BIMS

The Biodiversity Information Management System Handbook

Kartoza Pty (Ltd.) and the Freshwater Research Centre

2022

1 Biodiversity Information Management System

Welcome to the Biodiversity Information Management System (BIMS) home page!

BIMS is a platform for managing and visualising biodiversity data.

All of the source code for the platform is open source, and it uses popular open source tooling such as Postgres/ PostGIS, GeoServer, Django, Python as building blocks for the platform.

1 Instances

1.1 FBIS

1.3 ORBIS

1 User Documentation

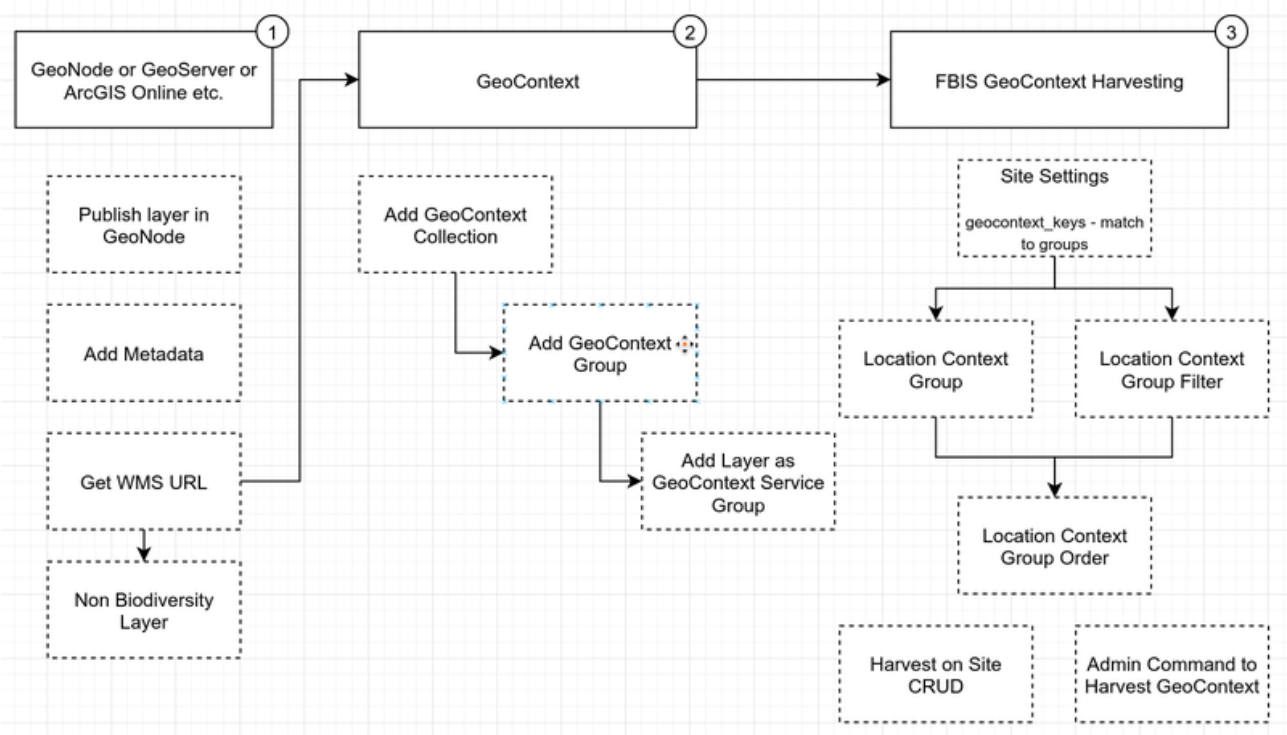
You can find the user manual for the freshwaterbiodiversity.org instance of BIMS here.

1 Administrator Documentation

1.1 Overview of GeoContext Management

In this guide we will explain the high level concepts of the GeoContext substystem which is used to derive location related data for each occurrence record added to RBIS.

GeoContext is an independent service, available at https://geocontext.kartoza.com/. The purpose of GeoContext is to harvest data for point locations from a range of online databases. GeoContext allows you to register WMS/WFS/WCS layers in groups which in turn can be registered in a collection. You can then pass it a point locality and it will query every layer in the collection, returning a set of values, one for each layer under the point location.



As you can see from the above diagram, the workflow consist of three parts:

1) Publishing layers under e.g. WMS

2) Registering layers, groups and collections in the GeoContext service

3) Registering the GeoContext service(s) with BIMS

This tutorial will lead you through all of these steps. We expect that you are already familiar with platforms such as GeoNode, GeoServer and concepts such as OGC services. We also expect that you are familiar with and understand the basic operations and management of BIMS.

The following YouTube video walks through the steps described in this section of the documentation in detail with examples.

Working with GeoContext layers in FBIS

Tim Sutton
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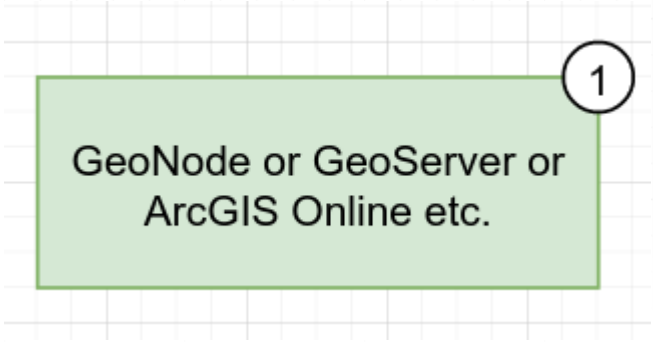
1.2 Publishing GeoContext and Visualisation Layers

This subsection describes how to publish layers as WMS (Web Mapping Services) for use by GeoContext or as Visualisation layers. BIMS deploys with an instance of GeoNode that can be used for publishing these layers, but you can use any standards compliant web mapping server for this purpose.



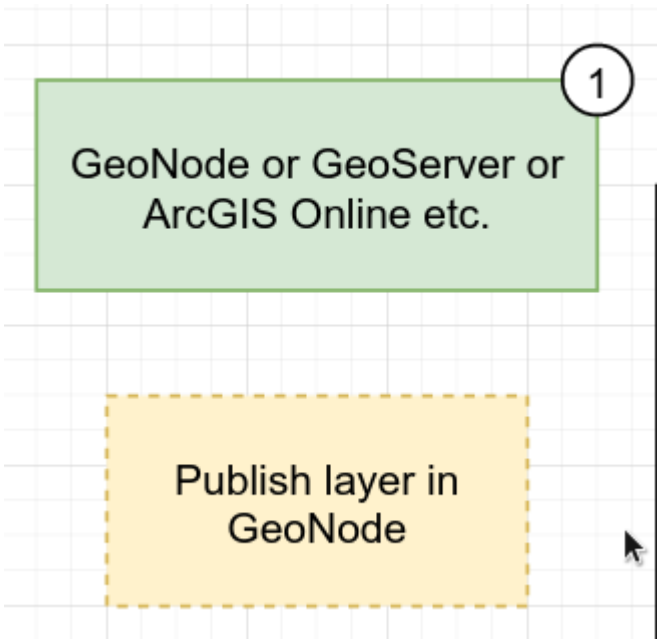
First let us define the terms 'GeoContext Layer' and 'Visualisation Layer':

1. **GeoContext** layers are layers that you publish online as an OGC web service with the explicit intention that these layers are harvested by the https://geocontext.kartoza.com GeoContext service.
2. **Visualisation** layers are used in the layer selector in BIMS and allow the user to add map overlays in the BIMS map view - for example to show soil types or catchment boundaries on the map.

In the next steps we will show you how to publish both of these types of layers.

1.2.1 Publishing a layer in GeoNode

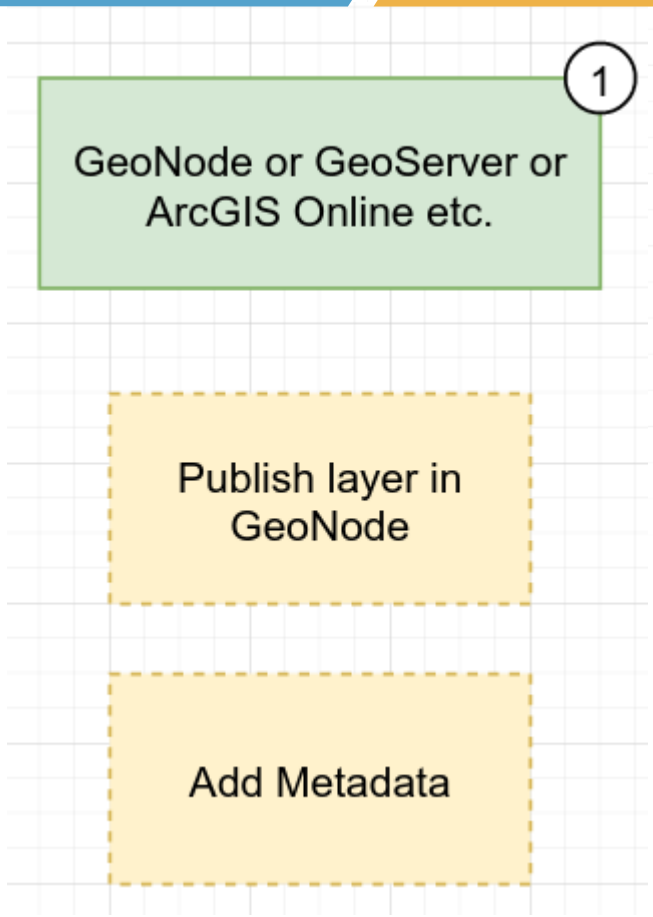
This article gives a short explanation of how to publish a layer in GeoNode. This is one way to provide a layer in GeoContext yourself.



To publish a layer from GeoNode you can follow this guide : https://docs.geonode.org/en/master/usage/managing_layers/uploading_layers.html

1.2.2 Adding metadata to your published layer

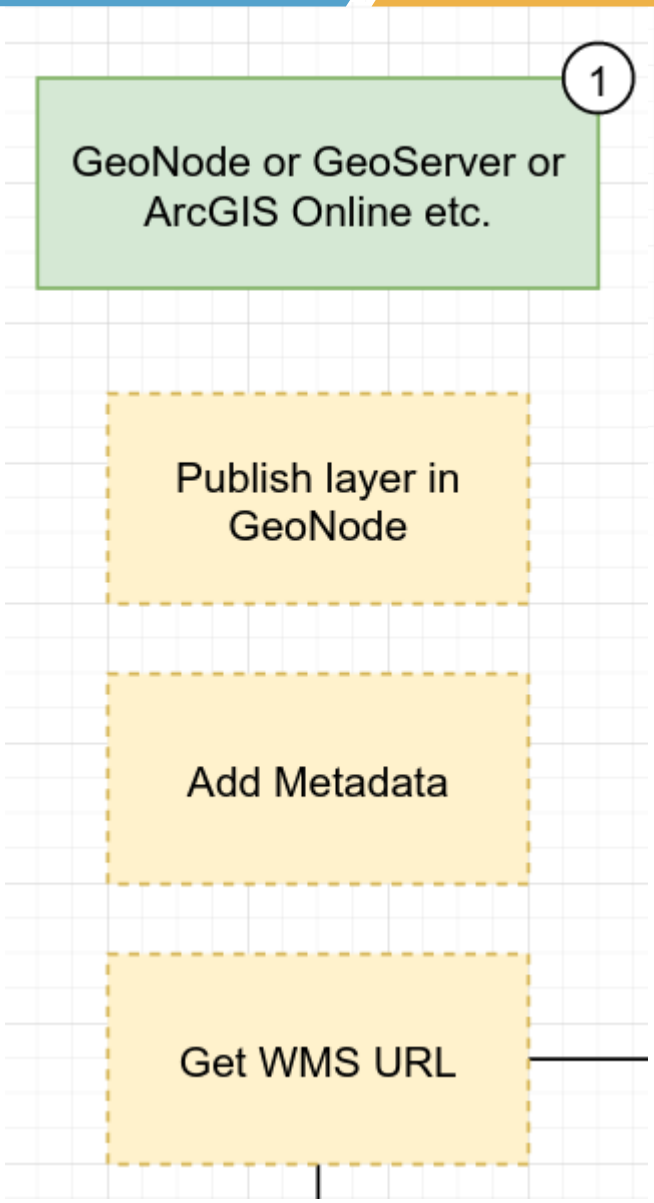
The guide shows you how to add metadata to the layer you have published.



