

GeoServer Orientation



FOSDEM 2020



GeoServer ~~Basics~~



FOSDEM 2020



Introductions

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GeoCat

Netherlands open-source company focused on spatial data publication and discovery.



Open Source Projects

- GeoServer, GeoTools, JTS, ImageN, uDig

Open Source Geospatial Foundation

- Incubation Committee Chair
- GeoTools Project Officer
- Marketing Committee Co-chair

Eclipse Foundation

- Technology Project Chair

Popular GeoServer Talks

State of GeoServer



2.16

FOSS4G BUCHAREST 2019
14-15 NOVEMBER, 10-12:00



*Annual team
update and tour of
what is new!*

GeoServer Ecosystem



*GeoServer use in
organizations, and
technologies,
around the
worlds.*

GeoServer Feature FRENZY



FOSS4G BUCHAREST 2019
14-15 NOVEMBER, 10-12:00



*Beloved features,
and impressive
tricks, showing
what is possible
with GeoServer*

Popular GeoServer Talks: Updated!

State of GeoServer



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GeoServer Ecosystem



GeoServer use in organizations, and technologies, around the worlds.

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FOSS4G BUCHAREST 2019



Beloved features, and impressive tricks, showing what is possible with GeoServer

GeoServer Orientation



FOSDEM 2020



Downloaded GeoServer, now what does it do again?

A solid blue vertical bar is located on the left side of the slide.

What is it for?

GeoServer Vision

geoserver.org:

“GeoServer is an open source server for sharing geospatial data.”

GeoServer is passionate about sharing data. GeoServer was founded out of a community project to map trees in New York city.

- If you are here to share a map.. GeoServer can do that.
- But don't stop at a map ... GeoServer will share the data
- And don't stop at the data ... GeoServer encourages data editing

GeoServer approach

Approach:

Designed for interoperability, it publishes data from any major spatial data source using open standards.

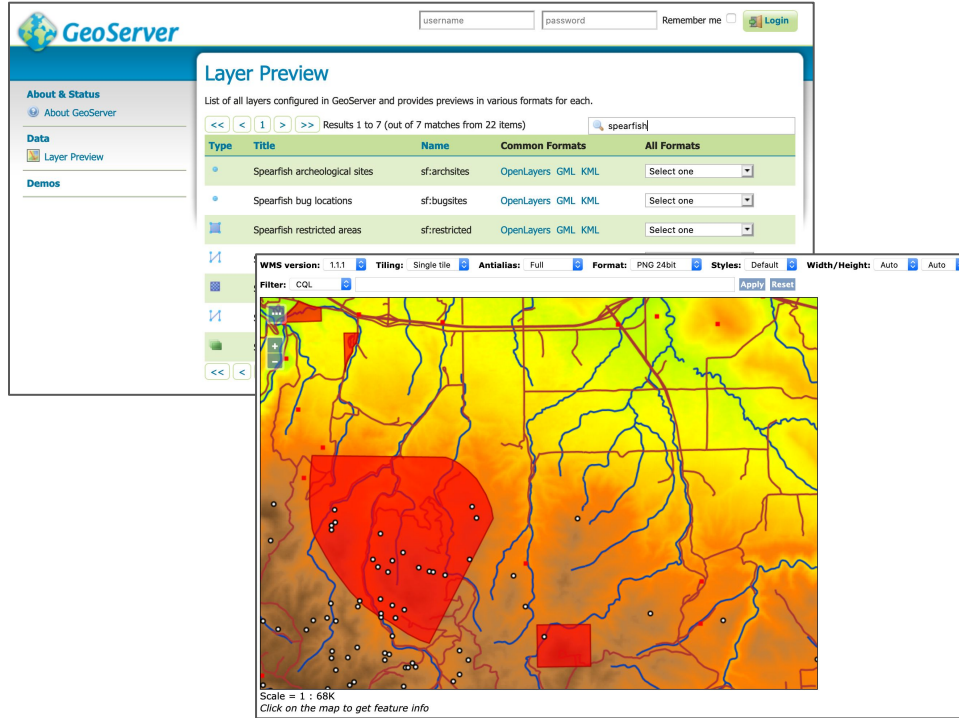
GeoServer really does not want to “lock-in” your data, from the ground up:

- Share your data with a wide audience
- Access your data where it is
- Start with “industry standards”
- Add protocols over time

Opposite of a “not-invented-here” attitude.

If GeoServer has to invent something in isolation chances are we are doing it wrong.

Maps Publishing



The screenshot displays the GeoServer web interface. At the top, there's a login section with fields for 'username' and 'password', a 'Remember me' checkbox, and a 'Login' button. Below this is the 'Layer Preview' section, which lists all layers configured in GeoServer. The interface includes a sidebar with navigation links: 'About & Status', 'Data', 'Layer Preview', and 'Demos'. The main content area shows a table of layers with columns for 'Type', 'Title', 'Name', 'Common Formats', and 'All Formats'. Below the table, there's a map preview showing a geographical area with various features like rivers, roads, and land use. The map is rendered in a yellow and orange color scheme. At the bottom of the map, there's a scale bar indicating 'Scale = 1 : 68K' and a note 'Click on the map to get feature info'.

GeoServer

username password Remember me Login

Layer Preview

List of all layers configured in GeoServer and provides previews in various formats for each.

<< < 1 > >> Results 1 to 7 (out of 7 matches from 22 items) searchfish

Type	Title	Name	Common Formats	All Formats
Point	Spearfish archeological sites	sf:archsites	OpenLayers GML KML	Select one
Point	Spearfish bug locations	sf:bugsites	OpenLayers GML KML	Select one
Polygon	Spearfish restricted areas	sf:restricted	OpenLayers GML KML	Select one

WMS version: 1.1.1 Tiling: Single tile Antialias: Full Format: PNG 24bit Styles: Default Width/Height: Auto Auto

Filter: CQL Apply Reset

Scale = 1 : 68K
Click on the map to get feature info

GeoServer can publish maps:

- Each dataset is a “**layer**” of content
- Gather into a “**layer group**” to arrange layers in order
- And there is a small **layer preview** for local testing

GeoServer is the rendering engine producing maps, for access from web clients and desktop clients.

Map Publishing Continued


GeoServer map publishing is about publishing a visualization.

More than one approach:

- Publish “Map” supporting, ad-hoc requests to draw imagery
- Publish entire “Tilesets” of content

The result does not always look like an image:

- SVG and KML output combine vector output with styling
- Extensions provide PDF output for printing
- Vector-tile output pre-processed for client side drawing



GeoServer

About & Status

About GeoServer

Data

Layer Preview

JSON Raw Data Headers

Save Copy Pretty Print

```

{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "id": "roads.1",
      "geometry": {
        "type": "MultiLineString",
        "coordinates": [
          [
            [598566, 26906782,
              4914585, 52150682],
            [598557, 69477679,
              4914085, 33977838],
            [598494, 67747285,
              4914254, 76475676],
            [598133, 91541973,
              4913438, 11723536],
            [598093, 95441378,
              4914446, 37147634],
            [598656, 43584271,
              4914589, 87683788],
            [598659, 42742456,
              4914085, 33977838]
          ]
        ]
      }
    }
  ]
}

```

Layer Preview

List of all layers configured in GeoServer and provides previews in various formats for each.

