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Solutions

**Base IMIS  
Deployment Manual  
(Windows Environment)**

**Integrated Municipal Information System (IMIS)**

**Innovative Solution Pvt. Ltd (ISPL)**

Base IMIS Deployment Manual

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Version 0.9.0

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Deploying the Base IMIS (Integrated Municipal Information System) on the Windows environment involves a series of steps and procedures. As the general practice for development and customization is carried out on a windows environment, the following guide provides a detailed walkthrough of the deployment process, including installing the necessary software, configuring the database, and running the IMIS application using Laravel and PostgreSQL.

## 1. BASIC REQUIREMENTS

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The deployment manual is based on the specific system requirements mentioned below and any deviations will require adjustments to the deployment process. The specific system requirements mentioned below are recommended to ensure a smooth and error-free deployment process.

### 1.1 Prerequisites

The tools mentioned below need to be installed in the system for IMIS deployment. The installation reference is provided in **Section 2**.

- XAMPP (PHP V 8)
- Composer (V 2.2.7)
- Node JS
- PostgreSQL (V 14)
- PostGIS (V3)
- GeoServer (V2.21.0)

### 1.2 Deployment Engineer Requirements

The recommended skillset for the deployment engineer conducting the deployment of IMIS is mentioned below. These skillsets are critical to ensure smooth and error free deployment and maintenance of IMIS.

- PostgreSQL
- PostGIS extension of PostgreSQL
- GeoServer

Apart from the deployment engineer, the minimum recommended skillset for the development/ maintenance team is mentioned below:

- PHP language
- Laravel Framework
- PostgreSQL
- PostGIS extension of PostgreSQL
- NPM package manager
- Git version control
- GeoServer
- JavaScript
- jQuery
- Open Layers (OL)
- Technical Documentation

## 2. PREREQUISITES INSTALLATION

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### 2.1 Localhost Server (XAMPP) Installation

To set up a local server, download and install XAMPP from the official website: <https://www.apachefriends.org/download.html>.

IMIS requires PHP version 8 or higher, as this version is essential for compatibility. Any version changes will require modifications to the deployment process and source code.

Once XAMPP is installed, launch the Apache server, and check the PHP version by navigating to <http://localhost/dashboard/phpinfo.php>. Ensure the PHP version is at least 8; if not, update XAMPP or manually configure PHP to use version 8 executable if available.

### 2.2 Composer Installation

Composer is essential for managing dependencies in Laravel applications. Download and install Composer (V 2.2.7) globally from the <https://getcomposer.org/>, enabling system-wide access.

To confirm successful installation, open the command prompt and run:

```
Composer -v
```

This command verifies that Composer is installed correctly and ready for managing Laravel dependencies.

### 2.3 Node JS Installation (V20.17.0)

Download the Node JS Installer from the provided link, with version **20.17.0**. Follow the installation steps provided.

```
https://nodejs.org/en/download/prebuilt-installer
```

To confirm successful installation, open the command prompt and run:

```
Node -v
```

## 3. DATABASE INSTALLATION

---

IMIS is designed and developed with PostgreSQL (V 14) database. For GIS data storage and processing, the PostGIS extension (V3) is used.

### 3.1 PostgreSQL Download and Installation

Download PostgreSQL (V14) from the [official website](https://www.postgresql.org/download/)

<https://www.postgresql.org/download/>

During installation, use default port 5432, or adjust it if needed to avoid conflicts.

Be sure to select essential tools like pgAdmin, which provides an intuitive interface for database management, query execution, and PostgreSQL configuration—making setup and ongoing management easier.

### 3.2 PostGIS Extension Installation

PostGIS is required within PostgreSQL to enable GIS (Geographic Information System) data management for IMIS.

#### 3.2.1 Enable PostGIS Extension

To install PostGIS,

Locate Your PostgreSQL Installation:

- Open File Explorer.
- Navigate to C:\Program Files\PostgreSQL.
- Identify the version of PostgreSQL you have installed (e.g., C:\Program Files\PostgreSQL\14).

Open Stack Builder:

- Inside the PostgreSQL installation folder, go to the bin subdirectory (C:\Program Files\PostgreSQL\14\bin).
- Run the StackBuilder.exe application.
- In Stack Builder, select your PostgreSQL version, then locate "Spatial Extensions" and choose **PostGIS**.

