

## Modular Open-Source Identity Platform (MOSIP)

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### Abstract

*In a rapidly changing world of technology, the significance of a legal identity in securing a person's status before the law cannot be underrated. Digital identity systems have the potential to significantly accelerate access to formal identity and enable more inclusive and equal participation in the digital economy. It is thus critical to ensure that 'good' ID is adopted by governments and service providers: ID that empowers individuals to receive the benefits of a formal identity, while ensuring adequate safeguards against misuse. This article describes how Modular Open-Source Identity Platform (MOSIP) as an open-source platform meant for governments or international organizations to build a foundational identification system in a cost-effective way as well as to ensure that digital identification programs are governed in such a way that is inclusive, safe and empowering to individuals. It has the capacity to set an example for the rest of the world.*

**Keywords:** Technology; Modular Open-Source Identity Platform (MOSIP); Digital identification; Governance; Safeguards

In this rapidly changing world of technology, there has been growing recognition that a legal identity (ID) forms the first step in securing a person's status before the law. In recognition of the fact that over a billion people globally lack formal identity, the UN Sustainable Development Goal 16.9 calls for "By 2030, provide legal identity for all, including birth registration". Because technology serves as an exceptional amplifier of both positive and harmful effects, digital identity systems have the potential to significantly accelerate access to formal identity and enable more inclusive and equal participation in the digital economy. It can also work to concentrate power in the hands of identity issuers, and perhaps other stakeholders in the data ecosystem.

It is critical, therefore, to ensure that 'good' ID is adopted by governments and service providers: ID that empowers individuals to receive the benefits of a formal identity, while ensuring adequate safeguards against misuse. A digital

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identification system is important for people who want to apply for the welfare schemes offered by the government.

### **MOSIP as an option**

Modular Open-Source Identity Platform (MOSIP) is an open-source platform meant for governments or international organizations to build a foundational identification system in a cost-effective way. A functional identity system enables individuals to get a unique identity from the government to avail various services such as financial, social security, etc. Nations can use the platform when they want to build their own identification system. It provides a vendor-neutral and interoperable approach allowing governments to configure their systems with high accuracy. Apart from that, the platform gives ways to address various challenges when building a national functional system that helps meet the essential needs.

It has been created as a global public good - a core for foundational digital identity systems that enable the issuer to accelerate progress towards inclusive, privacy-centric and secure digital economies. To make this a reality, key enablers need to be in place:

- A legal and governance framework for digital ID that is designed to be inclusive and to prioritize users' control over their information.
- Transparency and wide stakeholder participation in the decision-making process.
- A system that prioritizes privacy and user control, is secure and uses open standards.

### **Key Architectural Principles of MOSIP**

MOSIP started being developed in late 2018 by the International Institute of Information Technology, Bangalore (IIIT-B). It is funded by the Bill and Melinda Gates Foundation, Tata Trusts and Omidyar Network. The project is governed by an Executive Committee and a Technology Committee. The former advises and guides IIIT-B on matters of project governance, finances, intellectual property, etc. The latter is responsible for all technical decisions, including the product roadmap and open-source community management.

MOSIP endorses and works actively to implement the Principles on Identification for Sustainable Development, which set out a path to creating an inclusive, user-centric and secure identity system. These principles have been backed by a wide-ranging group of organizations, including the Asian Development Bank, the Bill and Melinda Gates Foundation, the Center for Global Development, Omidyar Network, Mastercard, Secure Identity Alliance, GSMA, United Nations High Commissioner for Refugees, United Nations Development Programme, United Nations Economic Commission for Africa, and the World Bank Group.

MOSIP platform comes with independent and interchangeable modules with API-based implementation. Some of the key modules include pre-registration, registration client, registration processor, ID repository and ID authentication. Those who want to develop a digital identification system can use any of or all the modules that help a lot to experience the desired outcomes. Additionally, it makes feasible methods to focus more on the objectives that will help accomplish goals to a large extent. The platform even contributes to integration with existing databases or present different flows, thereby showing ways to make the project successful.

#### **Inclusion (Universal Governance and Accessibility)**

1. Ensuring universal coverage for individuals from birth to death, free from discrimination.
2. Removing barriers to access and usage and disparities in the availability of information and technology.

#### **Design (Robust, Secure, Responsive, and Sustainable)**

1. Establishing a robust, unique, secure, and accurate identity.
2. Creating a platform that is interoperable and responsive to the needs of various users.
3. Using open standards and ensuring vendor and technology neutrality.
4. Protecting user privacy and control through system design.

#### **Governance (Building Trust by protecting Privacy and User Rights)**

1. Safeguarding data privacy, security, and user rights through a comprehensive legal and regulatory framework.
2. Establishing clear institutional mandates and accountability.
3. Enforcing legal and trust frameworks through independent oversight and adjudication of grievances.

