



DIGITAL TRANSFORMATION FOR RESPONSIBLE LAND ADMINISTRATION

FIG Commission 7 & 2 Annual Meeting 2023

2-4 October 2023, Deventer



National Geoportal Nepal

One step towards the establishment of Nepal's Spatial Data Infrastructure

Upendra OLI, Uttam PUDASAINI, Nishon TANDUKAR, Janak Raj JOSHI, Jyoti DHAKAL and Abhash JOSHI

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Co-Founder NAXA www.naxa.com.np

- A Geo-ICT Technology consulting company

Co-Founder Nepal Flying Labs

<https://flyinglabs.org/nepal>

- Localizing Drone Technologies for Social Good



We are a team of **young, diverse, & dedicated professionals** working together to the overall development of Nepal through contributions in **technological innovations** to solve local problems & challenges.

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PROBLEMS / RATIONALE

1. The users are required to **visit the SD** and a data request **application in a predefined format** should be completed by the users stating the **type of data** to be purchased.
1. The concerned officer at the department then **verifies the request** application form and checks for any missing information in the form and then proceeds forward for the **payment of the requested data**.
1. The total revenue to be paid is calculated and the data purchasers are required to proceed to the payment. The payment is transferred to the **SD account** maintained at Rastriya Banijya Bank. The **voucher** is then submitted to the concerned section at SD as a confirmation of payment by the purchaser.
1. The payment is followed by acknowledgement and signing of a **printed agreement at SD by both the parties (data purchaser and SD officers)**.
1. Finally, the requested **data is provided** to the purchaser/users in a printed and electronic version.



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Survey Department

Geodetic Survey Division

Geodetic, gravimetric and altimetric (height) data required for the preparation of maps and geoinformation products including cadastral information of Nepal.

Topographic Survey and Land Use Management Division

Topographic base maps, Aerial photography services, and resources maps and data, international boundaries to Nepal and publish various map types for various purposes.

Cadastral Survey Division

Cadastral maps, Details of land tenure, Field books Digital data related to real estate valuation. Digital data related to collected revenue.

Geographic Information Infrastructure Division (GIID)

Does not produce datasets on its own but keep an archive and share other datasets and maps published by other divisions.

Currently (Lidar survey data storage and management : Western Terai - Nepal)

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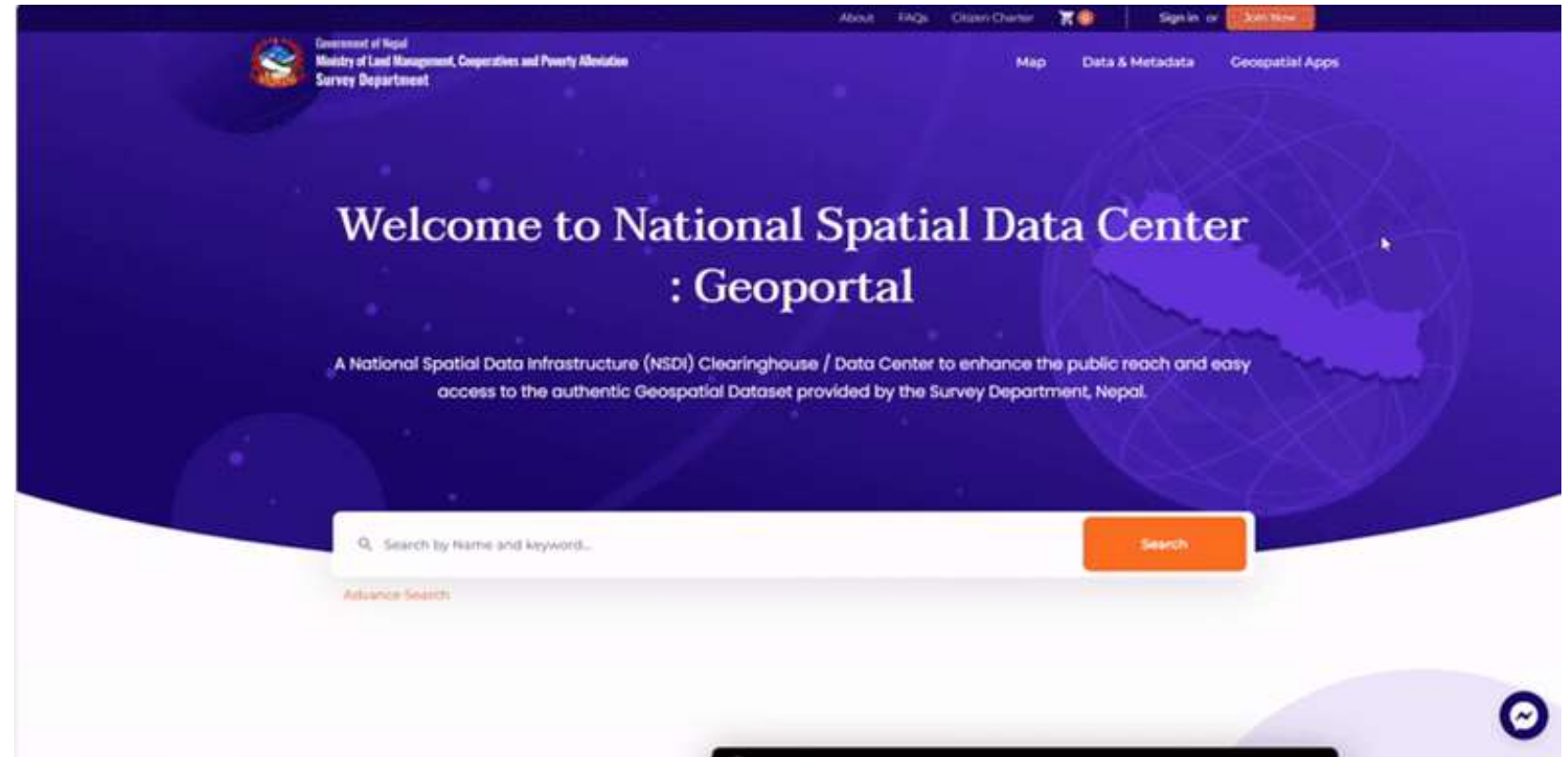


