

Serviços de Dados Geográficos

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Agenda

1. Implementação de SDG em GeoServer

- Introdução ao GeoServer
- Criação de Serviços de Visualização e Descarregamento



GeoServer

Criação de serviços de visualização e descarregamento

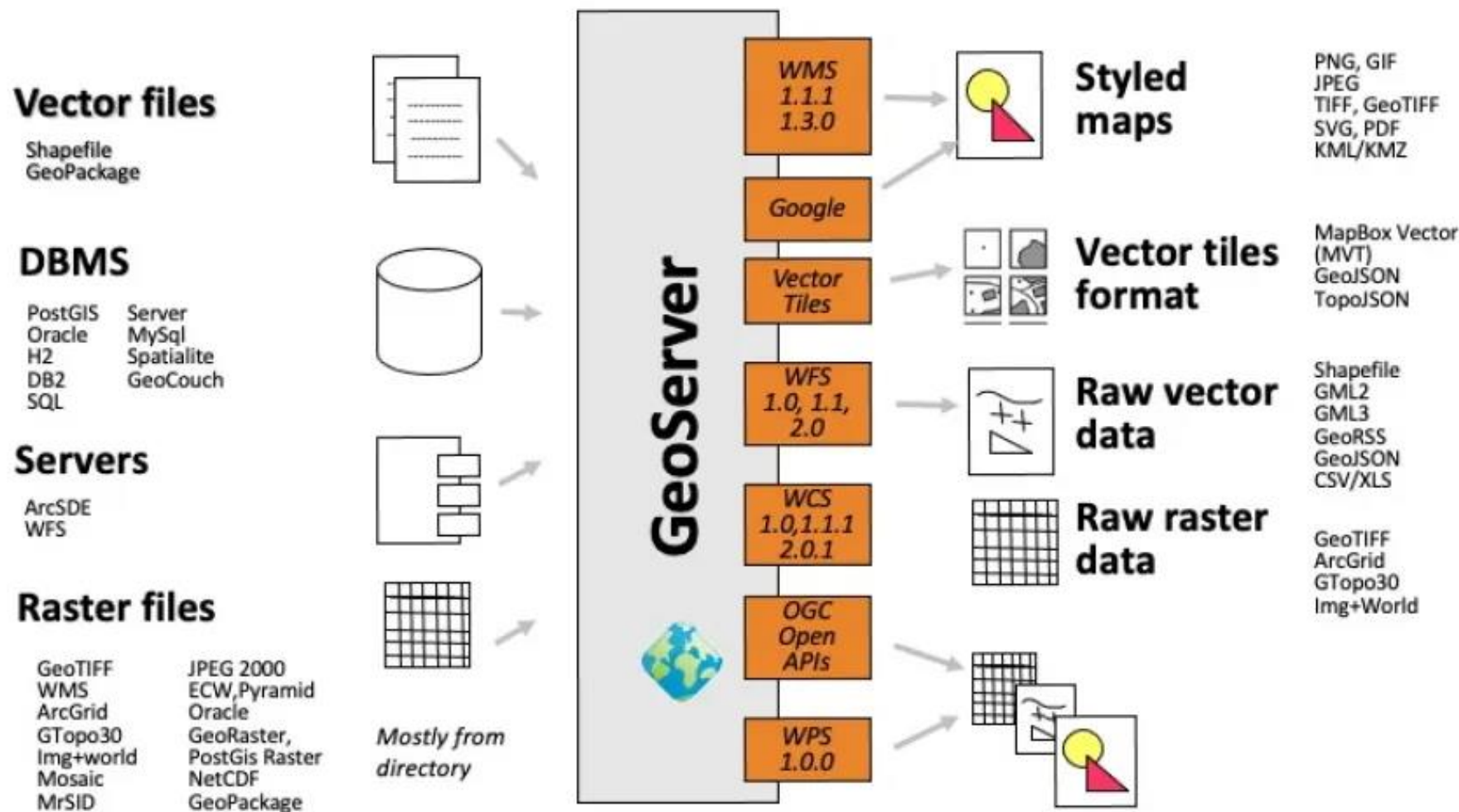
Introdução ao GeoServer

- Criado em 2001, o GeoServer é um **servidor de mapas** Java-based que permite aos utilizadores criar, editar, visualizar, transformar e publicar dados espaciais.
- É um projecto Open Source incubado pela OSGeo.
- Desenvolvido utilizando a biblioteca GeoTools.
- As correções de problemas e melhorias de recursos são realizadas com frequência.
- Possibilidade de correr em distintos sistemas operativos (Linux, Windows, Mac OS X).
- Suporta os requisitos INSPIRE.

