

## DIGIPIN (Digital Postal Index Number)

- ✓ A Digital Public Infrastructure (DPI), Standardized Geo-Coded Interoperable Addressing system in India established by Department of Posts, India.
- ✓ Beta version of DIGIPIN released on 19.07.2024 and request to Public for submission of feedback till 22.09.2024 and it can be assessed at <https://digipin.cept.gov.in>
- ✓ An official Digital Postal Index Number system, was launched on May 27, 2025 and it can be assessed at <https://dac.indiapost.gov.in/mydigipin/home>
- ✓ This initiative seeks to provide simplified addressing solutions for seamless delivery of public and private services and to enable “Address as a Service” (AaaS) across the country.
- ✓ DIGIPIN is an open-source national level addressing grid developed by **Department of Posts** in collaboration with **IIT Hyderabad and NRSC, ISRO** and is a key component of the digital address ecosystem.
- ✓ The DIGIPIN layer will serve as a uniform address referencing framework available both offline and online.
- ✓ A standardized geo-coded addressing system would enhance India's geo-spatial ecosystem. It would add to the geospatial knowledge stack of the country in line with the National Geospatial Policy 2022, which seeks to strengthen the geospatial sector to support national development, economic prosperity and a thriving information economy.

### Core Concept: -

- DIGIPIN is visualized as an alpha numeric offline grid system that divides the geographical territory of India into uniform 4-meter by 4-meter(approx.) units.
- Each of these 4m X 4m units (approx.) is assigned a unique 10-digit alphanumeric code, derived from the latitude and longitude coordinates of the unit.
- This alphanumeric code serves as the offline addressing reference for any specific location within the DIGIPIN system
- DIGIPIN solely represents a location and does not store any personal information, it respects privacy.

### Code Architecture

- The detailed structure is such that the DIGIPIN is essentially an encoding of the latitude and longitude of the address into a sequence of alphanumeric symbols using the following 16 symbols: 2, 3, 4, 5, 6, 7, 8, 9, C, J, K, L, M, P, F, T
- The encoding is performed at various levels, and the basic idea is the following:
  - A bounding box is used that covers the entire country.
  - The bounding box is split into 16 (i.e., 4x4) regions. Each region is labeled by one of the symbols 2, 3, 4, 5, 6, 7, 8, 9, C, F, J, K, L, M, P, T. The first character in the code would identify one of these regions. This is called the level-1 partition.
  - Each region is then subdivided into 16 subregions in a similar fashion. Each of the 16 subregions are labeled by the 16 characters. For a given region, the subregion is identified by the second character of the code. Therefore, the first two characters of the code uniquely identify one of the  $16^2=256$  subregions. This is called the level-2 partition.



