CHARISMA

Technical Documentation regarding
Online Viewer Platform

For

Ministry of Housing and Urban Affairs
(MoHUA)

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1 THE PLATFORM

1.1 Goal of this document

This document is a working document to explore the possibilities of hosting the online viewer developed in the CHARISMA project (including the model outputs based on publicly available data) on an external (non-VITO) infrastructure. The propositions in this document are not binding. If and when the platform is handed over to the Ministry of Housing and Urban Affairs or affiliated administration (hereafter referred to as “MoHUA”), a separate document will handle specific agreements.

1.2 Summary

The CHARISMA project requires a dissemination platform in the form of an online viewer where alle generated climate and land use maps, calculated based on publicly available data such as satellite imagery, including future scenarios, can be viewed (hereafter referred to as “dashboard” or “platform”). VITO has developed this platform and is currently being hosted on the VITO infrastructure.

To stimulate uptake of the platform the intent within the project has always been to have the dashboard on local government IT infrastructure, at least for the demonstration cities Lucknow, Ayodhya and Guwahati for which information was provided by the local authorities themselves. For these cities VITO is already collaborating with Abhitech IT Solutions Limited.

For all other pilot cities, the idea has been to have the dashboard hosted by a central Indian governmental body, to which other cities can have access. VITO aims to only have 1 single application rather than individual copies at individual city authorities because the platform would have a higher maintenance cost and effort to provide future updates.
Accessing the centrally hosted dashboard, cities included in the dashboard can therefore view and download GIS data regarding the impact of climate change on their city and utilize the data to design adequate adaptation plans to combat heat stress. Moreover, the dashboard can be used as a showcase and will give confidence to other Indian cities and facilitate upscaling.
It should be noted that the inclusion of new cities will constitute a commercial service, whereby VITO services are comprised to produce the necessary data layers. Furthermore, VITO is unable to offer service-level agreements pertaining dashboards which require to be operational 24/7. VITO therefore suggests MoHUA to host the dashboard on an on premise infrastructure, with potential access for VITO to upload updates.

1.3 Users and stakeholders

We target that the users of this platform will be Government & city officials responsible for:

- Climate change and impact studies
- City planning
- Execution of National Heat Action Plans.

However, also interested citizens might find the data useful. We foresee a total of 3000 users (which can also be citizens) of which 100 are concurrent (using the web application at the same time)

1.4 Ownership

1.4.1 The platform

The online viewer platform and the code that has been developed will remain VITO property. Future changes, deployments and updates to the platform will be the responsibility of VITO. Operating and hosting the platform will be responsibility of MoHUA.

1.4.2 The data

Data consists of, for different time periods, land use maps for the cities identified in Figure 2, climatic data and health data. Data is in the form of georeferenced tiff-files with additional files for proper visualization. An overview of the data is shown in Figure 1.

Figure 1: Overview of indicators incorporated in the dashboard.

1.4.3 The viewer

Once indicators are selected, these can be viewed and downloaded in the interactive map viewer (Figure 4). For each indicator a short explanation can be opened in which additional options (e.g. period) can be selected.

1.4.4 User registration

When opted for selected access to the city data, user registration (for access to one of the cities) is managed through an administration panel (Figure 5).

1.5 Screenshots & general functionalities

Figure 2: General overview and city selection.