National Geoportal - Nepal

A consolidated and centralized web-based digital platform that consists of spatial data management and sharing tools to access and view different data and maps published and managed by different divisions under the Survey Department - Nepal.

<https://nationalgeoportal.gov.np/#/>

Provides an online Geo Information Management System.



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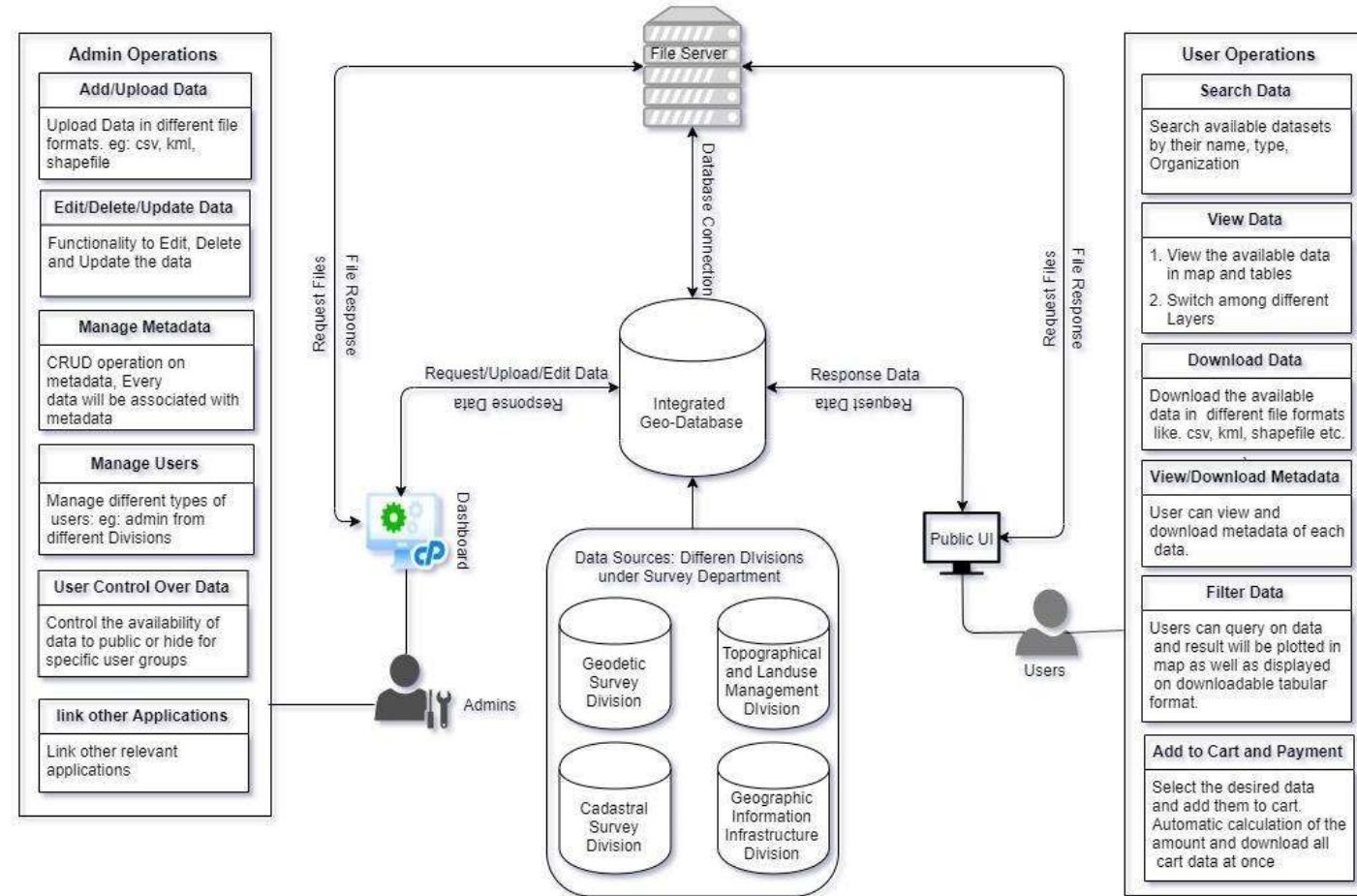
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SYSTEM OVERVIEW