Follow the prompts to complete the installation, which will enable PostgreSQL to handle spatial and geographic data.

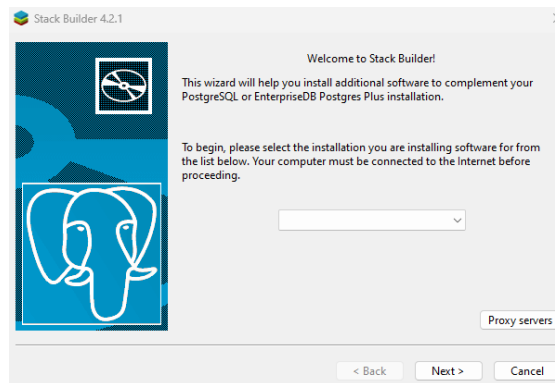


Figure 1 Stack Builder

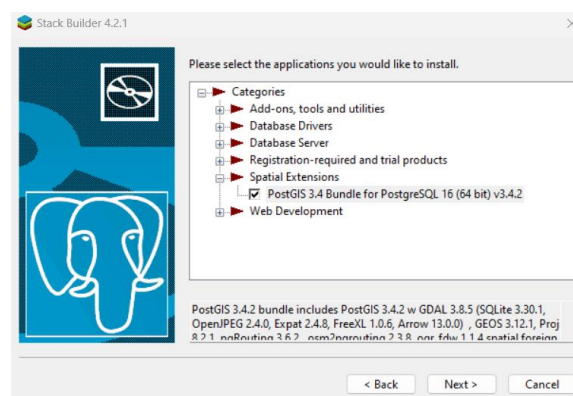


Figure 2 Select PostGIS extensions

### 3.3 GeoServer Installation

IMIS currently uses Geoserver (V2.21.0) for rendering and displaying spatial data maintained in the system. This specific version of Geoserver is recommended to ensure bugs/issues do not arise in the system.

#### 3.3.1 GeoServer Download

Downloading V2.21.0 from the Geo Server page on Source Forge.

<https://sourceforge.net/projects/geoserver/files/GeoServer/2.21.0/GeoServer-2.21.0-winsetup.exe/download>

Geo Server requires a **Java Development Kit (JDK)** version **11**.

Download the appropriate JDK installer for your operating system from the Oracle JDK website or from:



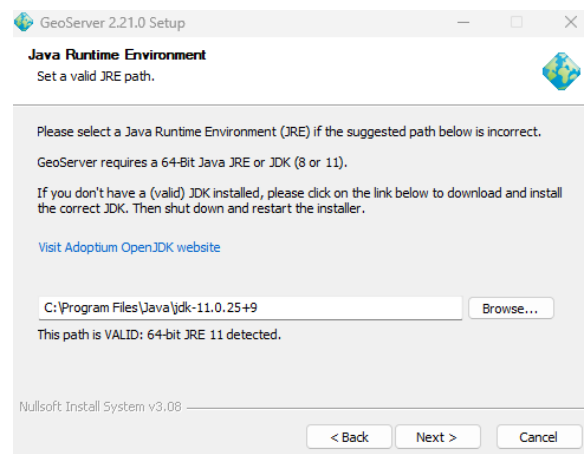
<https://adoptium.net/en-GB/temurin/releases/?os=windows&version=11&package=jdk>

Then install it in the Java folder within Program Files.

Once the JDK is installed, configure it in your system's environment variables so that applications can recognize Java.

**[Note: Remember the username and password during installation process.]**

- Open **System Properties > Environment Variables**
- Under **System Variables**, locate the Path variable, click **Edit**, and add the path to the JDK's bin directory (e.g., C:\Program Files\Java\jdk-11\bin).
- Click **OK** to save the changes.
- Once the JDK is configured, run the Geo Server installer and follow the prompts to complete the installation.
- Make sure to browse the JDK path, while adding just add JDK path not the bin path.