<< < 1 > >> Results 1 to 7 (out of 7 matches from 22 items)

search

Type	Title	Name	Common Formats	All Formats
FeatureCollection		roads	JSON Raw Data Headers	JSON KML GML WFS WFS-T WFS-X WFS-Geo WFS-GeoX WFS-GeoX2 WFS-GeoX3 WFS-GeoX4 WFS-GeoX5 WFS-GeoX6 WFS-GeoX7 WFS-GeoX8 WFS-GeoX9 WFS-GeoX10 WFS-GeoX11 WFS-GeoX12 WFS-GeoX13 WFS-GeoX14 WFS-GeoX15 WFS-GeoX16 WFS-GeoX17 WFS-GeoX18 WFS-GeoX19 WFS-GeoX20 WFS-GeoX21 WFS-GeoX22 WFS-GeoX23 WFS-GeoX24 WFS-GeoX25 WFS-GeoX26 WFS-GeoX27 WFS-GeoX28 WFS-GeoX29 WFS-GeoX30 WFS-GeoX31 WFS-GeoX32 WFS-GeoX33 WFS-GeoX34 WFS-GeoX35 WFS-GeoX36 WFS-GeoX37 WFS-GeoX38 WFS-GeoX39 WFS-GeoX40 WFS-GeoX41 WFS-GeoX42 WFS-GeoX43 WFS-GeoX44 WFS-GeoX45 WFS-GeoX46 WFS-GeoX47 WFS-GeoX48 WFS-GeoX49 WFS-GeoX50 WFS-GeoX51 WFS-GeoX52 WFS-GeoX53 WFS-GeoX54 WFS-GeoX55 WFS-GeoX56 WFS-GeoX57 WFS-GeoX58 WFS-GeoX59 WFS-GeoX60 WFS-GeoX61 WFS-GeoX62 WFS-GeoX63 WFS-GeoX64 WFS-GeoX65 WFS-GeoX66 WFS-GeoX67 WFS-GeoX68 WFS-GeoX69 WFS-GeoX70 WFS-GeoX71 WFS-GeoX72 WFS-GeoX73 WFS-GeoX74 WFS-GeoX75 WFS-GeoX76 WFS-GeoX77 WFS-GeoX78 WFS-GeoX79 WFS-GeoX80 WFS-GeoX81 WFS-GeoX82 WFS-GeoX83 WFS-GeoX84 WFS-GeoX85 WFS-GeoX86 WFS-GeoX87 WFS-GeoX88 WFS-GeoX89 WFS-GeoX90 WFS-GeoX91 WFS-GeoX92 WFS-GeoX93 WFS-GeoX94 WFS-GeoX95 WFS-GeoX96 WFS-GeoX97 WFS-GeoX98 WFS-GeoX99 WFS-GeoX100







```

1 <?xml version="1.0" encoding="UTF-8" standalone="yes"?>
2 <xml xmlns="http://www.opengis.net/kml/2.2"
3 xmlns:ns2="http://www.google.com/kml/ext/2.2" xmlns:ns3="http://www.w3.org/2005/Atom"
4 xmlns:ns4="urn:oasis:names:tc:ciq:xsdschema:XAL:2.0">
5 <Document>
6 <name>roads</name>
7 <description>roads</description>
8 <Style id="roads" mode="all">
9 <color>ff0000</color>
10 <strokeWidth>2</strokeWidth>
11 <label>roads</label>
12 <LookAt>
13 <longitude>0.0</longitude>
14 <latitude>0.0</latitude>
15 <altitude>0.0</altitude>
16 <heading>0.0</heading>
17 <tilt>0.0</tilt>
18 <range>20000.0</range>
19 <flyToView>true</flyToView>
20 </LookAt>
21 <Folder>
22 <name>roads</name>
23 <description>roads</description>
24 <LookAt>
25 <longitude>0.0</longitude>
26 <latitude>0.0</latitude>
27 <altitude>0.0</altitude>
28 <heading>0.0</heading>
29 <tilt>0.0</tilt>
30 <range>20000.0</range>
31 <flyToView>true</flyToView>
32 </LookAt>
33 <Placemark>
34 <name>roads</name>
35 <description>roads</description>
36 <MultiLineString>
37 <coordinates>
38 598566,26906782,4914585,52150682,598557,69477679,4914085,33977838,598494,67747285,4914254,76475676,598133,91541973,4913438,11723536,598093,95441378,4914446,37147634,598656,43584271,4914589,87683788,598659,42742456,4914085,33977838
39 </coordinates>
40 </MultiLineString>
41 </Placemark>
42 </Folder>
43 </Document>

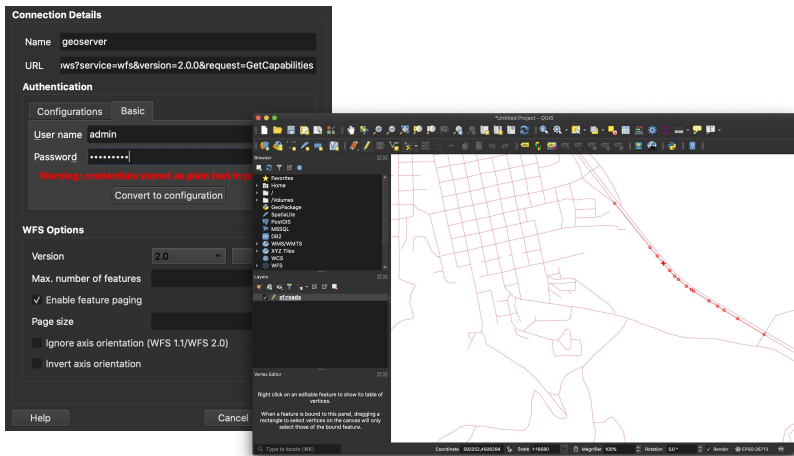
```

To reach a wide audience:

- Supports queries
- Range of output formats available (and more available to install)

Name	Date Modified	Size	Kind
 roads.cst	Today at 2:12 AM	10 bytes	Document
 roads.dbf	Today at 2:12 AM	5 KB	3rd party formats
 roads.prj	Today at 2:12 AM	773 bytes	Document
 roads.shp	Today at 2:12 AM	18 KB	ESRI Shape document
 roads.shx	Today at 2:12 AM	500 bytes	Document
 wfsrequest.txt	Today at 2:12 AM	141 bytes	Plain Text Document

Vector data editing



Sharing does not stop at providing access, the ability to *edit information together* is key to collaboration.

GeoServer is not used to interactively edit data, instead it **provides a protocol** for QGIS Desktop and OpenLayers library to edit information. These clients are responsible for providing an interactive editing experience.

The same protocols can be used in your own scripts for batch editing and processing.

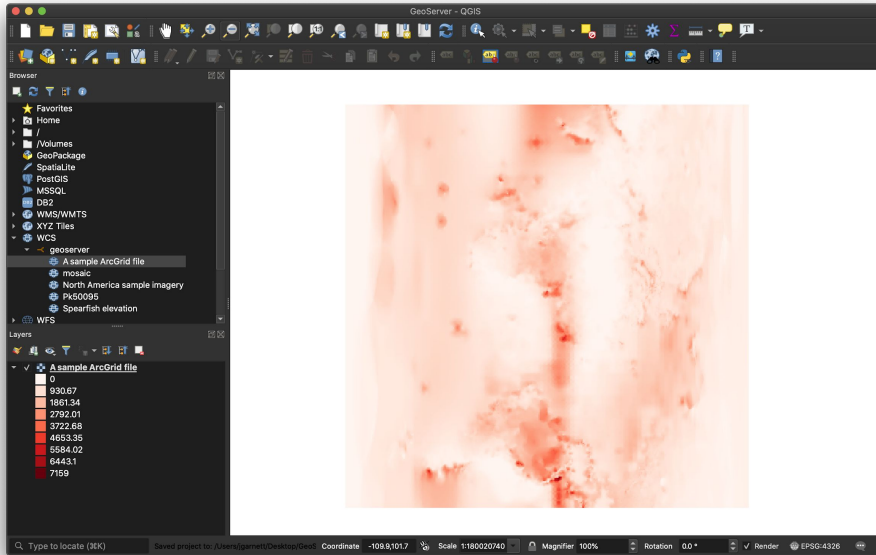
Hint: We made sure editing is off by default!