- OS: Linux
- Backend:
 - Python (Django, GeoDjango)
 - GeoNode
- Custom Visualization (Data Overview)
- Database: Postgres and PostGIS extension
- Web Mapping: Leaflet JS and GeoServer
- Front-end: React JS
- API: REST API
- Container: Docker



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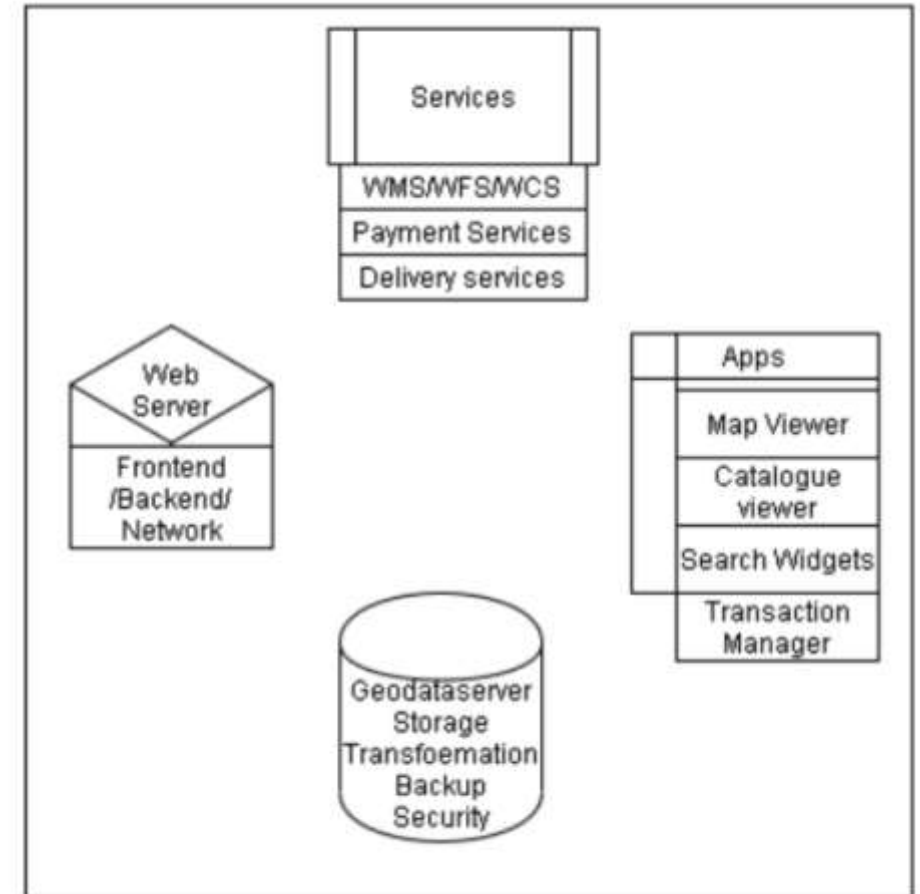
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COMPONENTS - GEOPORTAL

- A. **Services:** WMS/WFS/WCS Services are used to get the geographic data and plot them in a Map. Payment service through the voucher attachment and online payment is integrated. Download service is also available based on the user requests.
- A. **Web Server:** Web server for file management and code management.
- A. **Apps:** Different Apps to disseminate and explore datasets are used.
- A. **Geodata Server:** Very powerful tool GeoNode for geo-data management and dissemination is used which can handle large volumes of geographic, non-geographic data and metadata.



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10 SALIENT FEATURES

OF NATIONAL GEOPORTAL - NEPAL

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FEATURE 1 (F1) : User Management

Super Admin

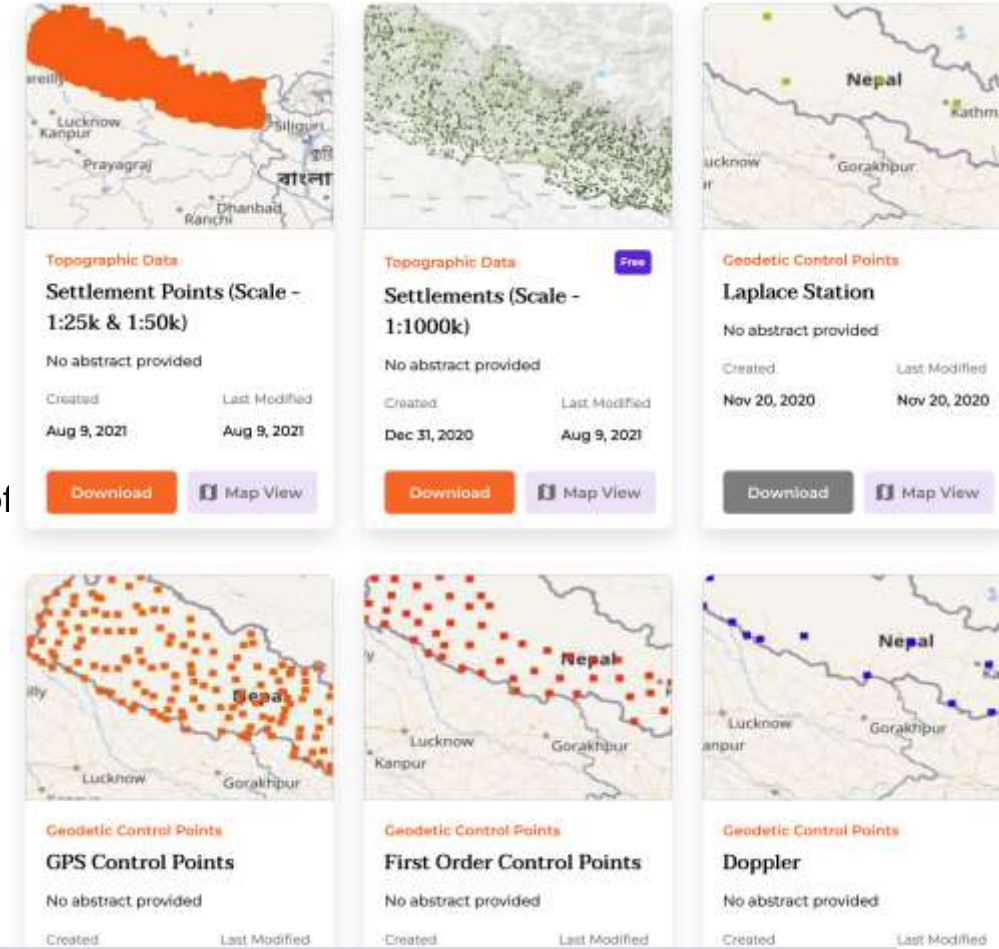
- Can create any new users for divisions and grant/change access accordingly.