*Figure 3 Installation of geo server(Browse the path to JDK)*

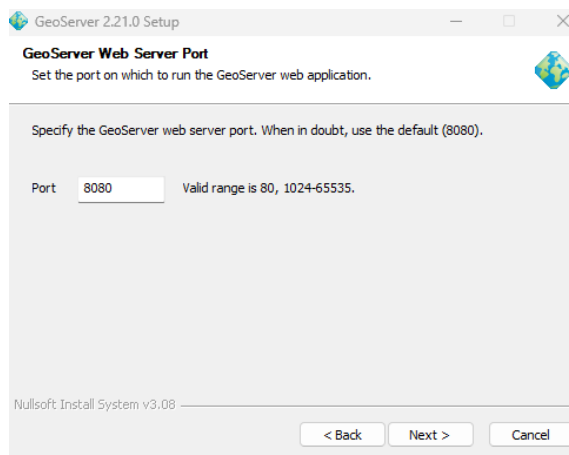


Figure 4 Add port 8080

### 3.3.2 Install Plugins for Geo Server

To enhance GeoServer functionality, certain plugins are essential.

#### a) CSS Plugin

Download the CSS Plugin using the following link:

<https://sourceforge.net/projects/geoserver/files/GeoServer/2.21.0/extensions/geoserver-2.21.0-css-plugin.zip/download>

#### b) Query Plugin

Download the Query Plugin using following link

<https://sourceforge.net/projects/geoserver/files/GeoServer/2.21.0/extensions/geoserver-2.21.0-querylayer-plugin.zip/download>

#### c) Printing Plugin

Download the Printing Plugin using following link

<https://sourceforge.net/projects/geoserver/files/GeoServer/2.21.0/extensions/geoserver-2.21.0-printing-plugin.zip/download>

#### d) Copying the Plugins

Once downloaded, unzip the files and copy all the files with jar extension and place it in following path:

C:\Program Files\GeoServer\webapps\geoserver\WEB-INF\lib

Once successfully added the plugins restart the GeoServer.

### 3.3.3 Resolving CORS Errors in GeoServer

If you encounter a CORS error in the web interface during deployment, follow these steps to resolve it, Locate the following path

C:\Program Files\GeoServer\webapps\geoserver\WEB-INF\web

Open web.xml as administrator, and uncomment the following section

```
<!-- Uncomment following filter to enable CORS in Jetty. Do not forget the second
config block further down. -->
```

```
<filter>
  <filter-name>cross-origin</filter-name>
  <filter-class>org.eclipse.jetty.servlets.CrossOriginFilter</filter-class>
  <init-param>
    <param-name>chainPreflight</param-name>
    <param-value>>false</param-value>
  </init-param>
  <init-param>
    <param-name>allowedOrigins</param-name>
    <param-value>*</param-value>
  </init-param>
  <init-param>
    <param-name>allowedMethods</param-name>
    <param-value>GET,POST,PUT,DELETE,HEAD,OPTIONS</param-value>
  </init-param>
  <init-param>
    <param-name>allowedHeaders</param-name>
    <param-value>*</param-value>
```

```

    </init-param>

</filter>

<!-- Uncomment following filter to enable CORS -->
<filter-mapping>
    <filter-name>cross-origin</filter-name>
    <url-pattern>/*</url-pattern>
</filter-mapping>

```

## 4. WEB APPLICATION SETUP

---

The following steps are recommended to be carried out to ensure deployment of IMIS in windows environment.

### 4.1 Clone the IMIS project from GitHub

To initiate the deployment of IMIS on a local Windows environment, start by cloning the project files directly from GitHub.

Navigate to C:\xampp\htdocs in File Explorer; this directory serves as the default web root for XAMPP.

Open a command prompt or terminal with administrative privileges, switch to the htdocs directory, and execute the following Git command to clone the IMIS repository:

```
git clone <github_repo_link>
```

This command copies all files from the remote repository to your local htdocs folder, making the IMIS codebase available for further setup steps. After cloning, you'll see a new folder with the repository name in htdocs.

#### 4.1.1 Folder Setup

Two folders need to be created manually to store building survey KML files sent via mobile application and the emptying receipts and house images as well.