Raster data access

Direct access to raster data is available.

- Imagery
- Digital Elevation Model
- NetCDF for scientific modeling

Hint: The language “grid coverage” is used to emphasize that measurements are being provided (rather than just a visualization)



GeoServer at a Glance

Java Web Application to share and edit geospatial data.

Publish data from any major spatial data source using open standards.



Core Protocols

WMS – maps

WFS – vector

WFS-T – editing

WCS – coverage

WMTS – tiles

TMS – tiles

WMS-C – tiles

Extension/community protocols

WPS – process

CSW – search

OpenSearch for Earth Observation – search

OGC API - prototype json + rest standards

A solid blue vertical bar is located on the left side of the slide.

How do I use it?

GeoServer Configuration

GeoServer provides a web application for configuration and setup.

A REST API is also available for automation.

Notes:

- “Web admin” is not really geoserver
 - Only used for setup geoserver
 - In production hide this!
- The links to “service capabilities” are the actual web services


The screenshot displays the GeoServer web application interface. At the top right, it shows "Logged in as admin." with a "Logout" button. The main content area is titled "Welcome" and includes a message: "This GeoServer belongs to The Ancient Geographers." Below this, there are three rows of statistics and actions: "19 Layers" with an "Add layers" button, "9 Stores" with an "Add stores" button, and "7 Workspaces" with a "Create workspaces" button. A warning message states: "The master password for this server has not been changed from the default. It is highly recommended that you change it now. Change it". Another warning message states: "The administrator password for this server has not been changed from the default. It is highly recommended that you change it now. Change it". A status message indicates "Strong cryptography available". At the bottom, it says "This GeoServer instance is running version 2.16.2. For more information please contact the administrator." On the right side, there is a "Service Capabilities" section listing various web services and their versions: WCS (1.0.0, 1.1.0, 1.1.1, 1.1, 2.0.1), WFS (1.0.0, 1.1.0, 2.0.0), WMS (1.1.1, 1.3.0), TMS (1.0.0), WMS-C (1.1.1), and WMTS (1.0.0). The left sidebar contains navigation links under "About & Status", "Data", "Services", and "Settings".

Natural Earth

A great public domain dataset used for web illustrations.

Our example uses the “Quickstart” download containing a range of vector and raster data

See: www.naturalearthdata.com

 Natural Earth

Free vector and raster map data at
1:10m, 1:50m, and 1:110m scales

Search

HomeFeaturesDownloadsBlogForumsCorrectionsAbout

Downloads


Data themes are available in three levels of detail. For each scale, themes are listed on Cultural, Physical, and Raster category pages.

Stay up to date! Know when a new version of Natural Earth is released by subscribing to our [announcement list](#).

Overwhelmed? The [Natural Earth quick start kit](#) (227 mb) provides a small sample of Natural Earth themes styled in an ArcMap .MXD document. Download all vector themes as [SHP](#) (279 mb), [SQLite](#) (222 mb), or [GeoPackage](#) (260 mb).

Natural Earth is the creation of many [volunteers](#) and is supported by [NACIS](#). It is free for use in any type of project. [Full Terms of Use »](#)

Large scale data, 1:10m




[Cultural](#)[Physical](#)[Raster](#)

The most detailed. Suitable for making zoomed-in maps of countries and regions. Show the world on a large wall poster.

1:10,000,000
1" = 158 miles
1 cm = 100 km

Medium scale data, 1:50m




[Cultural](#)[Physical](#)[Raster](#)

Suitable for making zoomed-out maps of countries and regions. Show the world on a tabloid size page.

1:50,000,000
1" = 790 miles
1 cm = 500 km

Small scale data, 1:110m



[Cultural](#)[Physical](#)

Suitable for schematic maps of the world on a postcard or as a small locator globe.

1:110,000,000
1" = 1,736 miles
1 cm = 1,100 km

A solid blue vertical bar is positioned on the left side of the slide.

Workspace

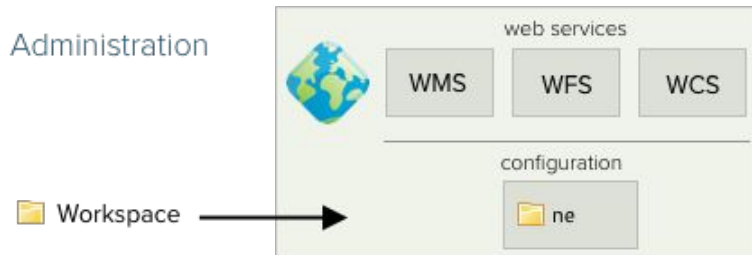
Workspace

Workspace is used to:

- Folder to organize content
- “Namespace” for XML content publication

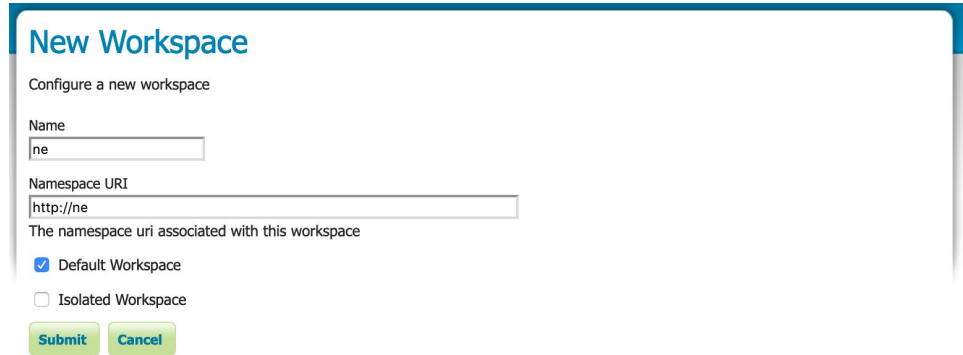
Notes:

- Workspace name used as a prefix for each layer
- Namespace should be a unique URI
- One workspace can be the “default”
- Advanced: Each workspace can be used as its own “virtual web service”



New Workspace

1. Data → Workspaces
2. Create new workspace
3. Fill in:
 - a. Name: **ne**
 - b. Namespace: <http://ne>
4. Mark as default workspace



The screenshot shows a 'New Workspace' dialog box with a blue header. Below the header, the text 'Configure a new workspace' is displayed. There are two input fields: 'Name' with the value 'ne' and 'Namespace URI' with the value 'http://ne'. Below these fields, the text 'The namespace uri associated with this workspace' is shown. There are two checkboxes: 'Default Workspace' (checked) and 'Isolated Workspace' (unchecked). At the bottom, there are two green buttons: 'Submit' and 'Cancel'.

New Workspace

Configure a new workspace

Name
ne

Namespace URI
http://ne

The namespace uri associated with this workspace

☒ Default Workspace

☐ Isolated Workspace

Submit **Cancel**

A solid blue vertical bar is located on the left side of the slide.