To add metadata to the layer in GeoNode please follow this guide : https://docs.geonode.org/en/master/usage/managing_layers/layer_metadata.html.

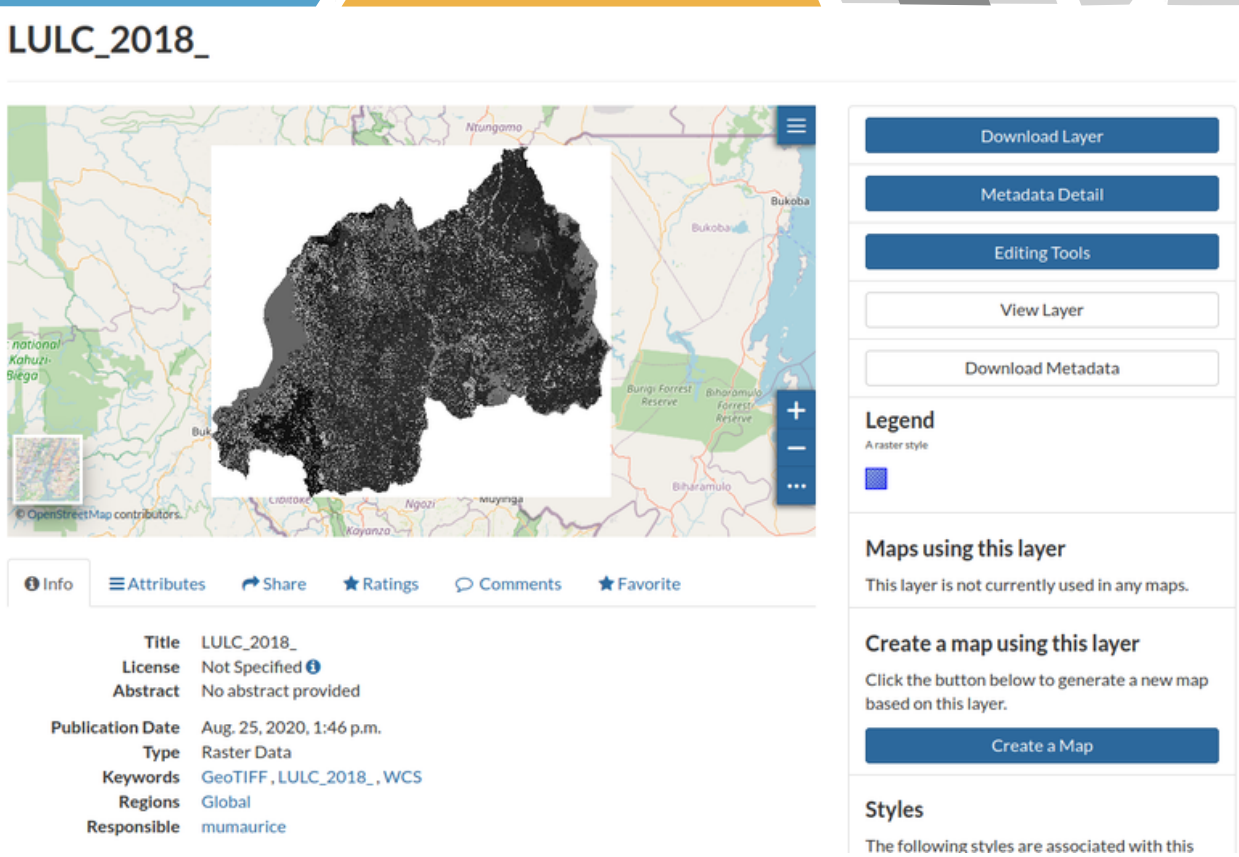
1.2.3 Discovering the WMS URL for a published layer

In this guide we show you how to find out the WMS URL for a published layer so that the layer can be published in GeoContext or as a GeoContext layer.



Discovering the WMS URL for a map service requires that you have a platform where you can browse the services. This could be done though a GIS client such as QGIS or on a web interface such as GeoNode or GeoServer. For this example we will show you the workflow in GeoNode.

First browse to the map layer in GeoNode that you want to publish in BIMS:



Next click on the metadata detail button to view the metadata for the layer.

On the metadata page you will see a long list of information about the layer. First make a note of the "Title" of the layer e.g.:

> **Note:**
>
> LULC_2018_

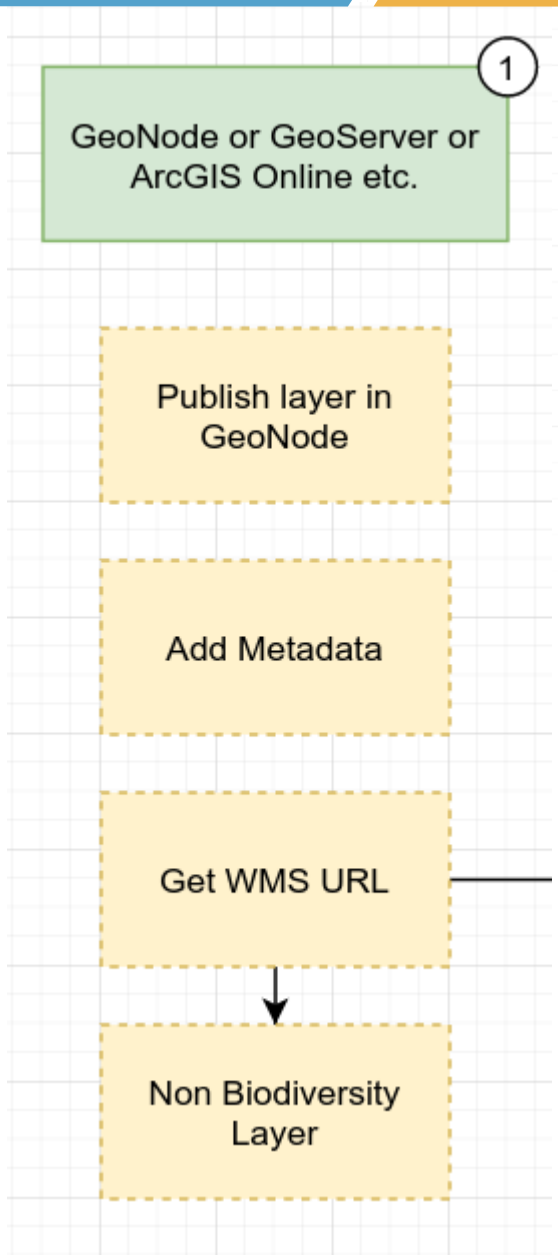
Now scroll down until you find the section called "References" and then look for the heading "OGC WMS: geonode Service". Right click on the service link and choose "Copy link location" from your browser's context menu.

Save the service URL that is now in your clipboard e.g.:

https://geonode.rbis.kartoza.com/geoserver/ows

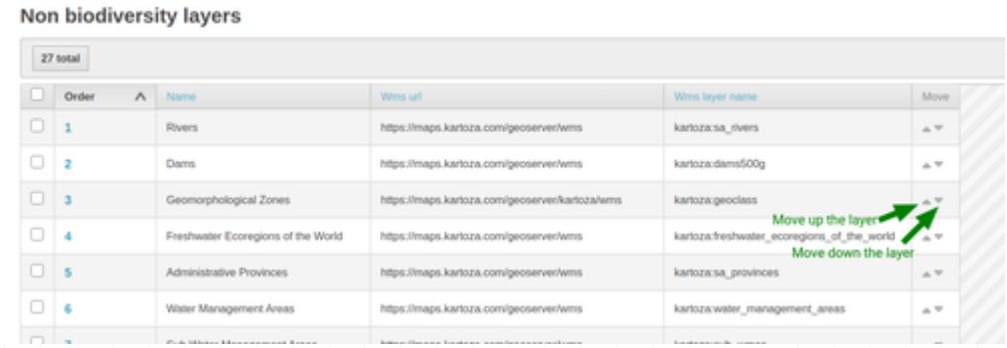
1.2.4 Adding a non-biodiversity layer to FBIS

In this guide we will show you how to publish a non-biodiversity layer in RBIS. Non-biodiversity layers can be displayed on top of the base map in RBIS to provide insights about the spatial situation of collection sites.

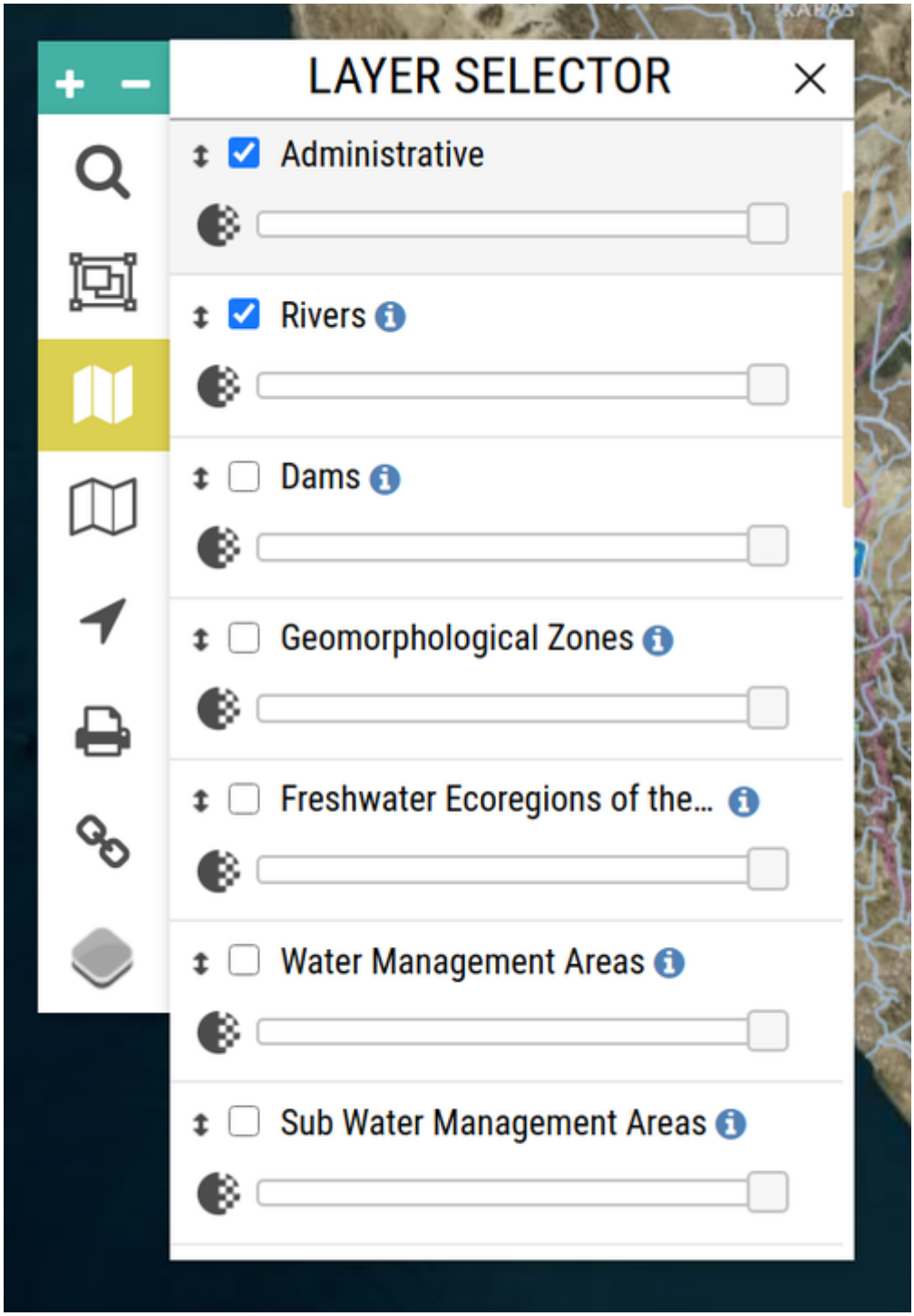


In order to add a layer to the RBIS, follow these steps :

