



*GeoServer*

# WS05 - Basic to Advance GeoServer

• • •

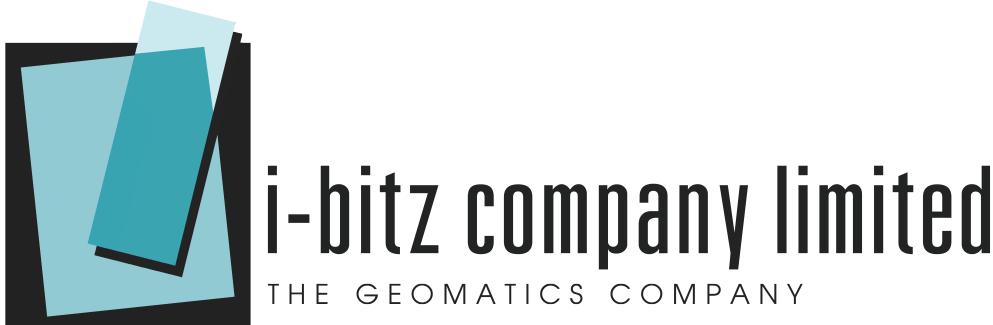
Instructor : Sattawat Arab

# I am a instructor

•••

ศตวรรษ อาร์บัน

GIS Analyst and Backend Engineer, i-bitz co.,ltd.



"เรื่องบางอย่างรู้คุณเดียวมันไม่สนุก ต้องบอกต่อให้คนอื่นรู้ด้วย และให้คนเหล่านั้นนำความรู้ที่ได้รับไปบอกต่อ"

จากประสบการณ์ด้านการวิเคราะห์ข้อมูลแบบ Automatic การจัดทำฐานข้อมูล ออกแบบ วิเคราะห์ และบริหารจัดการข้อมูลเชิงพื้นที่ (Spatial data) โดยให้บริการแพนที่ผ่านทางชุด โปรแกรมที่ชื่อว่า "GeoServer" ร่วมกับการออกแบบการแสดงผลแพนที่ (Map Style) ในรูปแบบต่าง ๆ เพื่อผลิตแพนที่ออนไลน์ที่สามารถตอบโจทย์เฉพาะเรื่องผ่านทาง Web Application ได้อย่างถูกต้องและเหมาะสม โดยเฉพาะข้อมูลที่มีเวลาเข้ามาเกี่ยวข้องต้องแสดงผลข้อมูลให้เหมาะสมกับสถานะการณ์นั้น ๆ เพื่อสื่อความหมายให้ประชาชนเข้าใจง่ายที่สุด

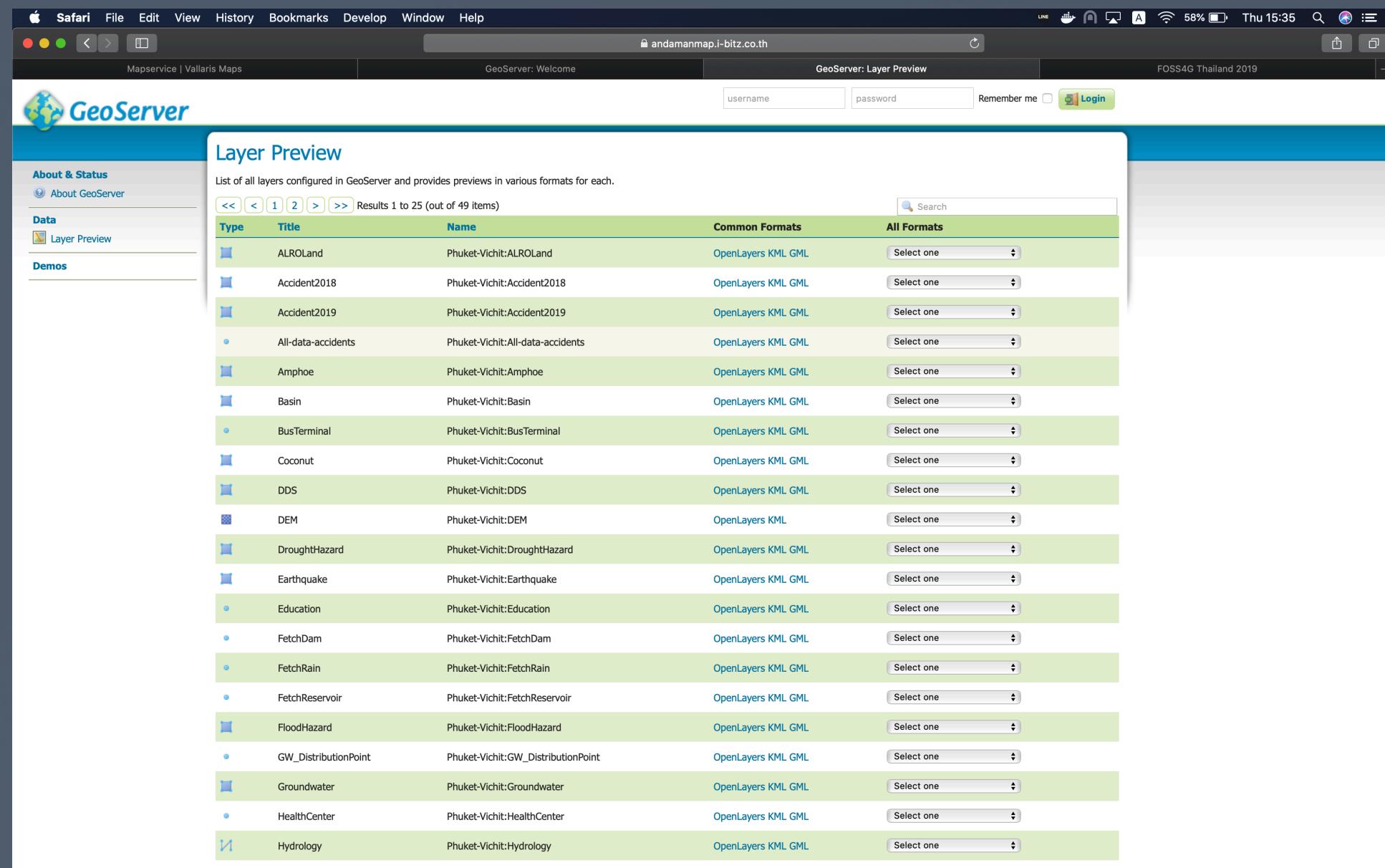
นอกเหนือจากการดูแลงานด้าน Geoinformatics ซึ่งเป็นภาระกิจหลักแล้ว ยังมีงานด้านการถ่ายทอดองค์ความรู้ที่มีแก่ผู้สนใจทั่วไป หน่วยงานราชการและเอกชน ในรูปแบบของ GIS Training&Workshop และกิจกรรม One day sharing UNI project แก่นิสิตนักศึกษาระดับมหาวิทยาลัยต่างๆอีกด้วย ภายใต้ GISBuildup Training Center

จากความรู้ข้างต้นผมจึงอยากรีบถ่ายทอดองค์ความรู้ที่มีให้แก่ผู้ที่สนใจขึ้นมาโดยเฉพาะสำหรับงานประชุมครั้งนี้

ติดต่อ : Email : [sattawat.a@i-bitz.co.th](mailto:sattawat.a@i-bitz.co.th)

# CONTENT

...



The screenshot shows the GeoServer Layer Preview interface. The left sidebar has sections for About & Status, Data (Layer Preview selected), and Demos. The main area is titled 'Layer Preview' and lists 49 items. Each item has columns for Type, Title, Name, Common Formats (e.g., OpenLayers KML GML), and All Formats (dropdown menus). The items include various geographical features like ALROLand, Accident2018, Accident2019, Amphoe, Basin, BusTerminal, Coconut, DDS, DEM, DroughtHazard, Earthquake, Education, FetchDam, FetchRain, FetchReservoir, FloodHazard, GW\_DistributionPoint, Groundwater, HealthCenter, and Hydrology, all associated with Phuket-Vichit.

Type	Title	Name	Common Formats	All Formats
	ALROLand	Phuket-Vichit:ALROLand	OpenLayers KML GML	Select one
	Accident2018	Phuket-Vichit:Accident2018	OpenLayers KML GML	Select one
	Accident2019	Phuket-Vichit:Accident2019	OpenLayers KML GML	Select one
	All-data-accidents	Phuket-Vichit:All-data-accidents	OpenLayers KML GML	Select one
	Amphoe	Phuket-Vichit:Amphoe	OpenLayers KML GML	Select one
	Basin	Phuket-Vichit:Basin	OpenLayers KML GML	Select one
	BusTerminal	Phuket-Vichit:BusTerminal	OpenLayers KML GML	Select one
	Coconut	Phuket-Vichit:Coconut	OpenLayers KML GML	Select one
	DDS	Phuket-Vichit:DDS	OpenLayers KML GML	Select one
	DEM	Phuket-Vichit:DEM	OpenLayers KML	Select one
	DroughtHazard	Phuket-Vichit:DroughtHazard	OpenLayers KML GML	Select one
	Earthquake	Phuket-Vichit:Earthquake	OpenLayers KML GML	Select one
	Education	Phuket-Vichit:Education	OpenLayers KML GML	Select one
	FetchDam	Phuket-Vichit:FetchDam	OpenLayers KML GML	Select one
	FetchRain	Phuket-Vichit:FetchRain	OpenLayers KML GML	Select one
	FetchReservoir	Phuket-Vichit:FetchReservoir	OpenLayers KML GML	Select one
	FloodHazard	Phuket-Vichit:FloodHazard	OpenLayers KML GML	Select one
	GW_DistributionPoint	Phuket-Vichit:GW_DistributionPoint	OpenLayers KML GML	Select one
	Groundwater	Phuket-Vichit:Groundwater	OpenLayers KML GML	Select one
	HealthCenter	Phuket-Vichit:HealthCenter	OpenLayers KML GML	Select one
	Hydrology	Phuket-Vichit:Hydrology	OpenLayers KML GML	Select one

1

2

3

4

- Store data and management daily weather data in PostgreSQL

- Store data and display the map in GeoServer according to the conditions of time (Vector and Raster )

- Design weather map using Styled Layer Descriptor (SLD)

- Using the function SQL view, CQL and Viewparams of GeoServer for display the map

- Providing time-based weather information using the WFS of GeoServer

- Call WMS layer Daily weather map display in OpenLayers

เอกสารที่ :

Software : <https://goo.gl/Ankrkt>

Document : <https://github.com/sattawatarab/foss4g-geoserver-2019.git>



i-bitz company limited  
THE GEOMATICS COMPANY



# Software

...



