Introduction to GeoServer

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Introduction to GeoServer

Objective: In this tutorial we will learn about the GeoServer GUI and how to create the workspaces, stores, publishing, styling and grouping the layers.

Software: OpenGeo Suite 3.0

Level: Beginner

Time required: 4 hours

Prerequisites and Geospatial Skills:

- Basic computer skills
- IGET_WEBGIS_001 and IGET_WEBGIS_002 should be completed

Readings

Introduction to the OpenGeo Suite, Chapter 3: GeoServer, pp. 39 – 78.
http://presentations.opengeo.org/2012_FOSSGIS(suiteintro.pdf

Tutorial Data: The tutorial data of this exercise may be downloaded from the associated folder
Introduction

GeoServer is an open source web mapping server written in Java platform. It is a subset of a web server model specially designed to share and publishes the Geographical information over the internet. It utilizes Web Mapping Service (WMS), Web Feature Service (WFS), Web Coverage Service (WCS) and many other open protocols for transfer the Geographical information, such as maps, spatial attributes and Feature data sets. Through these protocols GeoServer can serve the data and maps in an efficient and powerful way. GeoServer supports the most common data sources like, Geo Tiff, Shapefile, ArcGrid, JPEG200 and GDAL formats and various databases viz., PostGIS, SQL Server, DB2, Oracle Spatial and ArcSDE.

You are recommended to read the GeoServer concepts before proceeding to the exercise from following link: http://workshops.opengeo.org/suiteintro/geoserver/concepts.html

GeoServer Graphic User Interface (GUI)


2. In OpenGeo Suite Dashboard click on ‘Start’ button to start the server.

3. Click on the ‘Configure’ button in GeoServer column

4. Now ‘GeoServer: Welcome’ page will be opened in your default web browser.

5. You need to fill your credentials to login into the GeoServer to carry out the configuration tasks. By default the user name and password is ‘admin’ and ‘geoserver’. After filling the credentials click on ‘Login’ button.
6. After successful login, you can notice more options appeared in the GeoServer: Welcome window.

7. The GUI of the GeoServer: Welcome window is divided into 2 main parts
   i. **Main Panel** (shown in the orange box): It contains the information that corresponds to the selected option from the navigation panel.
   ii. **Navigation Panel** (show in green box): Navigation panel is further grouped into following groups.
       a. About & Status
       b. Data
       c. Services
       d. Settings
       e. Tile Caching
       f. Security
       g. Scripting
       h. Demos
       i. Tools
We will learn each of the above the groups in detail as we move further

Creating a workspace

A *workspace* is the name for a notional container used to group similar data together. A workspace consists of a Name and a Namespace URI (*Uniform Resource Identifier*). The workspace name should not contain any spaces.

8. In the navigation panel of ‘GeoServer: Welcome’ page, click on ‘Workspaces’

![Image of GeoServer workspace panel]

9. Now you will be redirected to the ‘GeoServer: Workspaces’ page. In order to create a workspace, click on ‘Add new workspace’ under Workspace in Main Panel.

![Image of GeoServer workspace creation]

10. Now you will redirect to ‘GeoServer: New workspace’ page. Here we have to specify the *Name* and *Namespace URI*, enter ‘BVU_Vector_wp’ and ‘BVU_vector_wp’ respectively in Name and Namespace URI, click on ‘Submit’ button.
11. You will redirect back to the ‘GeoServer: Workspaces’ page, under Workspaces name you can see the newly added ‘BVU_Vector_wp’ Workspace in the last step.

12. If you want to delete any Workspace, check the ‘Check box’ left side to the ‘Workspace Name’ you want to delete, now you will notice, ‘Remove selected Workspace(s)’ will be enabled, click over it. Then you will present with ‘Confirm Object removal’ window, Click ‘OK’ to delete the workspace.

Creating a Stores

“A store is the name for container of Geographic data (opengeo.org)”. In this tutorial we will learn how to connect to the PostGIS database that we created in IGET_WEBGIS_002: PostGIS, i.e., ‘BVU_IEER_DB’.

13. Click on the ‘Stores’ in navigation panel of the GeoServer Window page.

14. Now you will be redirect to the ‘GeoServer: Stores’ page. Click on ‘Add new store’, then you will redirect
to the ‘GeoServer: New data source’ page.