They can be done by following steps:

- Navigate to storage/app/public
- Make new folder and name it “building-survey-kml”
- Make another folder and name it “emptyings”
- Inside “emptyings” folder make two folders and name them “houses” and “receipts”

## 4.2 Install Dependencies

Launch a command prompt or terminal and use the `cd` command to navigate to the IMIS project directory within htdocs (commonly located at `C:\xampp\htdocs\imis-revamp2.0`). Once the terminal is set to the project root, run the following command:

```
Composer install
```

This command uses **Composer** to download and install all required PHP packages and libraries listed in the **composer.json** file. These libraries are essential for Laravel and IMIS to function properly.

### 4.2.1 Install JavaScript Dependencies

Execute the following commands to install and compile frontend dependencies:

```
npm install && npm run dev
```

The **npm install** command will download all required JavaScript dependencies, while **npm run dev** compiles assets, such as CSS and JavaScript files, for development. This step is essential for building the frontend of the IMIS application, ensuring all stylesheets and scripts load properly.

### 4.2.2 Configure Environment Variables (.env)

Configure the environment settings for the IMIS project, which define essential application and database connection parameters.

In the IMIS project directory, locate the `.env.example` file. Copy this file and rename the copy to `.env`. This file will hold environment-specific settings for your local IMIS deployment.

Open the `.env` file in a text editor and set the following configurations for the PostgreSQL database connection:

DB_CONNECTION=pgsql	# Sets PostgreSQL as the database driver
DB_HOST=127.0.0.1	# Sets PostgreSQL as the database driver
DB_PORT=5432	# Defines the port PostgreSQL is listening on (set to 5433 as configured earlier)
DB_DATABASE=imis_base	# Replace 'imis_base' with your actual database name
DB_USERNAME=your_username	# Replace with your PostgreSQL username
DB_PASSWORD=your_password	# Replace with your PostgreSQL password

### 4.2.3 Generate The Application Key

In the terminal, within the IMIS project directory, run the following command

```
php artisan key:generate
```

After running the command, you'll see an output message confirming that the application key was successfully generated. The .env file will now contain a line like

**APP\_KEY=base64:yourGeneratedKeyHere**

## 4.3 pgAdmin Database Setup

### 4.3.1 Blank Database Import

The blank database is maintained in the IMIS GitHub organization. The blank database contains the required database for IMIS. Follow the steps mentioned below to import the blank database.

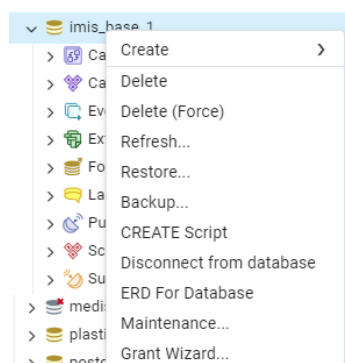


Figure 5 Select Restore and choose the provided database to restore

**Step 1 :** Download the blank database from the GitHub repository.

- Step 2 :** Open pgAdmin and connect to your PostgreSQL server.
- Step 3 :** Navigate to your server's "Databases" folder.
- Step 4 :** Right-click on the target database where you want to import the schema and data, and then select "Restore..." from the context menu.
- Step 5 :** Under the "Format" section, choose "Custom or Tar" from the dropdown menu. This format allows you to import both schema and data together. Browse the file by clicking on the "..." button in the "Filename" field.
- Step 6 :** Select the correct format of the file you are restoring, dump or backup.
- Step 7 :** Go to "Data Options" tab, under the "Do not save" section, check the box labeled "**Owner**". (Optional)
- Step 8 :** Click "Restore".
- Step 9 :** If prompted, enter the password for the database superuser.
- Step 10 :** Update the .env file in the web-application server with the corresponding values of the database, such as database name, credentials, etc.

The restoration process will start, and pgAdmin will import the schema and data into the target database. The time it takes to complete depends on the size of the database dump. Explore the tables and other database objects to verify that the schema and data have been imported.

**Note:** When restoring a PostgreSQL database, permission issues could arise if the original owner specified in the backup does not exist on the target system. To overcome this issue, Exclude Ownership Restoration as mentioned in Error! Reference source not found.. This corresponds to the `--no-owner` flag, telling pgAdmin not to set ownership of the objects to the original user from the backup.