Introdução ao GeoServer

- Suporte a múltiplos formatos de dados raster e vectorial.
- Suporte para Bases de Dados PostgreSQL/PostGIS e por extensões, o Oracle, MySQL, MS SQL Server, ArcSDE.
- Compatível com as especificações do OGC (WMS, WFS, WCS, etc).
- Suporte a projecções em tempo real.
- Pré-visualização integrada utilizando OpenLayers;
- Utiliza SLD (Styled Layer Descriptor) e CSS (Cascading Style Sheets) para representação de simbologias.
- Integração com o QGIS - **GeoCat Bridge for QGIS** (pago)
- Documentação em: <http://docs.geoserver.org/stable/en/user/index.html>

Introdução ao GeoServer



Introdução ao GeoServer

Extensions



[Extensions](#)

GeoServer Extension downloads.

Vector Formats

- [App Schema](#)
- [DB2](#)
- [H2](#)
- [MySQL](#)
- [Oracle](#)
- [Pregeneralized Features](#)
- [SQL Server](#)
- [MongoDB](#)

Cartography

- [Chart Symbolizer](#)
- [CSS Styling](#)
- [MBStyle Styling](#)
- [Printing](#)
- [YSLD Styling](#)

Miscellaneous

- [Control Flow](#)
- [Cross Layer Filtering](#)
- [Monitor](#)
- [Importer](#)
- [INSPIRE](#)
- [Resource Browser Tool](#)
- [GWC S3 tile storage](#)
- [Request parameters extractor](#)

Security

- [Key authentication](#)
- [CAS](#)
- [GeoFence \(Client, Server\)](#)

Coverage Formats

- [GDAL](#)
- [GRIB](#)
- [Image Pyramid](#)
- [JPEG2K](#)
- [NetCDF](#)

Output Formats

- [DXF](#)
- [Excel](#)
- [GeoPackage Output](#)
- [Image Map](#)
- [JPEG Turbo](#)
- [MapML](#)
- [NetCDF](#)
- [OGR \(WFS, WPS\)](#)
- [Vector Tiles](#)
- [XSLT](#)