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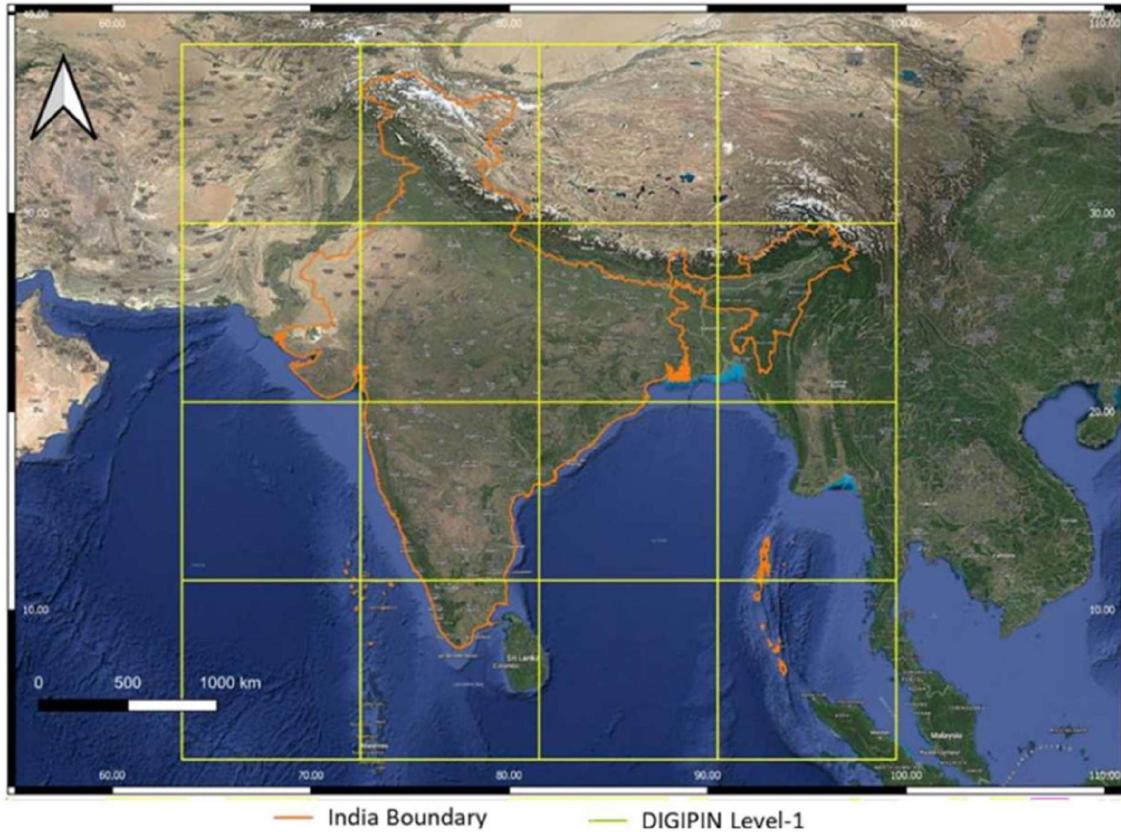


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- The encoding of successive characters, and therefore the next 8 levels is done in an identical fashion. The 10-symbol code therefore uniquely identifies one of the  $16^{10}$  cells within the bounding box.

### **Bounding box:**

Following are the details of the bounding box used:



*Figure 1: DIGIPIN level-1 grid lines (yellow) overlaid over the Indian region showing the extent of DIGIPIN bounding box*

- Longitude 63.5 – 99.5 degrees east
- Latitude 2.5 – 38.5 degrees north
- Includes the maritime Exclusive Economic Zone (EEZ), and therefore DIGIPIN allows to provide addresses to Indian assets in the sea (oil rigs, future man-made islands, etc.), or even potentially be used to locate regions in the sea by the maritime sector. The maritime EEZ is computed assuming 200 nautical miles extent from the coastline.



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- Level-1 grid lines do not cut through cities with very large population.
- The level-10 cells would be almost rectangular, but the dimensions would vary based on the latitude. This would translate to a cell of size smaller than 3.8-meter x 3.8-meter if measured at the equator, and this is reasonable given the accuracy of most current commercially available Global Navigation Satellite System (GNSS).

### **Properties of DIGIPIN**

- ❖ DIGIPIN contains the geographic location of the area. It is possible to extract the latitude and longitude of the address from the DIGIPIN with low complexity.
- ❖ DIGIPIN has been designed for the Indian context. All points of interest to India (including maritime regions) can be assigned codes, and it is possible to assign code even in areas that are very densely populated.
- ❖ The format of the DIGIPIN is intuitive and human-readable.
- ❖ DIGIPIN is designed as a permanent digital infrastructure, that does not change with changes in the names of state, city or locality, or with changes in the road network in an area.
- ❖ The DIGIPIN is designed to be robust to accommodate future developments and changes. The arrival of a new building in a community, or even a new village or city in a district, or changes in the name of a road or locality will not affect the underlying DIGIPIN