OpenLayers  
5%



GeoServer  
50%



PostgreSQL  
30%

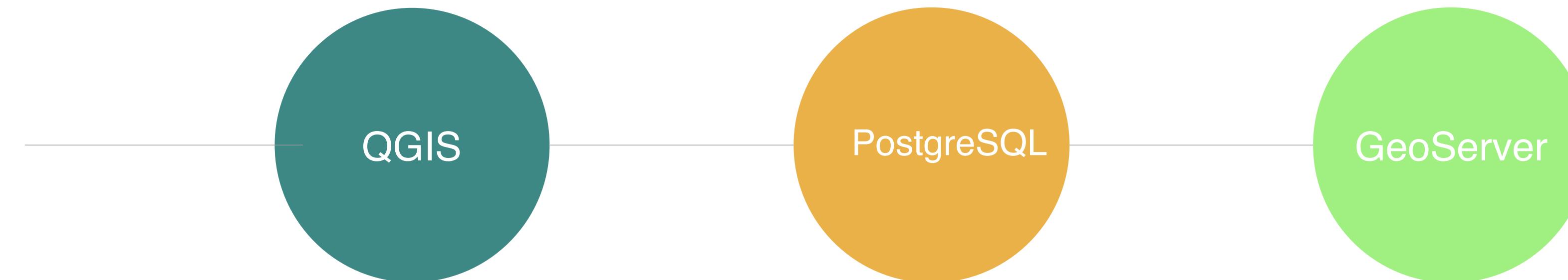


QGIS  
15%

# Concept



เมื่อมีการอัพเดทข้อมูลปริมาณน้ำฝนใหม่จากไฟล์ csv. เข้าไปในระบบ(ฐานข้อมูล PostgreSQL) แผนที่ใน GeoServer จะเปลี่ยนเองแบบอัตโนมัติ ตามเงื่อนไขที่เรากำหนดไว้ ยกตัวอย่างเช่น การแสดงแผนที่ปริมาณน้ำฝนรายสถานีตามเงื่อนไขของเวลา แผนที่น้ำวันนี้, แผนที่น้ำฝนเมื่อวาน, แผนที่น้ำฝน 3 วันที่แล้ว ทั้งแบบ Vector และ Raster



## Weather data

Management data csv ,  
Shapefile for import data  
to PostgreSQL

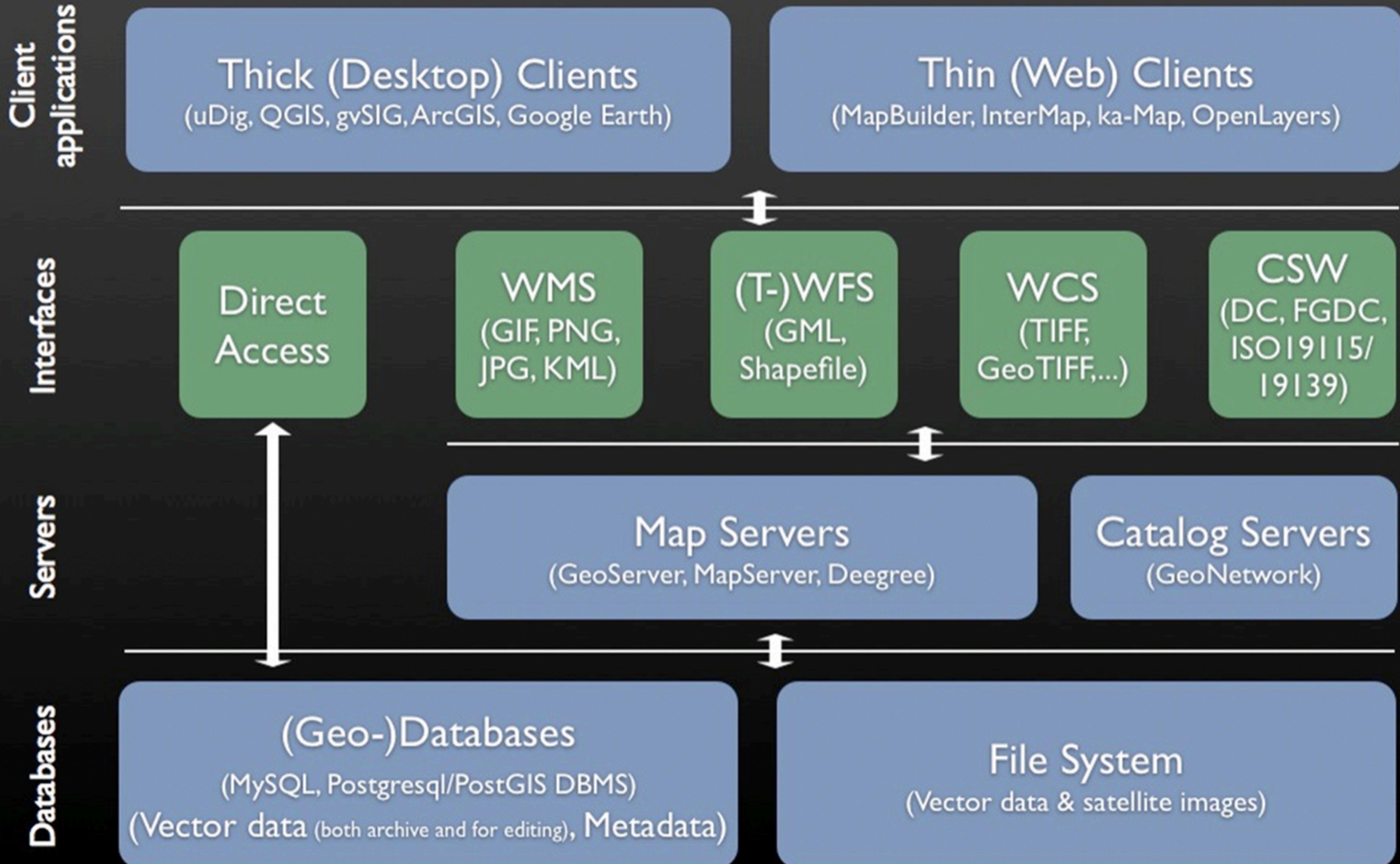
## SQL

Using SQL for Prepare  
Data data and create view  
data support layer in  
GeoServer

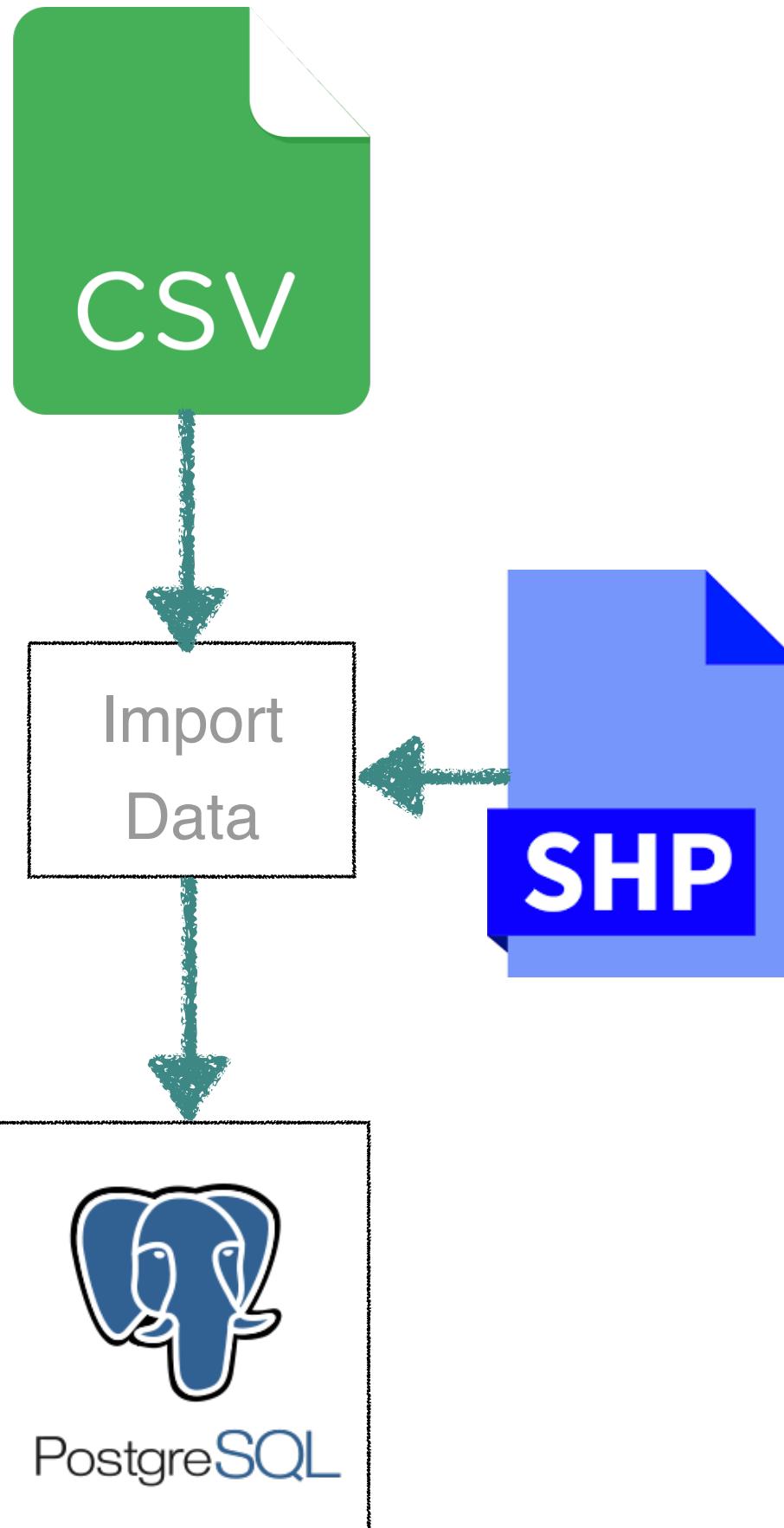
## Data service

Using the tool of  
GeoServer for create  
services WMS,  
WMTS,WFS and WCS

# Spatial Data infrastructure & Services



# Database management



**DB Manager**

Database Schema Table

Providers

- GeoPackage
- Oracle Spatial
- PostGIS
  - 10.0.0.120
  - Postgres
  - foss4g-2019
    - public
      - TMDStation
      - day-30-10-2019
      - geography\_columns
      - geometry\_columns
      - raster\_columns
      - raster\_overviews
      - spatial\_ref\_sys
    - topology
    - i-bitz
    - test
  - SpatiaLite
  - Virtual Layers

Import Layer/File... Export to File...

**TMDStation**

**General info**

Relation type: Table  
Owner: postgres  
Pages: 0  
Rows (estimation): 0  
Rows (counted): 122  
Privileges: select, insert, update, delete

**PostGIS**

Column: geom  
Geometry: MULTIPOLY  
Dimension: 2  
Spatial ref: WGS 84 (4326)  
Extent: (unknown) ([find out](#))

**Fields**

#	Name	Type	Length	Null	Default	Comment
1	id	int4	4	N	<code>nextval("TMDStation_id_seq")::regclass</code>	
2	geom	geometry (MultiPoint,4326)		Y		
3	wmonumber	varchar (80)		Y		
4	name	varchar (80)		Y		
5	province	varchar (80)		Y		