- Go to admin page
- Click non biodiversity layer section
- Click Add non biodiversity layer button at the top right
- Fill out these required fields (see Discovering the WMS URL for a published layer):
- Name - The name of the layer, will be displayed in the Layer Selector
- WMS url - WMS url for this layer (if you're using GeoNode to host the layer you can try following link : {geonode_url}/geoserver/wms)
- WMS layer name - Layer name from layer provider (e.g. geonode:layer_name)
- WMS format - Format of the wms, default is in image/png
- Get feature format - Output format of the GetFeature function, the default is in text/plain
- Click Save button at the bottom right
- To set the order in which the layers are displayed on the filter click these buttons :

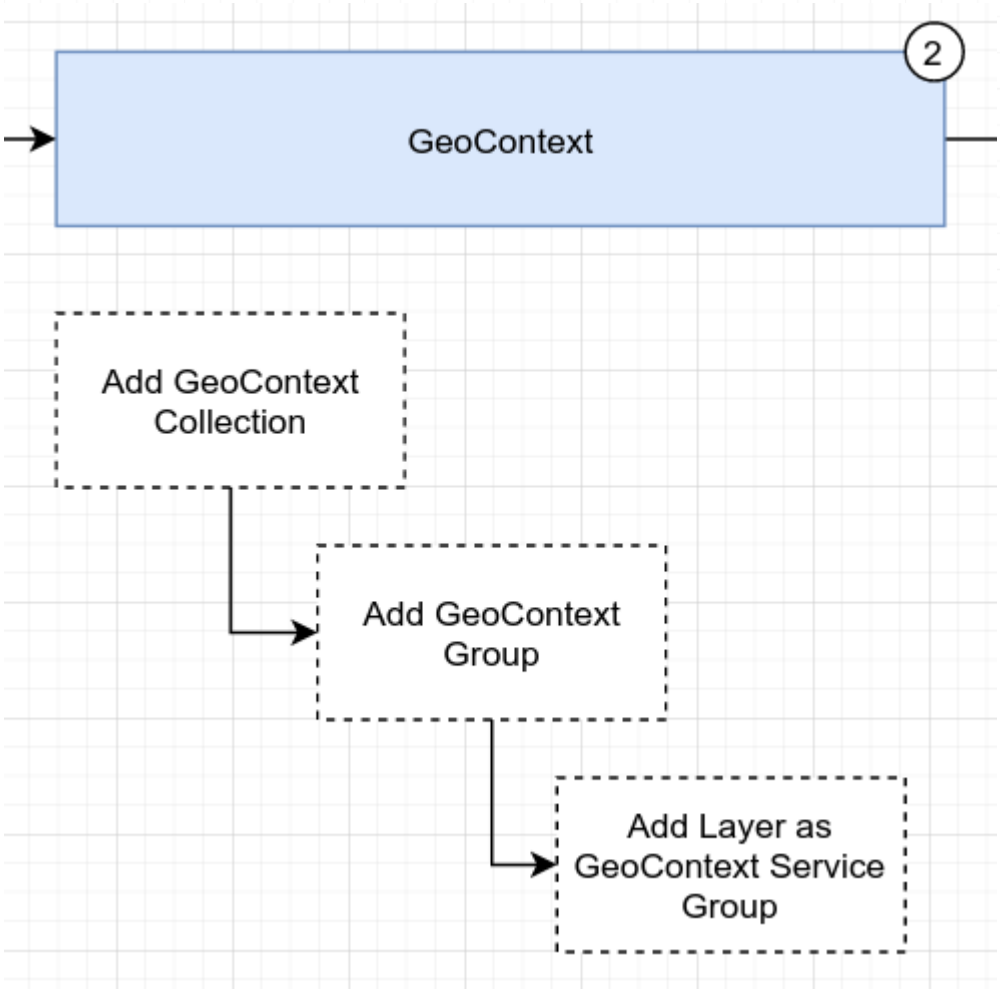


These layers will appear in the Layer Selector on the map page.



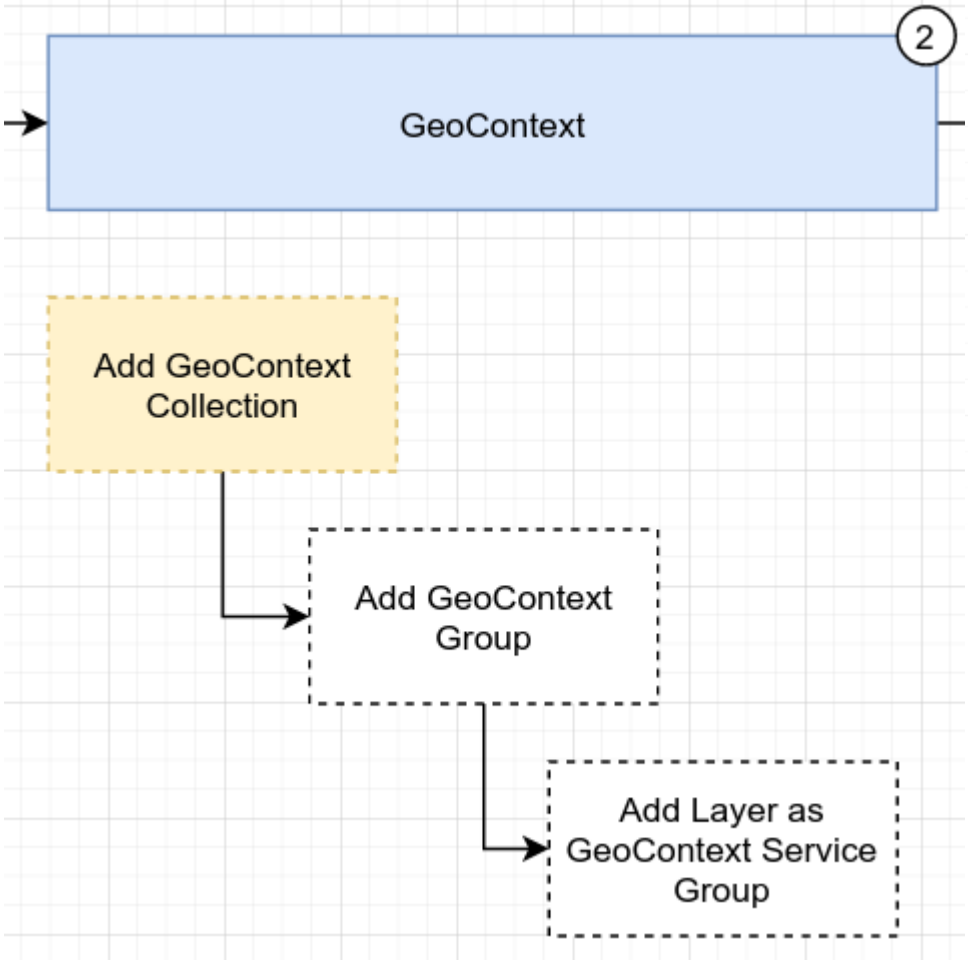
1.3 Working with GeoContext Data

In this article we explain the concept of the GeoContext platform and how layers are published to it in BIMS.

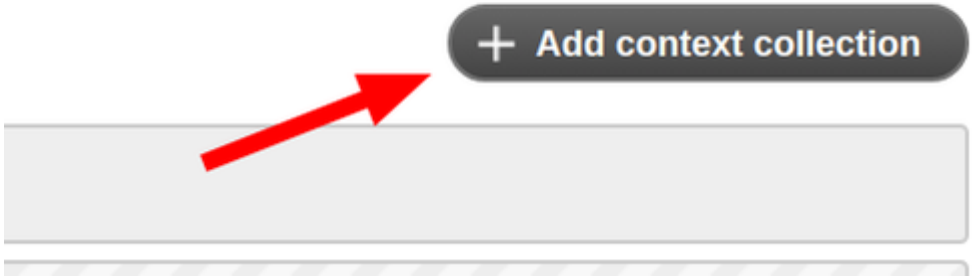


1.3.1 Creating a GeoContext Collection

A GeoContext collection is a set up web map services that can be queried in order to discover habitat or other relevant spatial data for a site.



From GeoContext collection admin page click **Add context collection button** to create a new collection



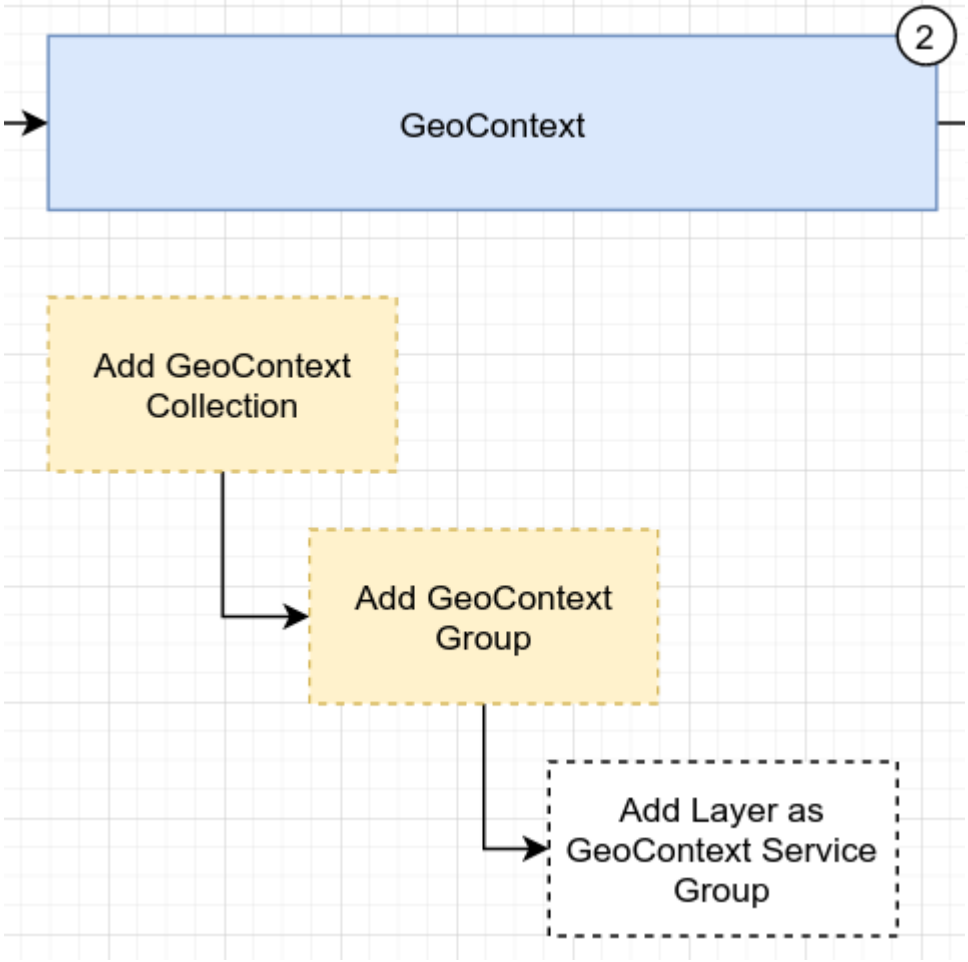
Fill out the required fields :

- Key - Key of the collection
- Name - Name of the collection

Click **Save** when you're done

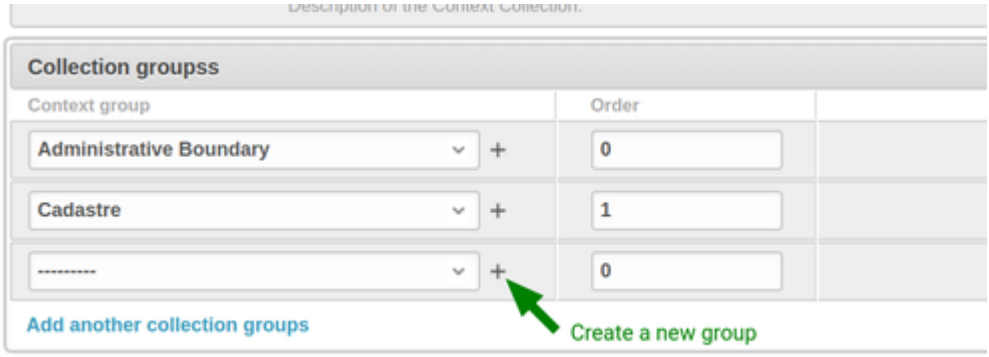
1.3.2 Adding a GeoContext Group

A GeoContext group is a subset of layers from a GeoContext collection that form a logical group, usually based around a theme such as temperature, political regions etc.