15. Select ‘PostGIS’ under ‘Vector Data Sources’

![New data source](image)

16. You will present with a form, where you have to fill the basic information to connect our PostGIS database created in IGET_WEBGIS_002. Select BVU_vector_wp from down drop list under Workspace, enter Data Source Name as ‘BVU_Vector_st’, Description as ‘Vector files of BVU toposheet’ and Make sure check box of ‘Enabled’ is checked.

![Basic Store Info](image)

17. Go to the ‘Connection Parameters’ section, type ‘54321’ under ‘port’, ‘BVU_IEER_DB’ under ‘database’ and enter ‘postgres’ as username and also as password under ‘user’ and ‘password’ fields. Leave all other fields as default and click on ‘Save’.
17. If the credentials are correct, then you will see the list of the resource/tables contained in the store ‘BVU_Vector_st’. If you were not successful, please check the credentials from the IGET_WEBGIS_002.
Publishing a layer

19. To publish a (single) layer click on the ‘Publish’ button, this is located against to the desired layer to be published under ‘action’ field. For example: if you want publish ‘agriculture_bvu’ click on publish against to it, under ‘action’ field here.

20. Now you will redirect to the ‘Edit Layer’ page, here we have to configure the layer for publishing. Change the ‘Basic Resource info’ under ‘Data’ tab as shown below.

21. Go to the ‘New Keyword’ text box, add the relevant keywords, Keywords makes the layers and information easily searchable on server. In our case, the toposheet belongs to Katra area of Pune city. So we are adding these two keywords now. To add keyword, type ‘Katraj’ in ‘New keyword’ text box → Select the language as ‘English’ from the down drop list located right side to the text box → Click on ‘Add Keyword’ button to add the key word. Similar add the keyword ‘Pune’.
22. Go to the ‘Coordinate Reference System’ section, here we have to specify the coordinate system of our layer i.e., ‘UTM 43N based on WGS84 Datum’. Type its code: EPSG: 32643 in the ‘Declared SRS’.

OR

If you don’t know the SRS ID, then click on ‘Find’ button then you will see a popup window ➔ in the popup window type ‘43N’ in the search box ➔ Press ‘Enter’ ➔ Now you will be presented with a number of results, Select ‘WGS84 / UTM zone 43 N’, by clicking on code number ‘32643’.

23. Now select ‘Force declared’ from the drop down list under ‘SRS handling’

24. Now go to the Bounding Boxes section. Here we have to specify the bounding box extent. To do this click on ‘Compute from data’ under ‘Native Bounding Box’ and ‘Compute from native bounds’ under ‘Lat/Long Bounding Box’. Now you will notice the extent values in the corresponding text boxes.
25. Click on ‘Save’ in the ‘Edit layer’ Page

26. Now you will redirect to the ‘Layers’ page where you can see the ‘Agriculture’ layer under the list of layers of published layers.

27. We published the ‘Agriculture’ layer successfully; it is time to preview our work. To do this click on ‘Layer Preview’ under ‘Data’ section.

28. Now you will redirect to the ‘Layer Preview’ page, in this page you will be presented with all available published layers. Navigate to the ‘BVU Vector_wp: Agriculture’ layer that we published earlier. You can search the layer using the keyword we added, type ‘Katraj’ in search box, press ‘Enter’ in keyboard.
29. Now select ‘OpenLayers’ from the drop list against to the ‘BVU_Vector_wp:Agriculture’ click on ‘Go’ ‘Agriculture’ layer will be published in a new browser window as shown below.

30. Similarly Publish all other layer in the store before proceeding further.

Styling Layer

We published the agriculture layer and would like to style the layer for better visualization purpose. This is necessary step because there is no implicit symbology exists within the geospatial data.

31. To style the agriculture layer, click on ‘Styles’ under ‘Data’ section in the navigation panel.

32. Now you will be redirect to the ‘GeoServer: Styles’ page. Click on ‘Add a new style’, then you will redirect to the ‘GeoServer: New style’ page.
33. Now name the style as ‘Agriculture Style BVU’ select ‘BVU_Vector_wp’ from workspace dropdown and select polygon from copy from existing style dropdown

34. Now click on ‘copy’, you will notice the text box below is filled with an xml code as show below. It is known as ‘Styled Layer Descriptor (SLD)’, an xml file based on the OGC specified format that is used to describe the symbol of features. To know more about the SLD please visit http://www.opengeospatial.org/standards/sld

35. Now edit the this Code as per our requirements, we have to edit Name, Title and CssParameter as shown in the below figure. The color codes are in hexadecimal format
36. Now validate the xml code by clicking on the validate button at bottom of the page. If there are no errors, you can see ‘No Validation errors’ message on screen similar to the image below.