### **Labelling of regions at various levels**

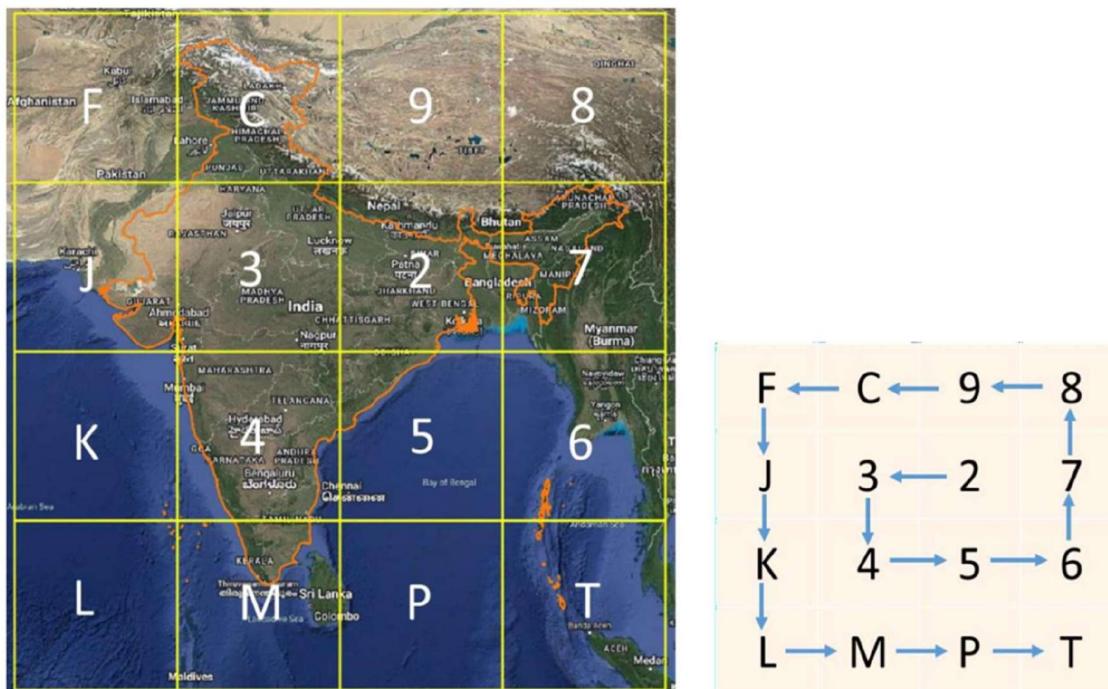


Figure 2: Labelling of DIGIPIN level-1 grids (left) and 4x4 grid used for labelling (right)



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- ❖ In first iteration (level-1), the bounding box is divided into 16 regions using a 4x4 grid and each region is labelled using 16 symbols, 2, 3, 4, 5, 6, 7, 8, 9, C, F, J, K, L, M, P, and T, as shown in Figure 2.
- ❖ A consistent gridding and labelling scheme are applied across all subsequent iterations (Levels 2 to 10). For these levels, the same labelled grid is utilized, with the labelling process carried out in a hierarchical manner.
- ❖ Each Level-1 region is further split into 16 sub-regions called Level-2 regions as illustrated in the *Figure 3*. The regions are hierarchically partitioned into sub-regions in an identical fashion.
- ❖ Symbols are assigned in anticlockwise fashion, spiralling outwards. The grid provides some sense of directionality and adjacency cells labelled by consecutive symbols (such as 6 and 7) are geographical neighbours.

