



DataSpace / Mobility

We're building India's first urban **DataSpace**.
Join Us!



सत्यमेव जयते

Ministry of Housing
and Urban Affairs
Government of India



Smart City
MISSION TRANSFORM-NATION



सत्यमेव जयते

iscf
Ministry of Housing and Urban Affairs

Agenda

- 1. The Problem**
- 2. Our Solution: DataSpace/Mobility**
- 3. The Vision: Future of Urban Data**

The Problem

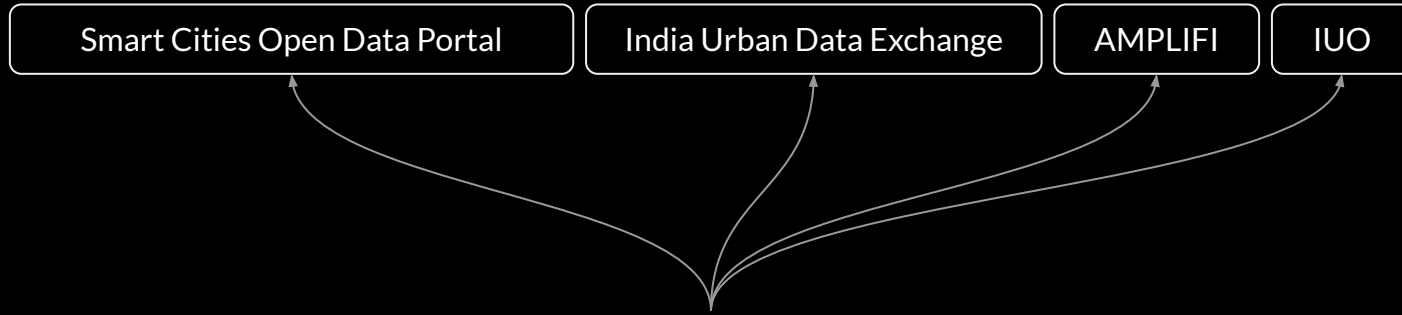
4041 statutory towns including **110 Smart Cities**

Sources of data - IoT sensors, connected devices, administrative records, etc. are in the city



The Problem

National Data Portals and Exchanges



4041 statutory towns including **110 Smart Cities**

Sources of data - IoT sensors, connected devices, administrative records, etc. are in the city

Data stored in silos

Data not harmonized for interoperability

Limited capacity for data management

Limited re-use of data outside source of collection



The Problem

National Data Portals and Exchanges

Smart Cities Open Data Portal

India Urban Data Exchange

AMPLIFI

IUO

Ad hoc data processing
and sharing mechanisms

Data limited to
aggregated statistics

High time and cost to access
data from multiple sources

Challenging to standardize datasets
from 4000+ cities & multiple sectors

4041 statutory towns including **110 Smart Cities**

Sources of data - IoT sensors, connected devices, administrative records, etc. are in the city

Data stored in
silos

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interoperability

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data management

Limited re-use of data outside
source of collection

The Problem

The **lack of a robust data culture** in India's **urban sector** acts as a constraint in the development of sound government policies, efficient service delivery and innovation from the private sector.

Our Solution: **A City DataSpace**

Our Solution - DataSpace

Streamlines the **city's capacities for data management** to enable democratic sharing of **standardized high quality urban data** and lay the **foundation for data-driven innovation** by citizens.

Our Solution

National Data Portals and Exchanges

Smart Cities Open Data Portal

India Urban Data Exchange

AMPLIFI

IUO

*Modular
Replicable*

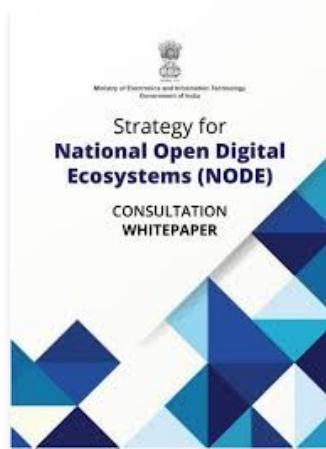
City Administration
DataSpace

*Decentralized
Scalable*

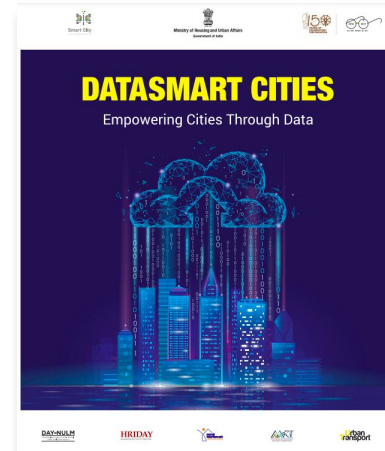
Connected to the sources of data - IoT sensors, connected devices, administrative records, ICCC, etc. in the city

Project Ideation

Envisioning DataSpace



Governance
Community
Delivery Platform



People
Platform
Processes

Based on
principles from:

India Enterprise Architecture
(IndEA) 2018

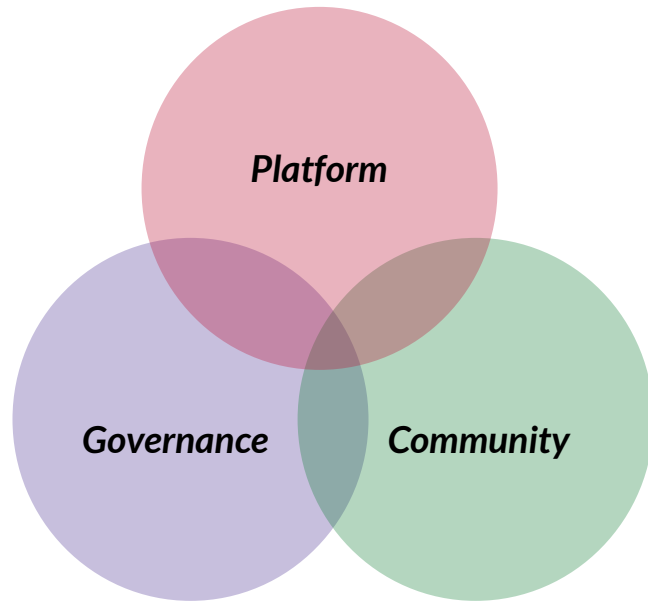
Draft Data Empowerment and
Protection Architecture 2020