Data Source

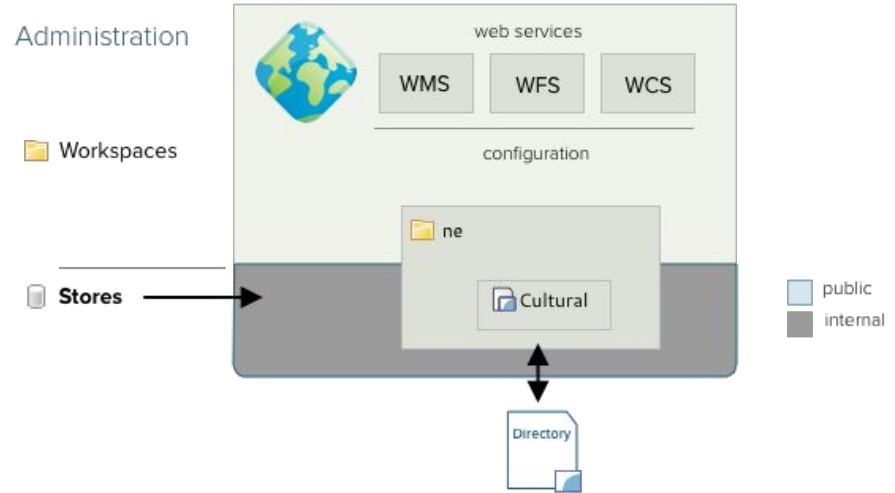
Vector Data Source

Data store:

- Used to connect to your data
 - Shapefile needs a file location
 - Database needs connection parameters
- Managed in a workspace

Notes:

- DataStore name is “internal” to GeoServer
 - So you can switch from Oracle to PostGIS
- Called a “DataStore” as we were focused on editing (and thus storing information)



New Vector Data Source

1. Data → Stores
2. Add new store
3. Select Directory of spatial files (shapefiles)
4. Name: Culture
5. Connection Parameters
 - a. Use browse button to locate
Natural Earth 4.1.1/10m_cultural
6. Save

New Vector Data Source

Add a new vector data source

Directory of spatial files (shapefiles)
Takes a directory of shapefiles and exposes it as a data store

Basic Store Info

Workspace *

ne

Data Source Name *

Culture

Description

☒ Enabled

Connection Parameters

Directory of shapefiles *

file:///Users/jgarnett/Data/Natural Earth 4.1.1/10m_cultural [Browse...](#)

DBF files charset

ISO-8859-1

☒ Create spatial index if missing/outdated

☐ Use memory mapped buffers (Disable on Windows)

☒ Cache and reuse memory maps (Requires 'Use Memory mapped buffers' to be enabled)

[Save](#) [Cancel](#)

Add Raster Data Source

1. Data → Stores
2. Add new store
3. Select Directory of spatial files (shapefiles)
4. Name: NE
5. Connection Parameters
 - a. Browser to locate
NE1_50M_SR_W/NE1_50M_SR_W.tif
6. Save

Add Raster Data Source

Description

GeoTIFF
Tagged Image File Format with Geographic information

Basic Store Info

Workspace *

ne

Data Source Name *

NE1

Description

Natural Earth

☒ Enabled

Connection Parameters

URL *

file:///Users/jgarnett/Data/Natural Earth 4.1.1/50m_raster/NE1_50M_SR_W/NE1_50M_SR_W.tif [Browse...](#)

A solid blue vertical bar is positioned on the left side of the slide.

Layer

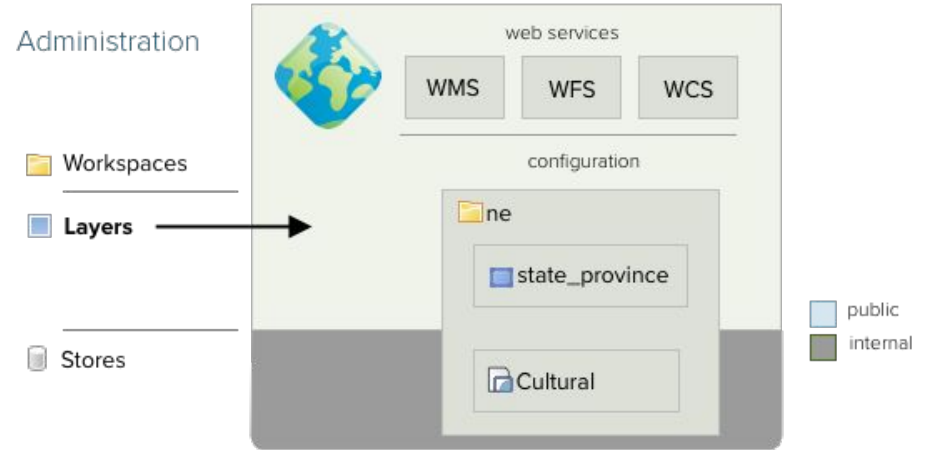
Vector Layer

Layer:

- GeoServer publishes information as distinct layers
- To publish you need to check
 - Name and title for the layer
 - Spatial Reference System
 - Bounds

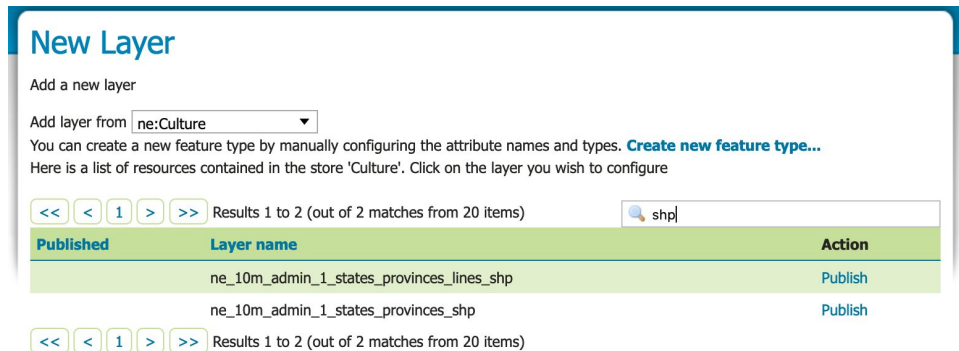
Notes:

- Each protocol uses a different word for its data product (feature type, coverage, tileset)



New Vector Layer

1. Data → Layers
2. Use **add new layer**, and select **ne:Culture**
3. **Ne_10m_admin_1_states_provinces_shp**



New Vector Layer: Description

1. Data → Layers
2. Use **add new layer**, and select **ne:Culture**
3. **Ne_10m_admin_1_states_provinces_shp**
4. Data
 - a. Name: **states_provinces_shp**
 - b. Title: **States and Provinces**

The screenshot displays the 'Edit Layer' interface. At the top, the title 'Edit Layer' is followed by the subtitle 'Edit layer data and publishing'. Below this, the layer name 'ne:ne_10m_admin_1_states_provinces_shp' is shown. A note indicates that the following configuration is for the current layer. A horizontal tab bar contains four tabs: 'Data', 'Publishing', 'Dimensions', and 'Tile Caching'. The 'Publishing' tab is currently selected. Under the 'Basic Resource Info' section, there are three input fields: 'Name' (containing 'states_provinces_shp'), 'Title' (containing 'States and Provinces'), and 'Abstract' (containing 'Internal administrative boundaries.'). The 'Abstract' field is a larger text area with a yellow background. Checkmarks are visible next to the 'Enabled' and 'Advertised' options.

Edit Layer

Edit layer data and publishing

ne:ne_10m_admin_1_states_provinces_shp

Configure the resource and publishing information for the current layer

Data **Publishing** **Dimensions** **Tile Caching**

Edit Layer

Basic Resource Info

Name

states_provinces_shp

☒ Enabled

☒ Advertised

Title

States and Provinces

Abstract

Internal administrative boundaries.