### 4.3.2 Database Seeder

The default look-up values for various dropdowns and default roles, permissions and user access can be setup through the seeder. Run the database seeder command:

```
php artisan db:seed
```

### 4.3.3 Build and Triggers Functions Setup

**[Note: Setup the functions only after the process of importing data into the blank database is completed, as the trigger will significantly slow down the process of import]**

Functions and Triggers are used in IMIS to automate and streamline database operations that perform specific tasks within the database, such as updating counts in real-time,

supporting map tools, and import modules. Triggers are used in IMIS to automatically execute predefined actions in the database, such as updating counts maintaining data consistency, whenever data insertions occur, without manual intervention. This setup improves overall performance by executing predefined actions efficiently, making the system responsive.

Run the following commands to build all the necessary functions and triggers required for the system to function correctly:

Creates Functions and triggers to update the count for grids & wards and summary chart

```
php artisan buildfunction:updatecount
```

Creates or replace (Or delete and create) maptool queries if not exists functions

```
php artisan buildfunction:maptool
```

Creates Functions to create table when new data is imported for tax payment, watersupply and swmpayment:

```
php artisan buildfunction:tax
```

```
php artisan buildfunction:watersupply
```

```
php artisan buildfunction:swmpayment
```

Create quarters data for FSM KPI dashboards.

```
php artisan kpi:cron
```

When importing data in bulk or during the initial setup, it's recommended to disable the trigger, update the count manually, and then re-enable the trigger to ensure accurate data processing without unnecessary overhead during the import process.

#### 4.3.4 Summary Data Count Update

During the initial setup or after importing data, you need to update the count in the summary tables manually, but once the system is up and running, a trigger will automatically update the count each time new data is added.

To update grids & wards count when buildings have changes

```
php artisan updatecount:buildings
```

To update grids & wards count when fsm.containments has changes

```
php artisan updatecount:containments
```

To update grids & wards count when utility\_info.roads has changes



```
php artisan updatecount:roadlines
```

To update grids & wards count when fsm.applications has changes

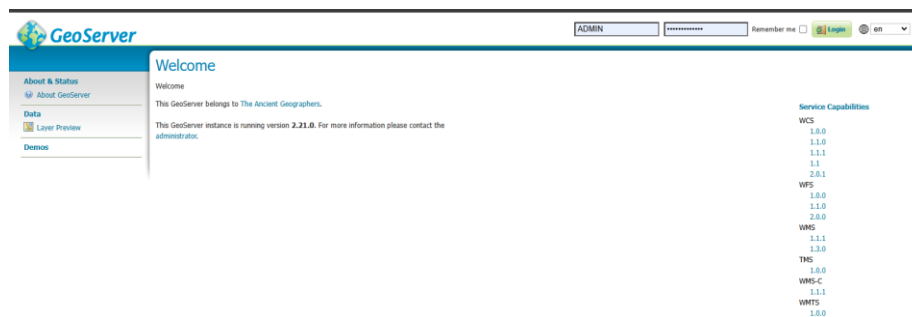
```
php artisan updatecount:applications
```

## 4.4 Setup GeoServer

In GeoServer, you'll need to create a Workspace, Stores, Layers, and Styles. Instructions for creating each of these components are provided in the sections below.

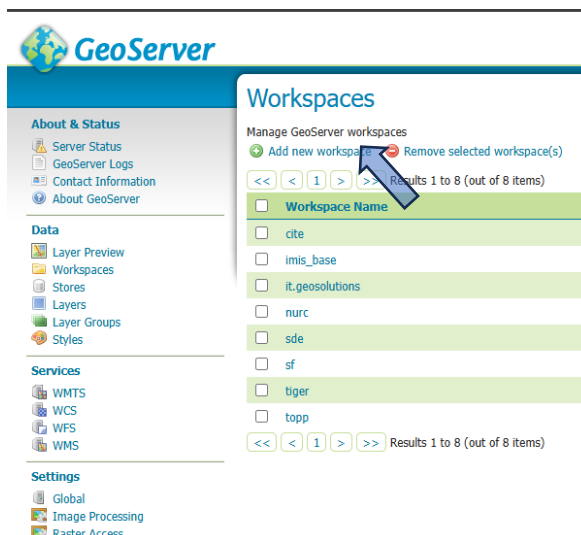
For specific items to create, refer to the GeoServer documentation available in the GitHub organization.

To launch GeoServer, start the GeoServer service and navigate to <http://localhost:8080/geoserver> in your web browser. This URL directs you to the GeoServer homepage. Log in using the username and password configured during the installation process.