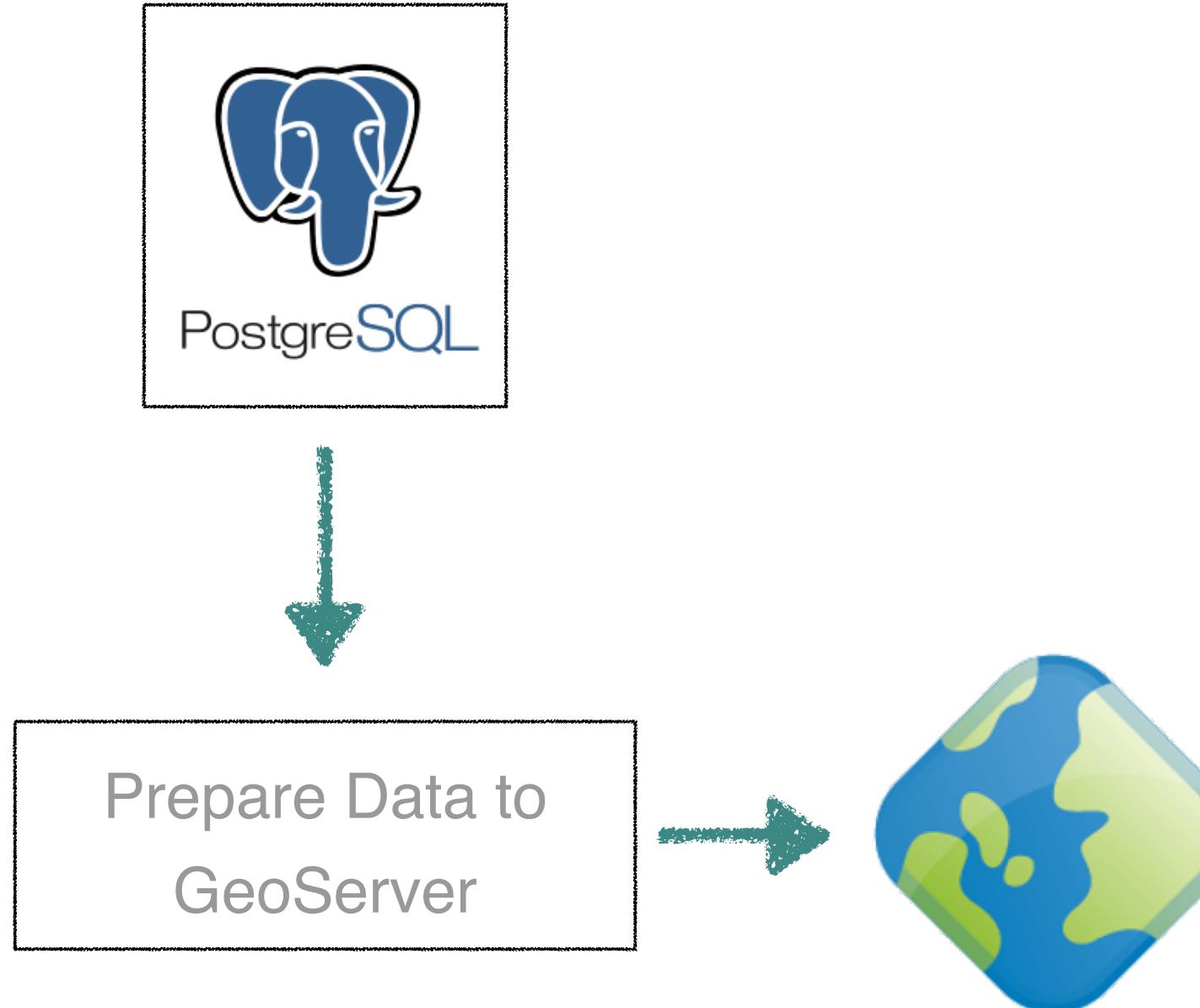
**Constraints**

Name	Type	Column(s)
TMDStation_pkey	Primary key	id

Import data to PostSQL using DB Manager in QGIS

# Database management

...



pgAdmin 4

**Browser**

- PostgreSQL 10
  - Databases (7)
    - foss4g
    - foss4g-2019
      - Casts
      - Catalogs
      - Event Triggers
      - Extensions
      - Foreign Data Wrappers
      - Languages
      - Schemas (2)
        - public
          - Collations
          - Domains
          - FTS Configurations
          - FTS Dictionaries
          - FTS Parsers
          - FTS Templates
          - Foreign Tables
          - Functions
          - Materialized Views
          - Sequences
          - Tables (3)
            - TMD-today
            - TMDStation
              - Columns
              - Constraints
              - Indexes
              - Rules
              - Triggers
            - spatial\_ref\_sys
          - Trigger Functions
          - Types
          - Views (6)
            - TMD-data
            - TMD-join
              - Columns
              - Constraints
              - Indexes
              - Rules
              - Triggers
            - geography\_columns
            - geometry\_columns
            - raster\_columns
            - raster\_overviews
    - Postgis
    - postgres

**PostgreSQL 10 - foss4g-2019 - public.TMD-join**

```

1 SELECT * FROM public."TMD-join"
2

```

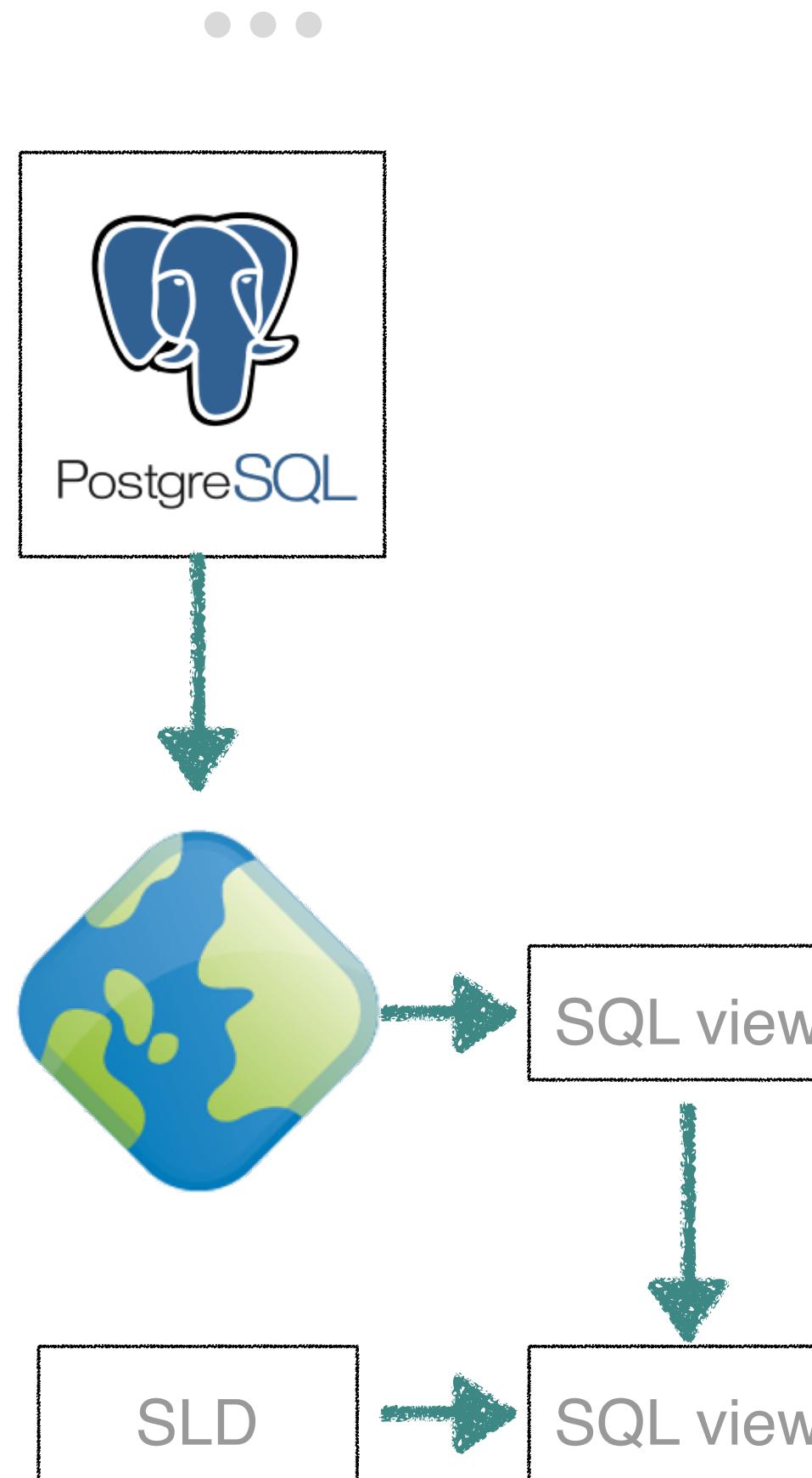
**Data Output**

WmoNumber	rain	temp	to_date	name	geom
character varying	character varying	character varying	date	character varying (80)	geometry
48325	9	21.8	2019-10-...	แม่สระบึง	01040002...
48303	0	22.4	2019-10-...	เชียงราย	01040002...
48304	1.4	22	2019-10-...	เชียงราย สกช.	01040002...
48310	12.7	23	2019-10-...	พะเยา	01040002...
48302	0	16.9	2019-10-...	ดอยล่างข้าง	01040002...
48327	15.5	22.1	2019-10-...	เชียงใหม่	01040002...
48328	1.8	24.5	2019-10-...	สapaง	01040002...
48324	5.6	24.5	2019-10-...	เด่น	01040002...
48334	0	23	2019-10-...	สapaง สกช.	01040002...
48329	2	22.5	2019-10-...	สำทุນ	01040002...
48330	0.01	24.4	2019-10-...	แมร์	01040002...
48331	0	23.3	2019-10-...	น่าน	01040002...
48333	0.5	22.4	2019-10-...	น่าน สกช.	01040002...
48315	0.2	22.3	2019-10-...	ท่าวังผา	01040002...
48307	0	21	2019-10-...	ทุ่งช้าง	01040002...
48352	0	22.3	2019-10-...	หนองคาย	01040002...
48353	0	24	2019-10-...	เลย	01040002...
48350	0	23	2019-10-...	เลย สกช.	01040002...
48354	0	21.2	2019-10-...	อุดรธานี	01040002...
48356	0	20	2019-10-...	สกลนคร	01040002...
48355	0	18.2	2019-10-...	สกลนคร สกช.	01040002...
48357	0	20.2	2019-10-...	นครพนม	01040002...
48358	0	23.5	2019-10-...	นครพนม สกช.	01040002...
48360	0	23.4	2019-10-...	หนองป่าสักชู	01040002...
48372	13	24.6	2019-10-...	สโขทัย	01040002...

Prepare Data in PostgreSQL for support layer of GeoServer

1. Convert date date to format date
2. Create view “TMD\_today”
3. Joint data TMD\_today and TMDStation
4. Create view “TMD\_join”

# Management layer in GeoServer



**Edit SQL view**

Update the definition of the SQL view and its metadata

**View Name:** RainToday

**SQL statement:**

```
Select "name", "to_date", "rain", "geom" from "TMD_join" WHERE "to_date" = CURRENT_DATE
```

**SQL view parameters:**

Guess parameters from SQL   Add new parameter   Remove selected

<input type="checkbox"/>	Name	Default value	Validation regular expression
<input type="checkbox"/>	Escape special SQL characters		
<input checked="" type="checkbox"/>	Guess geometry type and srid		
	Name	Type	SRID
	name	String	
	to_date	Date	
	rain	String	
	geom	Geometry	4326

**Attributes:**

Refresh    Guess geometry type and srid

**Security:**

Settings    Authentication    Passwords    Users, Groups, Roles    Data    Services    WPS security