New Vector Layer: Bounds

1. Data → Layers
2. Use **add new layer**, and select **ne:Culture**
3. **Ne_10m_admin_1_states_provinces_shp**
4. Data
 - a. Name: **states_provinces_shp**
 - b. Title: **States and Provinces**
5. Spatial Reference System:
EPSG:4326
6. Native bounding box:
Click compute from data
7. Lat/Lon Bounds:
8. Click compute from native bounds
9. Save

Coordinate Reference Systems

Native SRS

EPSG:4326

[GCS_WGS_1984...](#)

Declared SRS

EPSG:4326

[EPSG:WGS 84...](#)

SRS handling

Bounding Boxes

Native Bounding Box

Min X	Min Y	Max X	Max Y
-179.99999999999999	-89.99999999999999	180.00000000000000	83.63410065282

[Compute from data](#)

[Compute from SRS bounds](#)

Lat/Lon Bounding Box

Min X	Min Y	Max X	Max Y
-179.99999999999999	-89.99999999999999	180.00000000000000	83.63410065282

[Compute from native bounds](#)

Raster Layer

1. Publish “NE1_50M_SR_W”
2. Name: “ne”
3. Title: Natural Earth I
4. Double check:
 - a. Spatial Reference System
 - b. Bounds
5. Save

Edit Layer

Edit layer data and publishing

ne:NE1_50M_SR_W

Configure the resource and publishing information for the current layer

Data Publishing Dimensions Tile Caching

Edit Layer

Basic Resource Info

Name

☒ Enabled
☒ Advertised

Title

Abstract

Satellite-derived land cover data and shaded relief presented with a light, natural palette suitable for making thematic and reference maps.

A solid blue vertical bar is located on the left side of the slide.

Layer Group

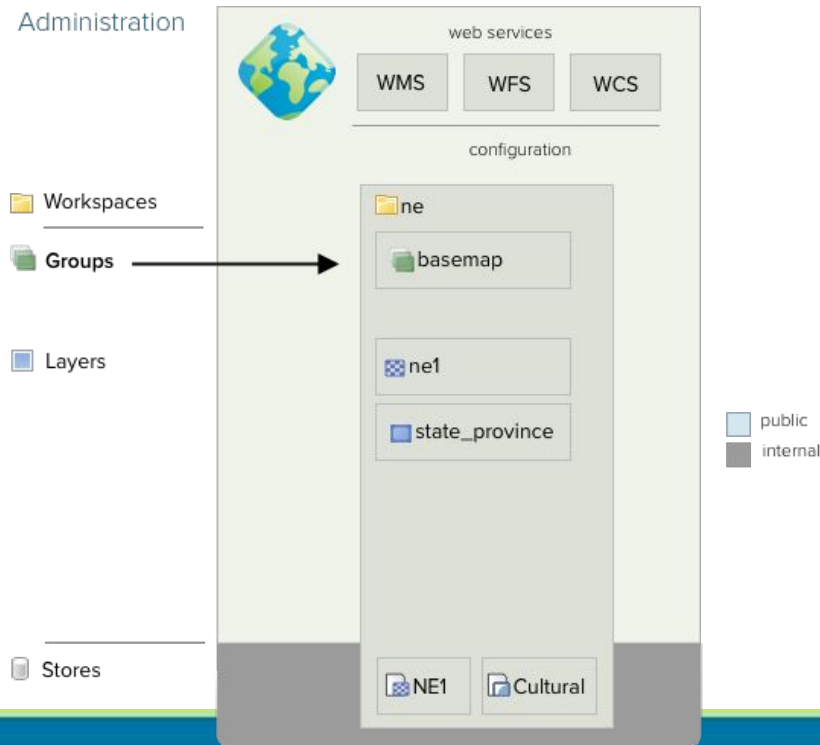
Layer Group

Layer groups are used:

- Can be used as a basemap
- Order of layers is in **draw order**

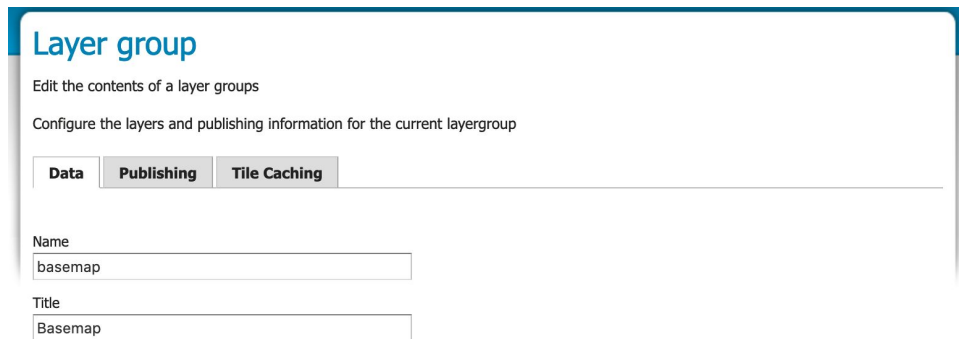
Notes:

- Can also use layer groups to define a table-of-contents structure for published content



Create Layer Group

1. Data → Layer Group
2. Click **Add new layer group**
3. Details:
 - a. Name: basemap
 - b. Title: Basemap



The screenshot shows a web interface for creating a layer group. At the top, the title 'Layer group' is displayed in blue. Below it, there are two instructions: 'Edit the contents of a layer groups' and 'Configure the layers and publishing information for the current layergroup'. A tabbed interface is present with three tabs: 'Data', 'Publishing', and 'Tile Caching'. The 'Publishing' tab is currently selected. Under the 'Publishing' tab, there are two text input fields. The first is labeled 'Name' and contains the text 'basemap'. The second is labeled 'Title' and contains the text 'Basemap'.

Layer group

Edit the contents of a layer groups

Configure the layers and publishing information for the current layergroup

Data **Publishing** **Tile Caching**

Name
basemap

Title
Basemap

Create Layer Group

1. Data → Layer Group
2. Click **Add new layer group**
3. Details:
 - a. Name: basemap
 - b. Title: Basemap
4. Scroll down to **Layers** heading
5. Use add layer to add **ne:ne1**
6. Use add layer to add **ne:state_province_shp**
7. Scroll up to bounds
8. Click **Generate Bounds**
9. Save

Bounds

Min X	Min Y	Max X	Max Y
-179.9999999999	-89.9999999999	180.0000000000	90

Coordinate Reference System

EPSG:4326 [GCS_WGS_1984...](#)

Mode

Single

☒ Queryable

Layers

[Add Layer...](#)

[Add Layer Group...](#)

[Add Style Group...](#)

	Drawing order	Type	Layer	Default Style	Style	Remove
1	↓	Layer	ne:ne	<input type="checkbox"/>	raster	⊖
2	↑	Layer	ne:states_provinces_shp	<input type="checkbox"/>	polygon	⊖

A solid blue vertical bar is positioned on the left side of the slide.