Adding groups to existing collection

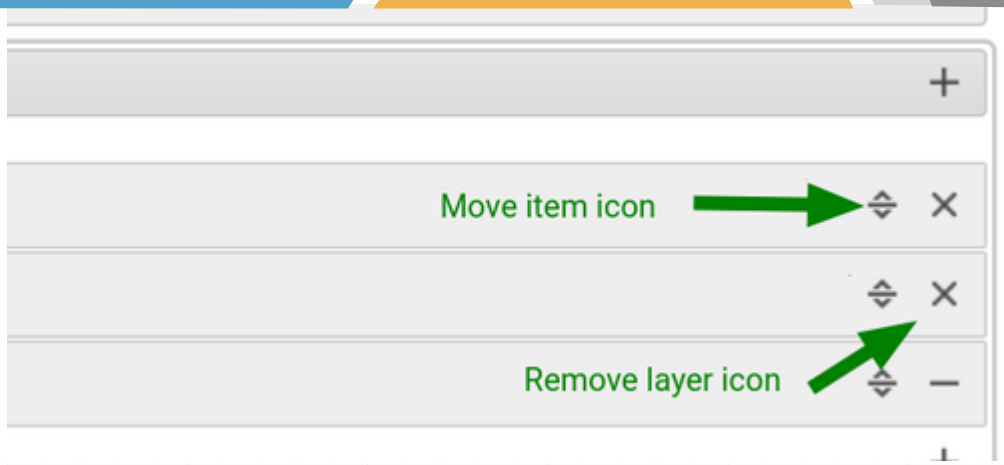
- From the GeoContext Collection admin page, open the collection that you want to add groups to.
- From the Context groups section click **Add another collection group** link
- Find existing group that you want to add to the group.
- If you want to create a new group, click + sign next to the dropdown. See **Adding new Group** to learn how to create a new group from scratch.



You can arrange the group order as follows:

- Update the order text manually
- Or move the group by dragging the move item icon that is located on the far right before the x sign

* In order to remove group from the group just click the **x** sign



Adding a new Group

You can create a new group from the context group page or directly from layer admin page.

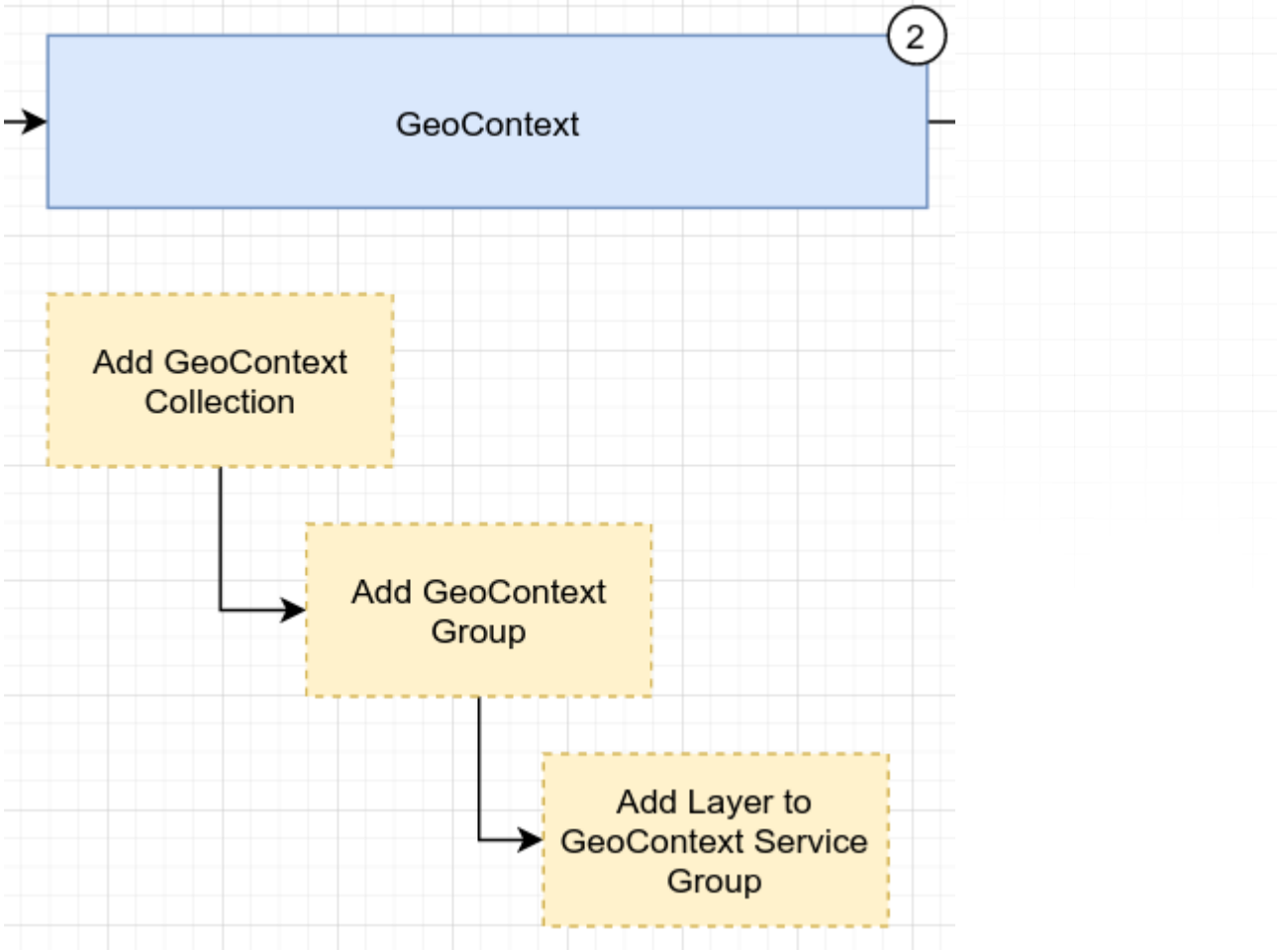
In order to create new group you need to fill out the required fields:

- **Key** - Key of the context group, this will be used in the bims to fetch the GeoContext data via API
- **Name** - Name of the group
- **Group Type** - Type of the group to determine the UI, choose Graph if this group depicting data over a time period. (e.g. monthly average temperature)

See other existing groups for guidance.

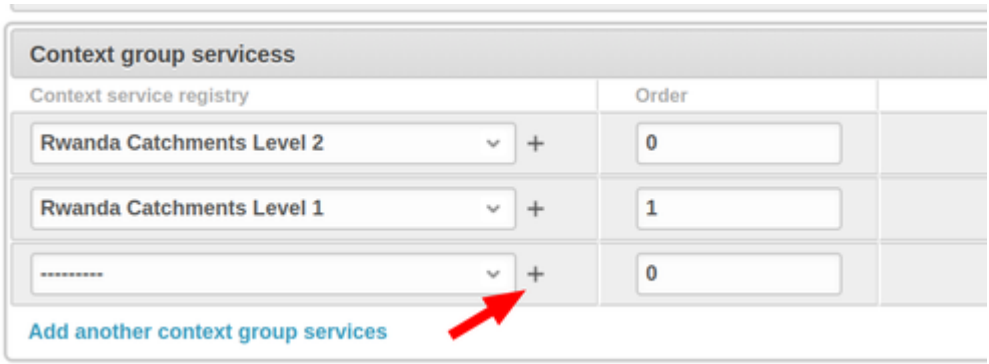
1.3.3 Adding a layer to a GeoContext group

In this sectio we describe how you add a layer to a GeoContext group. A layer is a Web Mapping Service intended to make spatial information available over the internet, covering a specific thematic topic e.g. average annual temperature in March



Adding Layers to an Existing GeoContext Group

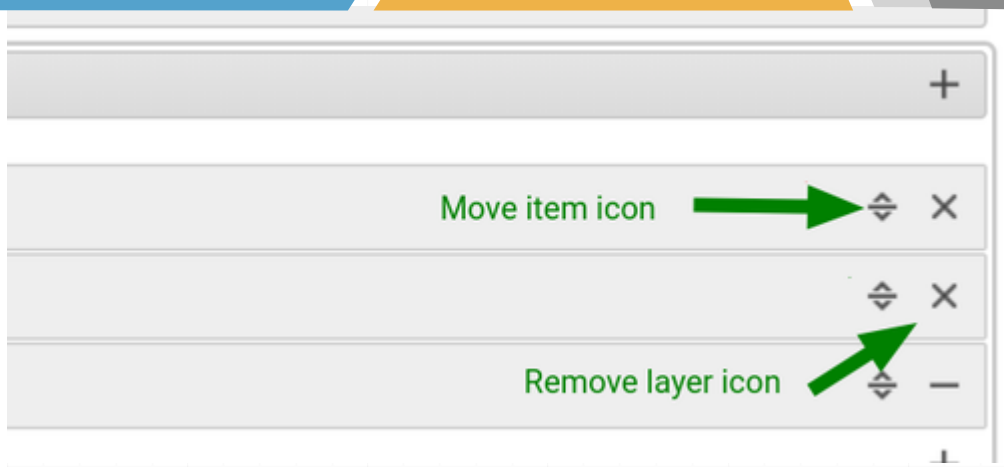
- From the GeoContext group admin page, open the group that you want to add layers to.
- From the Context group services section click **Add another context group service** link
- Find existing layer that you want to add to the group.
- If you want to create a new layer, click + sign next to the dropdown. See **Adding new Layer** to learn how to create a new layer from scratch.



You can arrange the layer order as follows:

- Update the order text manually
- Or move the layer by dragging the move item icon that is located on the far right before the x sign

In order to remove layer from the group just click the x sign



Click **Save** when you're done updating the group.

Adding a new Layer

You can create a new layer from the context group page or directly from layer admin page.