37. Now click ‘Submit’ button, you will be redirected to GeoServer: Styles page.

38. To assign this style to any polygon layer click on ‘Layers’ in Navigation panel.


41. Scroll down to WMS settings and select the ‘Agriculture Style BVU’ from the down drop list under ‘Default Style’. In ‘Additional styles’ section select ‘Agriculture Style BVU’ and click on the right arrow button, now you can see the selected style placed under ‘Selected Styles’ list. Scroll down to the bottom of the page and click on ‘Save’.

42. Now you will redirect back to the ‘GeoServer: Layers’ page. Now repeat steps 27 – 29 to preview the Agriculture layer with the style we specified in above steps.
Grouping the layers

A Layer Group is a collection of layers. It contains the information of individual layers and facilitates to request multiple layers through a single WMS request. It saves our time, provides easy access to the layers and makes our work smarter. In this section we will learn how to create a ‘transportation group’.

43. To create a Layer group, click on ‘Layer Groups’ under Data section in Navigation panel of GeoServer page.

44. Now we will direct to ‘GeoServer: Layer Groups’. Click on ‘Add new layer group’.

45. In the ‘New Layer Group’ page, enter ‘BVU_Transportation’ as ‘Name’ → Select workspace as BVU_Vector_wp. In the Coordinate reference system use ‘Find’ to select ‘EPSG:32643’ as SRS.
46. Click on ‘Add Layers’, select Bus stops, Highways and Street Roads layers (Published in Step 30) by clicking on their name under Name field in ‘Choose new layer’ popup window. Use remove button to remove any wrongly added layer.

47. After adding the layers click on ‘Generate Bounds’ button to calculate the extent of the layer and leave all other fields default, scroll down to click on ‘Save’.

48. No you will redirect to the ‘GeoServer: Layer Groups’ page. Where you can see newly added ‘BVU_Transportation’ Group in the list.
49. Now click on ‘Layer Preview’ in navigation panel → Now find ‘BVU_Transportation’ group under Layer Preview list (use navigation tools if required) → Click on ‘Go’ to preview the group.

Publishing a Raster file on GeoServer

As now we have covered the vector publishing now we will see how to publish the raster data on GeoServer.

50. Create a Workspace named ‘BVU_Raster_wp’ (refer steps 8-11)

51. Create a New Store (refer steps 13 -14) now select ‘GeoTIFF’ format under ‘Raster Data Sources’

52. Name the stores as ‘BVU_Raster_st’ using workspace as ‘BVU_Raster_wp’ add some description that describes the data correctly the click on ‘Browse’ to select the ‘BVU_tiff’ from tutorial data and click on ‘Save’.
53. A New raster layer will appear in New Layer page → click on ‘Publish’ in front of the **BVU_Tiff**.

54. You will direct ‘Edit Layer’ Page. Now give a proper ‘Name’, ‘Title’ and ‘Description’ as shown below.

55. Add necessary keywords such as ‘Katraj’ and ‘Pune’ refer Step 21.
56. Unlike the vector data you don’t have to generate the *Bounding box* and declare the *Coordinate Reference system* since *Geotiff* format includes the CRS information. If you think anything went wrong you can change the SRS. Now we are accepting it because the layer is assigned to right SRS, click on *Save* to finish.

57. Now go to the ‘Layer Preview’ search for ‘Katraj’ (Note: this will work only if you have added katraj as keyword as mentioned in step 55). Navigate to ‘BVU_Raster_wp: BVU_Tiff’ → Click on ‘Go’.
58. Now you can see the published ‘Satellite image covering Bharati Vidyapeeth University, along with Katraj Snake Park and Upper Katraj Lake’ in your browse window.

Task 1: Create a styling for Water bodies and publish the layer.

Task 2: Create a styling for Roads and publish the layer.

Task 3: Create Services layer group by using tutorial data.