**Monitor:**

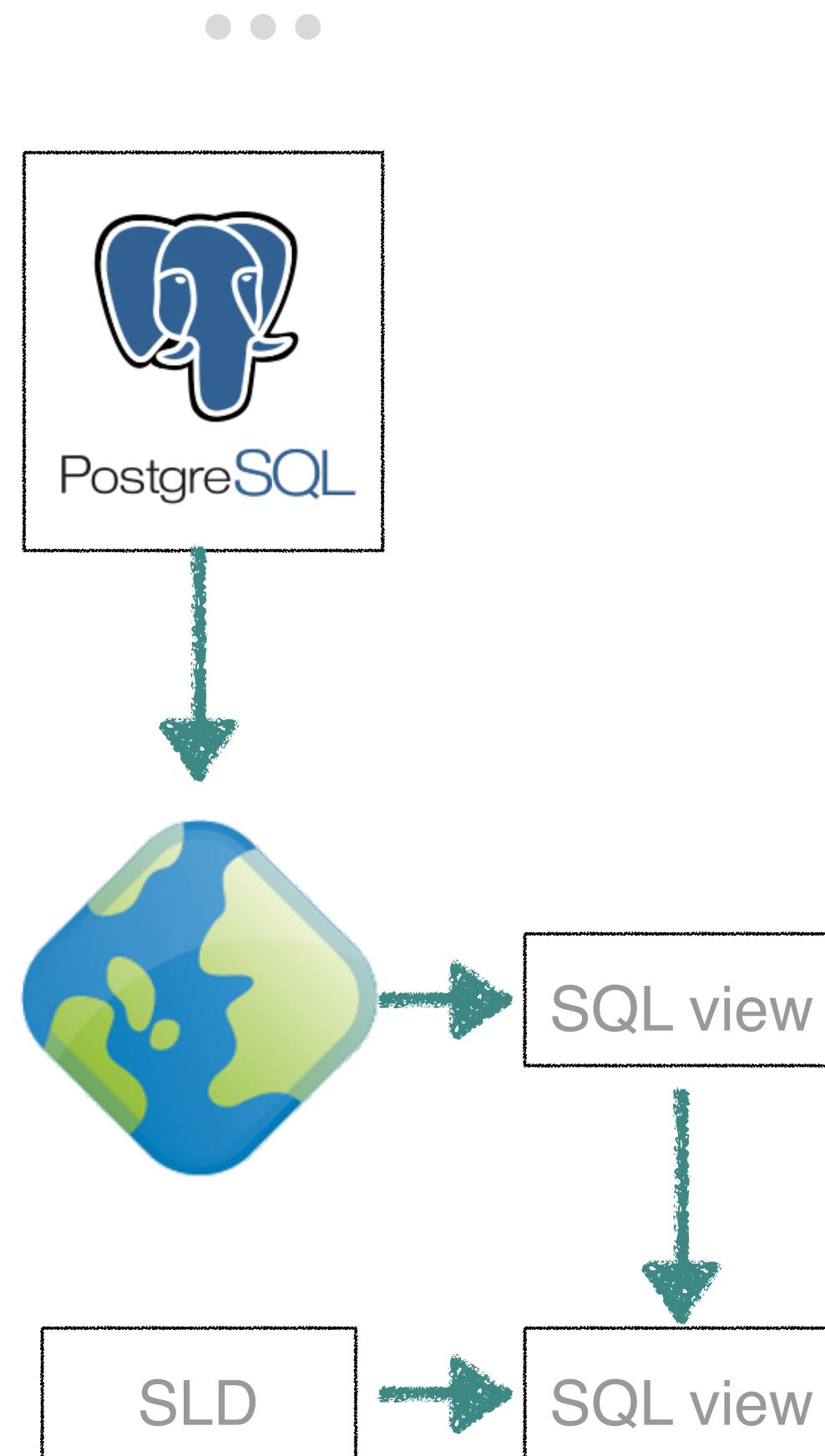
Activity

**Buttons:**

**Save**   **Cancel**

1. Create layer in GeoServer using SQL view
2. Create style for layer RainToday

# Management layer in GeoServer

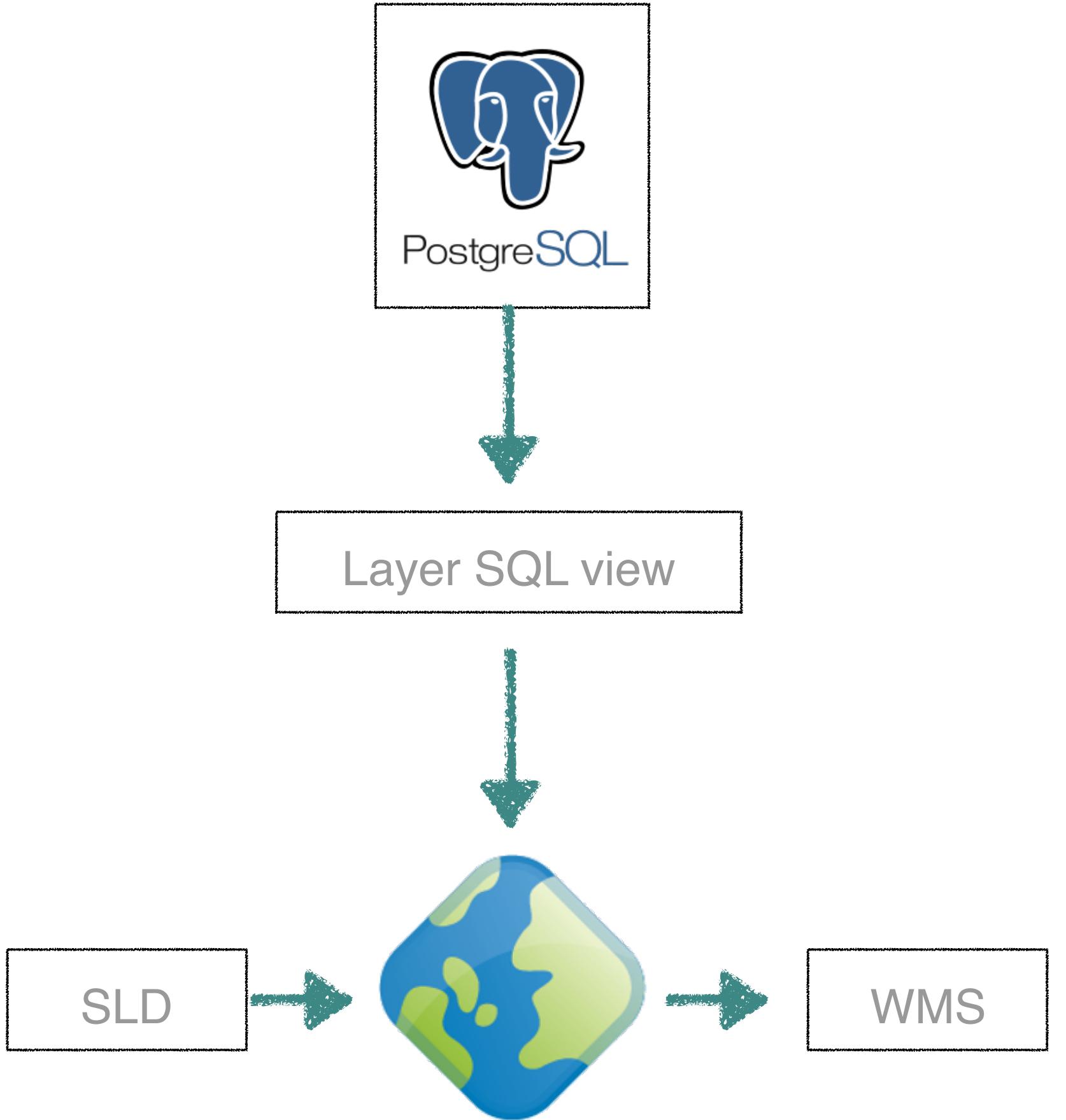


1. Rain today
2. Rain yesterday
3. Rain last 3 day



# Data service WMS

•••



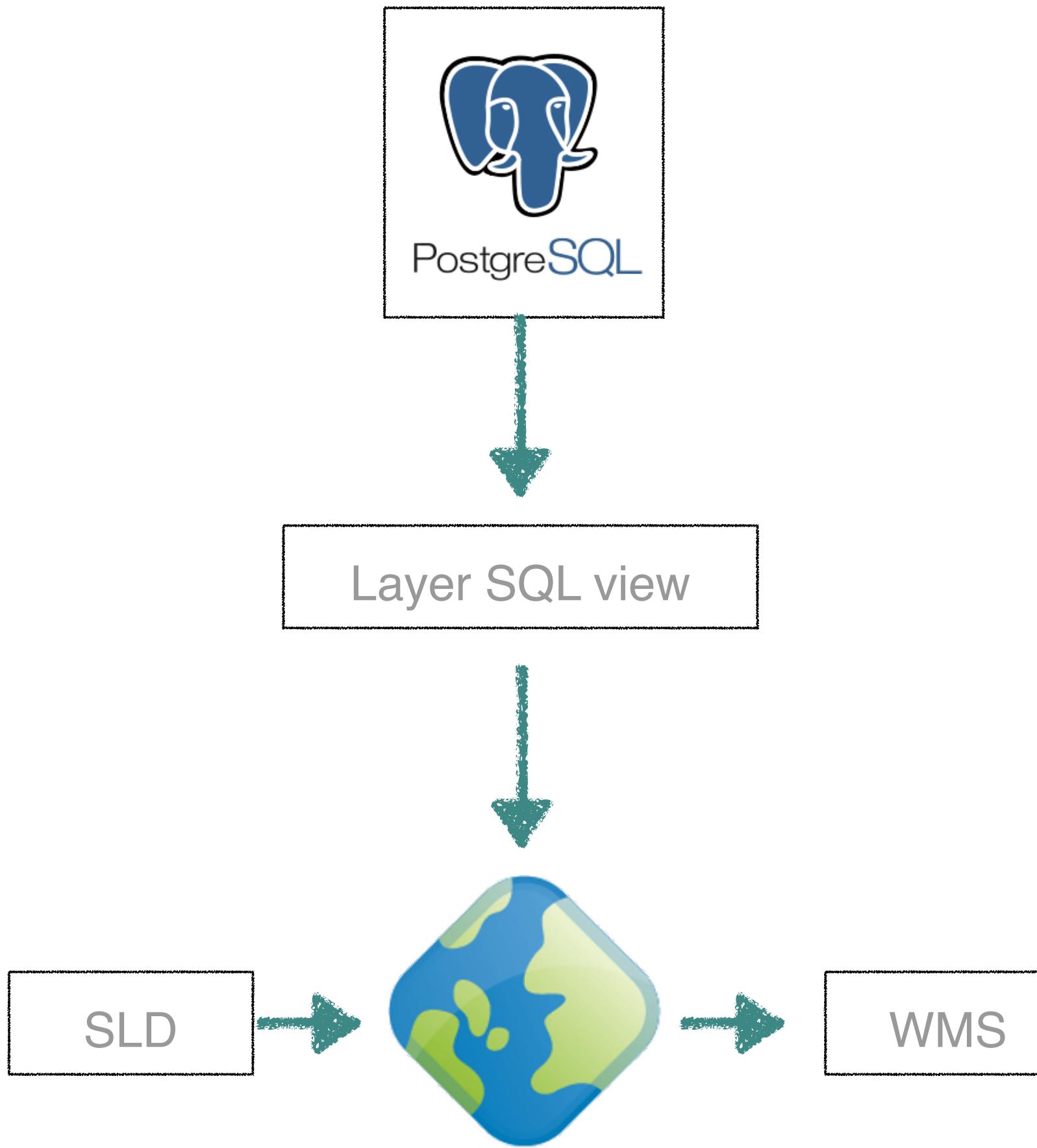
การใช้งานร้องขอข้อมูลลักษณะของแผนที่ต่าง ๆ ที่มีค่าพิกัดของข้อมูลแผนที่อยู่ด้วย Format ต่าง ๆ ประกอบด้วย PNG, GIF หรือ JPEG