Admin

- Different divisions under the SD have an admin and separate login credentials.
- Can only download, edit and update datasets under their respective divisions.
- These users have access to their designated divisions under the SD on the basis of their assigned role in their respective divisions.

Citizens, General Users

- Cannot make any modifications in the system but can view all the features of the system and interact with them.



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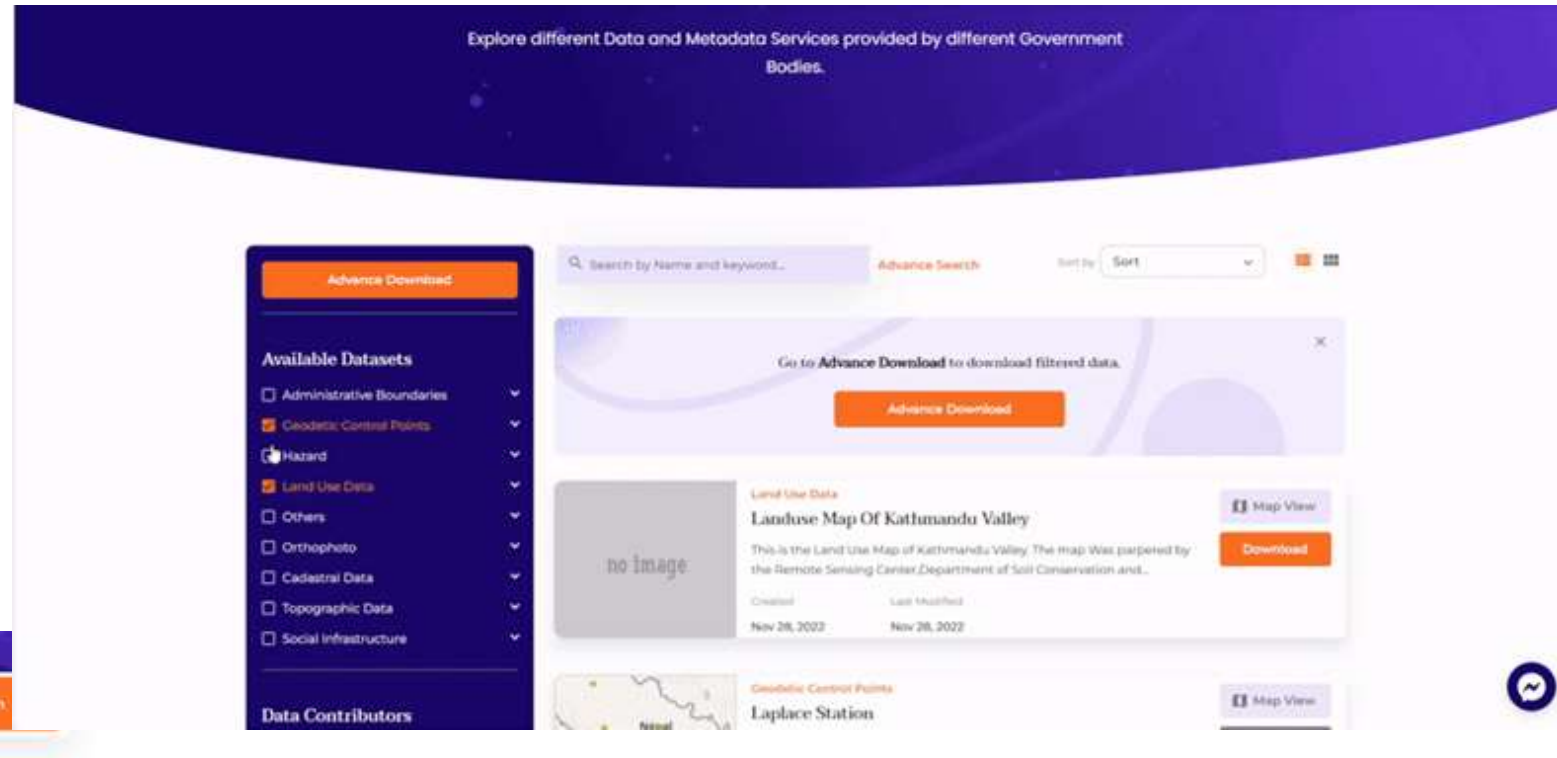


F2 : EXPLORE DATASETS

Datasets in Geoportal can be sorted by latest addition, most viewed or recently viewed.