#### **Features of MOSIP**

MOSIP open-source platform comes with different features and users should know about them in detail. Moreover, it allows government organizations to perform several tasks with ease.

##### **1. Scalability and manageability**

The primary advantage of MOSIP is that it gives ways to work on population and improves the functions when technologies evolve. Most open-source platforms come with vertical scaling that will result in high expenses. Not only that, they consume large capacity and storage. Vertical scaling also plays an important role in limiting the overall scaling ability that requires immediate attention. MOSIP is horizontally scalable that provides ways to scale out accordingly. The platform

comes with other features such as monitoring, auditing and upgrading to overcome unwanted issues.

## **2. Privacy**

MOSIP platform is available with security and privacy features that will help protect the data from potential threats. The consent framework in the platform takes care of user privacy that lets users choose what they want to share and when. Apart from that, it enables users to lock authentication features that pave the ways to reach the next levels.

## **3. Security**

The platform makes feasible methods to encrypt all the information that is inaccessible by both external and internal parties without user content. Some other security features include license keys, policies, and infrastructure security that will help minimize potential risks.

## **4. Cost-effectiveness**

MOSIP platform is a cost-effective solution for all government agencies that allow users to leverage the costs effectively. It provides ways to design a system at affordable rates, thereby showing ways to reduce expenses.

## **5. System integration**

Users can integrate the system with configuration-based approaches, which pave ways to develop an ID with high efficiency. Besides that, it allows them to design a system based on their choices.

## **6. Vendor neutrality**

Vendor neutrality is important for government agencies to manage the customer's labour ecosystem. It allows users to keep the ecosystem healthy, thereby helping to avoid potential risks. The MOSIP platform gives ways to avoid log-in by addressing the essential needs of users.

## **7. Modularity**

Every major feature of the platform allows users to handle them as a separate plug that gives ways to perform the activity without any difficulties.

## **8. High performance**

The MOSIP platform is available with infrastructure and networks that contribute to improving the performance levels effectively while performing important activities in identity platform designing.

## Modules of the MOSIP platform

The MOSIP platform comes with modules such as user-enabled data entry, appointment booking, fingerprint, IRIS, photo, field configurability, UIN generation, data enrichment, etc. Modular de-duplication engine, e-KYC services, tokenization, virtualization, resident services portal, reports and analytics, resident controlled privacy, field configurability, appointment booking, online mode, offline mode and so on.

MOSIP is compatible with all operating systems, which support Java language allowing the users to design and build an identification system depending on their needs. The platform is easy to use that gives ways to design digital identity cards with unique features.

MOSIP includes features such as demographic and optional biometric de-duplication. In **demographic de-duplication** the MOSIP system compares some of the demographic data (i.e. Name, Date of Birth and Gender) of the resident against the data present in MOSIP System (the residents who have already registered in MOSIP). If any potential match is found, the MOSIP system sends the resident's biometrics to the ABIS system to confirm if the biometrics is also matching.

In **biometric de-duplication** the MOSIP system sends the biometrics of the resident to an Automated Biometrics Identification System (ABIS) System. Here, the expectation from the ABIS system is to perform biometric de-duplication (1: N match) against all the records that it has stored earlier. When biometric duplicates are found in ABIS, MOSIP system sends a request for Manual Adjudication to the Manual Adjudication System via a queue.

However, in these national ID systems, biometric de-duplication is problematic. Not only from a potential data protection perspective, but also from a purely functional point of view. The larger the sample size of users, the more manual adjudications need to be performed and the more evident it becomes that the uniqueness of biometric identifiers cannot be guaranteed; therefore, sabotaging the one principle that biometric de-duplication relies on.

## Adopting a participatory approach and building trust

Many countries have initiated digital identity programs in the last decade, but in many of these attempts, adoption has been low. While reasons may vary, a recurring theme has been the lack of trust in a new ID system - an element that, when missing, poses the risk of derailing identity programs entirely. While recognizing that different countries, organizations, civil society groups, open source developers and business groups are in vastly different stages of awareness and readiness with respect to the key enablers mentioned above, MOSIP encourages governments and other ID issuers to adopt a transparent and participatory approach when making decisions about their identity systems. Open-

source solutions such as MOSIP carry with them an ethos of visibility into decision-making, receptiveness to constructive inputs and engagement with diverse voices, that we hope will carry through to the implementation of MOSIP-based systems as well, and enable the creation of a good ID system.

MOSIP will be used in a number of different countries and situations. Governments, international and regional organizations, civil society, open-source developers and businesses will all play different roles in the implementation and use of MOSIP. MOSIP intends to work with ID issuers to ensure that ID programs are inclusive, safe and empowering to individuals, and set an example for the rest of the world.

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