## มาตรฐาน WMS: Web Map Service รองรับการร้องขอบริการจากผู้ใช้

1. GetCapabilities จะส่งค่าการให้บริการ ในส่วนของ Metadata ซึ่งเป็นตัวอธิบายเกี่ยวกับ รายละเอียดของ ข้อมูลที่ให้บริการและการยอมรับค่าตัวแปรต่าง ๆ
2. GetMap จะเป็นการส่งภาพแผนที่ซึ่งสามารถระบุชั้นข้อมูล ขนาดของภาพแผนที่และลักษณะ ของภาพ แผนที่ได้ ซึ่งรูปแผนที่แสดงภาพในรูปแบบ PNG, GIF หรือ JPEG
3. GetFeatureInfo มาตรฐานตัวนี้จะเป็น Option ใน การร้องขอข้อมูลเกี่ยวกับรายละเอียดของ ข้อมูล ในแผนที่ การร้องขอการให้บริการต้องระบุเงื่อนไขทาง ตำแหน่ง เพื่อทำการสืบค้นข้อมูลของ แผนที่มาแสดงผล
4. GetLegendGraphic มาตรฐานตัวนี้จะเป็น Option ใน การร้องขอข้อมูลเกี่ยวกับรายละเอียดของค่าอธิบายสัญลักษณ์แผนที่

# Data service WMS

• • •



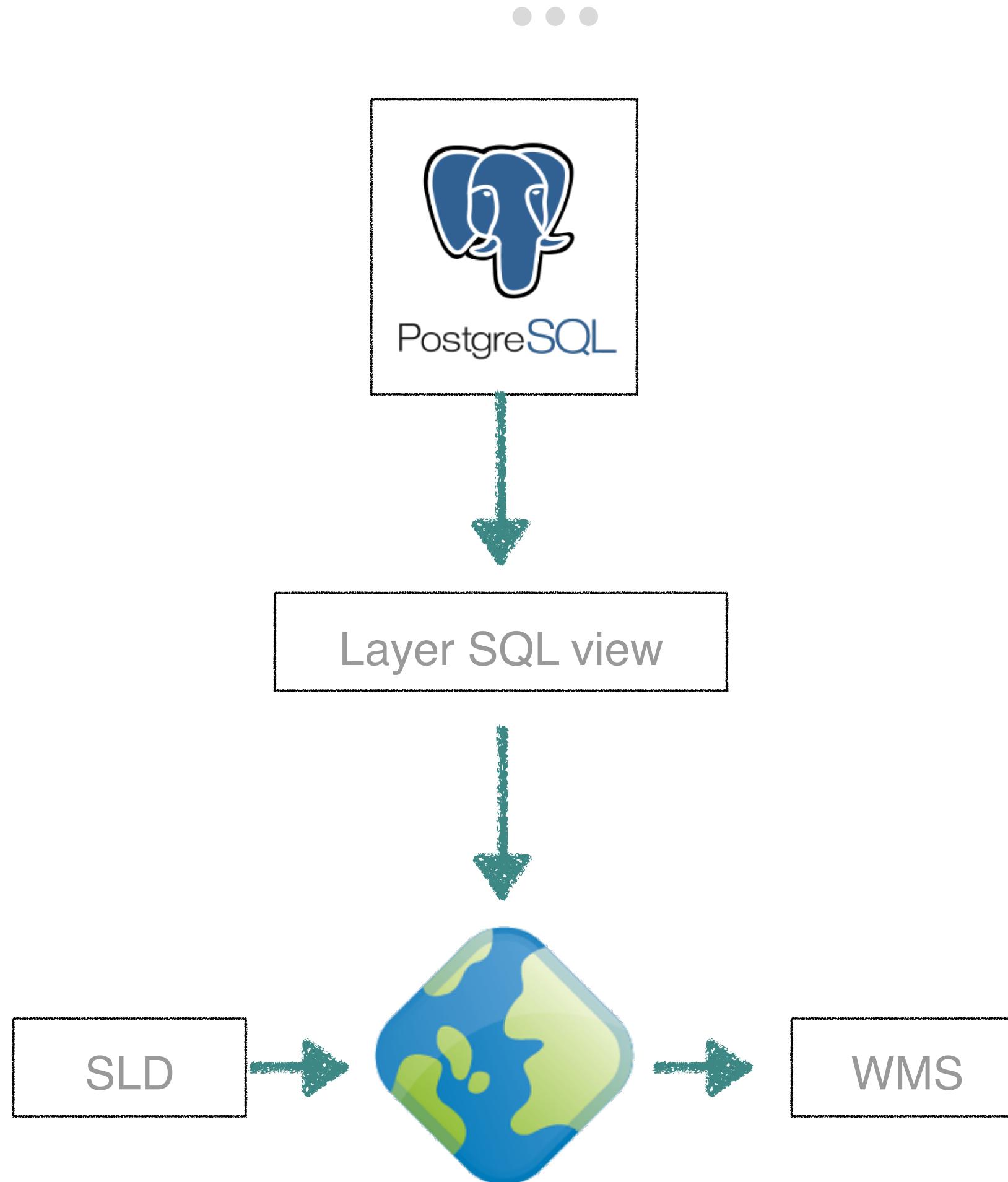
## WMS: Requests GetCapabilities

`http://localhost:8082/geoserver/ows?service=wms &version=1.1.1 &request=GetCapabilities`

```

<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE WMT_MS_Capabilities SYSTEM "http://localhost:8082/geoserver/schemas/wms/1.1.1/WMS_MS_Capabilities.dtd">
<WMT_MS_Capabilities updateSequence="261" version="1.1.1">
  - <Service>
    <Name>OGC:WMS</Name>
    <Title>GeoServer Web Map Service</Title>
    <Abstract>A compliant implementation of WMS plus most of the SLD extension (dynamic styling). Can also gene
  - <KeywordList>
    <Keyword>WFS</Keyword>
    <Keyword>WMS</Keyword>
    <Keyword>GEO SERVER</Keyword>
  </KeywordList>
  <OnlineResource xlink:href="http://geoserver.org" xlink:type="simple" xmlns:xlink="http://www.w3.org/1999/xli
  - <ContactInformation>
    - <ContactPersonPrimary>
      <ContactPerson>sattawat Arab</ContactPerson>
      <ContactOrganization>The Ancient Geographers</ContactOrganization>
    </ContactPersonPrimary>
    <ContactPosition>GIS Analyst</ContactPosition>
  - <ContactAddress>
    <AddressType>Work</AddressType>
    <Address/>
    <City>Bangkok</City>
    <StateOrProvince/>
    <PostCode/>
    <Country>Thailand</Country>
  </ContactAddress>
  <ContactVoiceTelephone/>
  <ContactFacsimileTelephone/>
  <ContactElectronicEmailAddress>sattawatarab@gmail.com</ContactElectronicEmailAddress>
</ContactInformation>
<Fees>NONE</Fees>
<AccessConstraints>NONE</AccessConstraints>
</Service>
- <Capability>
  
```

# Data service WMS

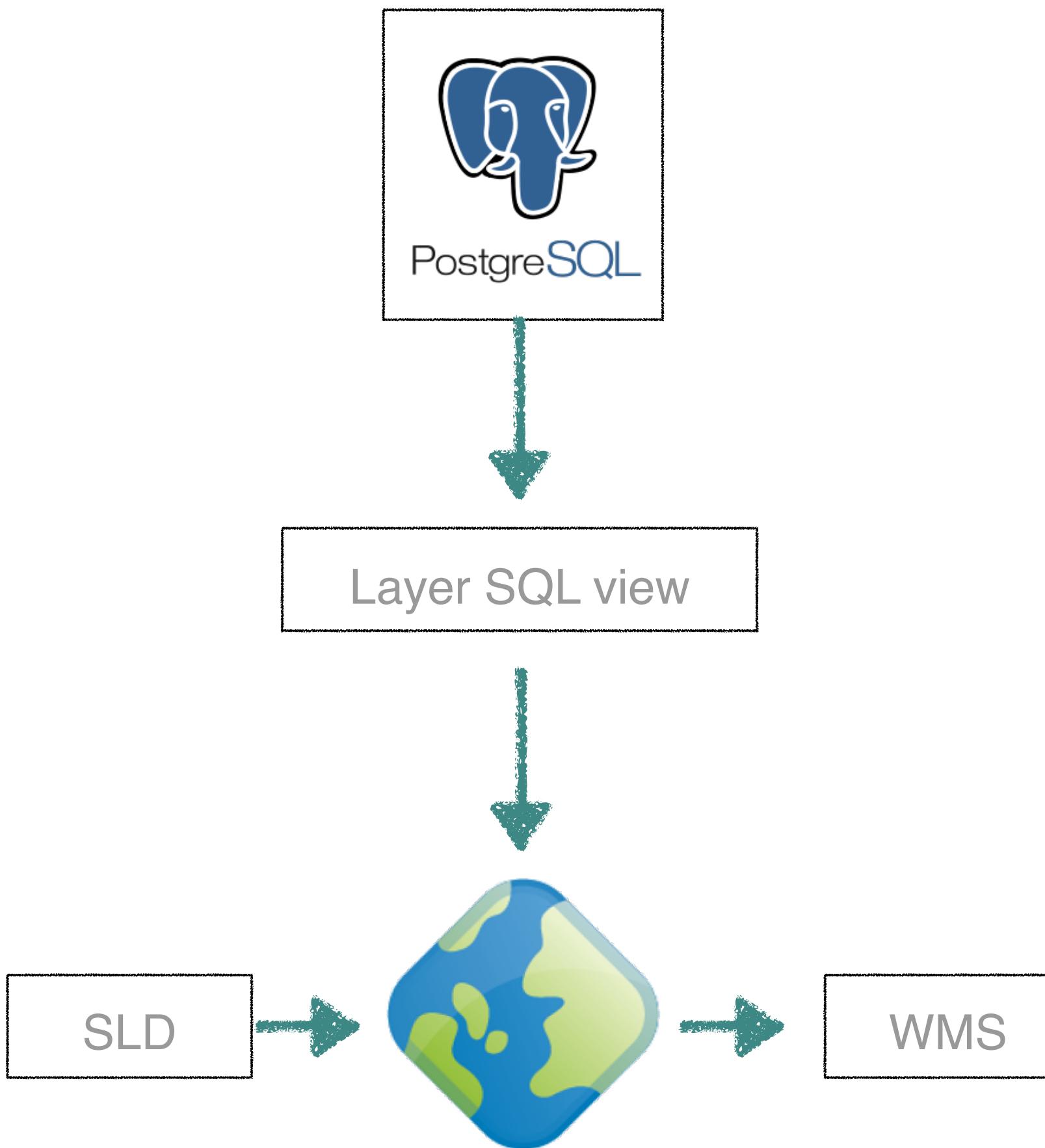


## WMS: Reques GetMap

```
http://localhost:8082/geoserver/foss4g-2019/wms?  
service=WMS  
&version=1.1.0  
&request=GetMap  
&layers=foss4g-2019:RainToday  
&styles=  
&bbox=97.93333333,6.416666667,105.0235,19.96138889  
&width=402&height=768  
&srs=EPSG:4326  
&format=image/png
```