Data Download

- Free
- Paid Option



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FEATURE 3 : Metadata

Topographical Map Of Development Region(English)

[Download Metadata](#)
[Download](#)

This is the area of Topographical maps of the Development Regions of Norway. The maps were compiled and prepared by the Topographical Survey Branch, Directorate of Maps in 1985. From a delineation boundary description and various other maps and street information in its possession. Coordinates are in the UTM projection system with EPSG: 3143 and EPSG: 3143 longitude at the central meridian respectively.

Created: Nov 28th 22
 Last modified: Nov 28th 22



Metadata | Attributes

Metadata Standard: North American Profile of ISO 19115:2003

Metadata Record Information:

File Identifier	d85ec3c6-6022-11ed-910e-0242ac560005
Language of the metadata	eng
Character set of the metadata	undefind
Hierarchy level	dataset
Metadata Contact	

Share this layer

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F4: Data Upload Management

To handle and manage multiple geospatial datasets and file types by different divisions under the SD.

System Admin from different Departments

- ❑ Upload different kinds of datasets such as shapefiles including Info shapefiles, Rasters (Satellite Images, Orthophotos), excel data, image data and associated metadata for each data type, word and pdf files.

Admins under different divisions

- ❑ Access to delete operation of any uploaded datasets under their division as per the need as well as update file and metadata of the datasets.



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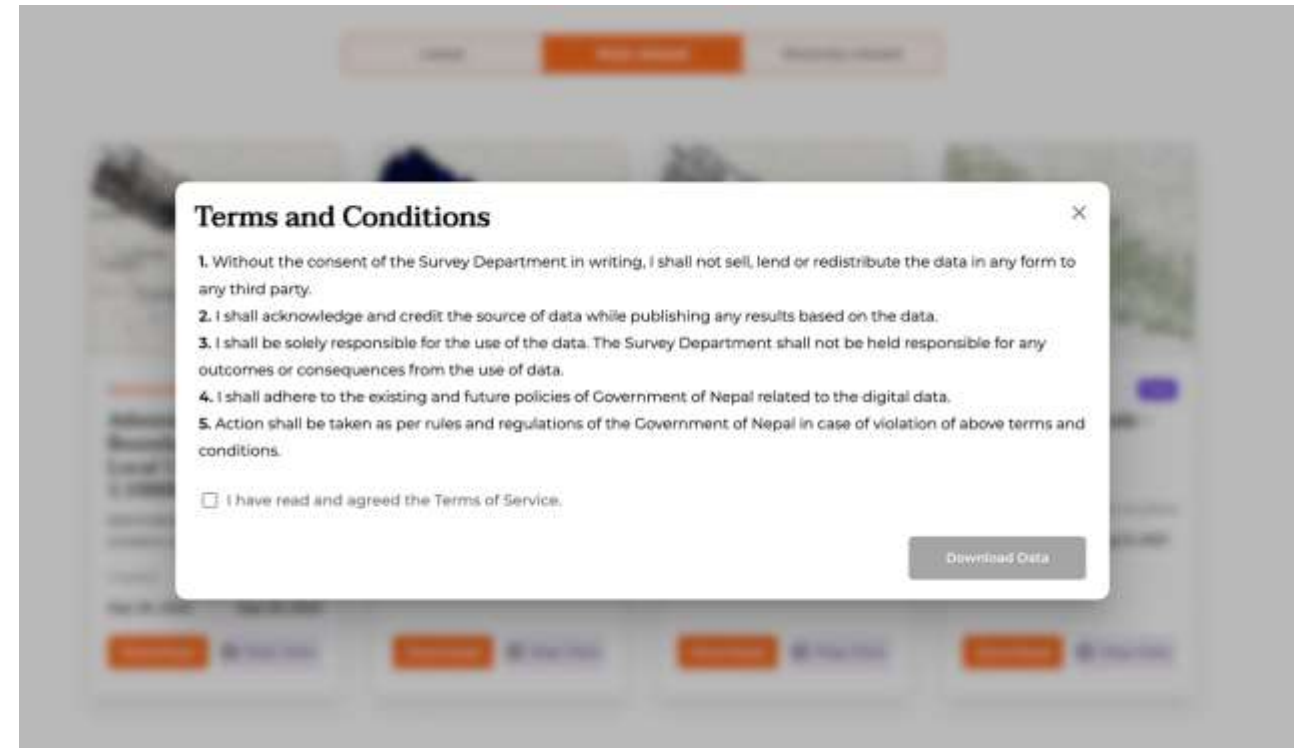


F5: Data Download Management

An interface that allows any users/organizations or general public to download the datasets as per their interests and requirements.