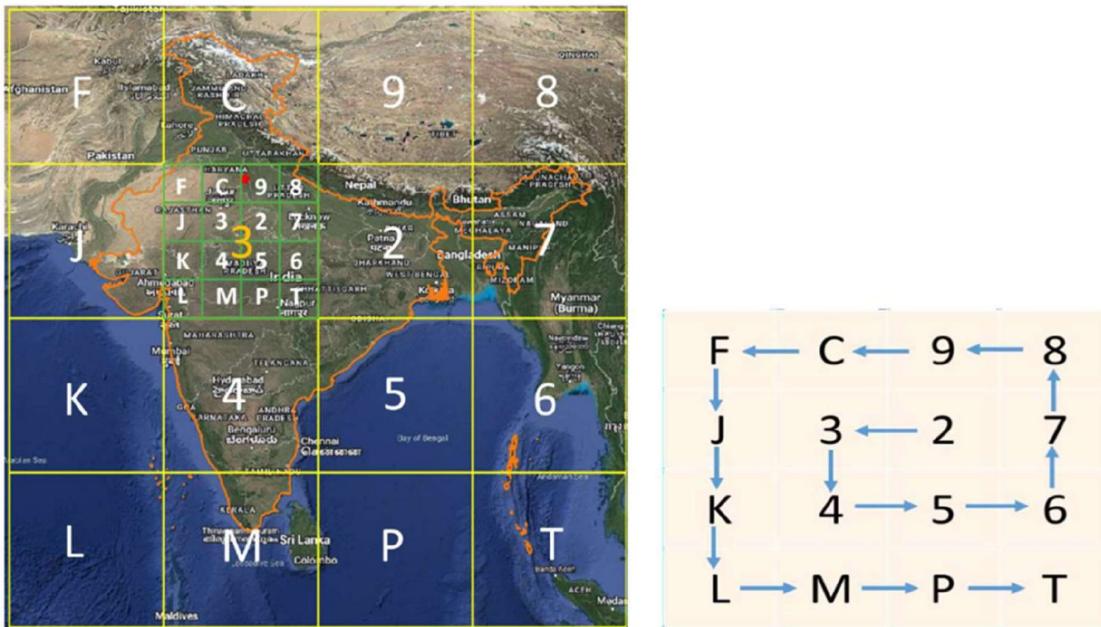


Figure 3: Labelling of DIGIPIN level-2 grids (left) and 4x4 grid used for labelling (right)

#### Grid sizes at various levels

- As explained above, the DIGIPIN generation is an iterative procedure. At level-1, the bounding box is divided into 16 (4x4) regions. The total latitudinal and longitudinal width of bounding box is  $36^\circ$ , resulting in  $9^\circ \times 9^\circ$  regions at level-1. Similarly, at level-2, each  $9^\circ \times 9^\circ$  region is further divided into 16 (4x4) sub-regions, resulting in  $2.25^\circ \times 2.25^\circ$  regions. The same process is carried out up to 10 levels. The table below shows a relation between the DIGIPIN code length, corresponding grid size and approximate linear distance at the equator. It gives an estimate of the positional uncertainty associated with DIGIPIN code length. For instance, a DIGIPIN code



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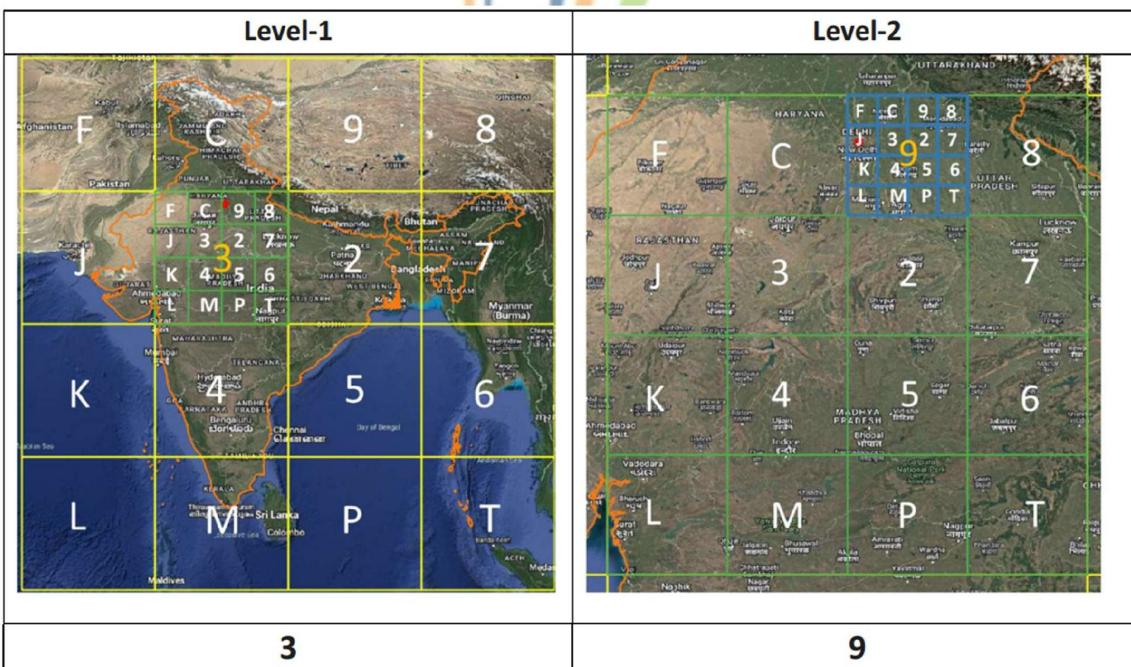
of length 6 represents a ~ 1km x 1km region. It requires an additional 4 digits to precisely locate a 3.8m x 3.8m region inside this region.