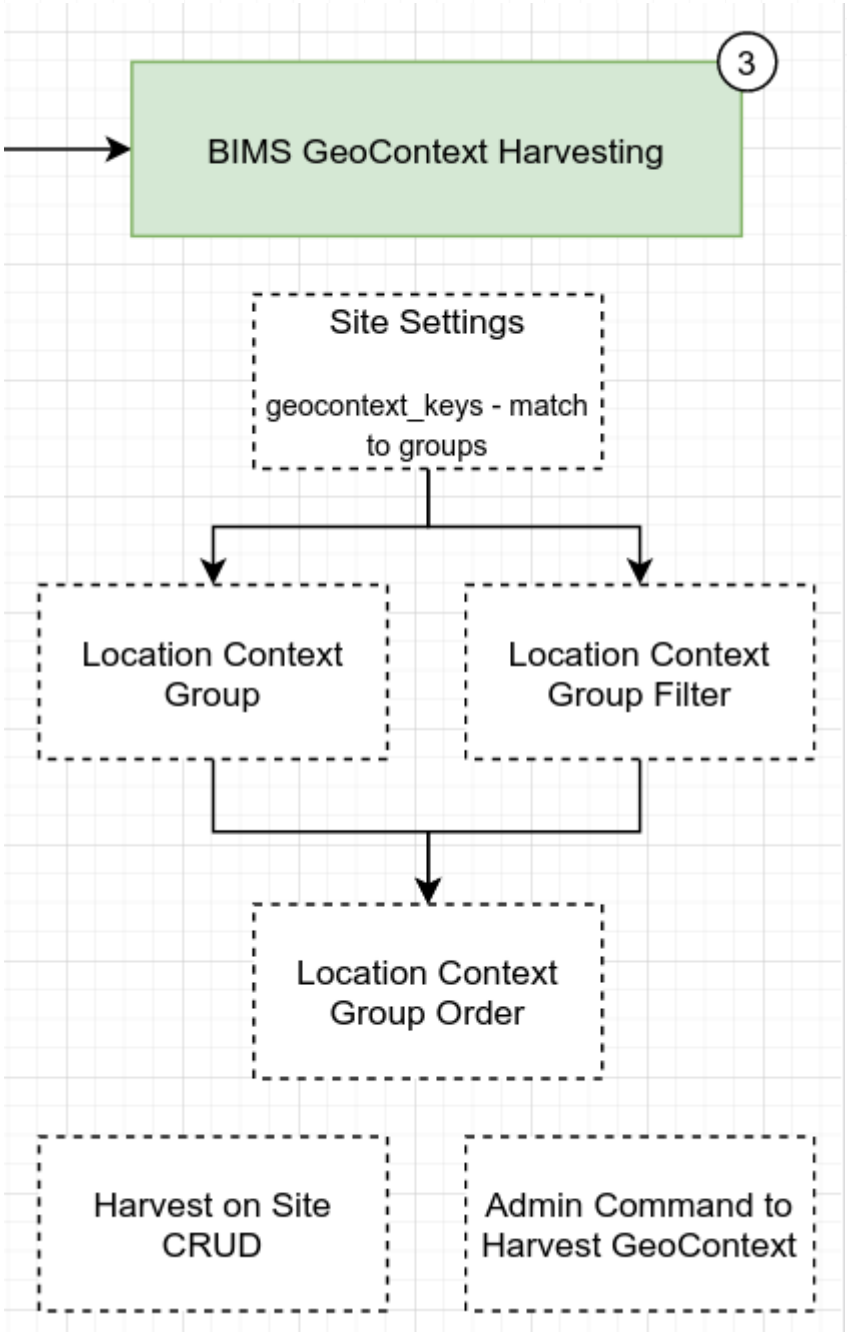
In order to create new layer you need to fill out the required fields:

- **Key**
- **Name**
- **Url** - Url of the layer service, e.g. if you use Geoserver then you can try following link : `{geoserver_host}/geoserver/wfs`
- **Query Type** - Query type of the layer, usually we use WFS
- **Result Regex** - Regex to retrieve the desired value.
- **Layer typename** - Layer type name to get the context.
- **Service version** - Version of the service (e.g. WMS 1.1.0, WFS 2.0.0).

See other existing layers for guidance.

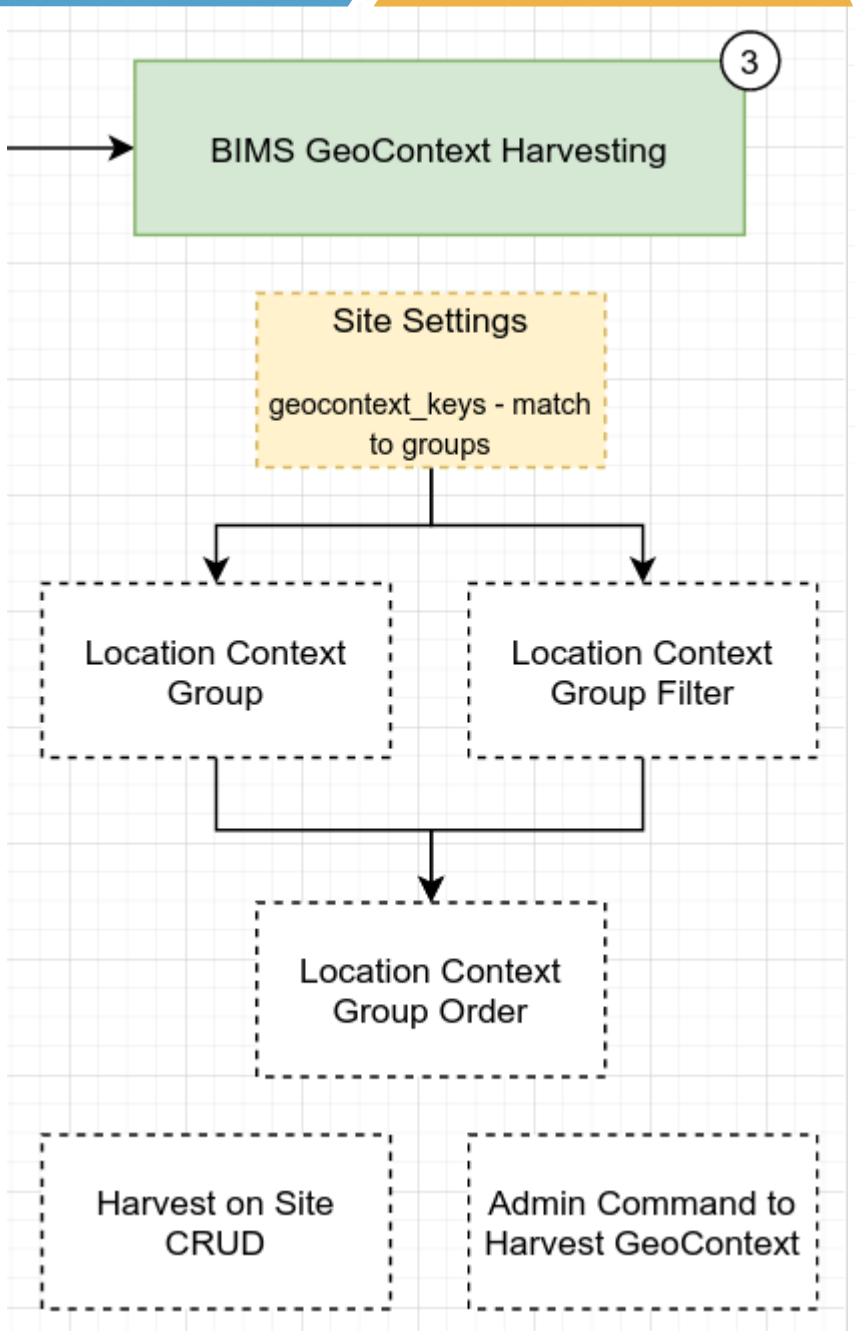
1.4 Harvesting GeoContext Data in BIMS

In this section we explain the process of configuring BIMS to harvest GeoContext data from a GeoContext server for a collection of layers.



1.4.1 Configuring site settings for GeoContext

This section describes how to configure your site settings to harvest GeoContext data for each site.



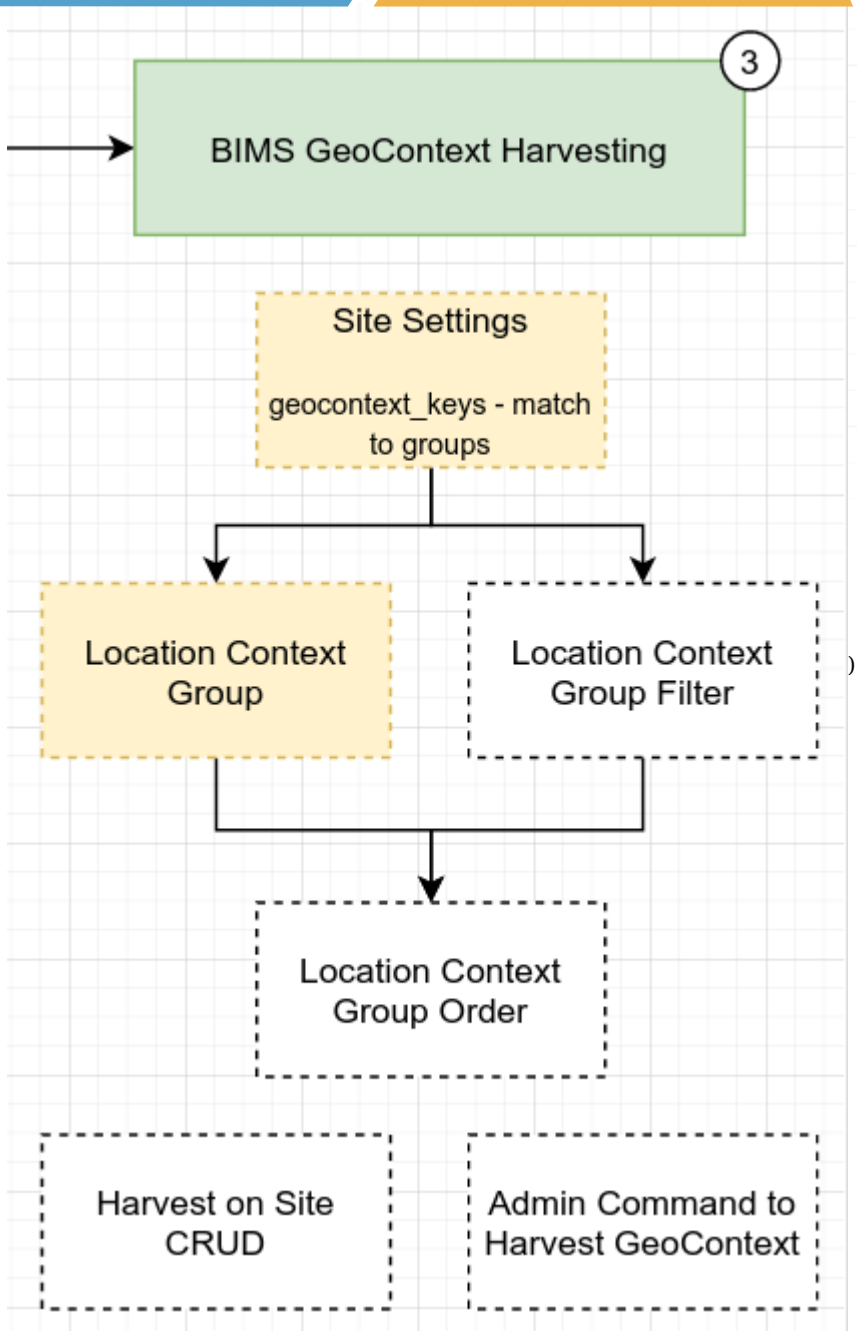
Open site settings in admin page Find Geocontext keys field

- Add the GeoContext group keys in this field, use commas to separate multiple keys
- Click **Save** when you're done
- Now the system will check these keys to fetch GeoContext data for new sites

> **Note:**
>
> Make sure that the key exists in the GeoContext, to check you can use this api : https://geocontext.kartoza.com/api/v1/geocontext/value/group/1/1/{geocontext_key}/ change the geocontext_key in the url with the key you want to check

1.4.2 Creating a Location Context Group in BIMS

In this section we explain how to create a location context group in the django admin interface for BIMS.



To create a Location Context Group in BIMS, you need to know what layers are returned from the GeoContext group.

For instance, we want to create Location Context Group for Rwanda Catchments.

First, check the output from GeoContext with this API : https://geocontext.kartoza.com/api/v1/geocontext/value/group/29/-2.5/rwanda_catchments/ Note : Change rwanda_catchments in the url with GeoContext group you want to add.

You will receive this data from GeoContext :

There are two service registry values (layers), so you need to add them both to the Location Context Group to display all those layers in the filter.