Personal Data
Protection Bill, 2019

National Data Sharing and
Accessibility Policy (NDSAP) 2012

Draft Non-Personal Data
Governance Framework 2020

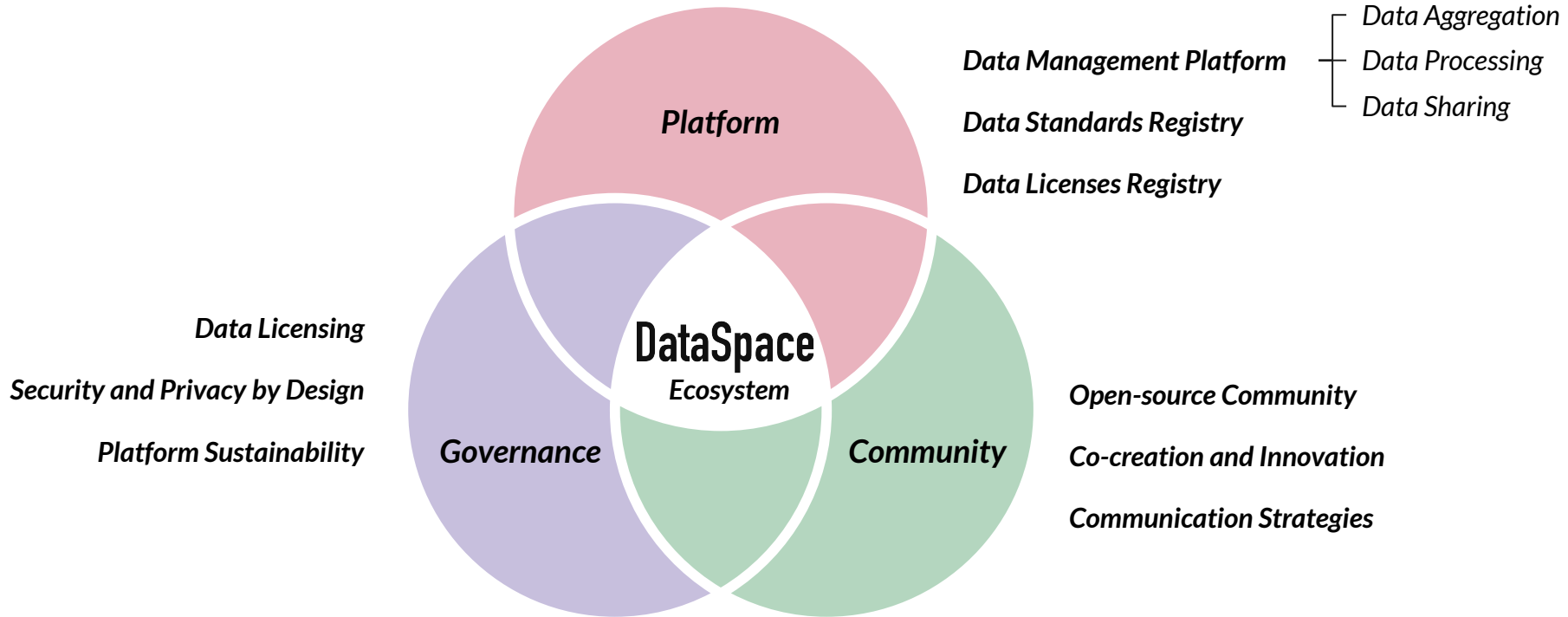
Three Foundational Pillars of DataSpace



DATA PLATFORM - unified digital platform to share high quality standardized data

GOVERNANCE - clearly define the rules of usage with responsibilities and liabilities of various actors

COMMUNITY - facilitate collaboration and co-creation among quadruple helix



Aligned to:

DataSmart Cities Strategy

City Data Policy

Personal Data Protection Bill

Draft Non-Personal Data
Governance Framework

National Urban Digital Mission

IUDX

DMAF

Pilot Showcase

Selecting a Pilot Sector

NATURE OF DATA

Largely **non-personal** and **non-sensitive** data

AVAILABILITY OF DATA

Significantly **large volumes** already being collected and stored by various public and private sector agencies



DEMAND FOR DATA

Large scale demand by both **private** and **public** sector

ACCESSIBILITY OF DATA

Ease of access to large volumes of mobility data through **ICCC** at **Smart Cities**

DataSpace / **Mobility**

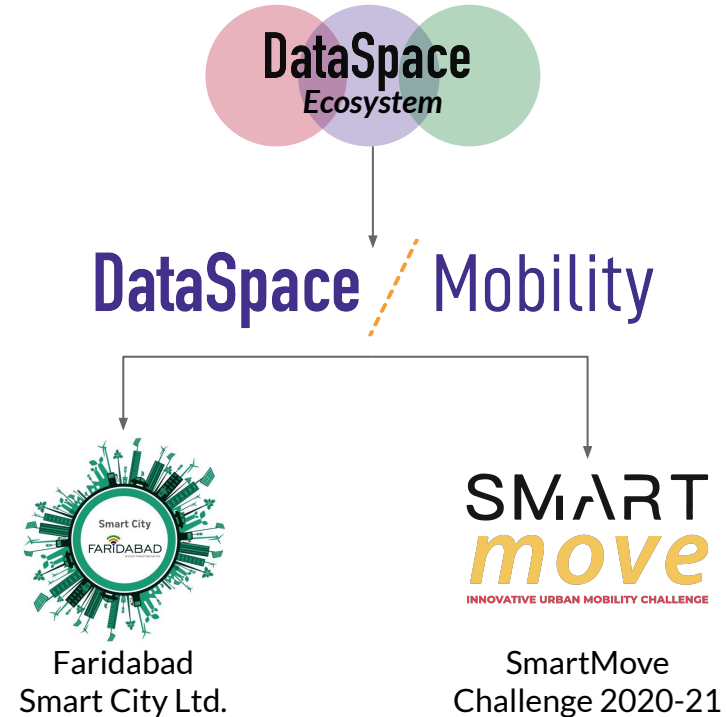
Selecting a Pilot Deployment

THREE CRITERIA

1. Access to large and **diverse mobility** ecosystem
2. **Availability** of open data and high level of data maturity
3. Vibrant **startup community** interested in urban mobility