Following are the steps that users must follow to purchase and download the datasets:

1. Select geographical location and type of datasets
2. Add to cart while purchasing datasets and maintain cart contents (The users can remove the contents in cart or add more data as required.)
3. Login/ Signup to the system
4. Fill the data request Form
5. Make necessary payments / Attach the voucher slip.
6. Download the selected file (or zip) after the request payment is verified by admin and followed by the agreement.



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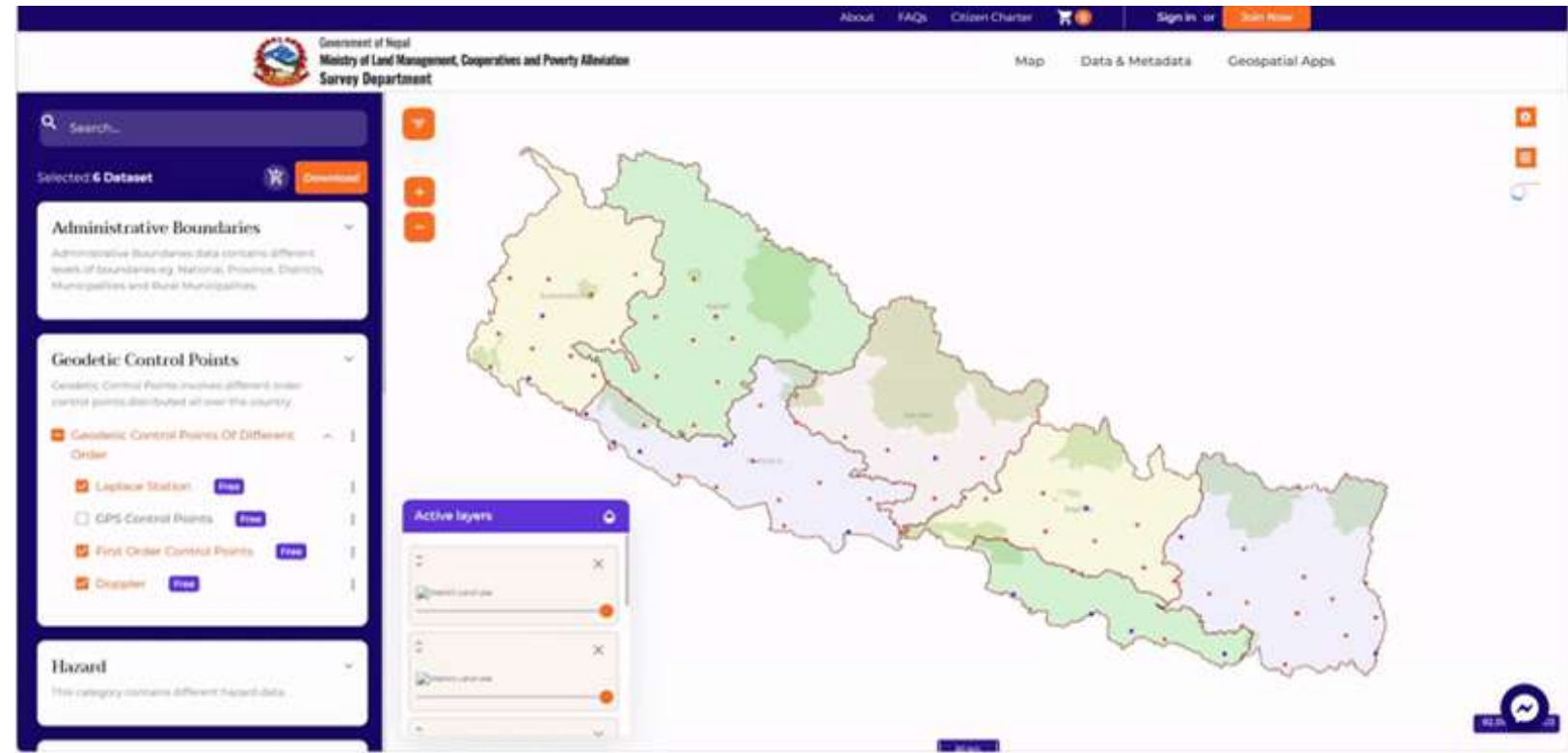
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F6 - Interactive Map Module

- View different map items as map layers.
- View geographical objects/uploaded data on maps in multiple layers.
- Search functionalities to search dataset based on keywords and different filters
- Export maps as images.
- Measure the distance between two point.



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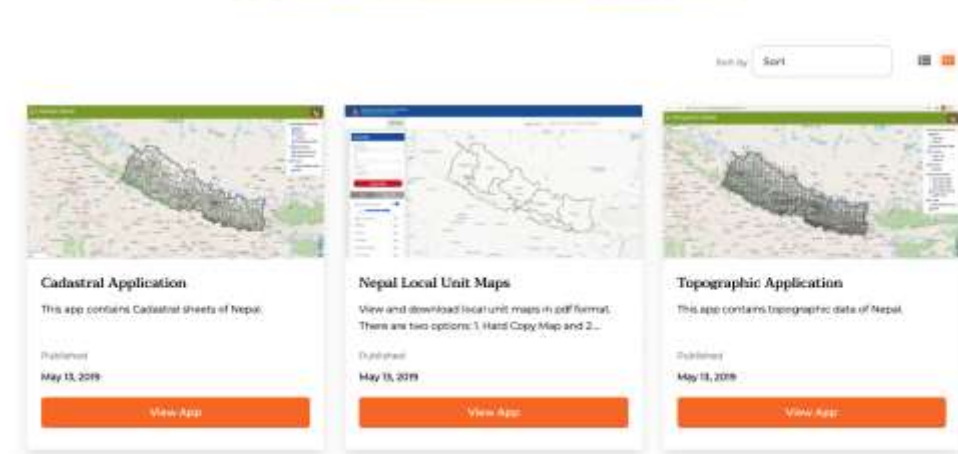




F7 - App Management Module

The different divisions and projects implemented under the SD have created different applications such as **Topographic App, Cadastral App, Geodetic Control Points** etc. in different times.

