices for how to include interoperability and examples of how you can "translate" these into action.

Thank you to the folks at the Mobility Data Interoperability Principles Coalition for their work on MDIP as well as their detailed procurement guidance, which is the basis of this document. If you would like a more technical version of this resource, please use: https://www.interoperablemobility.org/procurement/.

TRANSLATION GUIDE TABLE OF CONTENTS

1. Align your team on the importance of interoperability

Before beginning, you should consider why interoperability matters:

- Integration across components: Interoperability makes it possible to connect different components within technology systems without custom integrations.
- Shifting individual components to systems thinking: Interoperability allows the data gathered from each component of technology to communicate as one system. This provides you a comprehensive view of your system and allows you to consolidate performance into data dashboards to show the full picture of your system and inform decision-making.
- Improved user experience: Interoperability allows you to bring transit data straight to your riders and meet them in the apps they're already using.

Avoid the common pitfall of assuming that you don't have enough technology to need interoperability. Our world is becoming more technology forward – what you do today will set a strong foundation for any potential investments to come.

2. Determine where to incorporate interoperability into your documents

The first step toward interoperability is to identify what interoperability standards relate to your procurement and to require them in your procurement documents. But, where should you put it? In general, references to interoperability requirements should be included in all official procurement documents (e.g., Request for Information, Request for Proposals, Request for Qualifications, Purchase Orders, informal solicitations, and vendor / services contracts). The most important way to do this is by specifying the data standards in which the technology system should be able to import and export data.

Within these documents, interoperability should be included in both project objectives and scopes of work as applicable. The table below summarizes which MDIP items should be included in which parts of the procurement documents. Not sure how to incorporate this? Examples of each MDIP item are explored in the next section.

MDIP Item	Typical Location
Ownership and licensing terms	Contract body or terms of service
Privacy and cybersecurity terms	Contract body, terms of service, or privacy policy
System requirements for the specific piece of technology being procured	Scope of work or terms of service
Definitions to support project objectives, terms, and requirements	Within each document where defined terms are used

Remember: MDIP is a community of vendors and agencies that you can consult for feedback on your technology needs, contracting language, and more.

3. Think through procurement scenarios

As you craft your procurement, consider some common scenarios and how to mitigate their impact to your procurement response:

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Topic	What if...	Mitigation(s)
Market	I want to make sure enough vendors respond to my procurement.	• ·Talk to the market! Meet vendors and discuss your technology wants and needs. • Interoperability is more advanced outside the US. If using federal funds, this can be a challenge if you face Buy America requirements. State/ local funds may be more flexible.
Market	My agency is not large enough to generate interest from most vendors that offer this product.	• ·Consider joint procurement with another small agency operating on a similar timeline. • Outreach to vendors to ensure they've seen your solicitation.
Cost	I am told that my interoperability requirements are too stringent for my budget.	• ·Good, cheap, and fast – everyone wants to find a solution that is all three, but that's hard to do. If multiple vendors quote beyond your budget, you may need to reduce your scope or consider a phased approach. • ·Let vendors know your budget up front- transparency may improve vendor engagement before you've spent a significant time procuring. • Ask vendors what is driving the cost and let them share their concerns. This can uncover the true state of the market. You need to evaluate if you need to change your requirements or increase your budget (i.e., more funds, space out implementation over time, etc.)

Cost	My agency doesn't want to spend money up front for interoperable requirements.	• ·Interoperable solutions may have higher capital costs but come with longer term savings. Evaluate long term benefits- "total cost of ownership," "lifecycle costs" and reduced integration costs down the road. You also de-risk your procurement by ensuring you don't have to start over if the vendor doesn't perform or exits the market. • ·The costs of integration for proprietary solutions can be massive, requiring both paid vendor development hours and a significant amount of staff time. • Interoperable solutions give you more freedom to build your "tech stack." If you select a "cheaper"" proprietary solution up front, you'll be locked into that vendor suite. Additional modules may not be the cheapest or best option, but you no longer can pick another vendor without starting over.
Product	My other technology systems are not currently interoperable, so I don't have a way to realize the full benefits of interoperability.	• ·Everyone starts somewhere. If you want to realize the full benefits, you should add only interoperable products when you procure new technology. • Consider starting to swap out your other systems for interoperable solutions as contracts expire, over time you are likely to experience increasing returns on this initial investment.
Product	My requirements depend on future development of my transit technology ecosystem (e.g., new products / services I will add in the next few years).	• ·Tell the vendor about your plan so they can be prepared. Most vendors will be excited about a build-out (which means more business for them!). • ·Be sure that whatever you buy today is interoperable and uses open data (See our Data Ownership Factsheet for more!). If you are unhappy with your vendor or want to add another vendor, you won't have to worry about as many integration barriers. • Read contracts carefully to make sure you aren't committing to one vendor or one technology. Keep your options open.