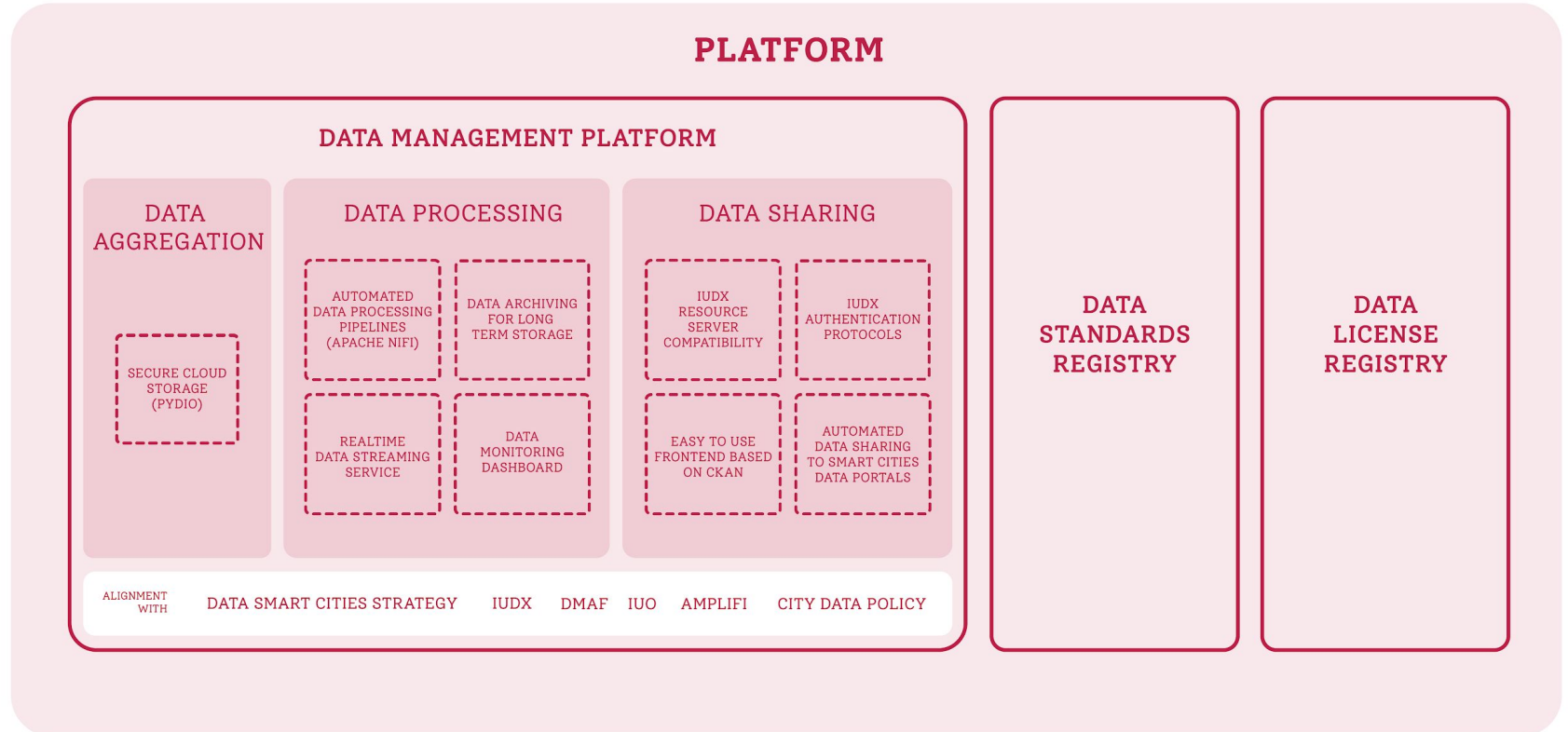
CHOICE OF SMART CITY SPVs

1. NDMC Smart City
2. **Faridabad Smart City**
3. Bengaluru Smart City
4. Pune Smart City

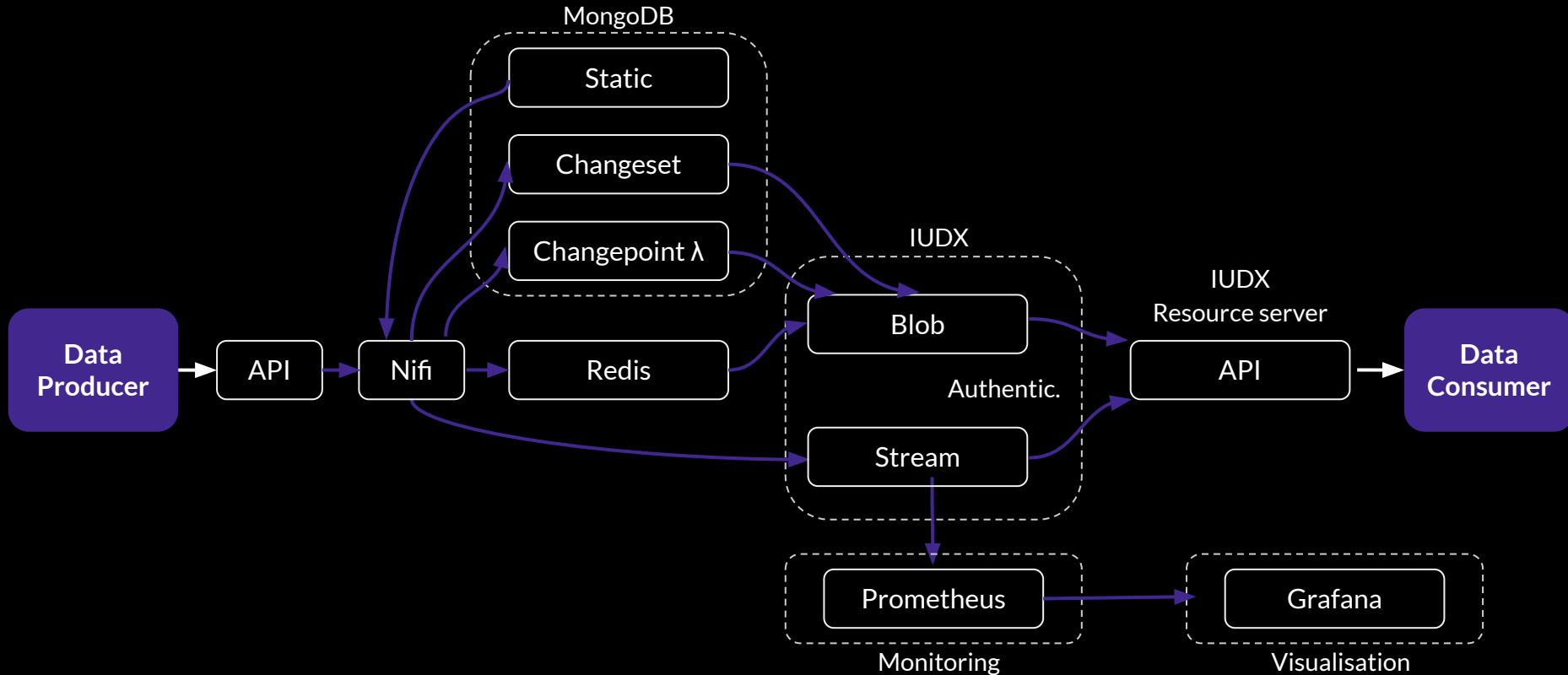


Preview - Platform

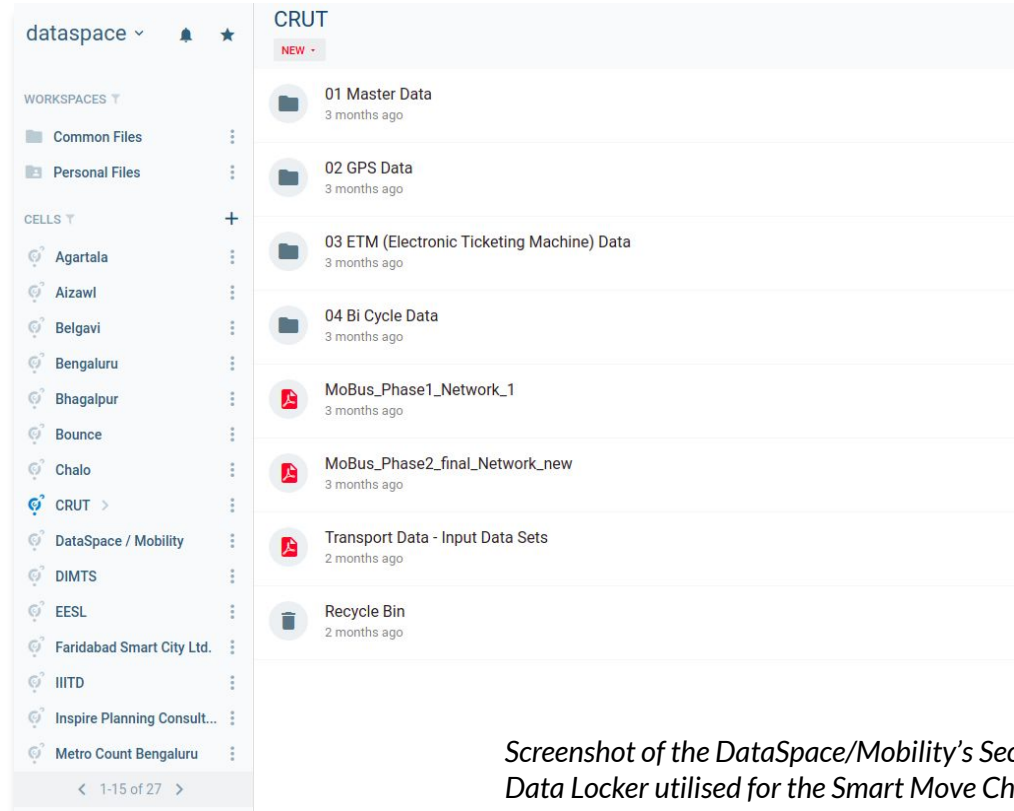
Data Management Platform



Data Management Platform - Architecture

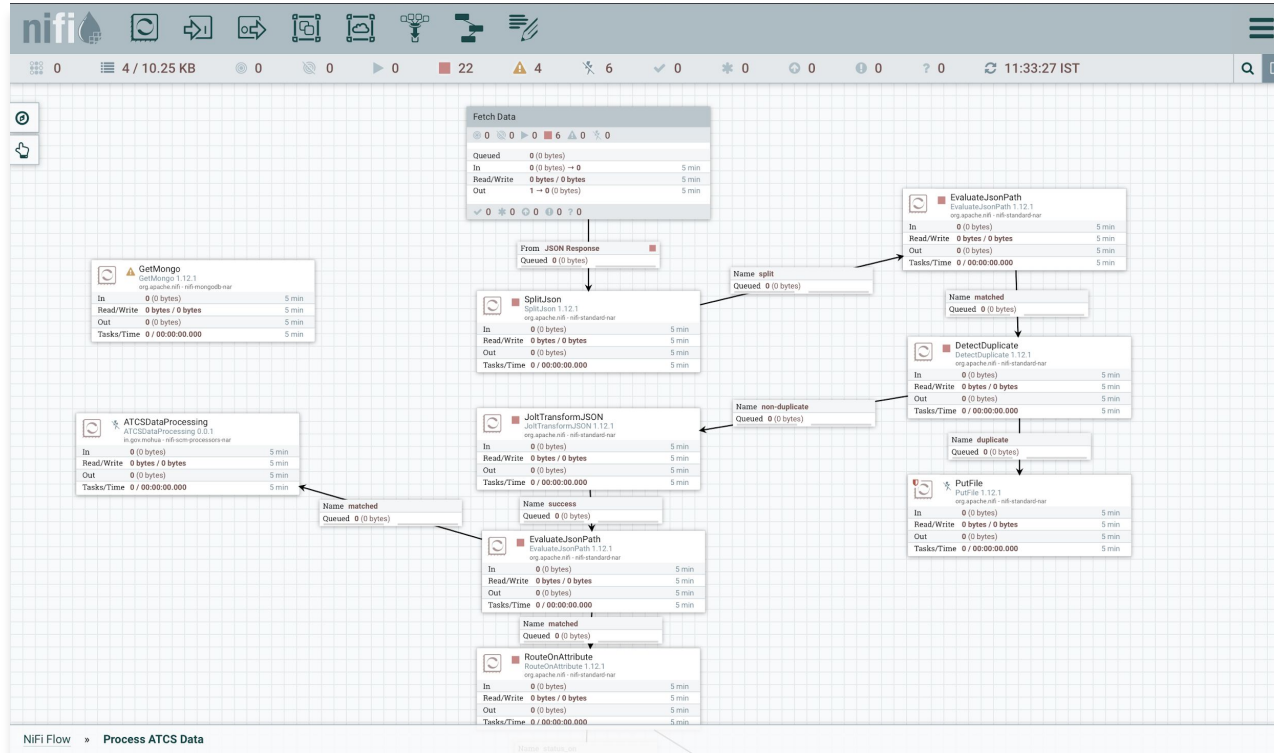


Data Management Platform - Aggregation



Screenshot of the DataSpace/Mobility's Secure Data Locker utilised for the Smart Move Challenge

Data Management Platform - Processing



Data Licensing and Licenses Registry


DataSpace / Mobility

search

- ▶ GOI - Govt. Open Data
- ▼ CC - Creative Commons
 - CC-1.0 - Zero Universal
 - CC BY-4.0 - Attribution Int.
 - CC BY-SA-4.0 - Attribution Share Alike
 - CC BY-ND-4.0 - Attribution NoDerivs
 - CC BY-NC-4.0 - Attribution NonCommercial
- ▶ GPL - Free Software Foundation
- ▶ ASF - Apache Software Foundation
- ▶ MF - Mozilla Foundation
- ▶ MIT - Massachusetts Inst. of Technology

Data Licenses Registry


Data License Registry



NDSAP: Govt.
Open Data
License 2016

| Permissions | Limitations | Conditions |
|--|--|---|
| <ul style="list-style-type: none"> -Commercial use -Modification -Distribution -Patent use -Private use | <ul style="list-style-type: none"> -Limitation of liability -Does not provide any warranty -Non-endorsement | <ul style="list-style-type: none"> -Attribution statement -license and copyright notice -Continuity of provision |


Show full license ▶



GLP - GNU
General
Public

| Permissions | Limitations | Conditions |
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Show full license ▶

