Towards Interoperable Personal Data Management within Smart Cities: Minimum Interoperability Mechanism 4

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Introduction: Next level of personal data connectivity

Citizen data is a key element in providing human-centric public services. Open and Agile Smart Cities (OASC) explores the mechanisms for personal data protection, transparency, and trust when sharing personal data between cities. These capabilities are a key part of the digital transformation journey of cities worldwide. The journey is supported by common and open standards and open technical specifications like the Minimal Interoperability Mechanisms (MIMs) that more than 150 cities in over 30 countries have adopted. The objective is to have cities and communities replicate and scale data sharing solutions globally.

The Minimum Interoperability Mechanism for Personal Data Management, MIM4, consists of four layers. In the earlier MIM4 related documentation the concept of a MyData Operator and personal data platforms were introduced. The authors of this documentation are now releasing a legal framework, technical specification and an open-source component implementation for review. It is hoped that this will then progress to an implementation phase to take personal data connectivity to the next level.

The concepts of personal data management and connectivity are approached in this paper through two pillars. The first pillar describes an open-source access gateway – a connector that enables multiple cities to utilise one data source without needing to build their own data sources or connectors. The second pillar is a legal framework that governs the use of connectors for data access.

A similar approach has been adopted in another governance framework project called ‘Trust over IP’ where the technical and legal frameworks have been developed side-by-side.

Two-pillar approach: Data access gateway and legal framework

MyData Operators are responsible for the infrastructure and tools that enable secure access and control of the flow of personal data within and between data sources and data-using services. A city, for example, can be a MyData Operator (or data intermediary, as referenced in the upcoming

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EU Data Governance Act). Operators should be able to share personal data easily, both in and outside of their organisations - on both technical and legal levels - without an extensive amount of legal work and point-to-point integrations.

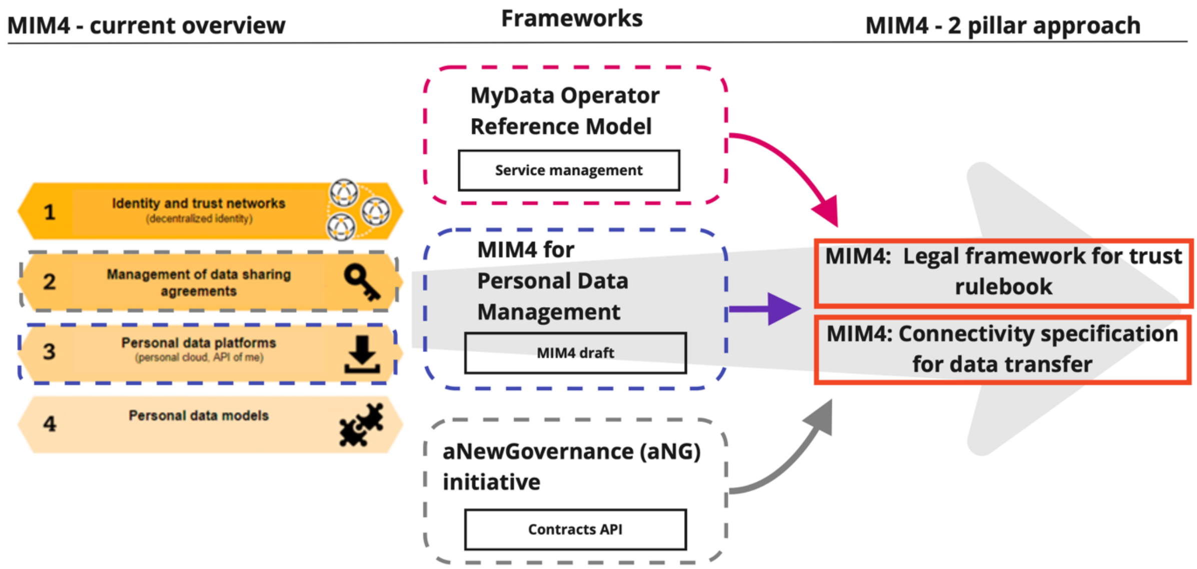
MIM4 - current overview
Frameworks
MIM4 - 2 pillar approach
1
Identity and trust networks
(decentralized identity)
2
Management of data sharing agreements
3
Personal data platforms
(personal cloud, API of me)
4
Personal data models
MyData Operator Reference Model
Service management
MIM4 for Personal Data Management
MIM4 draft
aNewGovernance (aNG) initiative
Contracts API
MIM4: Legal framework for trust rulebook
MIM4: Connectivity specification for data transfer

Figure 1: Relationship of initial MIM4 layers, MyData Operator Reference Model and aNewGovernance data sharing agreement framework.