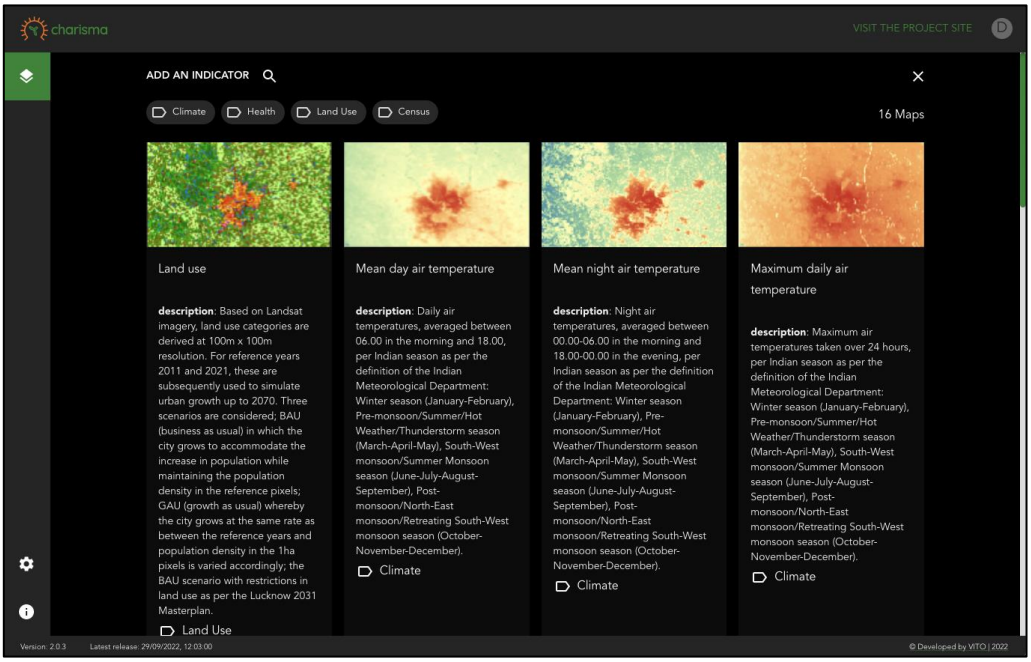


Figure 3: Map catalog and selection.

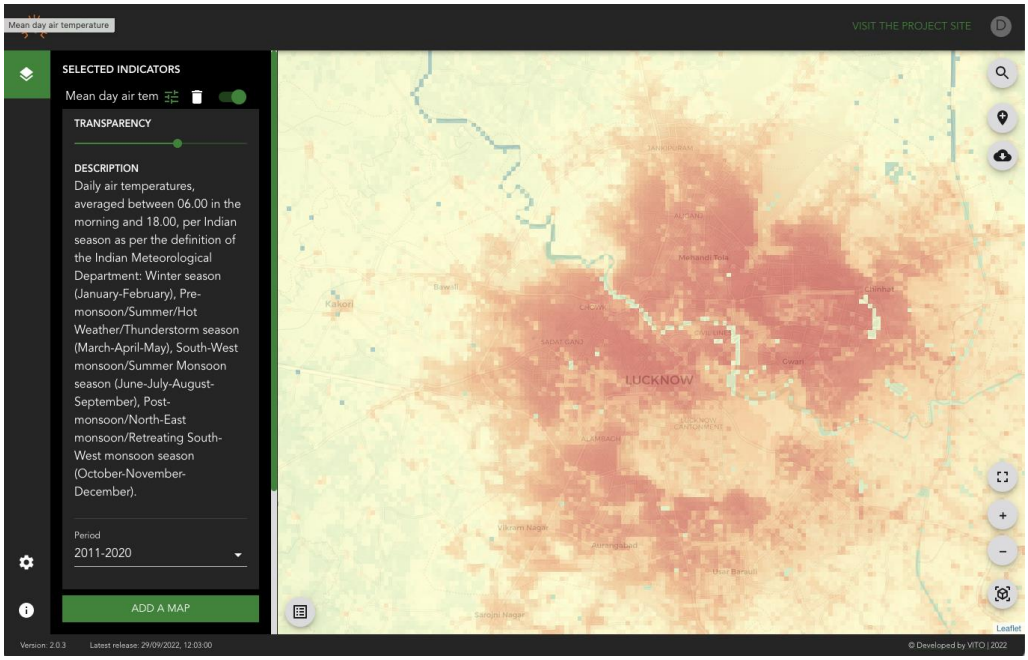


Figure 4: Interactive map viewer.