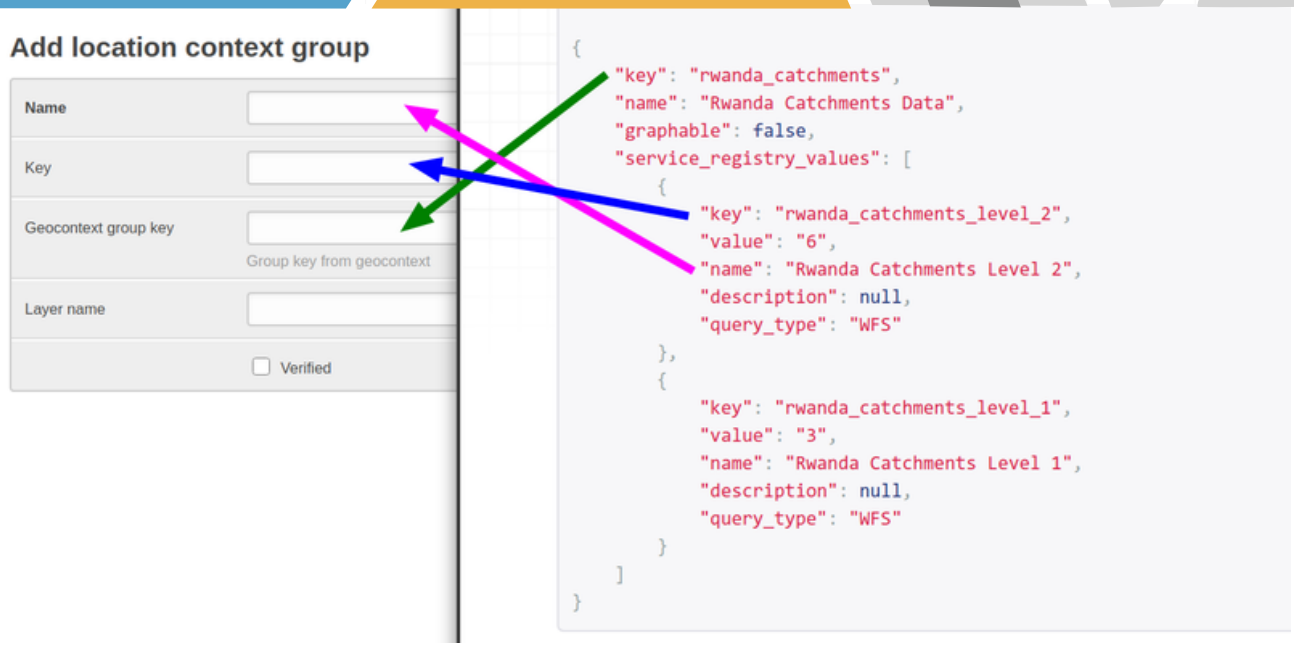
To add those layers please follow these steps :

Note : We will use this data for the following steps

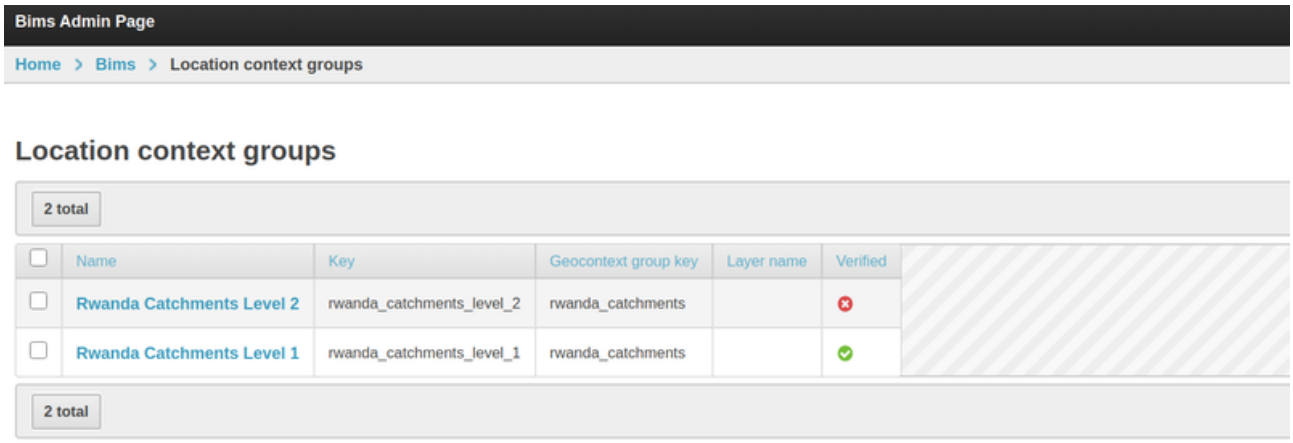
```
{
    "key": "rwanda_catchments_level_1",
    "value": "3",
    "name": "Rwanda Catchments Level 1",
    "description": null,
    "query_type": "WFS"
}
```

- Open Location Context Groups admin page
- Click Add location context group button at the top right corner
- Fill out these fields :
- **Name** - Name of the layer, Rwanda Catchments Level 1
- **Key** - Layer key, rwanda_catchments_level_1
- **Geocontext group key** - Group key from GeoContext, rwanda_catchments
- Click **Save**

Then you need to do the same thing for other layer.

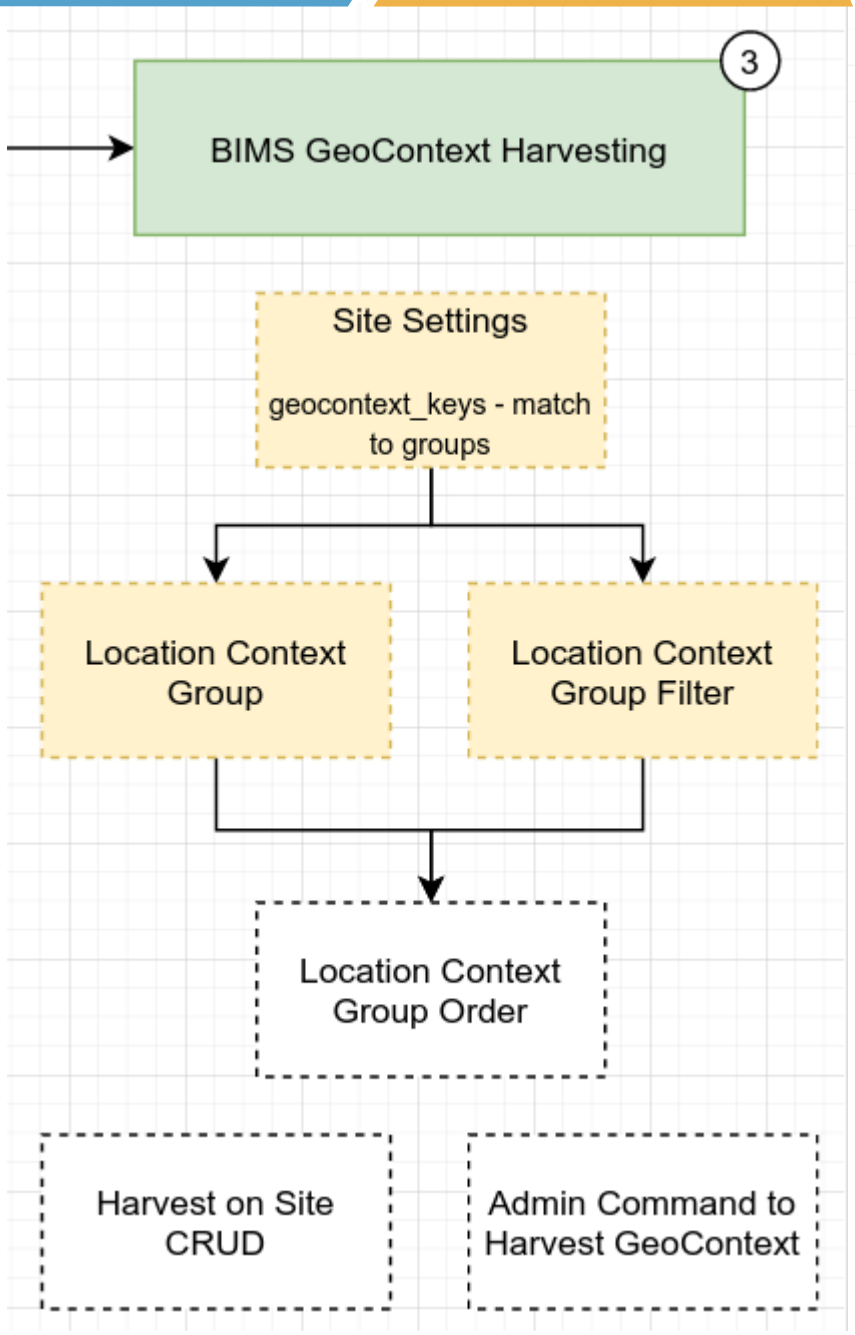


If you've done it correctly, then you will have two new layers in Location Context Group admin page :

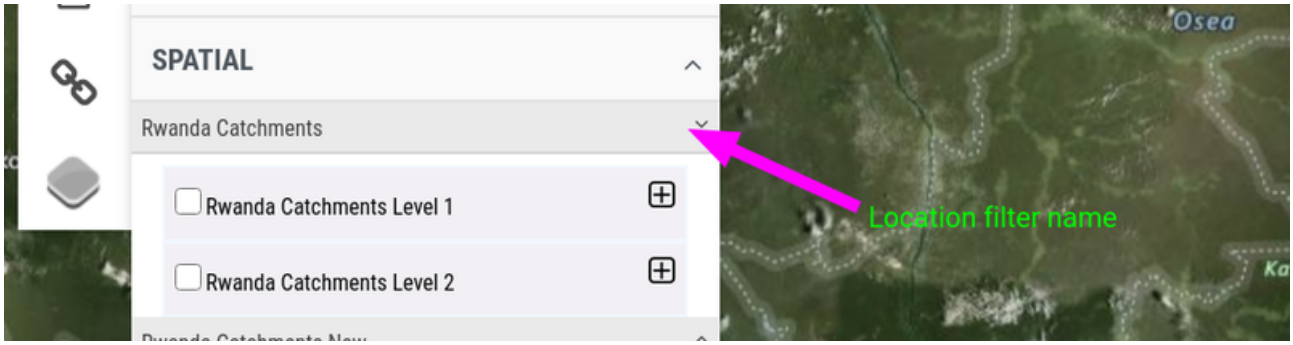


1.4.3 Creating a Location Context Group Filter in BIMS

In this section we explain how to create a Location Context Filter in BIMS.



Location context filter is just the filter name for the spatial filter on the Map page.