# Data service WMS

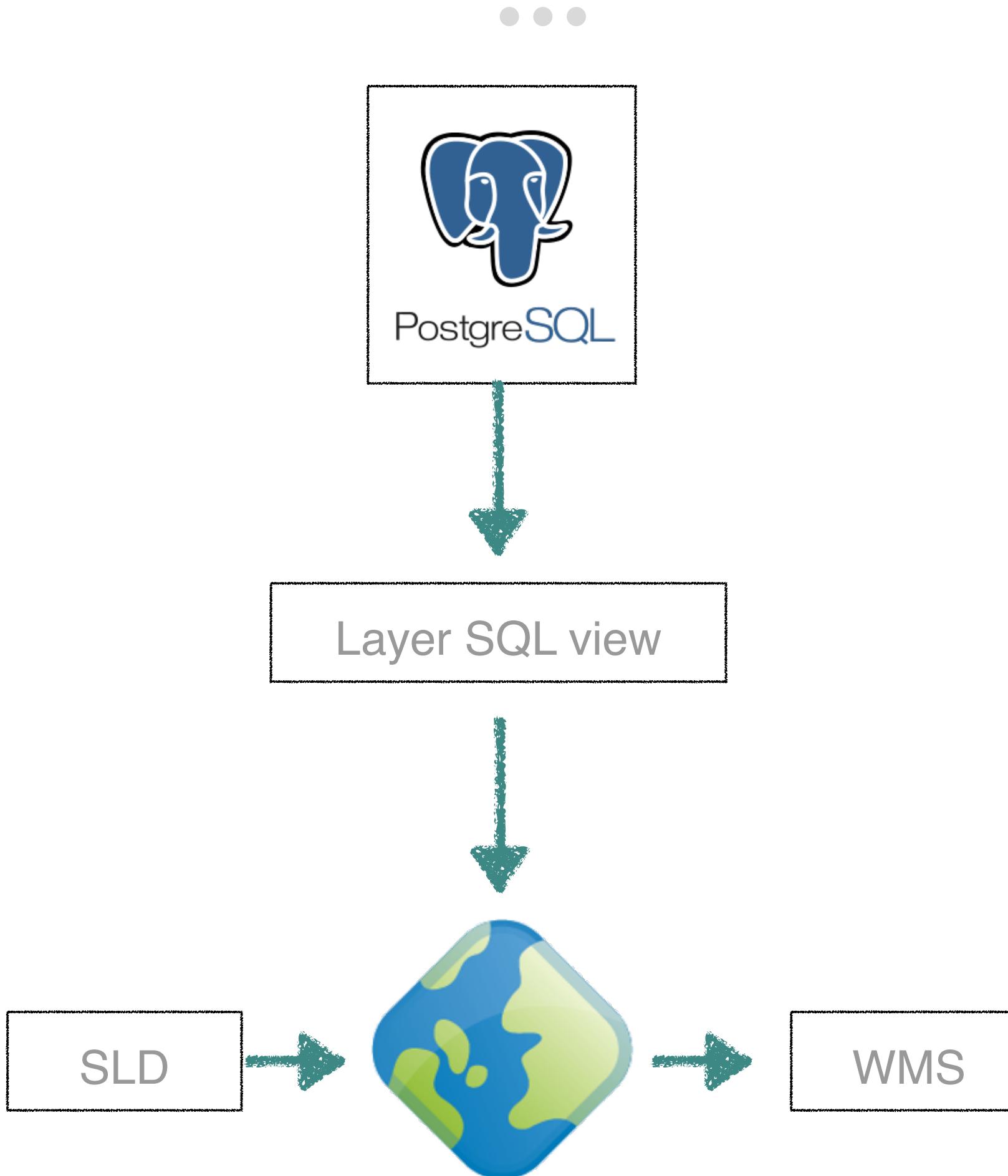
• • •



## WMS: Request GetFeatureInfo

```
http://localhost:8082/geoserver/foss4g-2019/wms?SERVICE=WMS
&VERSION=1.1.1
&REQUEST=GetFeatureInfo
&FORMAT=image/png
&TRANSPARENT=true&QUERY_LAYERS=foss4g-2019:RainToday
&STYLES
&LAYERS=foss4g-2019:RainToday
&info_format=application/json
&X=50&Y=50
&SRS=EPSG:4326
&WIDTH=101&HEIGHT=101
&BBOX=101.72241210937501,10.733642578125,103.9416503906250
1,12.952880859375
```

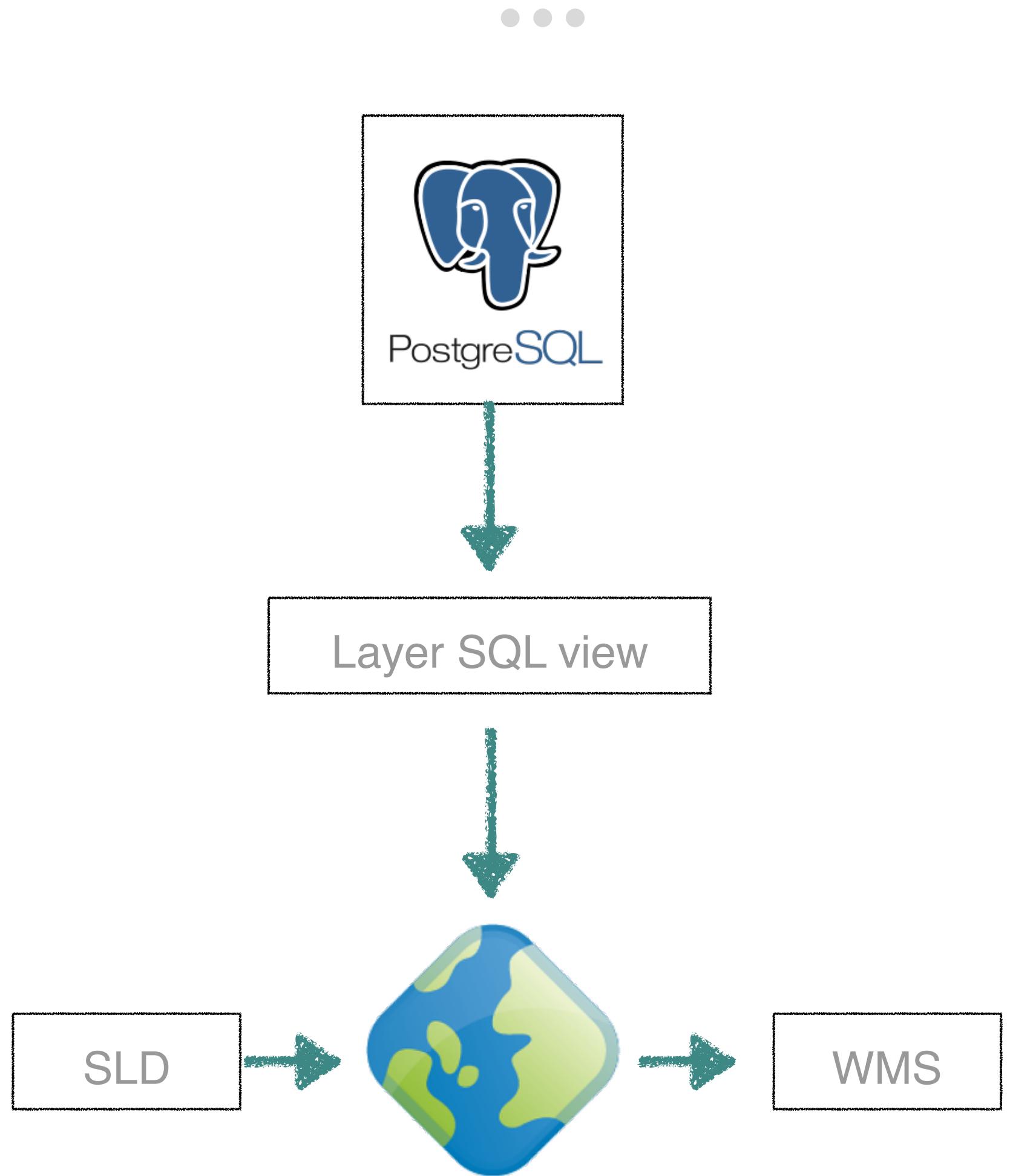
# Data service WMS



## WMS: Request GetLegendGraphic

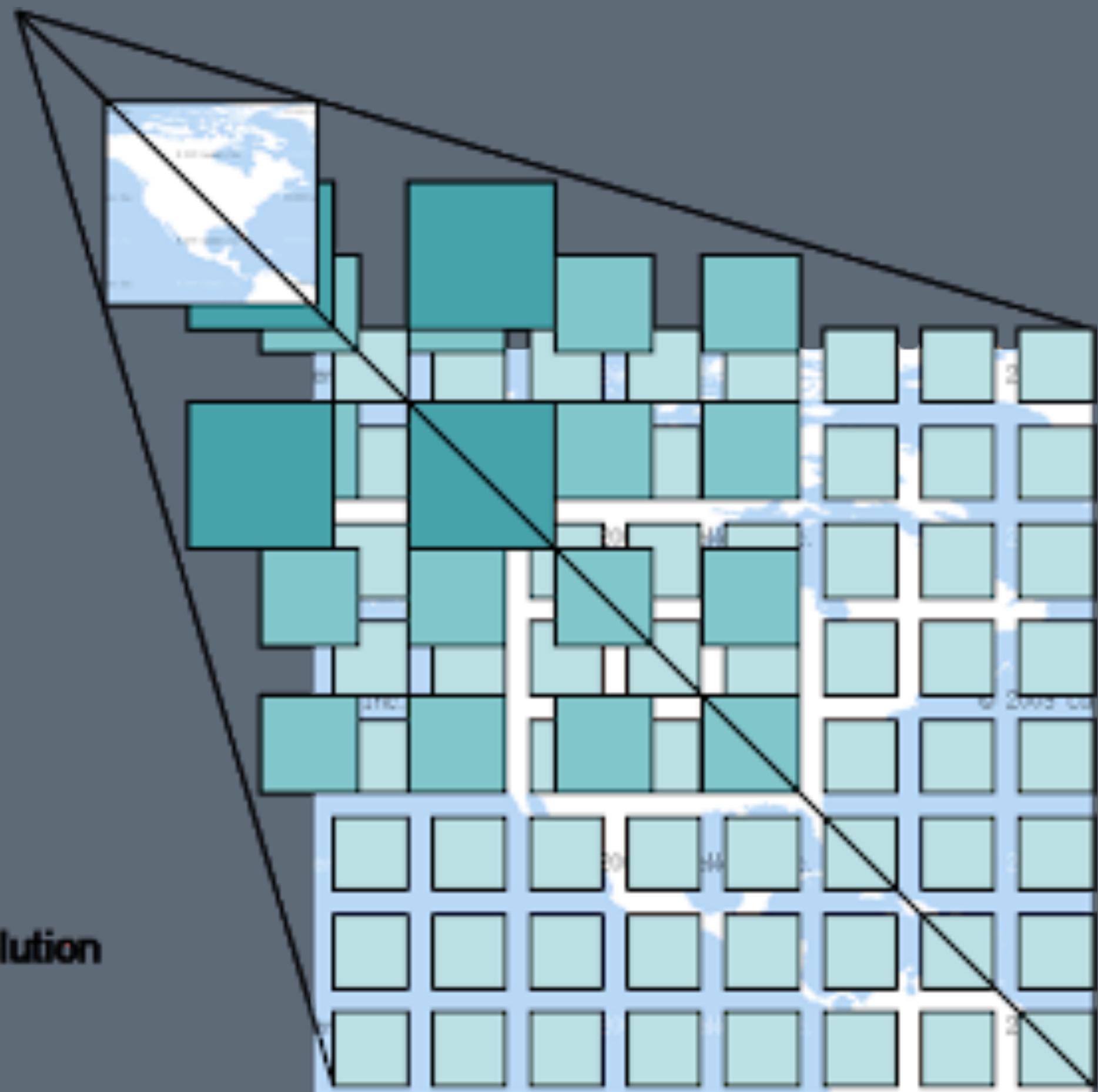
```
http://localhost:8082/geoserver/foss4g-2019/wms?service=WMS  
&request=GetLegendGraphic  
&version=1.3.0  
&FORMAT=image/png  
&WIDTH=25  
&HEIGHT=30  
&Layer=RainToday
```