<b>Code Length</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Grid Width</b>	9°	2.25°	33.75'	8.44'	2.11'	0.53'	0.13'	0.03'	0.5"	0.12"
<b>Approx. Distance</b>	1000 km	250 km	62.5 km	15.6 km	3.9 km	1 km	250 m	60 m	15 m	3.8 m

*Table 1: DIGIPIN grid size at different levels*

### Illustration of DIGIPIN Generation Process

- The *figure 4* illustrates the complete procedure for generating DIGIPIN for a specific location. For example, the geographical coordinates of Dak Bhawan (28.622788°N, 77.213033°E) are marked with a red star on the India base map. The figure demonstrates the selection of DIGIPIN symbols at each level, based on the grid encompassing Dak Bhawan. The DIGIPIN of Dak Bhawan is 39J 49L L8T4.





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## FAQs about DIGIPIN

- ❖ **What is DIGIPIN?**
- ❖ DIGIPIN is a nationwide geo-coded addressing system developed by the **Department of Posts** in collaboration with **IIT Hyderabad and NRSC, ISRO**. It divides India into approximately 4m x 4m grids and assigns each grid a unique 10-character alphanumeric code based on latitude and longitude coordinates. This system simplifies addressing for public and private services, improving logistics efficiency and emergency response capabilities.
  
- ❖ **How is DIGIPIN different from a regular postal address?**
- ❖ While a regular postal address depends on locality, street, and house numbers, DIGIPIN is a geospatial reference using a 10-character alphanumeric code based on the exact coordinates of a location.
  
- ❖ **Why do we need DIGIPIN when we already have postal addresses?**
- ❖ DIGIPIN simplifies address management by providing precise location-based identification, especially in areas with unstructured or changing addresses. It also helps in areas where no clear address exists, such as rural regions, forests, and oceans.
  
- ❖ **What is the meaning of the beta version of DIGIPIN?**
- ❖ The beta version of DIGIPIN is not the final version. It was released for public feedback and expert opinion to incorporate relevant suggestions into the final version.
  
- ❖ **Is DIGIPIN available offline?**
- ❖ Yes, DIGIPIN is designed for offline use as well. The Department of Posts has shared the programming code for DIGIPIN logic in the public domain for fetching and decoding.
  
- ❖ **Can DIGIPIN be used for navigation?**
- ❖ Yes, DIGIPIN codes can be integrated into navigation systems and apps, allowing for precise location tracking.
  
- ❖ **Will my postal address change if I use DIGIPIN?**
- ❖ No, your postal address remains the same. DIGIPIN is an additional digital addressing layer that complements existing systems for more precise location identification.
  
- ❖ **How is a DIGIPIN generated for a specific location?**
- ❖ DIGIPIN is derived from the latitude and longitude of a location, encoded into a 10-character alphanumeric format using predefined symbols.
  
- ❖ **Is my personal address data stored in DIGIPIN?**
- ❖ No, DIGIPIN does not store personal data. It only provides a location code based on geographic coordinates, ensuring privacy.