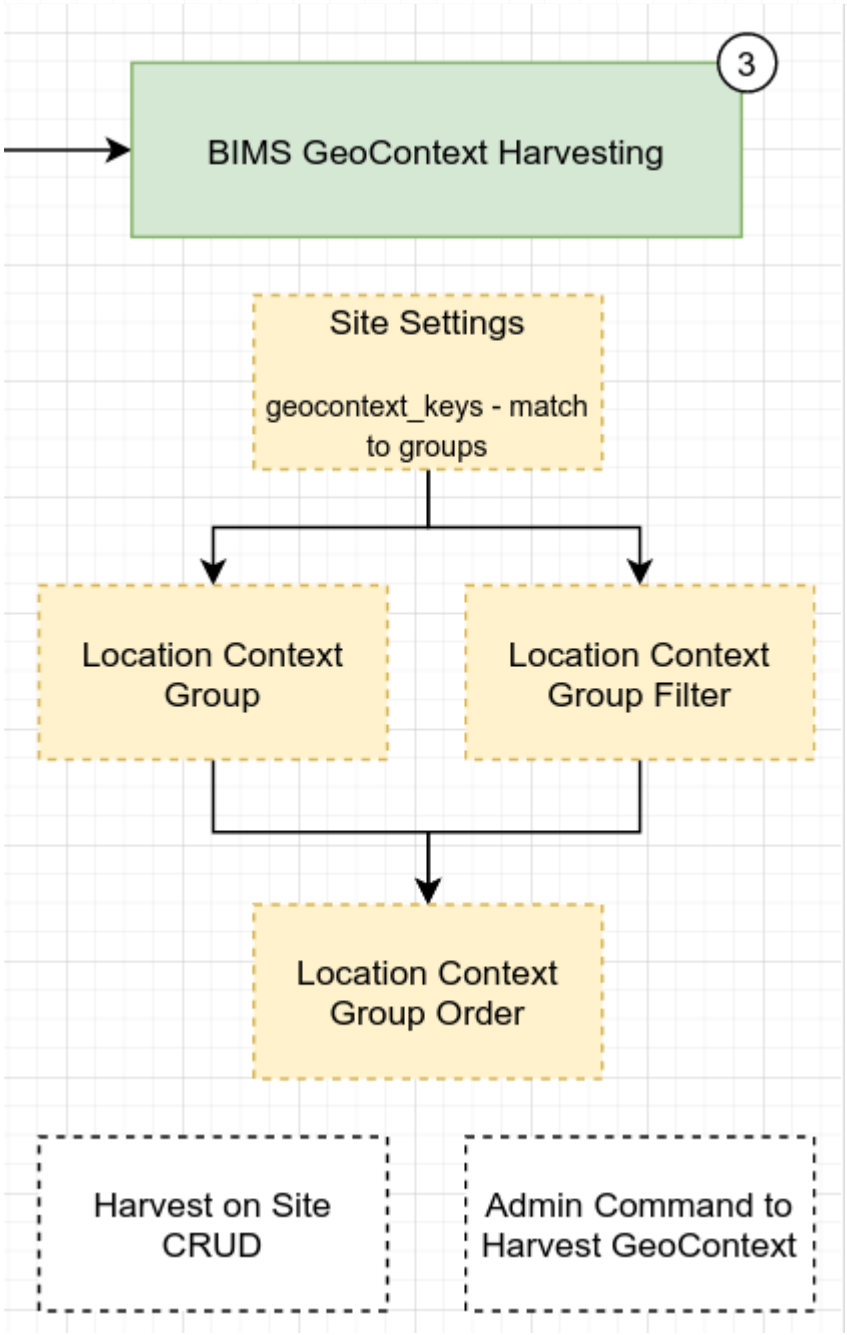
To add groups (Rwanda Catchments Level 1 & Rwanda Catchment Level 2) to the Location context filter please follow this guide.

To add new Location context filter please follow these steps :

- Open the Location context filter admin page
- Click Add location context filter button at the top right
- Fill up these required fields :
- **Name** - Name of the location context filter
- **Display order** - Order of this location context filter
- Click `Save` when you've done

1.4.4 Configuring the order of Location Context Groups

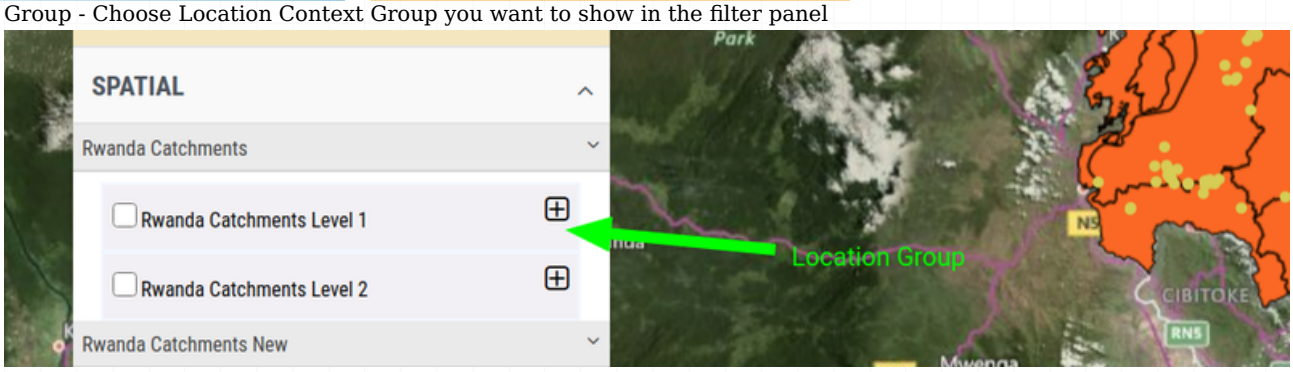
In this section we describe the process of sorting Location Context Groups to control the order in which they appear in BIMS.



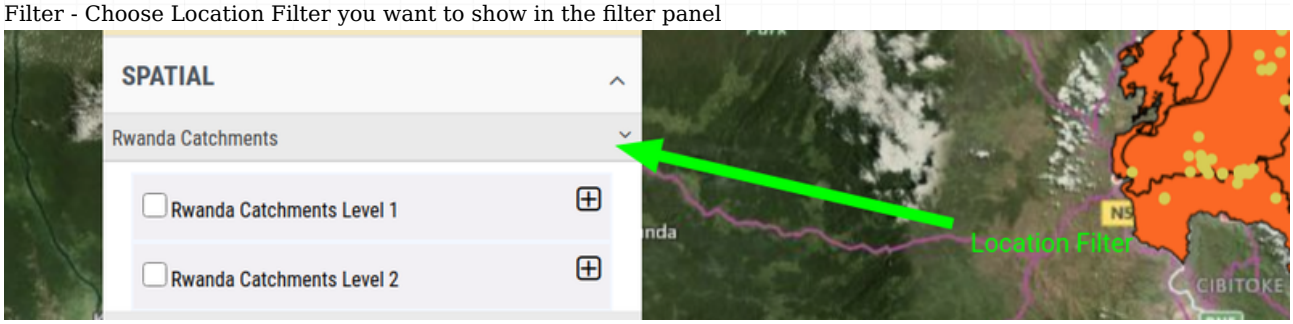
To do this guide, you need to add Location Context Group and Location Context Group Filter beforehand.

Open the admin page for Location Context Filter Group Order Click Add location context group order button at the top right Fill up these fields :

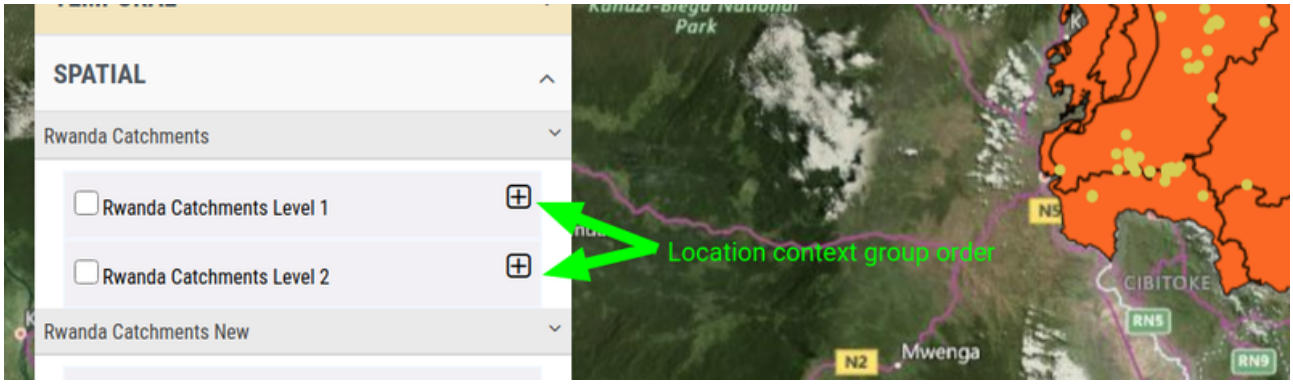
Group - Choose Location Context Group you want to show in the filter panel



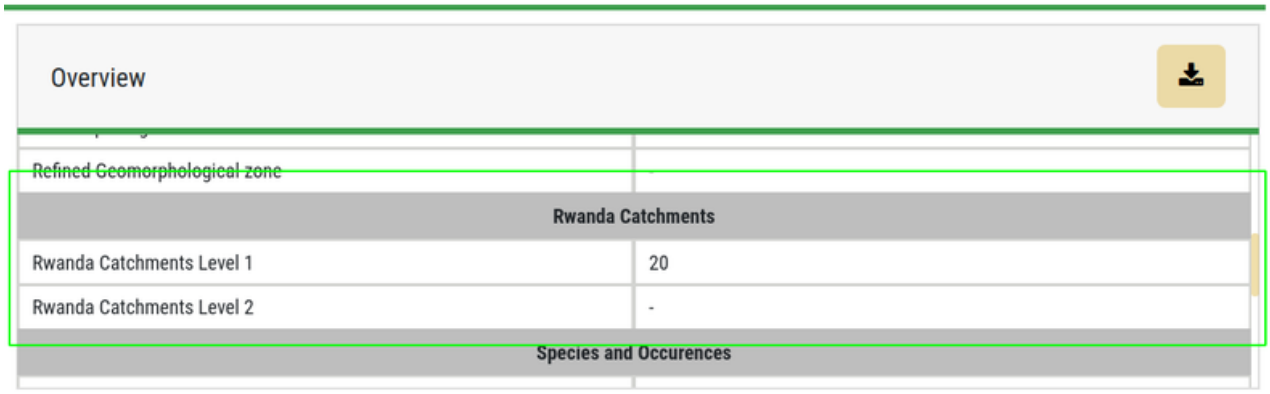
Filter - Choose Location Filter you want to show in the filter panel



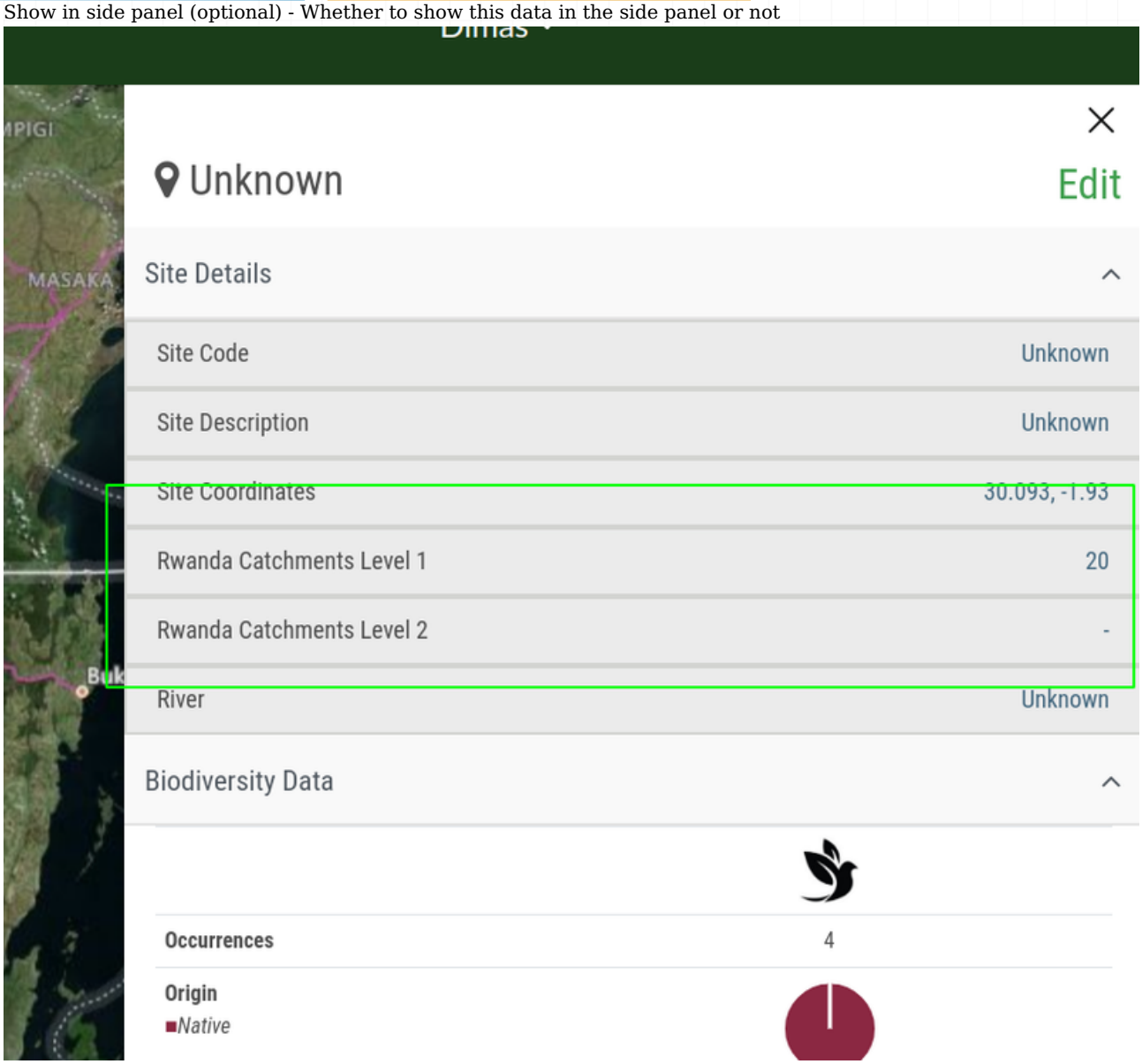
Group display order - This is the order of the groups inside the location filter