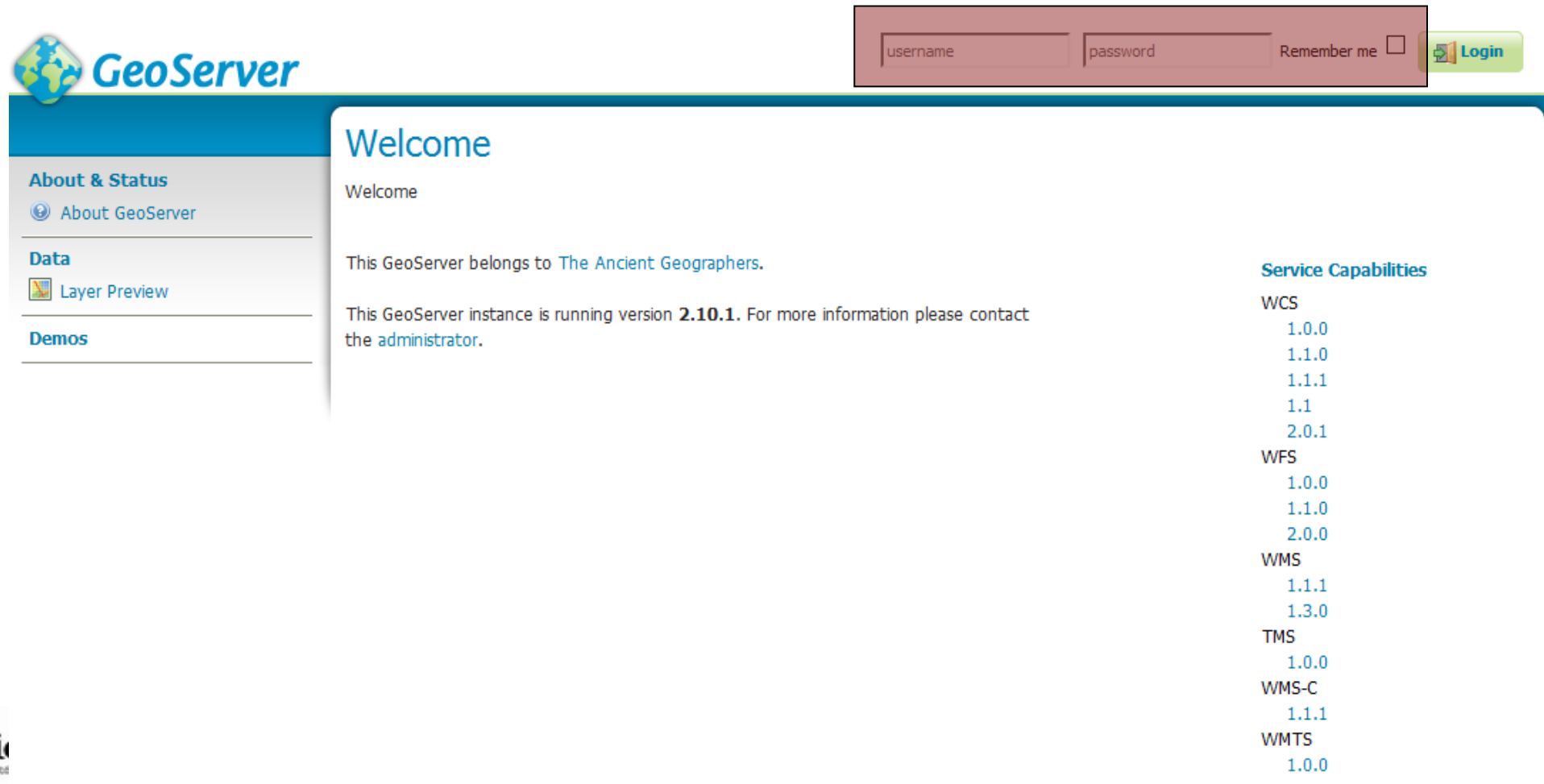
Services

- [CSW](#)
- [WCS 2.0 EO](#)
- [WPS](#)
- [WPS clustering, Hazelcast](#)
- [WPS clustering, JDBC](#)
- [WPS download](#)
- [SLDService](#)
- [WMTS multi-dimensional](#)

Introdução ao GeoServer

- Acesso ao GeoServer Web Administration Interface:

<http://localhost:8085/geoserver/web/>



The screenshot displays the GeoServer Web Administration Interface. At the top, there is a navigation bar with the GeoServer logo on the left and a login form on the right. The login form includes fields for 'username' and 'password', a 'Remember me' checkbox, and a 'Login' button. Below the navigation bar, the main content area is titled 'Welcome'. It contains a welcome message, a note that the GeoServer belongs to 'The Ancient Geographers', and information about the running version (2.10.1). On the right side of the main content area, there is a 'Service Capabilities' section listing various services and their versions. On the left side, there is a sidebar with navigation links for 'About & Status', 'Data', and 'Demos'.

GeoServer

username password Remember me ☐ Login

Welcome

Welcome

This GeoServer belongs to [The Ancient Geographers](#).

This GeoServer instance is running version **2.10.1**. For more information please contact the [administrator](#).

Service 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

WMS

- 1.1.1
- 1.3.0

TMS

- 1.0.0

WMS-C

- 1.1.1

WMTS

- 1.0.0

About & Status

- About GeoServer

Data

- Layer Preview

Demos

The screenshot shows the GeoServer web interface with the following sections highlighted:

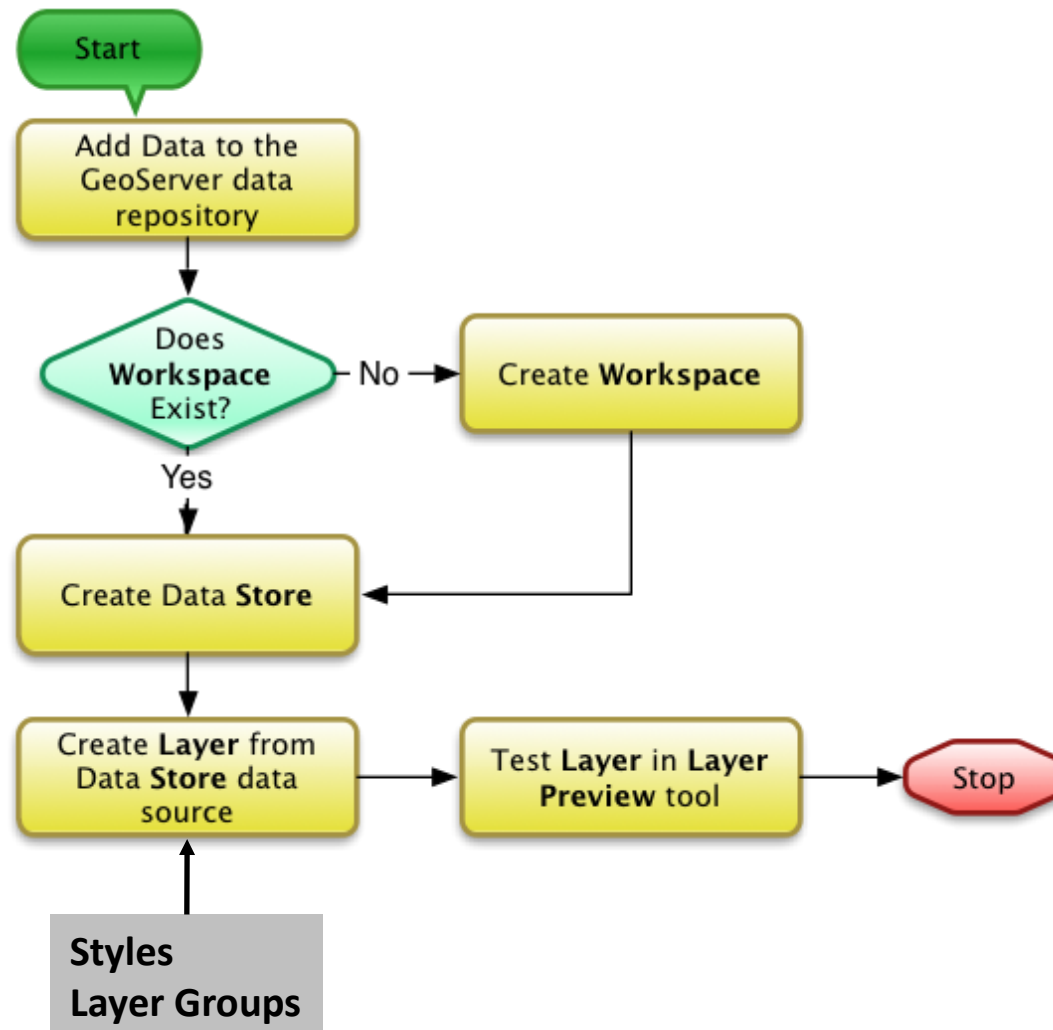
- About & Status** (Red box): Includes links for Server Status, GeoServer Logs, Contact Information, and About GeoServer.
- Data** (Blue box): Includes links for Layer Preview, Workspaces, Stores, Layers, Layer Groups, and Styles.
- Services** (Green box): Includes links for CSW, WMTS, WCS, WFS, and WMS.
- Settings** (Orange box): Includes links for Global, Image Processing, and Raster Access.
- Tile Caching** (Dark Red box): Includes links for Tile Layers, Caching Defaults, Gridsets, Disk Quota, and BlobStores.
- Security** (Light Blue box): Includes links for Settings, Authentication, Passwords, Users, Groups, Roles, Data, and Services.
- Demos** (Purple box): A link to demo applications.
- Tools** (Dark Blue box): A link to various tools.
- Informações do ambiente GeoServer** (Red box): A label for the main content area.
- Gestão dos dados espaciais** (Blue box): A label for the Data section.
- Configuração dos serviços OGC** (Green box): A label for the Services section.
- Configurações gerais** (Orange box): A label for the Settings section.
- Serviços cache** (Dark Red box): A label for the Tile Caching section.
- Configurações de segurança** (Light Blue box): A label for the Security section.
- links para exemplos de aplicações** (Purple box): A label for the Demos section.
- Visão geral** (Dark Green box): A label for the main content area.
- Descrição (metadados) dos serviços disponíveis** (Purple box): A label for the Service Capabilities section.

The main content area displays the following information:

- Welcome**: A message from the administrator.
- 19 Layers**: A link to [Add layers](#).
- 9 Stores**: A link to [Add stores](#).
- 7 Workspaces**: A link to [Create workspaces](#).
- Service Capabilities**: A list of available services and their versions:
 - CSW: 2.0.2
 - 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
 - WMTS: 1.0.0

Introdução ao GeoServer

- Workflow de carregamento dos dados



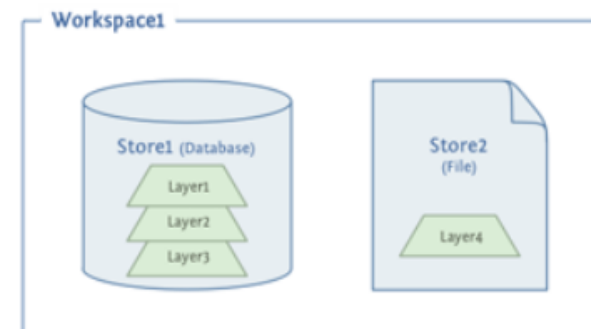
Introdução ao GeoServer

- Conceitos
 - **Workspace:** área utilizada para agrupar temas semelhantes.
 - Pode-se associar quantos temas quisermos a um workspace
 - Podem existir vários temas com o mesmo nome desde que estejam em workspaces diferentes.
 - O nome de um tema é dado pelo par **workspace:layer** (eg. topp:states).

Com a configuração **Global**

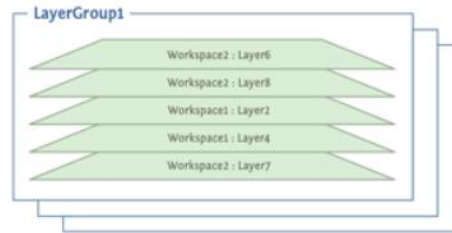
workspace layer

- **Store:** repositório de dados e indica ao GeoServer a forma de se ligar a eles.
 - Uma store tem de estar numa workspace.
- **Layers:** raster, vectores ou WMS.