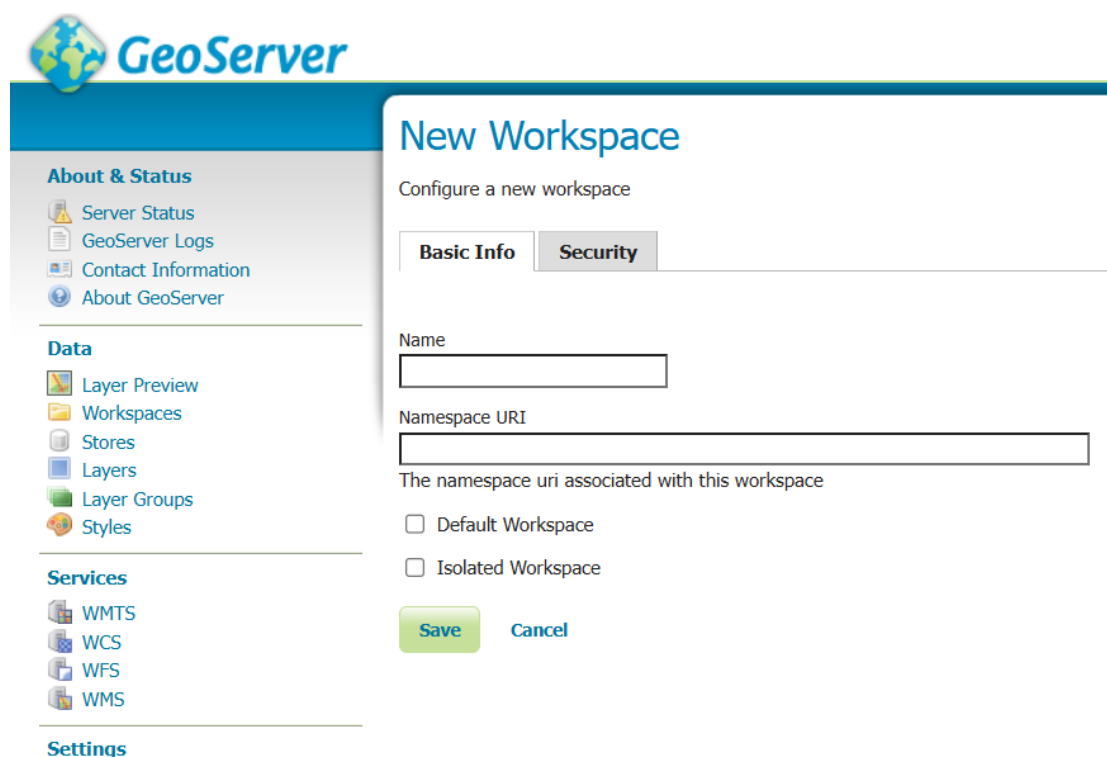


### 4.4.1 Add New Workspace

After logging into GeoServer, create a new workspace by navigating to the **Workspace** in the left-side menu and selecting **Add new workspace**.



Add a new workspace, for the workspace add the name of the current database that we are working on. For Namespace URI add the URI that we are currently working on. In our local deployment Namespace URI may be localhost:8000



## 4.4.2 Add New Store

To add a new store in GeoServer, follow the steps mentioned below

- On the left sidebar, select **Stores**.
- This will open the main **Stores** page where existing stores are listed.
- On the **Stores** page, look for the **Add New Store** link or button.

- Click **Add New Store** to open the form for entering the details of the new store.

## Stores

Manage the stores providing data to GeoServer

[Add new Store](#) [Remove selected Stores](#)

<< < 1 2 3 > >> Results 1 to 25 (out of 58 items)








<input type="checkbox"/>	Data Type	Workspace	Store Name	Type	Enabled?
<input type="checkbox"/>		nurc	arcGridSample	ArcGrid	✓
<input type="checkbox"/>		nurc	img_sample2	WorldImage	✓
<input type="checkbox"/>		imis_africa	imis_africa_building_info	PostGIS	✓
<input type="checkbox"/>		imis_africa	imis_atrica_layer_info	PostGIS	✓

It will take you to new data source page where we are working with POSTGIS so we will select that:






## New data source

Choose the type of data source you wish to configure



### Vector Data Sources

-  Directory of spatial files (shapefiles) - Takes a directory of shapefiles and exposes it as a data store
-  GeoPackage - GeoPackage
-  PostGIS - PostGIS Database
-  PostGIS (JNDI) - PostGIS Database (JNDI)
-  Properties - Allows access to Java Property files containing Feature information
-  Shapefile - ESRI(tm) Shapefiles (\*.shp)
-  Web Feature Server (NG) - Provides access to the Features published a Web Feature Service, and the ability to perform transactions on the server (when supported / allowed).