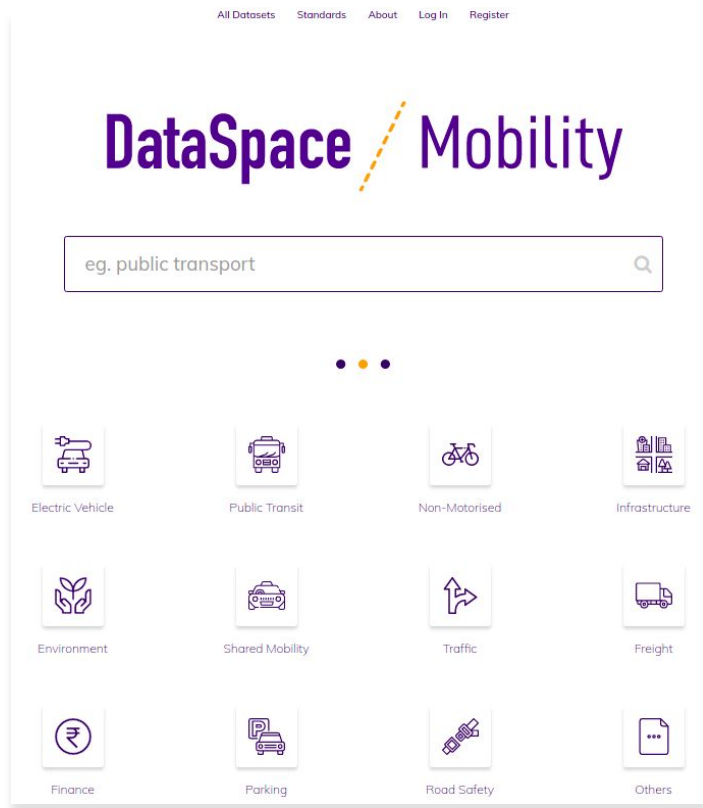


ASF - Apache

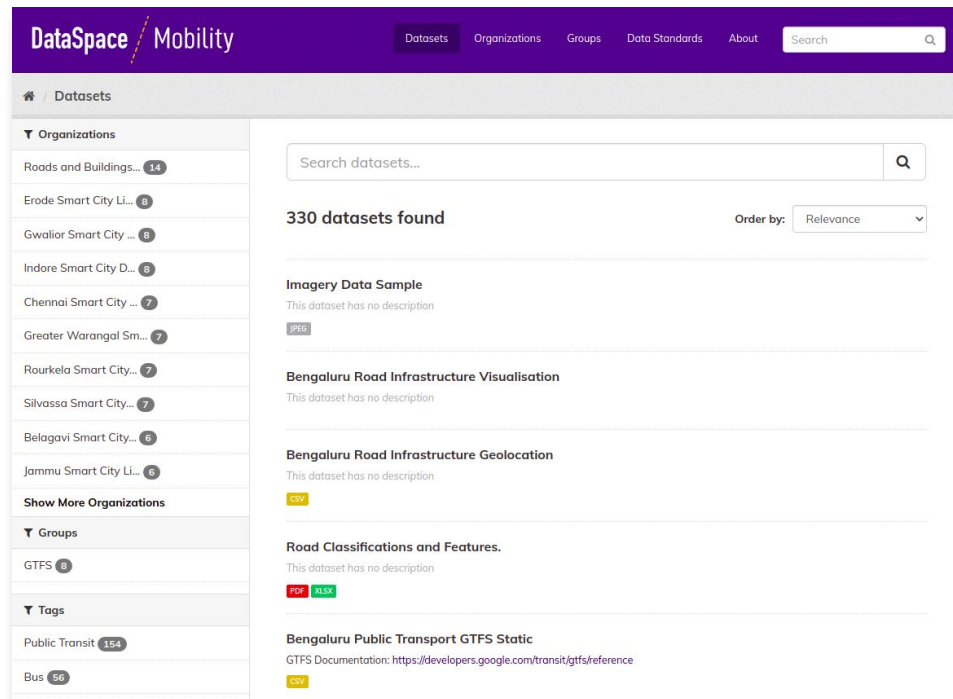
| Permissions | Limitations | Conditions |
|---|--|--|
| <ul style="list-style-type: none"> -Commercial use | <ul style="list-style-type: none"> -Limitation of | <ul style="list-style-type: none"> -State changes |

Screenshot of the DataSpace/Mobility's Open Data Licenses Registry

Data Management Platform - Sharing



The screenshot shows the homepage of the DataSpace/Mobility platform. At the top, there are navigation links: All Datasets, Standards, About, Log In, and Register. The main header features the logo "DataSpace / Mobility" with a dashed line between the words. Below the logo is a search bar containing the text "eg. public transport". Underneath the search bar are three small colored dots (purple, yellow, purple). The main content area is a grid of 12 icons, each representing a different category: Electric Vehicle, Public Transit, Non-Motorised, Infrastructure, Environment, Shared Mobility, Traffic, Freight, Finance, Parking, Road Safety, and Others.



The screenshot shows the "Datasets" page of the DataSpace/Mobility platform. The header is purple and contains the logo "DataSpace / Mobility" and navigation links: Datasets, Organizations, Groups, Data Standards, and About. There is a search bar on the right. Below the header, the page is divided into two main sections. On the left, there is a list of "Organizations" with a dropdown arrow and a "Show More Organizations" link. The organizations listed are: Roads and Buildings... (14), Erode Smart City Li... (8), Gwalior Smart City... (8), Indore Smart City D... (8), Chennai Smart City... (7), Greater Warangal Sm... (7), Rourkela Smart City... (7), Silvassa Smart City... (7), Belagavi Smart City... (6), and Jammu Smart City Li... (6). Below this list is a "Tags" section with a dropdown arrow and two tags: Public Transit (154) and Bus (56). On the right, there is a search bar with the text "Search datasets...". Below the search bar, it says "330 datasets found" and "Order by: Relevance". There are three dataset cards: "Imagery Data Sample" (with a JPEG icon), "Bengaluru Road Infrastructure Visualisation", and "Bengaluru Road Infrastructure Geolocation" (with a CSV icon). Below these are "Road Classifications and Features" (with PDF and XLSX icons) and "Bengaluru Public Transport GTFS Static" (with a CSV icon).

Screenshots of the DataSpace/Mobility's Data Management Platform

Community

The screenshot shows the GitHub profile for 'DataSpace-Mobility'. The header includes navigation links for 'Why GitHub?', 'Team', 'Enterprise', 'Explore', 'Marketplace', and 'Pricing', along with 'Sign in' and 'Sign up' buttons. The profile name 'DataSpace-Mobility' is displayed next to a logo with 'ds' on a purple background. Below the name, there are tabs for 'Repositories' (9), 'Packages', 'People', and 'Projects'. A search bar is present with filters for 'Type' and 'Language'. The repository list includes:

- scm-nifi-processors**: Java, 0 forks, 0 stars, 0 issues, updated 10 days ago.
- data-standard-registry-doc**: JavaScript, 2 forks, 1 star, 10 issues (2 need help), 1 issue, updated 10 days ago.
- smart-move-platform**: JavaScript, 0 forks, 0 stars, 10 issues, updated 12 days ago.
- data-standard-registry**: Makefile, 0 forks, 0 stars, 1 issue, updated on 23 Jan.
- quill**: Forked from techs/quill.