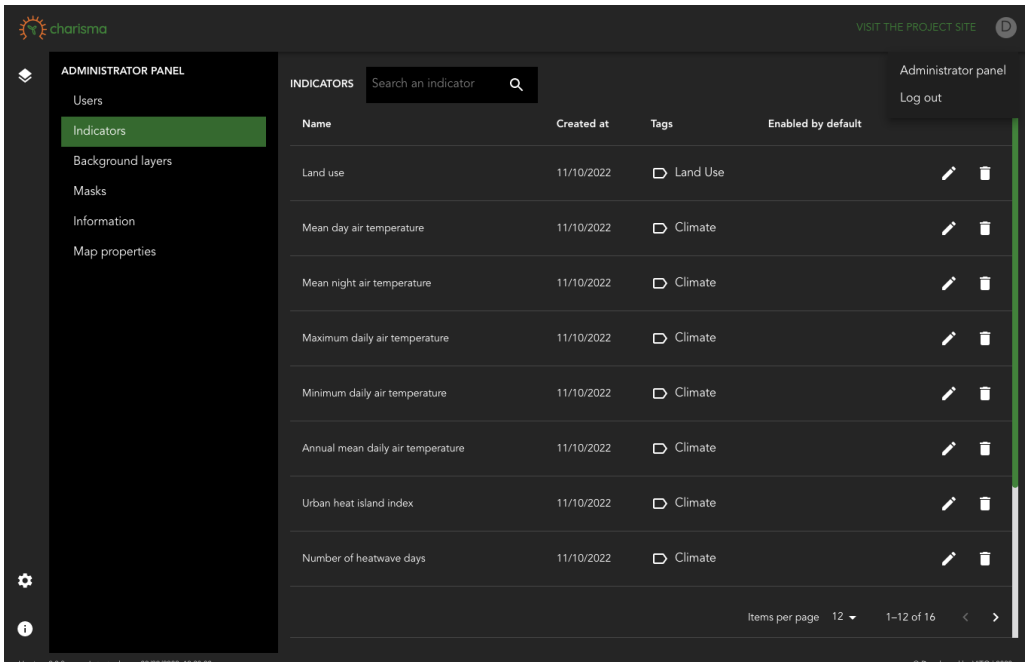


Figure 5: Administration panel.

2 TECHNOLOGY

The online platform has been developed by VITO using the following technologies:

2.1 Front End

React.JS - https://reactjs.org/
For the front end development, we use React.JS to define and re-use components.

Leaflet - https://leafletjs.com/
For the interaction with maps served by the Geoserver, we use Leaflet.

OSM Buildings - https://osmbuildings.org/
3D building data is translated to browser information using OSM Buildings

2.2 Back End

Python
Our scripting / back-end engine is programmed in Python

2.3 Database

Postgres - https://www.postgresql.org/
All data (apart from maps) is stored in a Postgres Database

2.4 Map server

Geoserver - https://geoserver.org/
All maps are served as tiles though Geoserver.

2.5 Technical

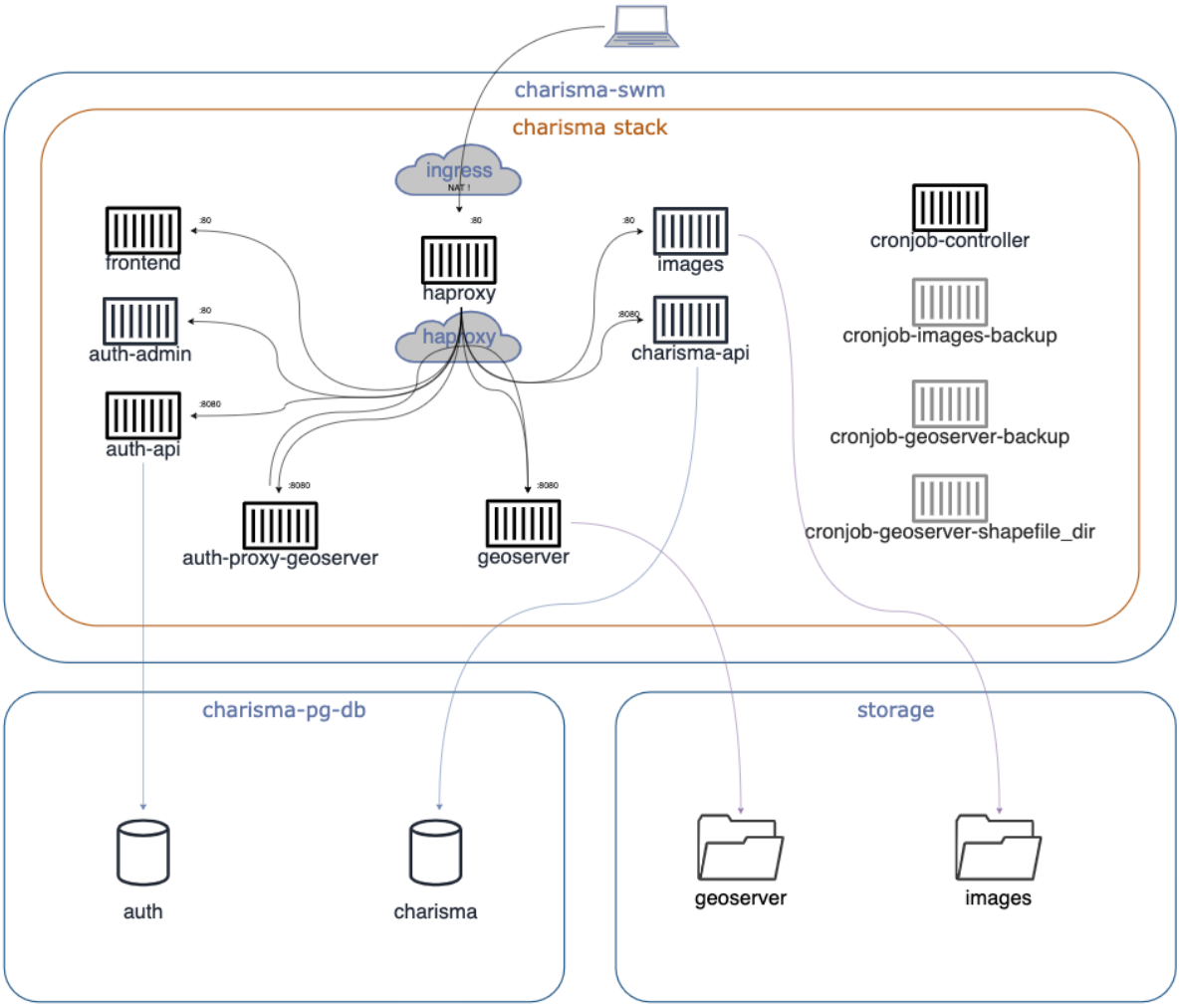
Docker - https://www.docker.com/
The Frontend, backend and Geoserver application are packaged as docker images, ready to be run on a docker swarm.