Introdução ao GeoServer

- Conceitos
 - **Layers Group:** permite compor um mapa a partir dos diferentes temas.



- **Styles:** por defeito via SLD - Styled Layer Descriptor.
 - Existe uma extensão para css - Cascading Style Sheets (compacto).
 - QGIS exporta para sld.

Style Editor

Edit the current SLD style. The editor can provide syntax highlight and be brought to full screen. Click on the "validate" button to verify the style is a valid SLD document.

Name
burg

Workspace
[dropdown]

Format
SLD [dropdown] [info icon] Format only editable for new styles

Copy from existing style
Choose One [dropdown] Copy...

```
<?xml version="1.0" encoding="ISO-8859-1"?>
2 <StyledLayerDescriptor version="1.0.0" xmlns="http://www.opengis.net/sld"
  xmlns:ogc="http://www.opengis.net/ogc"
  xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.opengis.net/sld http://schemas.opengis.net/sld/1.0.0
  /StyledLayerDescriptor.xsd">
5 <NamedLayer>
6 <Name>redflag</Name>
7 <UserStyle>
8 <Name>burg</Name>
9 <Title>A small red flag</Title>
10 <Abstract>A sample of how to use an SVG based symbolizer</Abstract>
11
```

CSS Styles

Create and modify GeoCSS styles.

12pt [dropdown]

```
1 No CSS file was found for this style. Please make sure this is the style you
  intended to edit, since saving the CSS will destroy the existing SLD.
```

- Editing style: population
- Previewing on layer: topostates
- Create new CSS style

- Set style "population" as the default style for layer "topostates"
- Change layer associations for this style.