Capacity	My agency doesn't have staff that are equipped to evaluate if a vendor is meeting interoperability requirements.	• Seek Technical Assistance from N-CATT through this application.

4. Incorporate interoperability language into contracts

This section offers examples of key concepts to include in transit technology contracts. The examples below are illustrative and should not be considered guidance! Please remember to check your agency's procurement and contracting policies to ensure any language you include in your procurement documents aligns with your requirements.

Additionally, MDIP maintains a list of definitions for key mobility and interoperability terms. These are an excellent resource if you're not sure the correct terminology to use or are trying to better understand the terms in a vendor contract. These definitions can also be included within transit procurement documents where the relevant term is used to ensure a common understanding among all procurement parties.

Ownership and licensing terms

Example: Data ownership

"All data ***transmitted to*** the System by the Agency, ***collected from*** the Agency by the System, or ***generated by*** the System using data provided by the Agency is property of the Agency with **full rights to publish, distribute, and use at their discretion.**"

Be sure to cover all your bases on data! Don't just focus on what is being generated, but also what you're collecting & transmitting.

This is your data! Make sure that you have full rights to it and are able to exercise these rights at your discretion

Privacy and cybersecurity terms

Example: Data Security and Privacy

This language ensures that the privacy of your riders and employees is protected. It means data specific to them can't be out in the open.

"The Contractor shall ***ensure the security*** of all Personal Identifiable Information (PII). PII **includes but is not limited to** the **communication with, information provided by, and the movement** of individuals or vehicles which are responding to an individual's needs which could reasonably be associated with them."

Contractor is responsible for ensuring security of this data (risk allocation).

PII comes in a lot of forms – by saying "includes, but is not limited to" you are able to specify the situations you can think of while ensuring that additional ones can be added.

Define PII at the point of the contract where the term is used.

Example: Data Storage and Access

"PII ***shall be stored*** in a manner, consistent with **{reference your local or state laws regarding data privacy}. Access to** PII shall only be given according to a policy, determined by the Transit Provider or via the Transit Provider's written permission."

Explicit terms covered storage and access.

Referencing local laws ensures consistency across contracts and as legislation changes.

You have control at the end of the day on who has access to PII.

Example: Data Retention Policy

"PII shall follow a data ***retention policy*** as set by the Transit Provider. **At contract termination**, all **PII shall be destroyed within 30 days**."

Transit providers are empowered to determine data retention policies.

Procedures at contract termination are clearly outlined.

You want to be sure you know what will happen with the PII when the contract ends – this is part of your responsibility to your riders and employees.

System requirements

System requirements vary depending on the technology components included in the scope of the contract. Most technology systems (e.g., Automated Passenger Counters, CAD/AVL, Charge Management Systems) have associated open standards and protocols. So, you should require these open data formats be used whenever possible.

The table in Appendix 1 summarizes relevant open data standards for typical transit technology systems; you can use this table as a guide to ensure you are asking vendors to provide data in the typical industry format. Additional guidance for select technologies can also be found on the MDIP Procurement website: https://www.interoperablemobility.org/procurement/.

Regardless of technology being procured, there are general interoperability requirements that you should consider including. These are applicable to most hardware and software systems.

Example: Keeping technology systems up-to-date

These contracts last a long time! You want to make sure your requirements grow as the industry does; requiring the latest technology version ensures that your system doesn't become obsolete.

Note: Some changes may be "optional;" these can be difficult to hold vendors to since they aren't a requirement of the standard. If you want optional things implemented, there may be added costs.

"Updates to the ***relevant open standards used by the System within the period of performance*** shall result in updates to the system to support the updated open standard **within 90 days of its approval**, including modifications to best practices, ability to read and write with updated standard, and ability to read, right, and edit fields within software."