2.6 Deployment & maintenance

Depending on the proposed hosting solution of MoHUA, VITO will analyse the most efficient way to deploy our application and data.

3 TECHNICAL REQUIREMENTS FOR HOSTING

3.1 Component diagram of the online platform



Note: the cronjobs are VITO deployment only. Any back-ups of the platform are the responsibility of MoHUA.

3.2 Resources

The following resources are currently provisioned for the production environment that runs at VITO:

1 database server

- 1 CPU
- 768MB memory
- 10GB root disk.
- Extra 4GB share/disk for db storage and 4GB share/disk for backup.

1 docker swarm server

- 2 CPU
- 8GB memory
- 20GB root disk.
- Extra 10GB share/disk for geodata storage and 10GB share/disk for backup.

3.3 Requirements

Dependent on the proposed hosting solution although VITO's suggestion would be a Docker Swarm or Kubernetes environment.
The main question would be whether MoHUA is familiar with VITO's way of building applications through Docker. If so: VITO can help with setting up the application and data migration and estimate the required resources based on the VITO deployment.

4 TERMS OF USE

4.1 Limitation of liability

The use of the platform(and of the information) will take place at the user's own risk. In no case, not even in the event of negligence, shall VITO be held responsible or liable for any consequential loss or direct, indirect or specific losses or damage. Including but not restricted to:

- The loss of information
- The loss or exposure of personal data
- Loss of profits
- Out of date software or software components
- Subject of hacking
- Losses arising from an interruption to business operations or any financial losses

This arising from the use of the information or the inability to use the information, even if VITO has been informed of the possibility that losses or damage may occur.

In general we summarize that the platform is to be used at the user's own risk and VITO cannot be held responsible for any events, damage or harmful actions.

4.2 Use of the platform

You are entitled to view, copy and download the information on the platform, on condition that:

- you do not make any changes and/or additions to the Information you have copied;
- you only make use of the Information for personal and non-commercial purposes;
- you do not copy or distribute the Information on any computer network or by means of any other media;
- you include the references relating to copyright and all other statements relating to the property and ownership of all reproductions and/or copies.

All rights not explicitly referred to here will require the prior written permission of VITO.

4.3 Links

The platform may contain links to other websites that are not controlled by VITO. For that reason, VITO rejects any liability for the content made available on those websites. The sole purpose of including a link is to make the information more easily available on the internet. Under no circumstances will the placing of a link to third-party websites constitute the implicit approval by VITO of the content of those websites. Should you decide to make use of any

such link to consult a third-party website, you do so at your own risk. VITO reserves the right to remove any link at any time.

4.4 Brands and trade names

All names, logos and other symbols used on the platform are brands and/or trade names that are legally protected. Any use thereof or of any similar signs is strictly forbidden, unless VITO has agreed to this in advance and in writing.

4.5 Acceptance

Please note that related arrangements will be contained in a separate document, and must be agreed upon, before hand-over of the dashboard from VITO to MoHUA.

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