### Raster Data Sources

-  ArcGrid - ARC/INFO ASCII GRID Coverage Format
-  GeoPackage (mosaic) - GeoPackage mosaic plugin
-  GeoTIFF - Tagged Image File Format with Geographic information
-  ImageMosaic - Image mosaicking plugin
-  WorldImage - A raster file accompanied by a spatial data file

### Other Data Sources

-  WMS - Cascades a remote Web Map Service
-  WMTS - Cascades a remote Web Map Tile Service

After this will direct to the page where we will add details about new vector data source, On this page, you'll first encounter the **Basic Store Info** section.

### Basic Store Info

Workspace \*

Data Source Name \*

Description

☒ Enabled

☐ Auto disable on connection failure

- On the Workspace, dropdown select workspace you have created.
- In Data Source Name you need to give the name as given in the GeoServer Documentation in Git Hub Organization.

[**Note:** While adding store for “layer\_info” make sure you tick “**Expose Primary Key**” option.]

After this on the connection parameters section:

**Connection Parameters**

host \*  
localhost

port \*  
5432

database  
imis\_base

schema  
public

user \*  
postgres

passwd  
...

Namespace \*  
http://192.168.1.79:8000

- On database label, put the database name which you are working on.
- On the schema put the schema name you are working on.
- For the user and password, you will put the credentials used for the pgAdmin.

Once finished, click on the apply and then save.

### 4.4.3 Add New Layers

To add a new layer in GeoServer, follow the steps below

- On the left sidebar, select Stores.
- This will open the main Layers page where existing Layers are listed.
- On the Layers page, look for the Add New Layer link or button.
- Click Add New Layer to open the form for entering the details of the new Layer.

**Layers**

Manage the layers being published by GeoServer

[Add a new layer](#) [Remove selected layers](#)

<< < 1 2 3 4 5 > >> Results 1 to 25 (out of 182 items)

<input type="checkbox"/>	Type	Title	Name	Store	Enabled	Native SRS
<input type="checkbox"/>		buildings	imis_africa:buildings_layer	imis_africa_building_info	✓	EPSG:4326
<input type="checkbox"/>		citypolys	imis_africa:citypolys_layer	imis_africa_layer_info	✓	EPSG:4326
<input type="checkbox"/>		containments	imis_africa:containments_layer	imis_base_fsm	✓	EPSG:4326

To add the new layer select the table you want to add layer to.