Show in dashboard (optional) - Whether to show this data in the dashboard or not



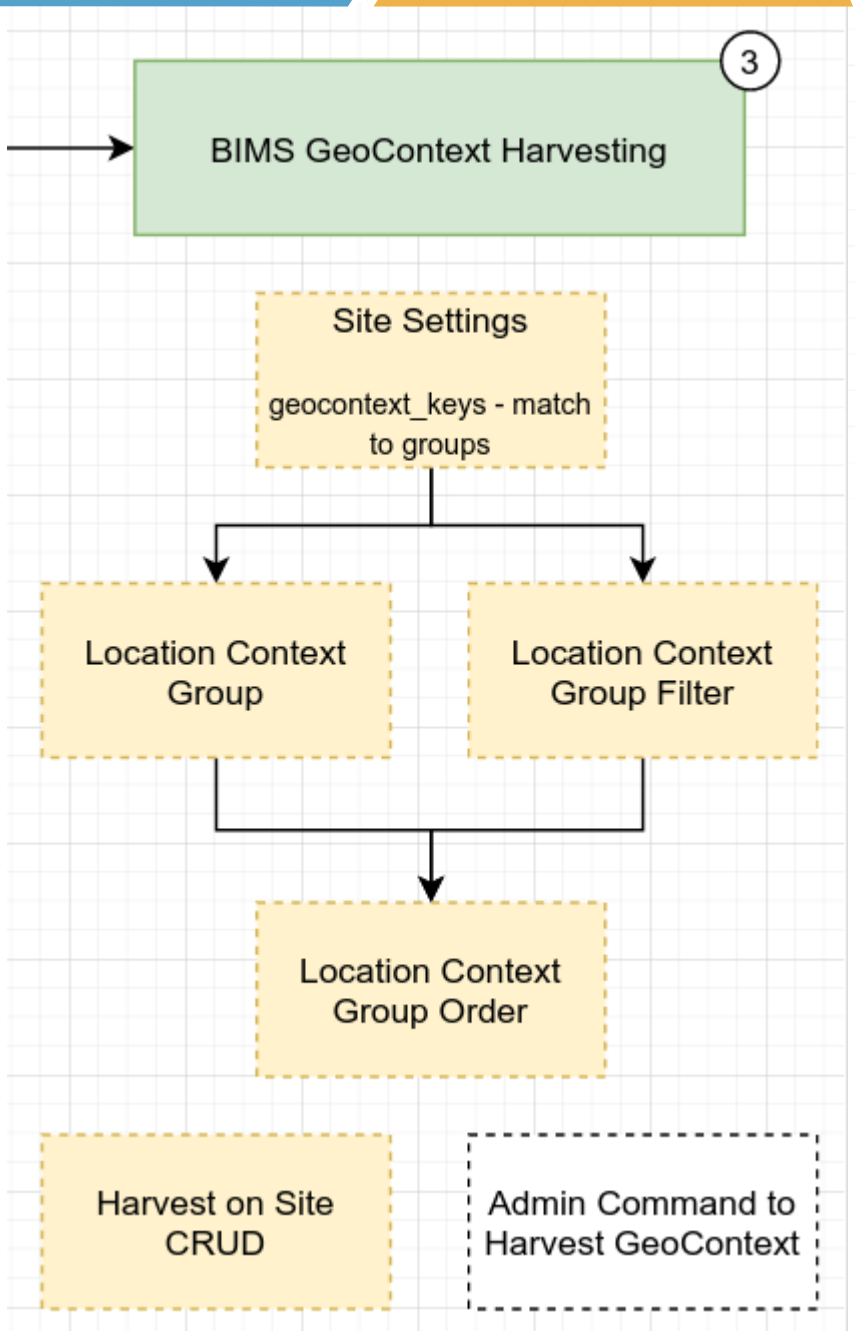
Show in side panel (optional) - Whether to show this data in the side panel or not



Click **Save** when you've done.

1.4.5 Harvesting GeoContext data when sites change

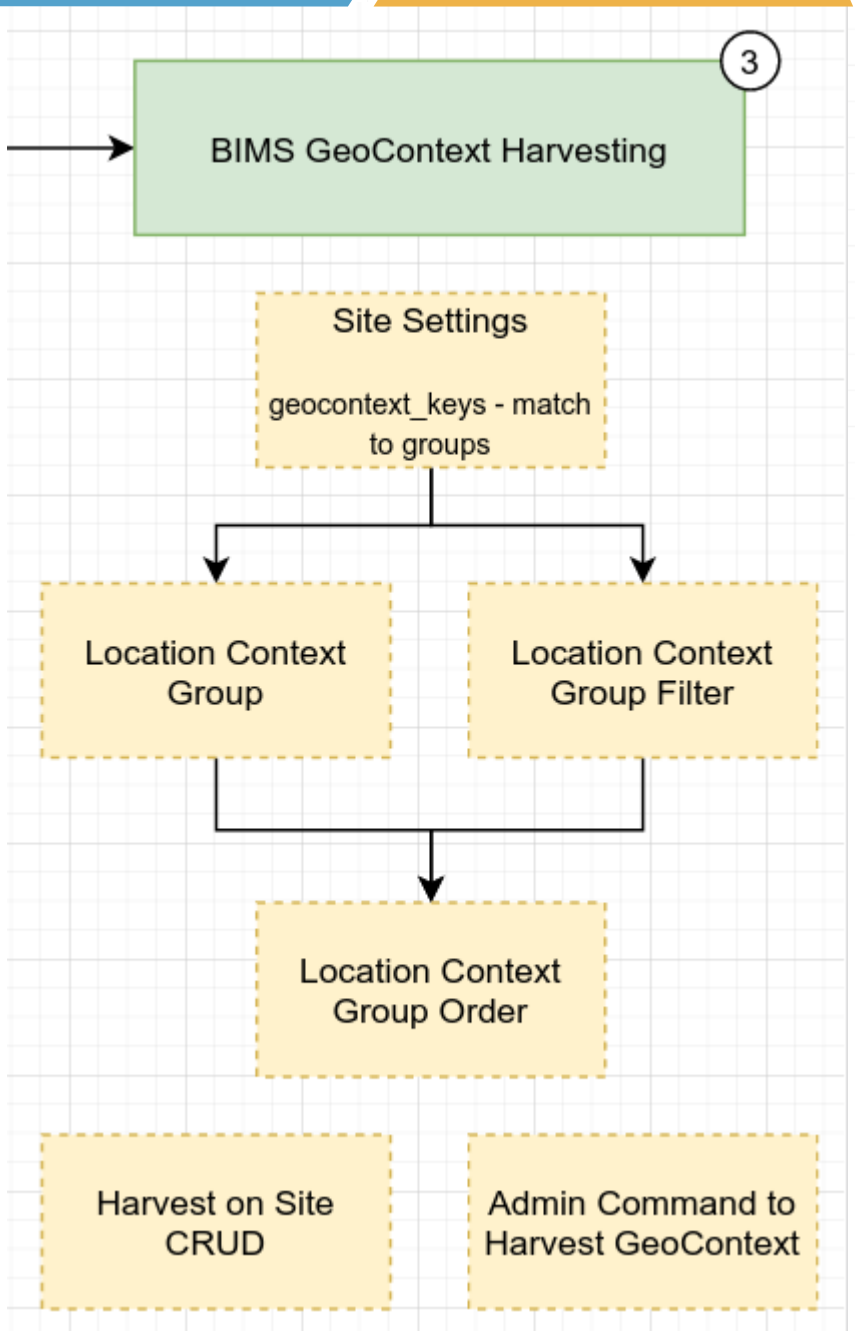
In this section we describe the process of updating GeoContext associated with sites when the location or content of those sites change.



Will be added later

1.5 Updating GeoContext data for sites using the admin panel

In this article we describe the process of updating the GeoContext data in one or more sites using the admin panel.


3
BIMS GeoContext Harvesting
Site Settings
geocontext_keys - match to groups
Location Context Group
Location Context Group Filter
Location Context Group Order
Harvest on Site CRUD
Admin Command to Harvest GeoContext

1 Resources

1.1 Contributing

1.1.1 🔧 Pull Request Steps

This project is open source, so you can create a pull request(PR) after you fix issues. Get a local copy of the plugins checked out for development using the following process.

Pull Request

Before uploading your PR, run test one last time to check if there are any errors. If it has no errors, commit and then push it!

For more information on PR's steps, please see links in the Contributing section.

Commit messages

Please make this project more fun and easy to scan by using emoji prefixes for your commit messages (see GitMoji).

Commit type	Emoji
Initial commit	🎉 `:tada:`
Version tag	🔖 `:bookmark:`
New feature	✨ `:sparkles:`
Bugfix	🐛 `:bug:`
Metadata	📇 `:card_index:`
Documentation	📚 `:books:`
Documenting source code	💡 `:bulb:`
Performance	🐎 `:racehorse:`
Cosmetic	💄 `:lipstick:`
Tests	🚨 `:rotating_light:`
Adding a test	✅ `:white_check_mark:`
Make a test pass	✔️ `:heavy_check_mark:`
General update	⚡ `:zap:`
Improve format/structure	🎨 `:art:`
Refactor code	🔨 `:hammer:`
Removing code/files	🔥 `:fire:`
Continuous Integration	💚 `:green_heart:`
Security	🔒 `:lock:`
Upgrading dependencies	⬆️ `:arrow_up:`
Downgrading dependencies	⬇️ `:arrow_down:`
Lint	👕 `:shirt:`
Translation	👽 `:alien:`
Text	📝 `:pencil:`
Critical hotfix	🚑 `:ambulance:`
Deploying stuff	🚀 `:rocket:`
Fixing on MacOS	🍎 `:apple:`
Fixing on Linux	🐧 `:penguin:`
Fixing on Windows	🏁 `:checkered_flag:`
Work in progress	🚧 `:construction:`
Adding CI build system	👷 `:construction_worker:`
Analytics or tracking code	📈 `:chart_with_upwards_trend:`
Removing a dependency	➖ `:heavy_minus_sign:`
Adding a dependency	➕ `:heavy_plus_sign:`
Docker	🐳 `:whale:`
Configuration files	🔧 `:wrench:`
Package.json in JS	📦 `:package:`
Merging branches	🔀 `:twisted_rightwards_arrows:`
Bad code / need improv.	💩 `:hankey:`
Reverting changes	⏪ `:rewind:`
Breaking changes	💥 `:boom:`
Code review changes	👌 `:ok_hand:`
Accessibility	♿ `:wheelchair:`
Move/rename repository	🚚 `:truck:`
Other	Be creative

1.1.2 💬 Contributing

- Code of Conduct
- Contributing Guideline
- Commit Convention
- Issue Guidelines

1.3 Links

https://github.com/kartoza/bims-website