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- ❖ **Can DIGIPIN be used for rural or remote areas?**
  - ❖ Yes, DIGIPIN works in all areas, including rural, remote, and urban regions. Even places without traditional addresses are covered.
- ❖ **How precise is the DIGIPIN system?**
  - ❖ Each DIGIPIN code represents an approx. 4m x 4m square, which ensures a high level of precision, making it ideal for navigation, deliveries, and emergency services. However, the accuracy of DIGIPIN created for any location might depend upon the accuracy of the GNSS location capture device you are using.
- ❖ **What is the difference between PINCODE and DIGIPIN**
  - ❖ A postal pincode identifies a broader area, such as a locality or neighborhood, whereas a DIGIPIN identifies a specific approx. 4m x 4m location, providing much more precision.
- ❖ **Is DIGIPIN applicable only within India?**
  - ❖ Yes, DIGIPIN is designed for the geographical boundaries of India, including maritime regions. Following are the details of the bounding box used: Longitude 63.5 – 99.5 degrees east & Latitude 2.5 – 38.5 degrees north
- ❖ **What is the benefit of DIGIPIN in emergency situations?**
  - ❖ DIGIPIN provides a precise location that can help emergency services reach the exact spot more quickly, especially in disaster-prone or remote areas.
- ❖ **How do I find my DIGIPIN?**
  - ❖ You will need a device with GNSS facility to find your exact location (latitude and longitude), which can then be converted into a DIGIPIN code. Department of Post have created a beta web application which can be assessed at [digipin.cept.gov.in](http://digipin.cept.gov.in). Department of Posts have also shared the programming code for DIGIPIN logic in public domain for fetching and decoding the DIGIPIN.
- ❖ **Do I need to login or signup for finding DIGIPIN?**
  - ❖ No, You don't have to login or signup for fetching the DIGIPIN of your location. You might have to provide location access in the device to fetch the DIGIPIN value of your location.
- ❖ **How does DIGIPIN help in Government Services?**
  - ❖ DIGIPIN helps in delivering government services more efficiently by providing precise location-based addresses for citizens, improving service delivery and better address capture during beneficiary on boarding.



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- ❖ **How does DIGIPIN handle changes in Infrastructure, such as new buildings or roads?**
  - DIGIPIN codes are fixed and independent of changes in infrastructure or street names, as they are based solely on geographic coordinates. Even if a new building is constructed, the DIGIPIN of the location remains the same.
- ❖ **Can a building having multiple residents/homes have different DIGIPIN?**
  - DIGIPIN is a pure function of latitude and longitude of the location. Floor information or any other address attribute does not affect the DIGIPIN value of a location. Since no personal information is needed for fetching the DIGIPIN , DIGIPIN is not different for different persons living in the same address. DIGIPIN is not an identifier of person but is only an addressing reference system.
- ❖ **Will DIGIPIN replace traditional addresses?**
  - No, DIGIPIN will complement traditional addresses. It offers an additional digital layer of precision but won't replace existing postal addresses.
- ❖ **Can I provide DIGIPIN for booking a Postal article in Post office next time I visit post office?**
  - A final version of DIGIPIN has been officially released out on 27.05.2025. Once the final version is incorporated in Department of Posts systems, Department will officially announce and citizens can then start using DIGIPIN for booking article in Post offices.
- ❖ **Can DIGIPIN be useful for rural villages?**
  - Yes, DIGIPIN is particularly useful in creating geo-referenced landmarks in rural or underdeveloped areas where traditional addressing systems may not be well-defined.
- ❖ **How do I fetch or decode a DIGIPIN?**
  - A DIGIPIN code is a 10-character alphanumeric sequence. it's a pure function of your location's latitude and making it unique for each approx. 4m x 4m area. Department of Posts have shared the programming code for DIGIPIN logic in public domain for fetching and decoding the DIGIPIN.
- ❖ **Does DIGIPIN work in areas with no internet access?**
  - Yes, because it is an offline system. Once a DIGIPIN is generated, it can be shared and used without the need for an internet connection.
- ❖ **Is DIGIPIN secure?**
  - Yes, since no personal data is associated with a DIGIPIN, it is secure. The code only represents a location, and no individual's information is stored.
- ❖ **Will DIGIPIN affect my privacy?**
  - No, DIGIPIN does not compromise privacy. It only refers to a geographic location and does not store or display personal information linked to that location.

❖ **How can businesses benefit from DIGIPIN?**

- Businesses can use DIGIPIN to improve delivery accuracy, logistics, service coverage, and customer service, especially in areas with complex addresses.

**Digital Hub for Reference & Unique Virtual Address or DHRUVA – the proposed DPI for address information management in India**

**Vision**

To establish a standardized, interoperable geocoded addressing system that supports secure, consent based and seamless sharing of address information, empowering users with meaningful control over their address data.