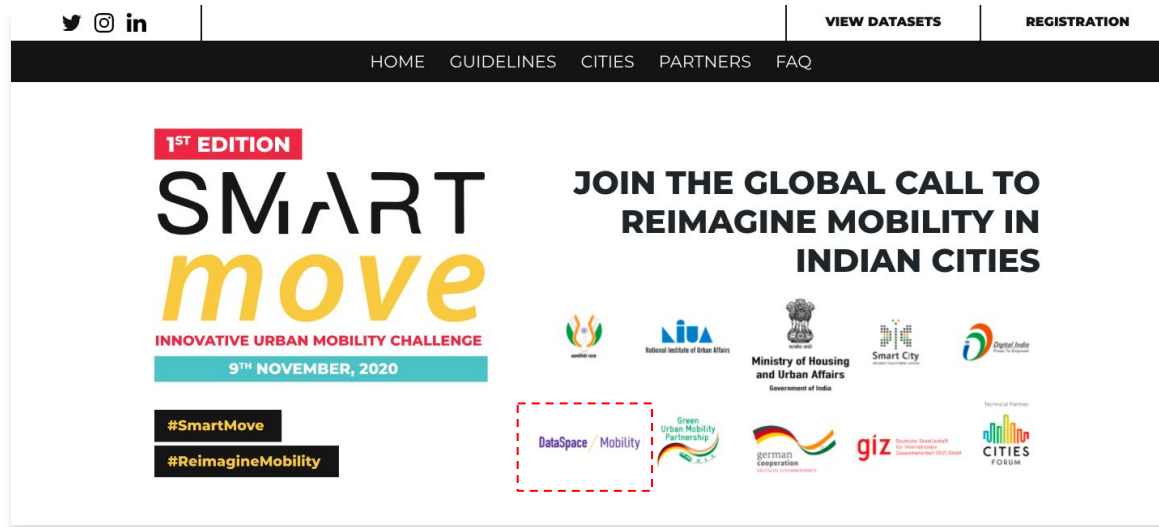
On the right side, there are sections for 'Top languages' (JavaScript, Java, Go, Makefile, HTML) and 'People' (no public members).

The screenshot shows the LinkedIn profile for 'Smart Move: Innovative Urban Mobility Challenge'. The header features the 'SMART move' logo and logos for 'CITIES FORUM', 'National Institute of Urban Affairs', 'Ministry of Housing and Urban Affairs Government of India', 'Smart City', 'National Innovation Foundation', and 'GIZ India'. The profile name is 'Smart Move: Innovative Urban Mobility Challenge', with the text 'REGISTRATIONS OPEN! Inviting academia, professionals, industry & startups to reimagine mobility in Indian cities.' and 'Government Relations · New Delhi · 386 followers'. There are buttons for 'Visit website' and 'More'. The navigation menu includes 'Home', 'About', 'Posts', 'Jobs', 'People', and 'Videos'. The 'About' section states: 'Innovate and co-create with India's biggest cities to solve the most complex urban mobility challenges. SMART MOVE Innovative Urban Mobility Challenge is an initiative by the Ministry of Housing and Urban Affairs supported by the Smart Cities Mission, the National Institute of Urban Affairs and GIZ India. Cities Forum is the Technica... see more'. Below this is a 'See all details' link. The 'Page posts' section shows two posts from 'SMART move' (386 followers):

- Post 1: 'Join our first technical workshop of #SmartMove #Challenge. The session by Mr Alok Jai ...see more' (2mo).
- Post 2: 'Shortlisting for #Smartmove challenge phase 1 is complete. Teams of 15 shortlisted conce ...see more' (1w).

Screenshots of the DataSpace/Mobility's Community Platforms - LinkedIn and Github

SmartMove Challenge 2020-21



330+

Datasets onboarded

80+

Concept notes
submitted

100+

Members in a vibrant
community of innovators

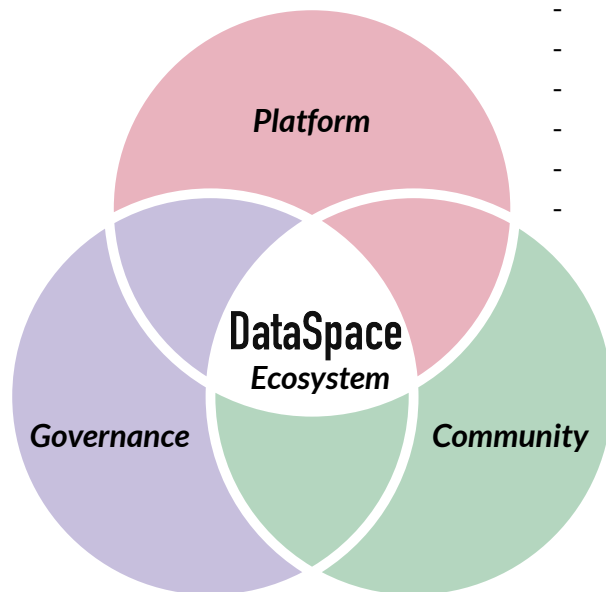
6

Data standards created
and documented

10+

Smart Cities being
engaged2ndPhase kickstarted
on 26th Feb 2021

SmartMove Challenge 2020-21



Tech Stack deployed for

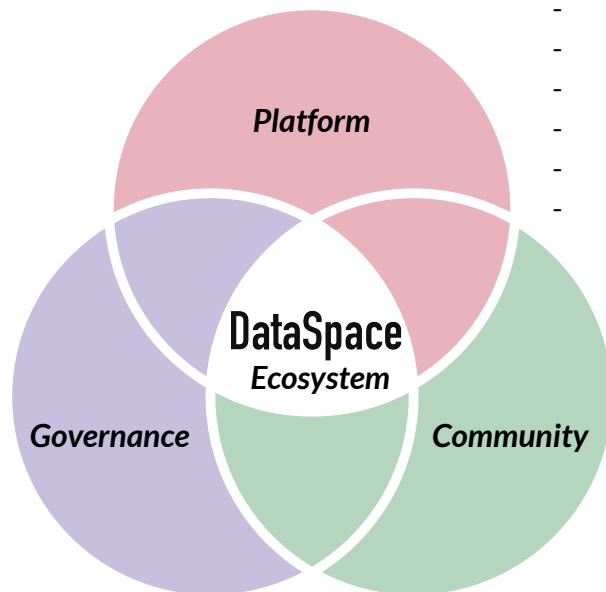
- Data **aggregation** and storage *storage.dataspace.mobi*
- Data **processing** pipelines
- Data **delivery platform** (CKAN) *dataspace.mobi*
- **Hackathon management platform** *hack.dataspace.mobi*
- Discord Server
- Website development *smartmove.niua.org*

SmartMove Challenge 2020-21

Discussions with Data Partners
on **data sharing preferences** to
create data licenses