Submit

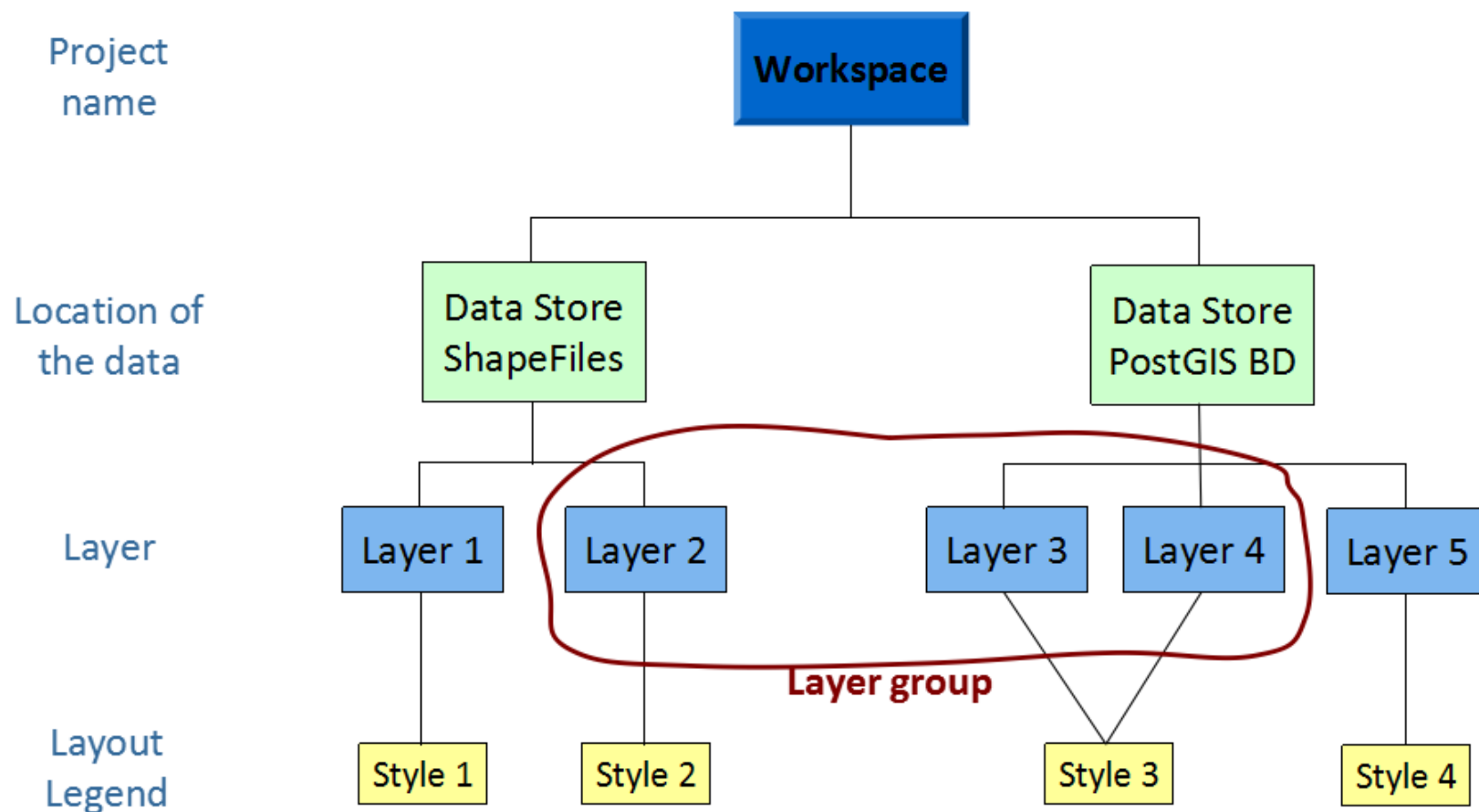
Introdução ao GeoServer

- SLD - Styled Layer Descriptor

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<StyledLayerDescriptor version="1.0.0"
  xsi:schemaLocation="http://www.opengis.net/sld StyledLayerDescriptor.xsd"
  xmlns="http://www.opengis.net/sld"
  xmlns:ogc="http://www.opengis.net/ogc"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <NamedLayer>
    <Name>Simple point</Name>
    <UserStyle>
      <Title>Simple point</Title>
      <FeatureTypeStyle>
        <Rule>
          <PointSymbolizer>
            <Graphic>
              <Mark>
                <WellKnownName>circle</WellKnownName>
                <Fill>
                  <CssParameter name="fill">#FF0000</CssParameter>
                </Fill>
              </Mark>
              <Size>6</Size>
            </Graphic>
          </PointSymbolizer>
        </Rule>
      </FeatureTypeStyle>
    </UserStyle>
  </NamedLayer>
</StyledLayerDescriptor>
```

Introdução ao GeoServer

- Conceitos



Criação de Serviços de Dados

- Workspace



Workspaces

Manage GeoServer workspaces

- Add new workspace** ²
- Remove selected workspace(s)

<< < 1 > >> Results 1 to 7 (out of 7 items) Search

<input type="checkbox"/>	Workspace Name	Default
<input type="checkbox"/>	cite	✓
<input type="checkbox"/>	it.geosolution	
<input type="checkbox"/>	nurc	
<input type="checkbox"/>	sde	
<input type="checkbox"/>	sf	
<input type="checkbox"/>	tiger	
<input type="checkbox"/>	topp	

GeoServer

About & Status

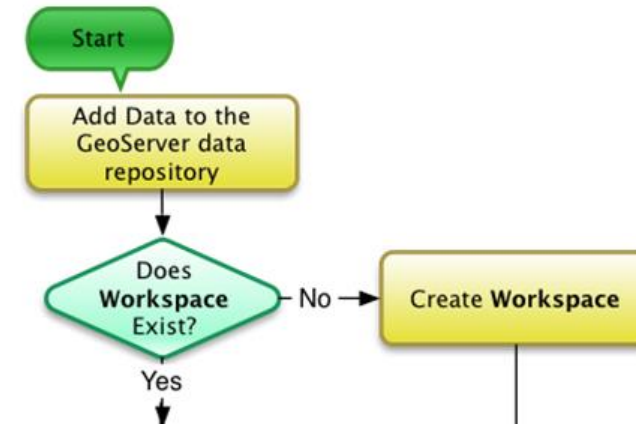
- Server Status
- GeoServer Logs
- Contact Information
- About GeoServer

Data

- Layer Preview
- Import Data
- Workspaces** ¹
- Stores
- Layers
- Layer Groups
- Styles

Services

- WMTS
- WCS
- WFS
- WMS



New Workspace

Configure a new workspace

3

Name
dgt

Namespace URI
http://dgterritorio.pt/dgt
The namespace uri associated with this workspace

☐ Default Workspace

Submit **Cancel**

GeoServer

About & Status

- Server Status
- GeoServer Logs
- Contact Information
- About GeoServer

Data

- Layer Preview
- Import Data
- Workspaces
- Stores
- Layers
- Layer Groups
- Styles

Criação de Serviços de Dados

- Stores

The image shows a screenshot of the GeoServer web interface. The top navigation bar includes the GeoServer logo, a 'Logged in as admin.' status, and a 'Logout' link. The left sidebar contains a menu with categories: 'About & Status' (Server Status, GeoServer Logs, Contact Information, About GeoServer), 'Data' (Layer Preview, Import Data, Workspaces, Stores, Layers, Layer Groups, Styles), 'Services' (WMTS, WCS, WFS, WMS), and 'Settings' (Global). The 'Stores' link under the 'Data' category is highlighted with a red circle and the number 1. The main content area is titled 'Stores' and contains the text 'Manage the stores providing data to GeoServer'. It features two buttons: 'Add new Store' (highlighted with a green circle and the number 2) and 'Remove selected Stores'. Below these buttons is a table with columns 'Data Type' and 'Workspaces'. The table lists several entries: 'nurc', 'nurc', 'tiger', 'sf', 'sf', 'topp', 'topp', and 'nurc'. The 'Add new Store' button is also highlighted with a red circle and the number 3. To the right of the main content area, there is a yellow box with the text 'Create Data Store' and arrows pointing to it from above, below, and from the right. Below the main content area, there is a 'New data source' dialog box. The dialog box has a title 'New data source' and a subtitle 'Choose the type of data source you wish to configure'. It contains a list of 'Vector Data Sources' (CSV, Directory of spatial files (shapefiles), PostGIS, PostGIS (JNDI), Properties, Shapefile, Web Feature Server (NG)) and a list of 'Raster Data Sources' (ArcGrid, GeoTIFF, Gtopo30, ImageMosaic, WorldImage). At the bottom of the dialog box, there is a section for 'Other Data Sources' with a link to 'WMS - Cascades a remote Web Map Service'.

GeoServer

Logged in as admin. Logout

Stores

Manage the stores providing data to GeoServer

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

Data Type	Workspaces
<input type="checkbox"/>	nurc
<input type="checkbox"/>	nurc
<input type="checkbox"/>	tiger
<input type="checkbox"/>	sf
<input type="checkbox"/>	sf
<input type="checkbox"/>	topp
<input type="checkbox"/>	topp
<input type="checkbox"/>	nurc

New data source

Choose the type of data source you wish to configure

Vector Data Sources

- CSV - Comma delimited text file