Pillar 1: One Connector for all MyData Operators

The layer 3 Personal data platform APIs of the MIM4 stack offer harmonised data access to MyData Operators. The architectural target is to abstract the operator (permission management service~~s~~) from the data transfer. This way one data source – an existing API or Personal Data Storage - is able to serve data to multiple MyData Operators simultaneously. This capability is envisaged to be required in collaborative arrangements across cities and in use cases where personal data is re-used. Access to a data source should be possible with multiple permission management systems and scale to cover future technologies.

The **Access Gateway** is a freely available and extendable **open-source proxy component**, a connector that implements the MIM4 connectivity requirements and allows the same data source to be utilised by multiple MyData Operators. Each operator provides their own identity and access management services and interfaces. The City of Helsinki is utilising the open-source Access Gateway structure that is based on Vastuu Group's MyDataShare operator platform.

Data sources are not accessible freely by default. MIM4 enables data sources to be private to a single MyData Operator ecosystem.

The proposed novel interoperability model removes the need to standardise MyData APIs across operators. Instead, the standardised connector concept enables data sources to be utilised by multiple MyData operators.

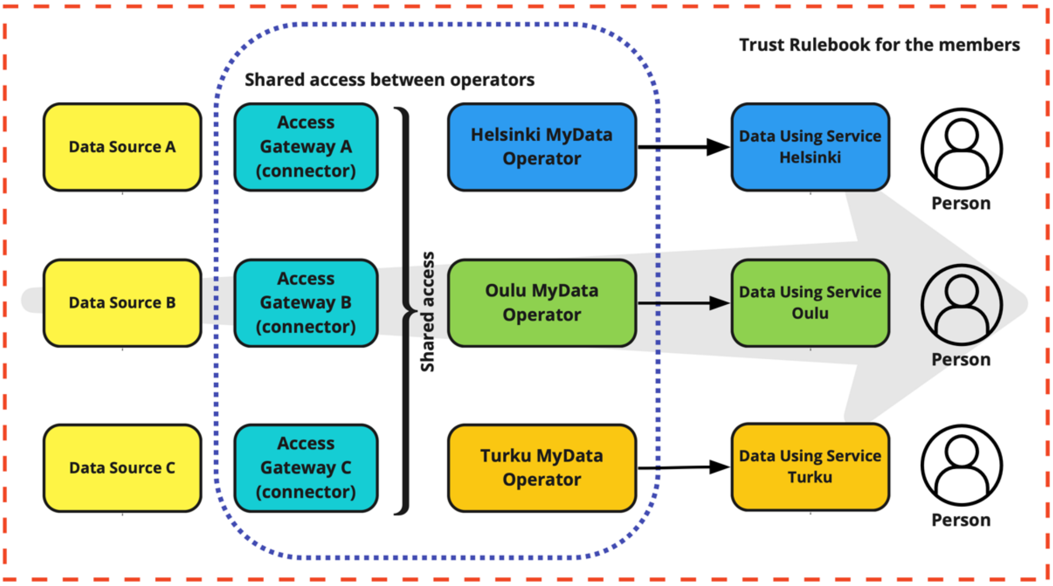

Figure 2: Access Gateway as a shared connector between multiple MyData Operators and actual data source.

Pillar 2: Legal framework governance

The legal framework governance is designed to make personal data re-use easier whilst retaining robust permissioning. The legal framework considers each data-using service as a **customer** that requires access to one or more data sources. This legal framework is required to permission customer access to data sources via a single point of contact (operator) irrespective of the operator of the data source.

The legal framework stipulates **trust framework requirements - MyData Operator Network Rulebook -** for common rules between operators within a Trust Group (two or more MyData Operators operating in e.g., smart city context).