- ❑ The navigation feature to different links from the integrated Geoportal can be identified by the title, description and introductory images created in the system.
- ❑ The super users and system admins under each department can upload the app details after logging in to the system.



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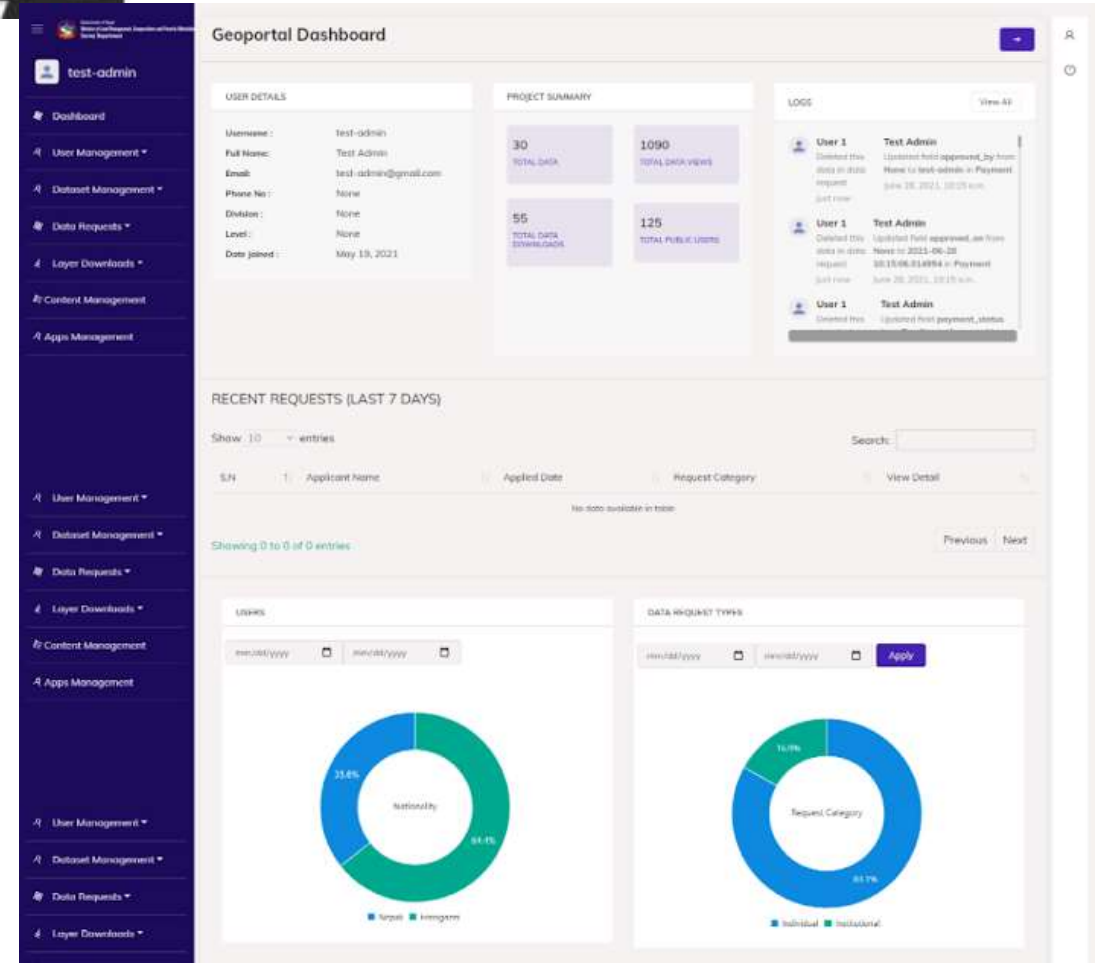
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F8 - Admin Dashboard

- ❑ Manage Data (Upload data , Upload associated datasets - Additional files to explain certain datasets).
- ❑ Respond to Data Request (Approve, Reject, Comment).
- ❑ Summary of Data Purchase - Department wise.
- ❑ Generate Report.