- Directory of spatial files (shapefiles) - Takes a directory of shapefiles and exposes it as a data source
- 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 (when supported / allowed).

Raster Data Sources

- ArcGrid - ARC/INFO ASCII GRID Coverage Format
- GeoTIFF - Tagged Image File Format with Geographic information
- Gtopo30 - Gtopo30 Coverage Format
- ImageMosaic - Image mosaicking plugin
- WorldImage - A raster file accompanied by a spatial data file

Other Data Sources

- WMS - Cascades a remote Web Map Service

Criação de Serviços de Dados

- Stores - SHP

New Vector Data Source
Add a new vector data source

Shapefile
ESRI(tm) Shapefiles (*.shp)

Basic Store Info
Workspace *
dgt

Data Source Name *
caop

Description

☒ Enabled

Connection Parameters
Shapefile location *
file:data/example.extension Browse...
DBF 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)

Shapefile location

Name	Last modified	Size
coverages/	28/jan/2017 17:15	
data/	7/fev/2017 4:49	
demo/	28/jan/2017 17:15	
gwc/	28/jan/2017 17:15	
gwc-layers/	11/fev/2017 15:47	
layergroups/	28/jan/2017 17:15	
layouts/	28/jan/2017 17:15	
legendsamples/	29/jan/2017 16:57	
logs/	28/jan/2017 17:15	
palettes/	28/jan/2017 17:15	
plugIns/	28/jan/2017 17:15	
security/	28/jan/2017 18:34	
styles/	7/fev/2017 4:49	

Create Data Store

Criação de Serviços de Dados

- Stores – Raster Tiff

The image shows the GeoServer web interface. On the left is a sidebar with navigation links: About & Status, Data, Services, and Settings. The main area displays the 'Add Raster Data Source' dialog. This dialog has several sections: 'Description' (GeoTIFF), 'Basic Store Info' (Workspace: dgt, Data Source Name: ortos), and 'Connection Parameters' (URL: file:data/example.extension). A 'URL' window is open, showing a file list with columns 'Name', 'Last modified', and 'Size'. The file '431_4_21_15.tif' is selected, and a red arrow points from it to the 'Browse...' button in the 'Connection Parameters' section. Above the dialog, a yellow button labeled 'Create Data Store' is shown with arrows indicating its position in a workflow.

Add Raster Data Source

Description

GeoTIFF
Tagged Image File Format with Geographic info

Basic Store Info

Workspace *

dgt

Data Source Name *

ortos

Description

☒ Enabled

Connection Parameters

URL *

file:data/example.extension

Browse...

URL

Data directory: GeoServer_Data_Dir/ data/

Name	Last modified	Size
PorNorte-PT/	11/fev/2017 17:10	
431_4_21_15.tif	29/dez/2016 1:14	33,9M

Create Data Store

Criação de Serviços de Dados

- Layer

New Layer

Add a new layer

You can create a new feature type by manually configuring the attribute names and types. [Create new feature type...](#)
Here is a list of resources contained in the store 'Norte'. Click on the layer you wish to configure

<< < 1 > >>

Results 1 to 1 (out of 1 items)

Search

Published	Layer name	Action
	PorNorte-PT	Publish

<< < 1 > >>

Results 1 to 1 (out of 1 items)

Criação de Serviços de Dados

- Layer Preview

About & Status

- Server Status
- GeoServer Logs
- Contact Information
- About GeoServer

Data

- Layer Preview
- Import Data
- Workspaces
- Stores
- Layers
- Layer Groups
- Styles







Services

- WMTS
- WCS
- WFS
- WMS

Layer Preview

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


<< < 1 > >> Results 1 to 23 (out of 23 items)

Type	Title	Name	Common Formats	All Formats
	PorNorte-PT	dgt:PorNorte-PT	OpenLayers KML GML	<input type="text" value="Select one"/>
	A sample ArcGrid file	nurc:Arc_Sample		
	North America sample imagery	nurc:Img_Sample		
	Pk50095	nurc:Pk50095		
	mosaic	nurc:mosaic		
	Spearfish archeological sites	sf:archsites		

...

+

-



Criação de Serviços de Dados

- Styles

GeoServer

Logged in as admin. [Logout](#) [en](#)

Styles

Manage the Styles published by GeoServer

2 [Add a new style](#) [Removed selected style\(s\)](#)

<< < 1 > >> Results 1 to 22 (out of 22)

Style Name
<input type="checkbox"/> burg
<input type="checkbox"/> capitals
<input type="checkbox"/> cite_lakes
<input type="checkbox"/> dem
<input type="checkbox"/> generic
<input type="checkbox"/> giant_polygon
<input type="checkbox"/> grass
<input type="checkbox"/> green
<input type="checkbox"/> line
<input type="checkbox"/> poi

1

3 **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.

4 **Data**

Style Data

Name: **3**

Workspace:

Format:

5 **Style Content**

Generate a default style: [Generate ...](#)

Copy from existing style: [Copy ...](#)

Upload a style file: No file selected. [Upload ...](#) **5**

6 **7**

[Validate](#) [Save](#) [Apply](#) [Cancel](#)