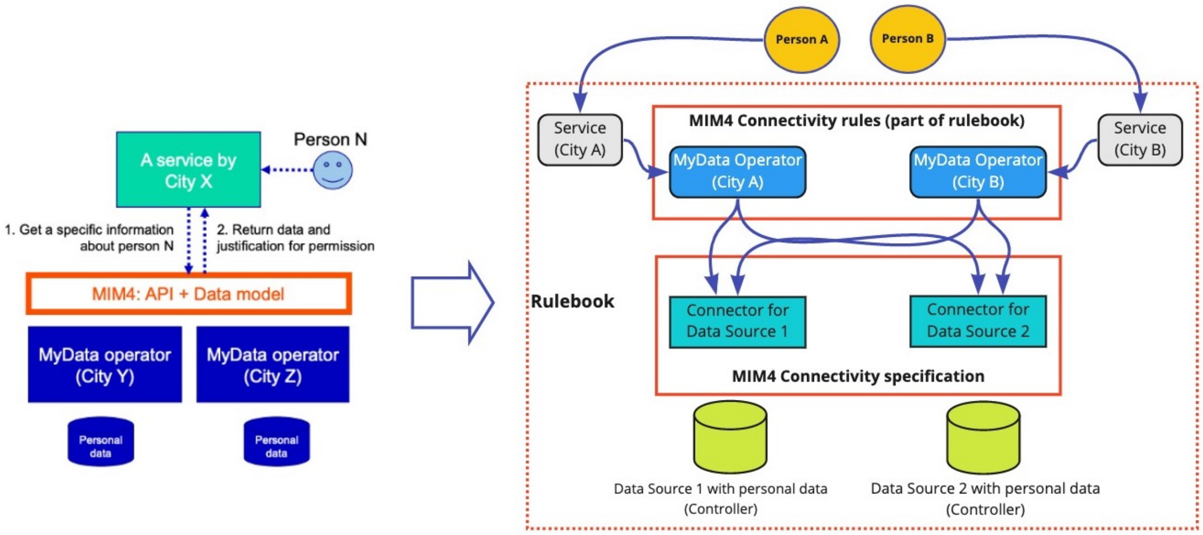
A service by City X
Person N
1. Get a specific information about person N
2. Return data and justification for permission
MIM4: API + Data model
MyData operator (City Y)
MyData operator (City Z)
Personal data
Personal data
Person A
Person B
Service (City A)
Service (City B)
MIM4 Connectivity rules (part of rulebook)
MyData Operator (City A)
MyData Operator (City B)
Rulebook
Connector for Data Source 1
Connector for Data Source 2
MIM4 Connectivity specification
Data Source 1 with personal data (Controller)
Data Source 2 with personal data (Controller)

Figure 3: From early MIM4 ideas (Helsinki 2020 MIM4 paper) to proposed data source -level connectivity.

The legal framework extends the Helsinki Trust Network Rulebook to cover data sharing across operators across EU countries. Multi-city data sharing use cases are handled as inter-operator situations because smart cities working with similar entities may be assuming different roles within the MyData framework. Inter-operator trust frameworks need to be specified and formed.

A well-functioning connectivity layer is necessary but insufficient condition for a multi-operator human-centric network. Governance frameworks, contracts, and data sharing agreements are needed for organisations in the network to trust each other and diverse data intermediaries. Each organisation requires assurance that data transfers are compliant and respect the mutually agreed rules (regulations, sectoral rules, code of conduct contracts, etc). MyData Operators need to have unambiguous contracts between themselves, people, as well as organisations. This work builds on on-going initiatives such as Sitra Fair Data Economy Rulebook model and the **aNewGovernance** (aNG) initiative funded by the European Commission. Both initiatives aim to augment the MIM4 connector with a robust supporting legal framework.

The two pillars approach constitutes a key scalability step forward as currently there are no global standards for identity and permission management functions.

Deliverables and call to action

The participating entities' mutual goal is to release the below deliverables by summer 2021. This enables the OASC community to begin exploring and implementing personal data management use cases between MyData Operators following its General Assembly meeting in June 2021.

- **Initial version of the MIM4 connectivity specification** and future roadmap
  - Specification for initial connectivity-layer interoperability
  - Guiding principles for the technical environment and legal ecosystem
- **An open-source access gateway that facilitates the MIM4 implementation**
  - Initial, extendable version of the MIM4 connector - with interoperability across two or more MyDataShare (Vastuu Group) operator instances
  - Roadmap for multi-vendor support
  - Fitting the solution with Solid and other personal data stores in the MyData operator ecosystem
- **Legal framework and rulebook**
  - Initial Helsinki Trust Network Rulebook for cities
  - Requirements and roadmap for actual multi-operator framework – cross-mapping the MIM4 specification and the Service Management function as defined in the MyData Operator White Paper
- **OASC – aNG requirements and roadmap** for machine-readable data sharing agreement management