Style

Style

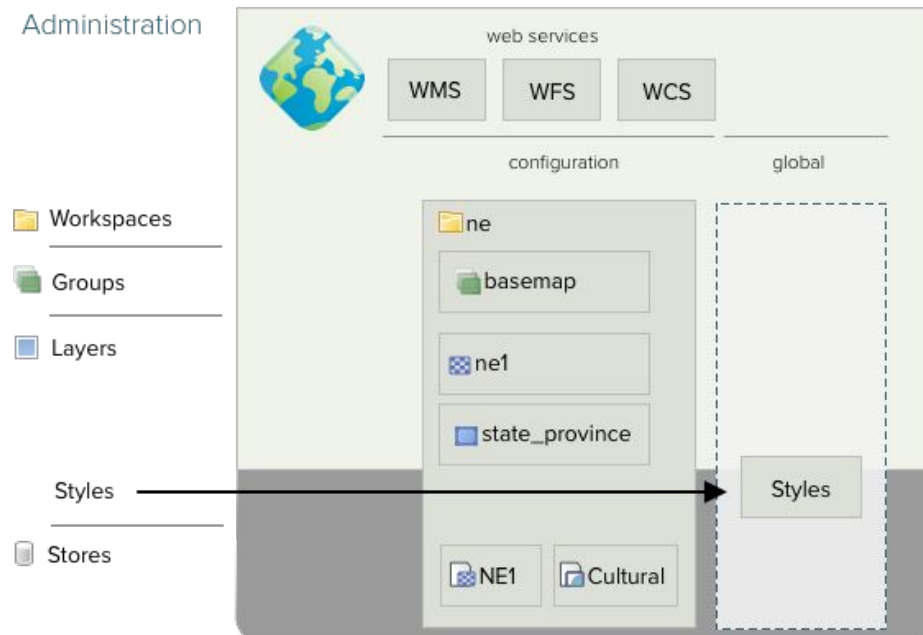
Used to configure the rendering process:

- We use an XML format called SLD
 - Intended for machine-to-machine use!
- We recommend people use CSS or YSLD

Notes:

- Built-in styles provided
- Styles folder used for icons and fonts
- Each workspace has a styles folder also

Administration



New Style

1. Data → Styles
2. Click **Add new style**
 - a. Workspace: ne
 - b. Name: mapcolor9
 - c. Format: YSLD
3. Select **Polygon**, and **Generate**

New style

Type a new style definition, or use an existing one as a template, or upload a ready made style from your file system. The editor can provide syntax highlighting and automatic formatting. Click on the "validate" button to verify the style is a valid style document.

Data

Style Data

Name

mapcolor9

Workspace

ne

Format

YSLD

Legend

Legend

Add legend

[Preview legend](#)

Style Content

Generate a default style

Polyg...[Generate ...](#)

Copy from existing style

Choose One







[Copy ...](#)

Upload a style file

Browse...

No file selected.

[Upload ...](#)



Font 12pt Height 300px

```
1 title: gold polygon
2 symbolizers:
3 - polygon:
4   stroke-width: 0.5
5   stroke-color: '#000000'
6   fill-color: '#ffcc00'
7
```

New Style

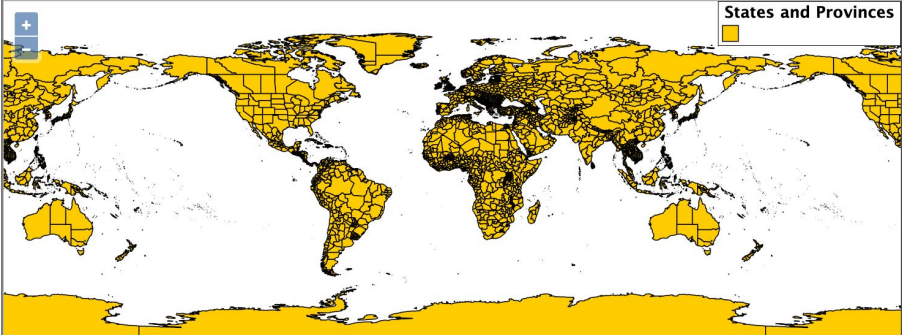
1. Data → Styles
2. Click **Add new style**
 - a. Workspace: ne
 - b. Name: mapcolor9
 - c. Format: YSLD
3. Select **Polygon**, and **Generate**
4. Apply, and then Layer Preview tab

Style Editor - ne:mapcolor9

Edit the current style. The editor can provide syntax highlighting and automatic formatting. Click on the "validate" button to verify the style is a valid SLD document.

Data **Publishing** **Layer Preview** **Layer Attributes**

Preview on layer: [ne:states_provinces_shp](#) Preview as style group: ☐



States and Provinces

Scale = 1 : 279,227,641

Font 12pt Height 300px

```
1 title: gold polygon
2 symbolizers:
3 - polygon:
4   stroke-width: 0.5
5   stroke-color: '#000000'
6   fill-color: '#ffcc00'
7
```

New Style

1. Data → Styles
2. Click **Add new style**
 - a. Workspace: ne
 - b. Name: mapcolor9
 - c. Format: YSLD
3. Select **Polygon**, and **Generate**
4. Apply, and then Layer Preview tab
5. Fill in style shown, and Apply
(Theme on mapcolor9 attribute)

```
symbolizers:  
- polygon:  
  stroke-color: 'gray'  
  stroke-width: 0.5  
  fill-color: ${Recode(mapcolor9,  
    '1','8dd3c7',  
    '2','#ffffb3',  
    '3','#bebada',  
    '4','#fb8072',  
    '5','#80b1d3',  
    '6','#fdb462',  
    '7','#b3de69',  
    '8','#fccde5',  
    '9','#d9d9d9')}}}
```

Theme from user guide style workshop

New Style

1. Data → Styles
2. Click **Add new style**
 - a. Workspace: ne
 - b. Name: mapcolor9
 - c. Format: YSLD
3. Select **Polygon**, and **Generate**
4. Apply, and then Layer Preview tab
5. Fill in style shown, and Apply
(Theme on mapcolor9 attribute)

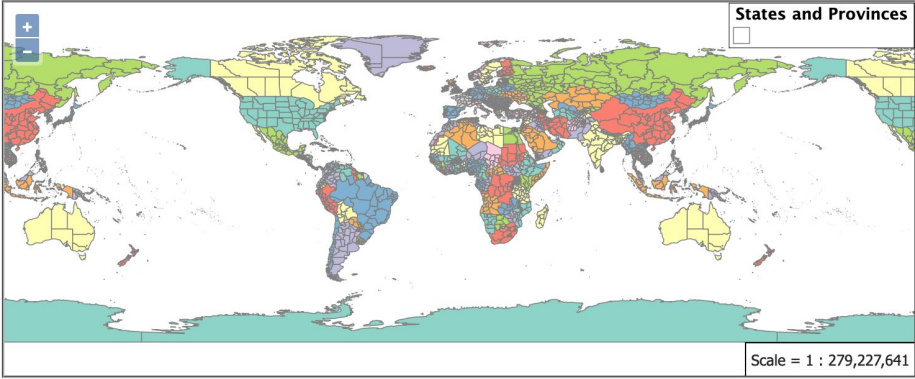
Style saved

Style Editor - ne:mapcolor9

Edit the current style. The editor can provide syntax highlighting and automatic formatting. Click on the "validate" button to verify the style is a valid SLD document.

Data **Publishing** **Layer Preview** **Layer Attributes**

Preview on layer: [ne:states_provinces_shp](#) Preview as style group: ☐



Scale = 1 : 279,227,641

Font 12pt Height 300px

```
1 symbolizers:
2 - polygon:
3   stroke-color: 'gray'
4   stroke-width: 0.5
5   fill-color: ${Recode(mapcolor9,
6     '1', '#80d3c7',
7     '2', '#ffffb3',
8     '3', '#b0bada',
9     '4', '#fb8072',
```


New Style

1. Data → Styles
2. Click **Add new style**
 - a. Workspace: ne
 - b. Name: mapcolor9
 - c. Format: YSLD
3. Select **Polygon**, and **Generate**
4. Apply, and then Layer Preview tab
5. Fill in style shown, and Apply
(Theme on mapcolor9 attribute)
6. Use Publishing tab, set default for ne:state_provinces_shp

Style saved

Style Editor - ne:mapcolor9







Edit the current style. The editor can provide syntax highlighting and automatic formatting. Click on the "validate" button to verify the style is a valid SLD document.