**Mission**

- (1) To recognize address information management as a core public infrastructure essential for effective governance, inclusive service delivery, and improved user experience.
  - (2) To develop an address data sharing and management ecosystem that supports seamless integration across public and private sector.
  - (3) To promote user autonomy through secure and consent-based sharing of address information, that can support innovation and user convenience and promotes ease of living.
  - (4) To foster a collaborative ecosystem of public and private actors co-creating user-centric solutions built on a secure and trusted digital address infrastructure
- India's digital transformation has been anchored in its ability to leverage technology to build scalable public infrastructure layers to address foundational gaps, such as Aadhaar for identity, Unified Payments Interface ('UPI') for digital payments, and the Ayushman Bharat Digital Mission for health data management ('ABDM').
- For instance, the National Geospatial Policy (2022) acknowledged geospatial data as a critical national infrastructure and information resource, with wide-ranging social and economic value



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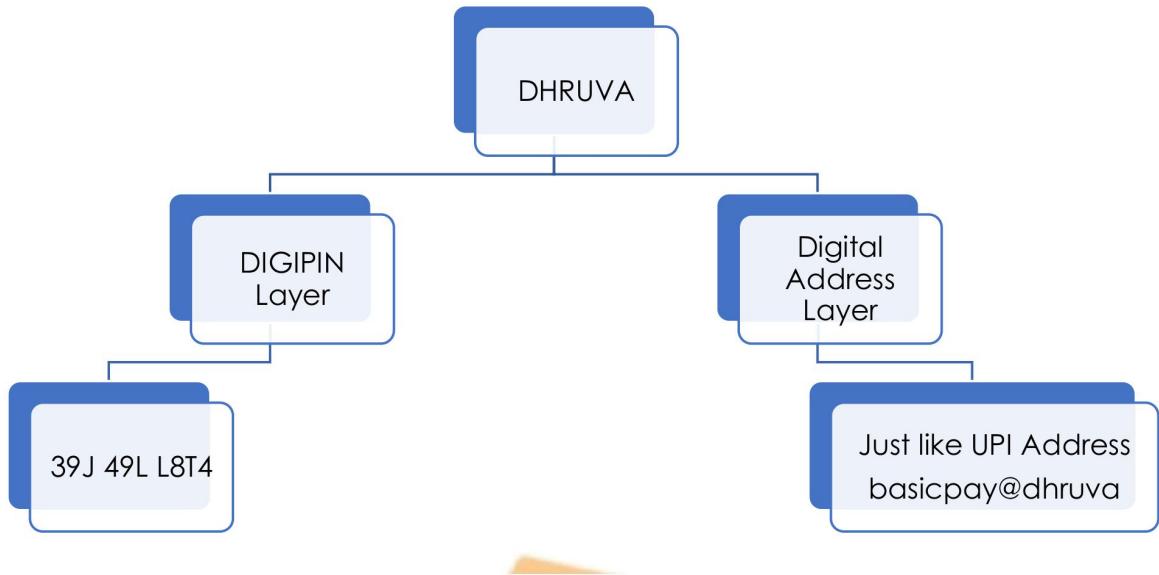
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#### 2.1.2. Key Interfaces



Fig 2: Key Interfaces for Users of DHRUVA

### **Important Full Form**

- **AaaS** - Address as a Service
- **AAVA** - Authorized Address Validation Agency
- **ABDM** - Ayushman Bharat Digital Mission
- **AIA** - Address Information Agent
- **AIP** - Address Information Provider
- **AIU** - Address Information User
- **API** - Application Programming Interface
- **CM** - Central Mapper
- **DHRUVA** - Digital Hub for Reference & Unique Virtual Address
- **DIGIPIN** - Digital Postal Index Number
- **DPDPA** - Digital Personal Data Protection Act, 2023
- **DPI** - Digital Public Infrastructure
- **GIS** - Geographic Information System
- **GNSS** - Global Navigation Satellite System
- **KYC** - Know Your Customer
- **NHA** - National Health Authority
- **NPCI** - National Payments Corporation of India
- **ONDC** - Open Network for Digital Commerce
- **PIN** - Postal Index Number
- **SDG** - Sustainable Development Goal
- **UIDAI** - Unique Identification Authority of India
- **UPI** - Unified Payments Interface
- **UPRN** - Unique Property Reference Number
- **UPU** - Universal Postal Union

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