Ensures that vendors keep their systems updated to reflect any changes to open data standards.

Because open data standards are frequently industry-led, vendor should know well in advance of "official adoption" what changes will be made and should be able to implement these changes quickly.

Example: Data Storage

"The ***System shall store exported schedule data*** on the system **for the duration of the contract** unless it is removed by client."

Ensures the data is not inadvertently deleted while it is still needed.

There may be a time limit that historical data will be saved on vendor servers (e.g. 3 years). This is normal because more space costs more money for the vendor to maintain.

Example: Data Accessibility

"Saved data shall be ***accessible*** and **searchable** and **available for bulk download**."

Ensures the data is not inadvertently deleted while it is still needed.

There may be a time limit that historical data will be saved on vendor servers (e.g. 3 years). This is normal because more space costs more money for the vendor to maintain.

It is typical to require written noticwe to the vendor

5. Hold vendors accountable

Laying out your goals and requirements from the beginning is an important step toward creating a vendor relationship that can be a partnership. There will also be moments when both parties fall short, so it is important to include language in your procurement documents and contracts about enforcement actions and recourse mechanisms for when issues arise.

We encourage you to always start by talking to your vendor about identified issues. However, if the issue cannot be resolved or the vendor refuses to comply with your interoperability requirements, possible enforcement mechanisms include:

- Notifying MDIP of your complaint: MDIP may be able to remove the vendor from their co-sponsor list (if applicable) or otherwise communicate that the vendor has failed to comply with interoperability requirements.
    - MDIP has technical expertise on interoperability and may also be able to assist you in better understanding the problem and/or proposed vendor resolution.
- Contacting your state Department of Transportation (DOT): State DOTs have a vested interest in MDIP. Notify them if vendors are unwilling to adopt open standards.
- Levy performance penalties, if applicable: Performance penalties must be stated in the contract for this option to be exercised. While useful, monetary penalties may disincentivize vendors from responding to smaller agencies due to the increased risk to the vendor within smaller scale procurements. They are likely to either charge more or not respond to the procurement. For medium sized agencies or regional/group procurements, this may be a more viable option.
- Exiting the contract: Your agency may be eligible to terminate the contract under a "failure to perform" clause, which FTA requires of many contracts (See: FTA Circular 4220.1F).

Example: Contract termination for convenience

"The Agency may terminate this contract, ***in whole, or in part, at any time*** by **written notice to the Contractor** when it is in its best interest. The Contractor shall be paid its costs, including the contract close-out costs, and profit on work performed up to the time of termination. The Contractor shall promptly submit it's termination claim to the Agency to be paid the Contractor. **If the Contractor has any property in its possession belonging to the (Recipient), the Contractor will account for the same and dispose of it in the manner the Agency directs**."

Broad termination provisions, empower the agency to determine when and if the contract should be ended.

It is typical to require written notice to the vendor.

Termination clauses should specify exactly what happens in the event of termination, including any data retention/deletion require requirements.

APPENDIX 1: Transit Technology Data Standards

This appendix summarizes some data standards typically used in different transit technology systems. Procuring agencies can use this table as a guide to ensure the data they expect to receive from vendors is required to be in the "typical" format.

If you'd like to learn more about different data standards (or the difference between a standard and a protocol!) the Shared Use Mobility Center (SUMC) has a detailed resource.

Standard / Protocol / Format	Applies to...
GTFS Schedule (General Transit Feed Specification)	Fixed-route transit: Static schedules, routes, stops, and fares
GTFS Realtime	Real time vehicle locations, arrival predictions, and service alerts
GTFS-Flex	Demand-responsive services: Flexible routing (e.g., deviated fixed-route)
TIDES (Transit Integrated Data Exchange Specification)	Operational data on vehicle activities, passenger counts, and fare collection from AVL, APC, and AFC systems.
TODS (Transit Operational Data Standard)	CAD/AVL data integration with scheduling software
NTCIP (National Transportation Communications for ITS Protocol)	Transit Signal Prioritization (TSP) integration
TMDD (Traffic Management Data Dictionary)	TSP Center to Center (C2C) communication
OCPP (Open Charge Point Protocol)	Charge management systems