Data **Publishing** **Layer Preview** **Layer Attributes**

<< < 1 > >> Results 1 to 2 (out of 2 matches from 21 items)

Workspace	Layer	Default	Associated
ne	ne	<input type="checkbox"/>	<input type="checkbox"/>
ne	states_provinces_shp	<input checked="" type="checkbox"/>	<input type="checkbox"/>

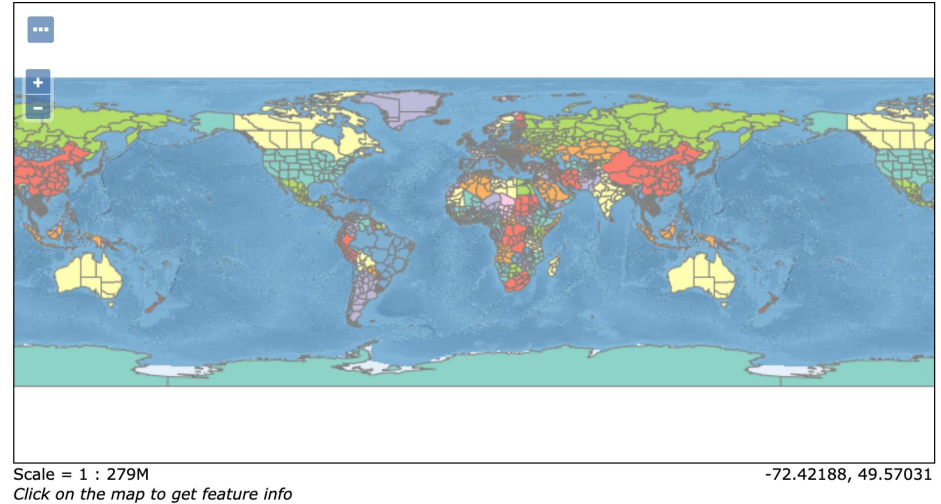
<< < 1 > >> Results 1 to 2 (out of 2 matches from 21 items)

      Font 12pt Height 300px

```
1 symbolizers:
2 - polygon:
3   stroke-color: 'gray'
4   stroke-width: 0.5
5   fill-color: ${Recode(mapcolor9,
6     '1', '#8d3c7',
7     '2', '#ffffb3',
8     '3', '#bebada',
9     '4', '#fb8072',
10    '5', '#80b1d3',
11    '6', '#fdb462',
12    '7', '#b3de69',
13    '8', '#fccde5',
14    '9', '#d9d9d9' )}
15
```

Layer Preview

1. Data → Layer Preview
2. Locate **ne:basemap**



A solid blue vertical bar is located on the left side of the slide.

How does it work?

GeoServer



Web Administration

REST-API

WMS

WFS

WCS

TMS

WMTS

Wicket

OpenLayers

Spring MVC

Dispatcher

GeoWebCache

core

Catalog

Data Directory

Resource Pool

wms

wfs

wcs

geowebcache

BlobStore

Spring

GeoTools

JAI

application server

Jetty

Java Runtime Environment

OpenJDK

GeoServer Internals

- Java Web Application
 - Spring Framework - powerful framework for wiring together application out of components
 - Apache Wicket User Interface - framework only a java developer could love
- Modular Architecture
 - Enables the community to build extensions
(a key success factor for open source projects)
- GeoTools Library
 - Handles the data access, reprojection, and rendering
 - Try and keep GeoServer “light” and focused on sharing by moving heavy lifting here
- Java Advanced Imaging (and JAI-ExT)
 - Image processing library offering on-demand processing model
 - JAI-EXT teaching the image processing engine new tricks (“no-data”, “foot-prints”, ...)

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Doing more

Extensions

We saw a lot of effort devoted to keeping GeoServer modular.

- Official GeoServer plugins are called extensions
- Extensions are formally “part of GeoServer”
 - Must meet the same quality assurance and documentation requirements as core
 - Included in the release process, they version numbers match!

Check out some extensions

- Oracle DataStore
 - Is Oracle required for your data management policies? You can still use open standards.
- WPS Extension
 - Providing an **entirely new services**, in this case one used for processing and analysis
- GeoMesa
 - Cloud database are supported also!
 - GeoMesa offers both a DataStore for data access, and also WPS Processes to better summarize and work with massive cloud data volumes
- GeoFence
 - Integrates “GeoFence” security model, for “edit permission” with a specific operating area
- Vector Tiles
 - Generate pre-processed tiles of vector content ready for client-side rendering

Community Modules (for RnD)

Community modules started as a way to help developers share RnD ideas.

- Very helpful when working with grad students
- Also used by consulting teams take on specific challenges for their customers
- Ideally we want these to attract funding and become extensions

These are very much “use at your own risk”:

- These are not released as part of GeoServer
- You are expected to compile these yourself
- Not subject to any quality assurance or IP check

Check out some community modules

- JDBC Config / JDBC Store
 - Replace the entire catalog (config) and data directory (store)
 - Use with AWS to “carefully” manage a cloud cluster
- Backup and Restore
 - Transport configuration settings from test to production
- SOLR datastore
- Dynamic colormap generation
- MapML
- SAP Hana
- OGC API Features

A solid blue vertical bar is located on the left side of the slide.

Brought to you by

Project Steering Committee

GeoServer is setup as an “**Open Source Geospatial Foundation**” project. With a core “project steering committee” and notes on how to keep everything running in a fair and consistent manner.

Steering committee members vote on change proposals, that come from a wide range of organizations participating in RND.

We try and have a mix of skills, with developers, users, managers, and designer joining the team as required to help out.

PSC Members:

- Alessio Fabiani
- Andrea Aime
- Ian Turton
- Jody Garnett
- Jukka Rahkonen
- Kevin Smith
- Nuno Oliveira
- Simone Giannecchini
- Torben Barsballe

Strong history of collaboration

Collaboration happens at the personal level, and also across organizations.

The **OpenPlanng Project** started GeoServer to support community mapping activities. Early collaborations with **GeoSolutions**, **Refractions Research** helped establish procedures to make this an open project.

GeoServer supports an active RnD scene with research labs, consulting companies and others joining to add new features.

Being “vendor-neutral” has allowed GeoServer to weather the success and failures of participating organizations.

In addition to an open source license we make use of the OSGeo Contributor License agreement to help in this respect.

This also has allowed the PSC to contribute code “up-stream” to more permissive projects.

A solid blue vertical bar is located on the left side of the slide.

Try it out!

Running GeoServer

Options:

- “binary” download used to try things out on the command line, often for testing or evaluation
- “Web Archive” for use with your application server (we recommend Tomcat)
- Sorry no Windows or macOS installers at present, due to vandalism

Alternatives:

- Docker? Nothing official, everyone is making their own ...
- Hosted? A few companies offer hosting