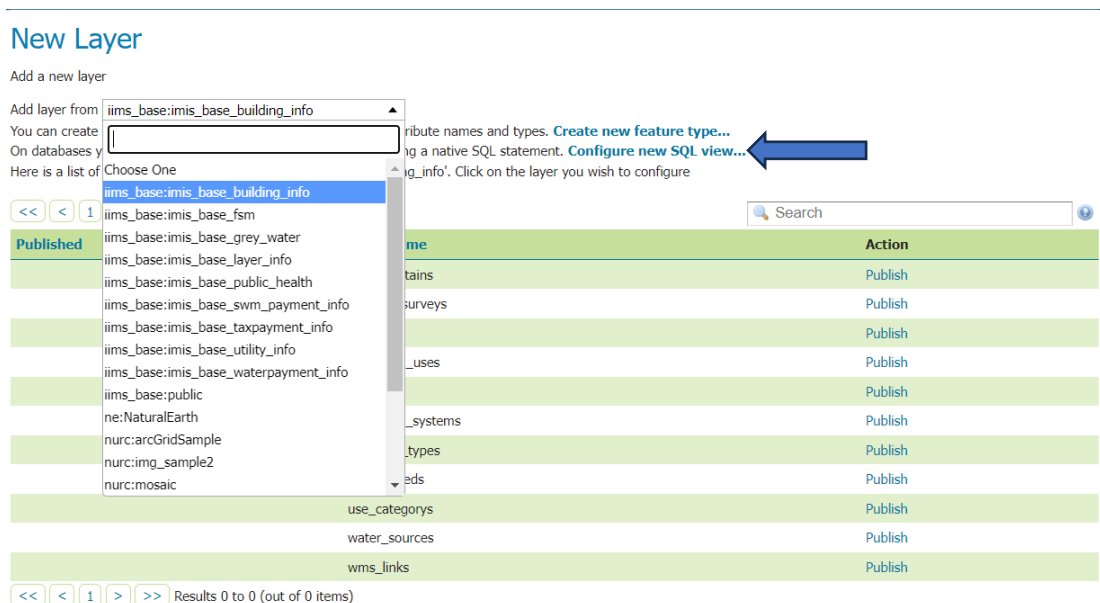


Figure 6 Adding new layer

Once you have chosen the table you can either publish or Configure new SQL view, which you can see in the figure 5.

#### 4.4.4 Create a new SQL view

If you click on the Configure SQL view, In the view name add the table name and in the SQL section add the SQL query and then save. The SQL statement is provided in the GeoServer document in the git hub organization.

## Create new SQL view

Define a new SQL view and configure its identified and geometry columns

View Name

SQL statement

```
SELECT building_info.buildings.*,
building_info.owners.owner_name,
building_info.owners.owner_gender,
building_info.owners.owner_contact,
building_info.structure_types.type as
structure_type_type,
building_info.functional_uses.name as
functional_use_name,
building_info.use_categorys.name as
use_category_name,
building_info.sanitation_systems.sanitation_system
as sanitation_system_technology_name,
building_info.water_sources.source as
water_source_source,
fsm.emptyings.house_image as house_image
FROM building_info.buildings
LEFT JOIN building_info.owners
```

SQL view parameters

[Guess parameters from SQL](#) [Add new parameter](#) [Remove selected](#)

On the Coordinate Reference System on the SRS label add to 4326, then on the Bonding Boxes click on Compute from data and compute from native bonds, also the same when using publish. Click on apply and then save.

## Edit Layer

### Basic Resource Info

① **Store Name:** imis\_base\_building\_info

① **Native Name:** buildings\_with\_owners

Name

buildings\_with\_owners

☒ Enabled

☒ Advertised

Title ☐ i18n

buildings\_with\_owners

Abstract ☐ i18n

### Keywords

Current Keywords

features

buildings\_with\_owners

Remove selected

New Keyword

Vocabulary

Add Keyword

### Metadata links

No metadata links so far

Add link Note only FGDC and TC211 metadata links show up in WMS 1.1.1 capabilities

### Data links

No data links so far

Add link

### Coordinate Reference Systems

Native SRS

Declared SRS

EPSG:4326

Find...

EPSG:WGS 84...

SRS handling

Force declared

### Bounding Boxes

Native Bounding Box

Min X

Min Y

Max X

Max Y

85.334191229478 27.622597652043 85.388994528385 27.671034196631

Compute from data

Compute from SRS bounds

Lat/Lon Bounding Box

Min X

Min Y

Max X

Max Y

85.334191229478 27.622597652043 85.388994528385 27.671034196631

Compute from native bounds

Save Apply Cancel

## 4.4.5 Add Environment Variable for Geo Server

Configure environment variables for Geo Server in the .env file to enable IMIS to connect with Geo Server and manage geospatial data.

In the IMIS project directory, open the .env file in a text editor. Append the following lines to define the Geo Server workspace and connection URLs:

```
GEOSERVER=http://your_local_ip:8080/geoserver
GEOSERVER_URL=http://your_local_ip:8080/geoserver/imis_base
GEOSERVER_WORKSPACE=imis_base
```

## 4.5 Start IMIS Application

To start the IMIS application, launch the Laravel development server by running the following command in the terminal within the IMIS project directory:

```
php artisan serve
```

This command initiates the development server, allowing the IMIS application to run on your local machine. Once the server is running, open a web browser and navigate to <http://127.0.0.1:8000> (localhost) to access the IMIS application homepage.