# Data service WMTS



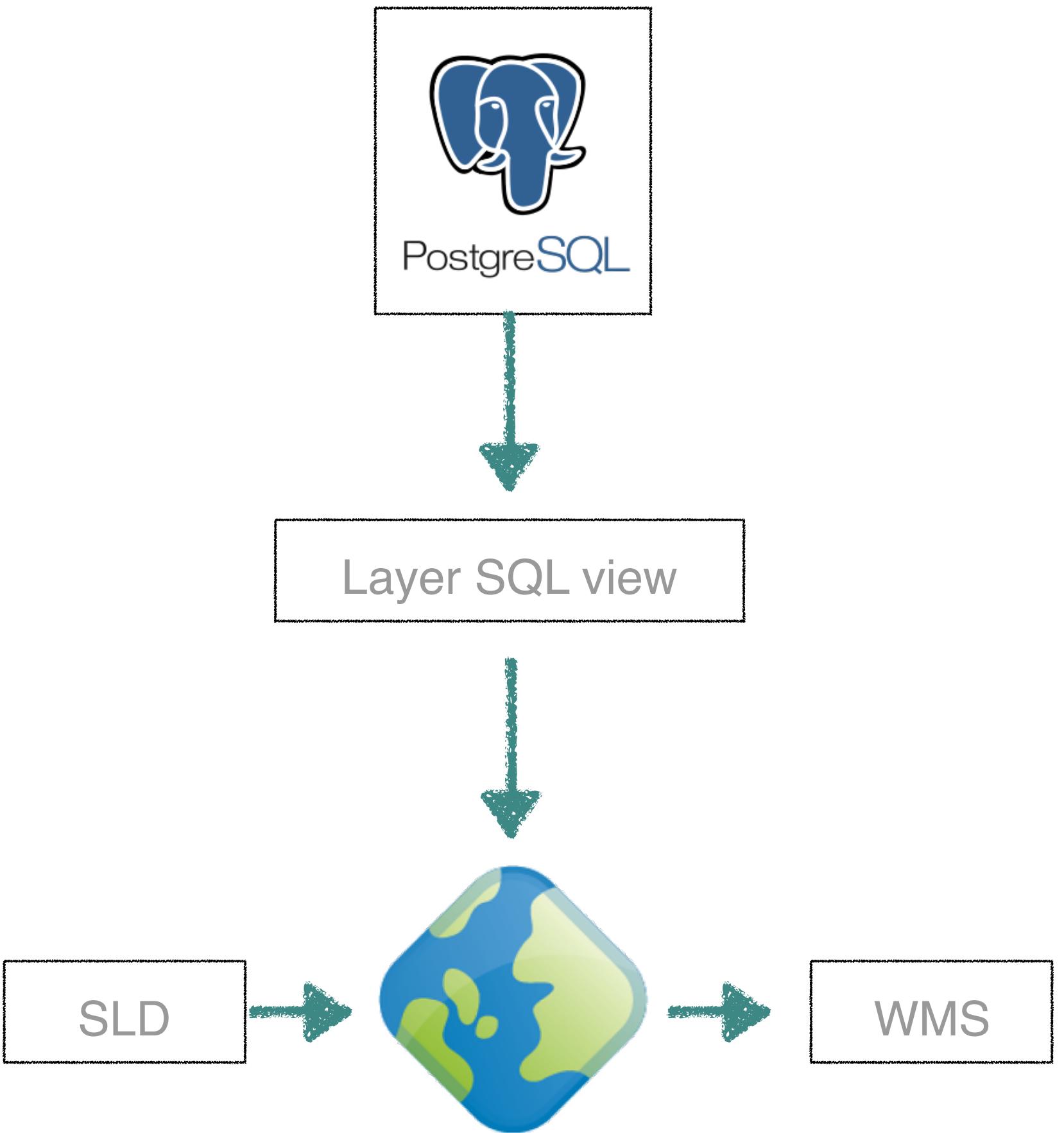
Coarse resolution  
Highest scale denominator

Detailed resolution  
Lowest scale denominator



# Data service WMTS

•••



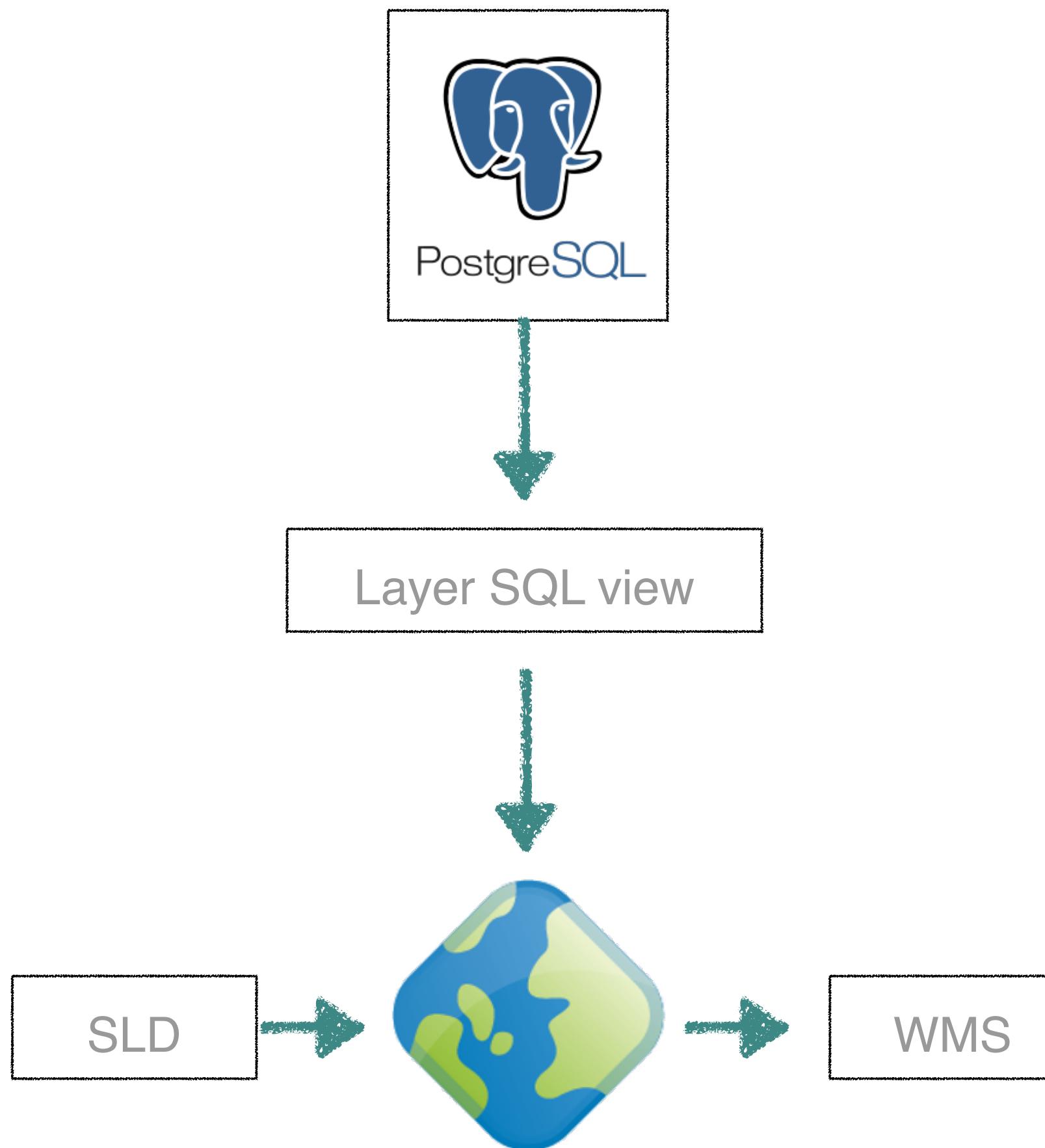
การใช้งานร้องขอข้อมูลลักษณะของแผนที่ต่าง ๆ โดยข้อมูลแผนที่จะถูกแบ่งเป็น Tile (ชิ้นของรูปภาพ) โดยผู้ร้องขอจะไม่ได้ขอมาจริงๆ ใน Layer แต่จะได้ข้อมูลที่ถูกทำ Tile ไว้แล้ว ทำให้การให้บริการรูปแบบนี้เร็วกว่าการให้บริการแบบ WMS

**WMTS: Web Map Tile Service รองรับการร้องขอบริการจากผู้ใช้**

1. GetCapabilities จะส่งค่าการให้บริการ ในส่วนของ Metadata ซึ่งเป็นตัวอธิบายเกี่ยวกับ รายละเอียดของ ข้อมูลที่ให้บริการและการยอมรับค่าตัวแปรต่าง ๆ
2. GetMap จะเป็นการส่งภาพแผนที่ซึ่งสามารถบุชั้นข้อมูล ชิ้นของ Tile แผนที่ที่ต้องการแสดงได้ ข้อมูลที่ได้จะอยู่ในรูปของไฟล์รูปภาพ เช่น PNG