Running GeoServer

```
geoserver-2.16.2 — java -Xbootclasspath/a:/Users/jgarnett/Desktop/geoserver-2.16.2/webapps/geoserver/WEB-INF/lib/marlin-0.9.3.jar -Dsun.j...
02 Feb 06:53:42 INFO [gwc.config] - Initializing GeoServer specific GWC configuration from gwc-gs.xml
02 Feb 06:53:42 INFO [config.GeoserverXMLResourceProvider] - Will look for 'geowebcache-diskquota.xml' in directory '/Users/jgarnett/Desktop/geoserver-2.16.2/data_dir/gwc'.
02 Feb 06:53:42 INFO [config.GeoserverXMLResourceProvider] - Will look for 'geowebcache-diskquota-jdbc.xml' in directory '/Users/jgarnett/Desktop/geoserver-2.16.2/data_dir/gwc'.
02 Feb 06:53:42 INFO [diskquota.ConfigLoader] - DiskQuota configuration is not readable: gwc/geowebcache-diskquota.xml
02 Feb 06:53:43 INFO [diskquota.ConfigLoader] - DiskQuota configuration is not readable: gwc/geowebcache-diskquota.xml
02 Feb 06:53:43 INFO [diskquota.DiskQuotaMonitor] - Setting up disk quota periodic enforcement task
02 Feb 06:53:43 INFO [diskquota.DiskQuotaMonitor] - 0 layers configured with their own quotas.
02 Feb 06:53:43 INFO [diskquota.DiskQuotaMonitor] - 25 layers attached to global quota 500.0 MB
02 Feb 06:53:43 INFO [diskquota.DiskQuotaMonitor] - Disk quota periodic enforcement task set up every 10 SECONDS
02 Feb 06:53:43 INFO [geowebcache.GeoWebCacheDispatcher] - Invoked setServletPrefix(gwc)
02 Feb 06:53:43 INFO [georss.GeoRSSPoller] - Initializing GeoRSS poller in a background job...
02 Feb 06:53:43 INFO [georss.GeoRSSPoller] - No enabled GeoRSS feeds found, poller will not run.
02 Feb 06:53:43 INFO [wms.WMSService] - Will NOT recombine tiles for non-tiling clients.
02 Feb 06:53:43 INFO [wms.WMSService] - Will proxy requests to backend that are not getmap or getcapabilities.
02 Feb 06:53:45 WARN [gce.imagemosaic] - Unable to set ordering between tiff readers spi
02 Feb 06:53:49 INFO [geoserver.security] - Start reloading user/groups for service named default
02 Feb 06:53:49 INFO [geoserver.security] - Reloading user/groups successful for service named default
02 Feb 06:53:49 INFO [geoserver.security] - AuthenticationCache Initialized with 1000 Max Entries, 300 seconds idle time, 600 seconds time to live and 3 concurrency level
02 Feb 06:53:49 INFO [geoserver.security] - AuthenticationCache Eviction Task created to run every 600 seconds
2020-02-02 06:53:49.771:INFO:oejsh.ContextHandler:main: Started o.e.j.w.WebAppContext@52a86356{GeoServer,/geoserver,file:///Users/jgarnett/Desktop/geoserver-2.16.2/webapps/geoserver/,AVAILABLE}{/geoserver}
2020-02-02 06:53:49.793:INFO:oejs.AbstractConnector:main: Started ServerConnector@4bf2c697{HTTP/1.1,[http/1.1]}{0.0.0.0:8080}
2020-02-02 06:53:49.794:INFO:oejs.Server:main: Started @13514ms
```

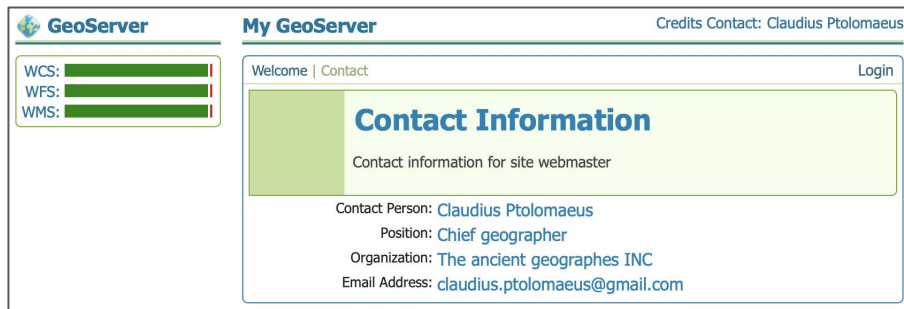



Thanks

Questions welcome!

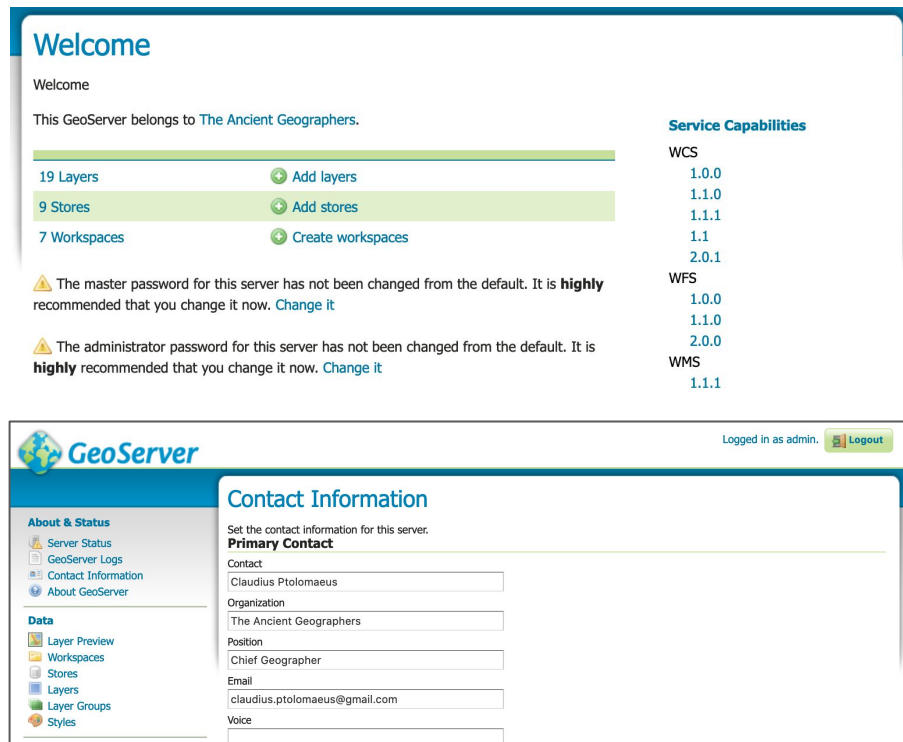
Mini production check-list

1. Please change the default **user name** and **password**
2. Also change the **master password** (used to encrypt on disk)
3. Update contact information (See “Claudius Ptolomaeus”)



The screenshot shows the GeoServer 1.0 web interface. The top navigation bar includes the GeoServer logo, the text "My GeoServer", and "Credits Contact: Claudius Ptolomaeus". On the left, there are links for "WCS:", "WFS:", and "WMS:". The main content area is titled "Contact Information" and contains the following text: "Contact information for site webmaster", "Contact Person: Claudius Ptolomaeus", "Position: Chief geographer", "Organization: The ancient geographes INC", and "Email Address: claudius.ptolomaeus@gmail.com". A "Login" link is visible in the top right corner of the main area.

GeoServer 1.0



The screenshot shows the GeoServer 2.16.2 web interface. The top navigation bar includes the GeoServer logo, the text "GeoServer", and "Logged in as admin. Logout". The main content area is divided into two sections. The left section, titled "Welcome", contains the text "This GeoServer belongs to The Ancient Geographers." and a table with the following data:

Item	Action
19 Layers	Add layers
9 Stores	Add stores
7 Workspaces	Create workspaces

Below the table, there are two warning messages: "The master password for this server has not been changed from the default. It is highly recommended that you change it now. Change it" and "The administrator password for this server has not been changed from the default. It is highly recommended that you change it now. Change it". The right section, titled "Service Capabilities", lists the following capabilities: WCS (1.0.0, 1.1.0, 1.1.1, 1.1, 2.0.1), WFS (1.0.0, 1.1.0, 2.0.0), and WMS (1.1.1).

The bottom section, titled "Contact Information", contains the text "Set the contact information for this server. Primary Contact" and a form with the following fields: "Contact" (Claudius Ptolomaeus), "Organization" (The Ancient Geographers), "Position" (Chief Geographer), "Email" (claudius.ptolomaeus@gmail.com), and "Voice".

GeoServer 2.16.2