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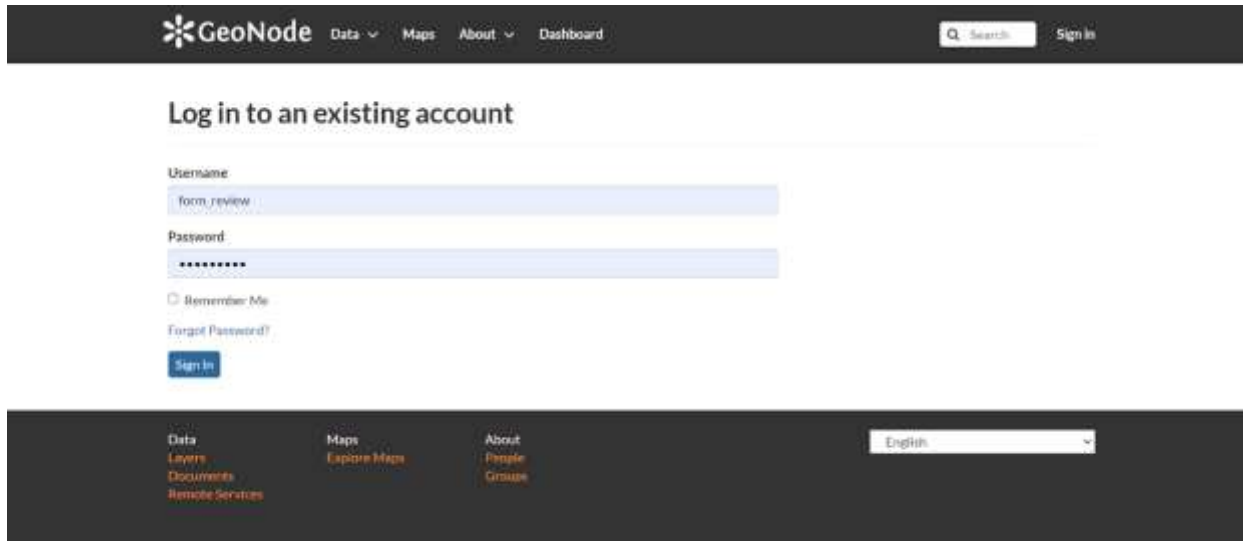
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Admin Dashboard



Individual Data Requests

Geoportal / Data Requests

Excel PDF Show 10 entries Search:

S.N	Applicant Name	Applicant Email	Admin Approval	Reviewer Approval	Payment Status	Applied Date	View Detail	View Payment	View App
1	Upendra OB	upendraob50@gmail.com	Approved	Approved	Payment Pending	June 28, 2021, 10:10 a.m.	View Detail	View Payment	View App
2	6443	widharthamasa@gmail.com	Pending	Pending	N/A	June 26, 2021, 10:09 a.m.	View Detail	View Payment	View App
2	6443	widharthamasa@gmail.com	Pending	Pending	N/A	June 27, 2021, 9:50 a.m.	View Detail	View Payment	View App
4	6443	widharthamasa@gmail.com	Approved	Approved	N/A	June 26, 2021, 7:32 p.m.	View Detail	View Payment	View App
5	Upendra OB	upendraob50@gmail.com	Approved	Approved	Payment Complete	June 25, 2021, 5:06 p.m.	View Detail	View Payment	View App
6	Vinay Bharti	vbharti997@gmail.com	Approved	Approved	Payment Complete	June 25, 2021, 5:31 p.m.	View Detail	View Payment	View App
7	Vinay Bharti	vbharti997@gmail.com	Approved	Approved	Payment Complete	June 25, 2021, 5:10 p.m.	View Detail	View Payment	View App
8	Upendra OB	upendraob50@gmail.com	Pending	Pending	N/A	June 27, 2021, 4:42 p.m.	View Detail	View Payment	View App
9	Upendra OB	upendraob50@gmail.com	Pending	Pending	N/A	June 27, 2021, 4:40 p.m.	View Detail	View Payment	View App
10	Vinay Bharti	vbharti997@gmail.com	Approved	Approved	Payment Complete	June 25, 2021, 3:50 p.m.	View Detail	View Payment	View App

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F9 - Report Generation Module

Export the report in an excel/pdf format where admins and super admin are able to view the status of the downloads.

- *Provides the overview of the data downloaded from the system ie. no. of downloads, who downloaded the data, what was the purpose of the download, which data is downloaded the most etc.*

Each division admins can export/download their status reports separately.

F10 - Backup Module

Implementation of docker container to perform the backup and restore process efficiently and effectively.

There are different servers/ applications installed within the system and managing them and reinstalling them separately is a very time consuming and hectic process. Using the docker container we can manage the system as a whole and restore it in a much easier way.

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IMPACT

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PAST

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4. The payment is followed by acknowledgement and signing of a **printed agreement at SD by both the parties (data purchaser and SD officers)**.
5. Finally, the requested **data is provided** to the purchaser/users in a printed and electronic version.

PRESENT

1. A user Sign Up /Login to the Geoportal.
1. Explore what datasets are currently available.
1. ADD TO CART .. Datasets of Interest.
1. Initiate Payment Request
 - a. Two-Steps verification: Automatic + Manual verification of all uploaded documents.
 - b. Receive Approval for data payment.
1. Payment Process - **Manual (/Upload Of Voucher)**.
1. Download desired datasets.

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NEXT STEPS

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SCALING PLANS

1. Automated Process including the Payment Gateway.
- 1. Geoportal** - One Stop Geospatial Data Portal for all Government Agencies.
1. Localized Versions of Geoportal :- Federal and Local Government Context.
1. API Services in the Geoportal for easy Data Sharing to other agencies.

TURNING DATA INTO ACTION ?

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THANK YOU

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