Ensuring **security and privacy of
data** shared by Data Partners

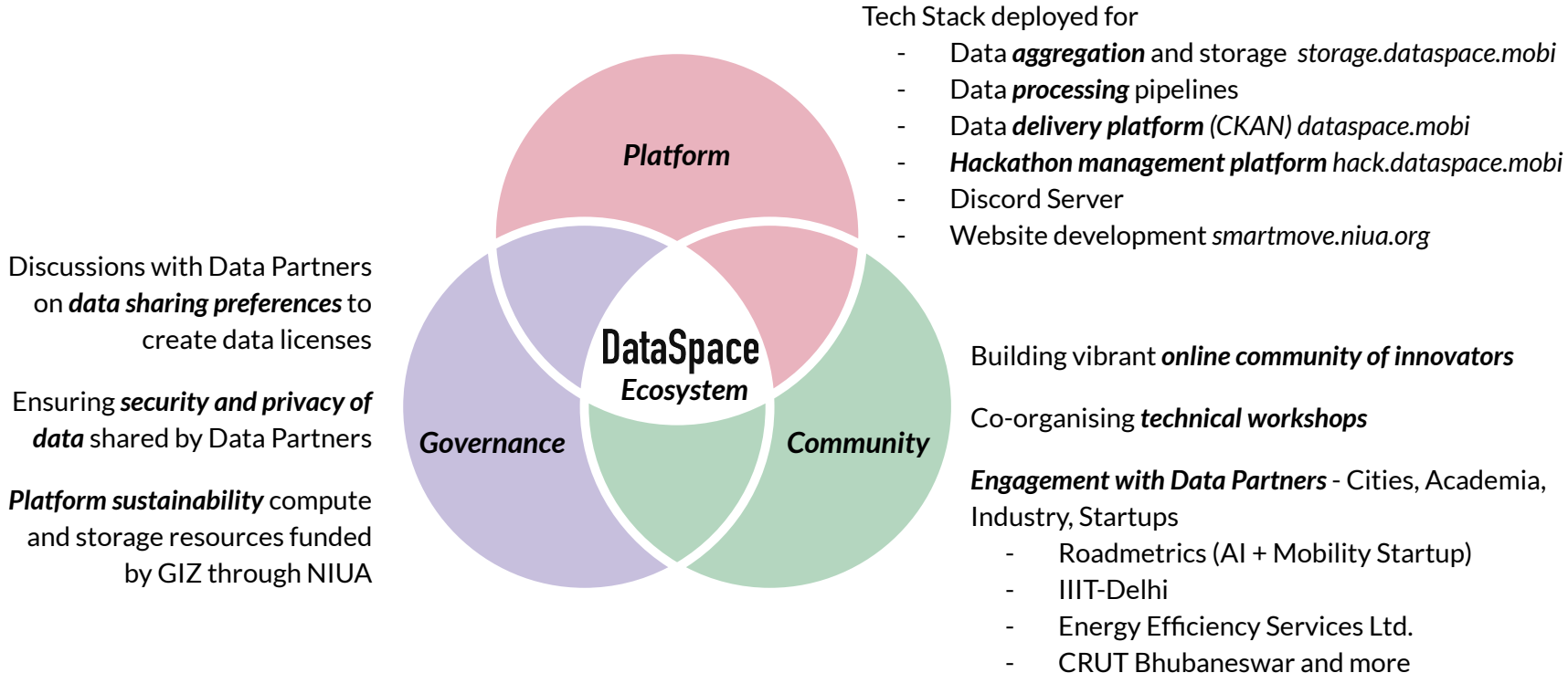
Platform sustainability compute
and storage resources funded
by GIZ through NIUA



Tech Stack deployed for

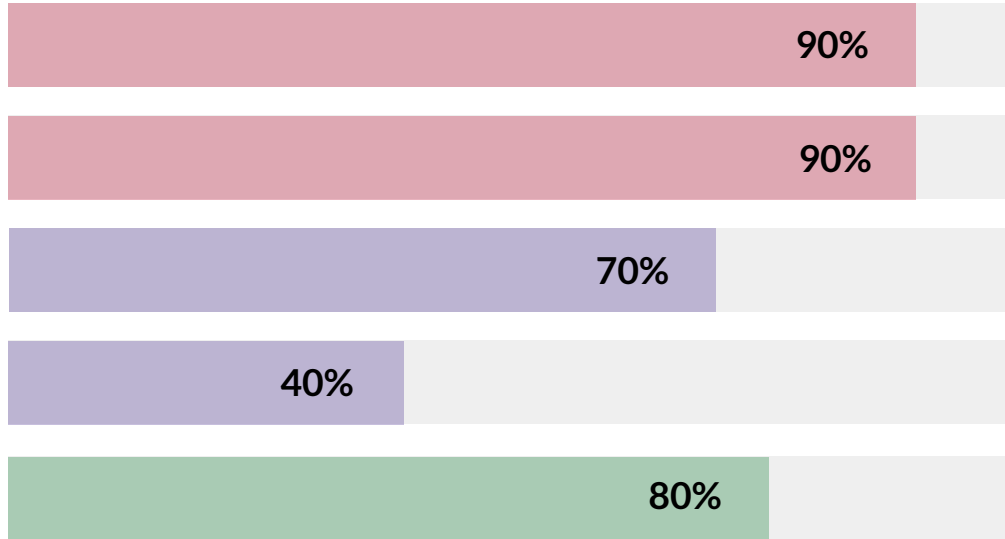
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- **Hackathon management platform** *hack.dataspace.mobi*
- Discord Server
- Website development *smartmove.niua.org*

SmartMove Challenge 2020-21



Project Critique

Project Report Card



Project Objectives

1. Develop a **public digital infrastructure** that acts as a **data delivery platform**
2. Develop comprehensive **domain-specific data standards** for urban mobility
3. Identify a **suitable governance framework** with clearly defined rules.
4. Build a **self-sustaining financial model** to fund development of the platform
5. **Engage with various stakeholders** to develop a vibrant community

Challenges

Limited response to requests for collaboration with public sector (state and central) and private sector agencies operating in the city

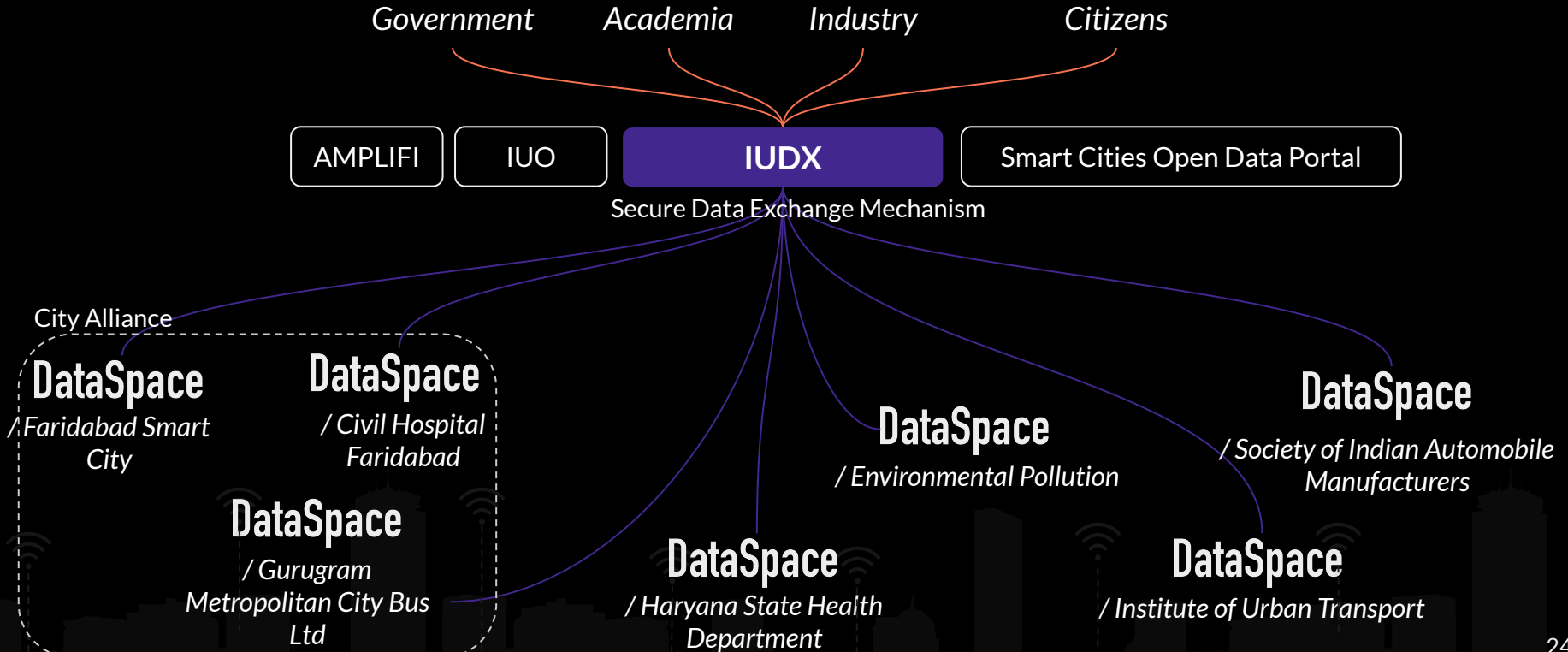
Limited institutional frameworks for big data management practices in the city