```
<?xml version="1.0" encoding="UTF-8"?>
<StyledLayerDescriptor xmlns="http://www.opengis.net/sld" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:se="http://www.opengis.net/se" xsi:schemaLocation="http://www.opengis.net/sld http://schemas.opengis.net/sld/1.1.0/StyledLayerDescriptor.xsd" xmlns:ogc="http://www.opengis.net/ogc" version="1.1.0">
  <NamedLayer>
    <se:Name>Distritos</se:Name>
    <UserStyle>
      <se:Name>Distritos</se:Name>
      <se:FeatureTypeStyle>
        <se:Rule>
          <se:Name>Single_symbol</se:Name>
          <se:PolygonSymbolizer>
            <se:Fill>
              <se:SvgParameter name="fill">#becf50</se:SvgParameter>
            </se:Fill>
            <se:Stroke>
              <se:SvgParameter name="stroke">#232323</se:SvgParameter>
              <se:SvgParameter name="stroke-width">1</se:SvgParameter>
              <se:SvgParameter name="stroke-linejoin">bevel</se:SvgParameter>
            </se:Stroke>
          </se:PolygonSymbolizer>
        </se:Rule>
      </se:FeatureTypeStyle>
    </UserStyle>
  </NamedLayer>
</StyledLayerDescriptor>
```

Criação de Serviços de Dados

- Styles



No validation errors.

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 the "validate" button to verify the style is a valid style document.

Data

Style Data

Name
Distritos

Workspace
▼

Format
SLD ▼

Style Content

Generate a default style
Choose One ▼ Generate ...

Copy from existing style
Choose One ▼ Copy ...

Upload a style file
Browse... No file selected. Upload ...

Legend

Legend
Add legend

Preview legend



No validation errors.

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 ca the "validate" button to verify the style is a valid style document.

Data

Style Data

Name
Distritos

Workspace
▼

Format
SLD ▼

Style Content

Generate a default style

Legend

Legend
Add legend

Preview legend
Single symbol

Criação de Serviços de Dados


- Serviços OGC – documento GetCapabilities


Welcome


Welcome

This GeoServer belongs to [The Ancient Geographers](#).

20 Layers	+ Add layers
10 Stores	+ Add stores
8 Workspaces	+ Create workspaces

 The master password for this server has not been changed from the default. It is **highly** recommended that you change it now. [Change it](#)

 The administrator password for this server has not been changed from the default. It is **highly** recommended that you change it now. [Change it](#)

 No strong cryptography available, installation of the unrestricted policy jar files is recommended

This GeoServer instance is running version **2.10.1**. For more information please contact the [administrator](#).

Service 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
WMS
1.1.1
1.3.0
TMS
1.0.0
WMS-C
1.1.1
WMTS
1.0.0

Criação de Serviços de Dados

- Recursos:
 - GeoServer User Manual
<http://docs.geoserver.org/stable/en/user/>
 - GeoServer Training Modules
<http://geoserver.geo-solutions.it/edu/en/>
INSPIRE Support

Serviços de Dados Geográficos

Danilo Furtado

Direção-Geral do Território

FCUL-IIG