Limited financial capacity for data management in Smart Cities for long-term sustainability

Limited skilled manpower in the city to handle Big Data

The Vision: **Future of Urban Data**

DataSpaces of the (near) Future



Immediate action points

1

DataSpace/ Faridabad

**Onboard datasets
from ICCC &
external
stakeholders -
Haryana Roadways,
GMCBL (City Bus),
Traffic Police,
Ambulance
operator for Civil
Hospital and more.**

Immediate action points

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Traffic Police,
Ambulance
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2

DataSpace/ SmartMove

Onboard datasets
from new Data
Partners

Technical
workshops

Weekly
engagements with
participant teams

Immediate action points

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Convergence

Connect
DataSpace/Faridabad
to IUDX

Support development
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Alliances at Faridabad

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Connect
DataSpace/Faridabad
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Support development of data-related City Alliances at Faridabad

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Collaboration

Explore data monetization opportunities - Draft document under review

Work with industry experts for more mobility-specific open data standards for the Indian context

Immediate action points

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Onboard datasets from ICCC & external stakeholders - Haryana Roadways, GMCBL (City Bus), Traffic Police, Ambulance operator for Civil Hospital and more.

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5

Finance

Access to funds from asset monetization or through grants from MoHUA

Pooled finances for open source development of DataSpace ecosystem

Roadmap for Phase 2



April 2021

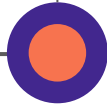
Complete **onboarding of datasets from Data Partners** for SmartMove Challenge

Develop **data standards & custom licenses** for datasets accessed

Roadmap for Phase 2

May 2021

Complete onboarding of datasets from **ICCC, Faridabad Smart City Ltd** and other external partners at Faridabad



April 2021

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Roadmap for Phase 2

May 2021

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June 2021

Engage with academia, industry and citizens to **develop use cases** for Faridabad Smart City

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Roadmap for Phase 2

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July 2021

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Deploy use case prototypes in Faridabad

Roadmap for Phase 2

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June 2021

Engage with academia, industry and citizens to **develop use cases** for Faridabad Smart City

August 2021

Handover DataSpace/ Faridabad to team at FSCL

April 2021

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Develop **data standards & custom licenses** for datasets accessed

July 2021

Complete engagement for SmartMove Challenge.

Deploy use case prototypes in Faridabad

Phase 3 - Scaling up to other cities and sectors begins

Acknowledgements



Special thanks

Mr. Kunal Kumar, Mission Director (Smart Cities)
Mr. Rahul Kapoor, Director (Smart Cities)

Mr. Hitesh Vaidya, Director, NIUA
Ms. Nabamalika Joardar, Fellowship Manager, NIUA

Dr. O.P. Agarwal, CEO, WRI
Mr. Jitender Pal, NIUA

Dr. Garima Mittal, CEO, FSCL
Mr. Shishir Saurabh, DGM (IT), FSCL
Mr. Bhupesh, CDO, FSCL

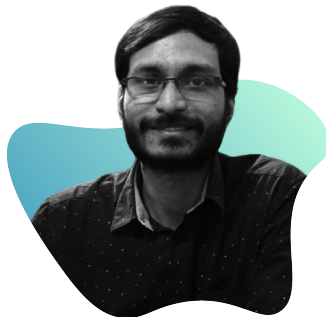
Mr. Ankit Rai, NIUA
Ms. Anusha Mishra, NIUA
and all the amazing Fellows of ISCF cohort 2020-21

Team Mobilize



Aparna Ramesh

Architect and Urban Planner
CEPT University, Ahmedabad



Abhishek Upperwal

Data Scientist
IISc, Bangalore



Manuel Diego

Architect
University of Nottingham, England



DataSpace / Mobility

Let's build a sustainable city for all.

Email: hi@dataspace.mobi

Website: <https://dataspace.mobi>

Annexures

List of all the products and subproducts forming the technology stack of DataSpace/Mobility along with its link and the link to the source code

| DataSpace Products and Subproducts | Link to the Product/Subproduct | Link to the Open Source code of the customised Product/Subproduct | Open Source base project/ platform | Link to the Open Source base project/ platform |
|------------------------------------|---|---|---|---|
| Data Management Platform | https://dataspace.mobi/ | https://github.com/DataSpace-Mobility/ckanext-dataspace | CKAN | https://ckan.org/ |
| Open Data Standards Registry | https://standards.dataspace.mobi/ | https://github.com/DataSpace-Mobility/data-standard-registry | Specifically developed for DataSpace and made it available as Open Source | |
| Open Data Licenses Registry | Under development | | | |
| Data Preprocessing Pipeline | Backbone tool not available via browser | https://github.com/DataSpace-Mobility/scm-nifi-processors | Apache Nifi | https://nifi.apache.org/ |
| Data Monitoring Dashboard | Under development | | Grafana | https://grafana.com/ |

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|---|---|---|---|---|
| Website | https://about.dataspace.mobi/ | https://github.com/DataSpace-Mobility/website | Specifically developed for DataSpace and made it available as Open Source | |
| Smart Move Official Website | https://smartmove.niua.org/ | https://github.com/DataSpace-Mobility/smart-move-microsite | Specifically developed for DataSpace and made it available as Open Source | |
| Hackathon Registration Platform for Participants | https://hack.dataspace.mobi/ | https://github.com/DataSpace-Mobility/quill | Quill by HACKMIT | https://code.hackmit.org/ |
| Hackathon Registration Platform for Data Partners | https://smartmove.niua.org/#/cities | https://github.com/DataSpace-Mobility/smart-move-microsite | Specifically developed for DataSpace and made it available as Open Source | |
| Secure Data Locker | https://storage.dataspace.mobi/ | https://github.com/DataSpace-Mobility/pydio | Pydio | https://pydio.com/ |