# Data service WMTS

• • •



## WMTS: Reques GetCapabilities

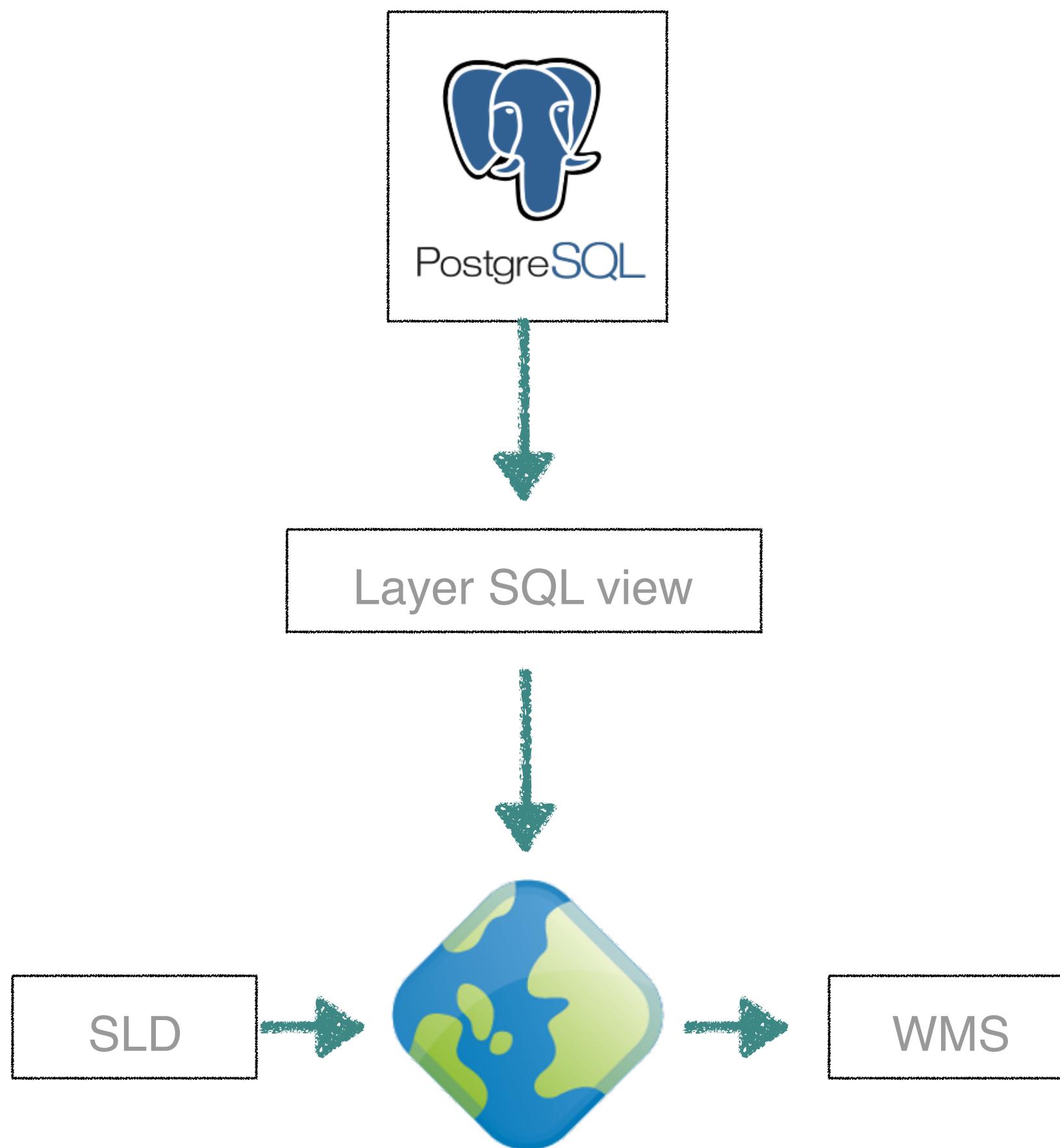
[http://localhost:8082/geoserver/ows?service=wms &version=1.1.1 &request=GetCapabilities](http://localhost:8082/geoserver/ows?service=wms&version=1.1.1&request=GetCapabilities)

```

</ows:WGS84BoundingBox>
<ows:Identifier>sattawat:Centroid</ows:Identifier>
<Style isDefault="true">
    <ows:Identifier/>
    <LegendURL width="20" height="20" format="image/png" xlink:href="http://localhost:8082/geoserver/ows?service=WMS&request=GetLegendGraphic&layer=sattawat:Centroid"/>
</Style>
<Format>image/png</Format>
<Format>image/jpeg</Format>
<InfoFormat>text/plain</InfoFormat>
<InfoFormat>application/vnd.ogc.gml</InfoFormat>
<InfoFormat>text/xml</InfoFormat>
<InfoFormat>application/vnd.ogc.gml/3.1.1</InfoFormat>
<InfoFormat>text/xml</InfoFormat>
<InfoFormat>text/html</InfoFormat>
<InfoFormat>application/json</InfoFormat>
<TileMatrixSetLink>
    <TileMatrixSet>EPSG:4326</TileMatrixSet>
    <TileMatrixSetLimits>
        <TileMatrixLimits>
            <TileMatrix>EPSG:4326:0</TileMatrix>
            <MinTileRow>0</MinTileRow>
            <MaxTileRow>0</MaxTileRow>
            <MinTileCol>1</MinTileCol>
            <MaxTileCol>1</MaxTileCol>
        </TileMatrixLimits>
    </TileMatrixSetLimits>
</TileMatrixSetLink>
  
```

# Data service WMTS

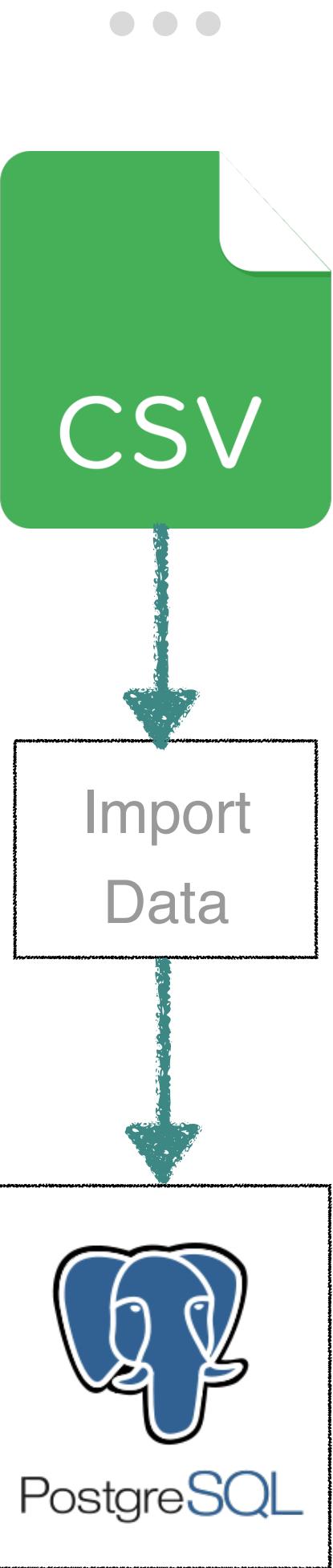
...



## WMTS: Request GetMap

```
http://localhost:8082/geoserver/gwc/service/wmts?  
layer=foss4g-2019:RainToday  
&style=  
&tilematrixset=EPSG:4326  
&Service=WMTS  
&Request=GetTile  
&Version=1.0.0  
&Format=image/png  
&TileMatrix=EPSG:4326:0  
&TileCol=1&TileRow=0
```

# Import CSV To PostgreSQL



pgAdmin 4

Import/Export data - table 'TMD-today'

**Options** **Columns**

**Import**

**File Info**

Filename: E:\foss4g-2019\Day\TMD\day-01-11-2019-2.csv

Format: csv

Encoding: UTF8

**Miscellaneous**

OID: No

Header: No

Delimiter: Select from list...

Quote: "

Escape:

Specifies the character that separates columns within each row (line) of the file. The default is a tab character in text format, a comma in CSV format. This must be a single one-byte character. This option is not allowed when using binary format.

Specifies the quoting character to be used when a data value is quoted. The default is double-quote. This must be a single one-byte character. This option is allowed only when using CSV format.

Specifies the character that should appear before a data character that matches the QUOTE value. The default is the same as the QUOTE value (so that the quoting character is doubled if it appears in the data). This must be a single one-byte character. This option is allowed only when using CSV format.

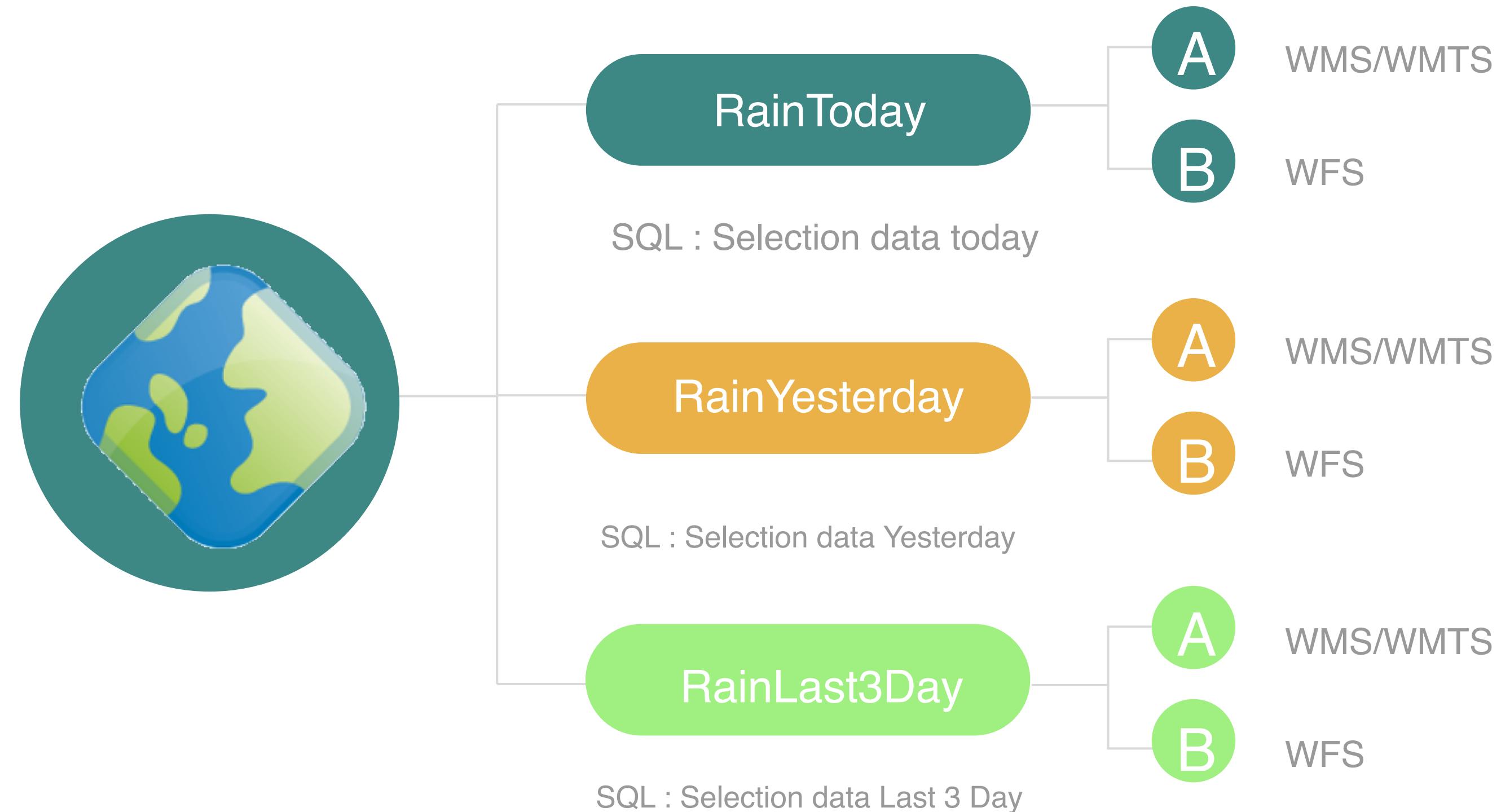
243	48315	0	16.7	31/10/2019	
244	48350	0	16.6	31/10/2019	
245	48333	0	16	31/10/2019	
246	48307	0	15	31/10/2019	

OK Cancel

Basic to Advance GeoServer

# Create Vector Layer

• • •



**Edit SQL view**

Update the definition of the SQL view and its metadata

**View Name:** RainToday

**SQL statement:**

```
Select "name","to_date","rain","geom" from "TMD_join" WHERE "to_date" = CURRENT_DATE
```

**SQL view parameters:**

Name	Type	Default value	Validation regular expression
name	String		
to_date	Date		
rain	String		
geom	Geometry	4326	

**Settings:**

- Global
- Image Processing
- Raster Access

**Tile Caching:**

- Tile Layers
- Caching Defaults
- Gridsets
- Disk Quota
- BlobStores

**Security:**

- Settings
- Authentication
- Passwords
- Users, Groups, Roles
- Data
- Services
- WPS security

**Monitor:**

- Activity

**Layers**

Manage the layers being published by GeoServer

**Add a new layer**

**Remove selected layers**

**Data:**

Type	Title	Name	Store	Enabled	Native SRS
Buffer	sattawat:Buffer	postgis	✓	✓	EPSG:4326
Centroid	sattawat:Centroid	postgis	✓	✓	EPSG:4326
Contains	sattawat:Contains	postgis	✓	✓	EPSG:4326
buffer_viewparam	sattawat:buffer_viewparam	postgis	✓	✓	EPSG:4326
test	sattawat:test	postgis	✓	✓	EPSG:4326
Rain Today	foss4g-2019:Rain Today	postgis-foss4g	✓	✓	EPSG:4326

**Services:**

- CSW
- WMTS
- WCS
- WFS
- WMS
- WPS

**Settings:**

- Global
- Image Processing
- Raster Access

**Tile Caching:**

- Tile Layers
- Caching Defaults
- Gridsets
- Disk Quota
- BlobStores

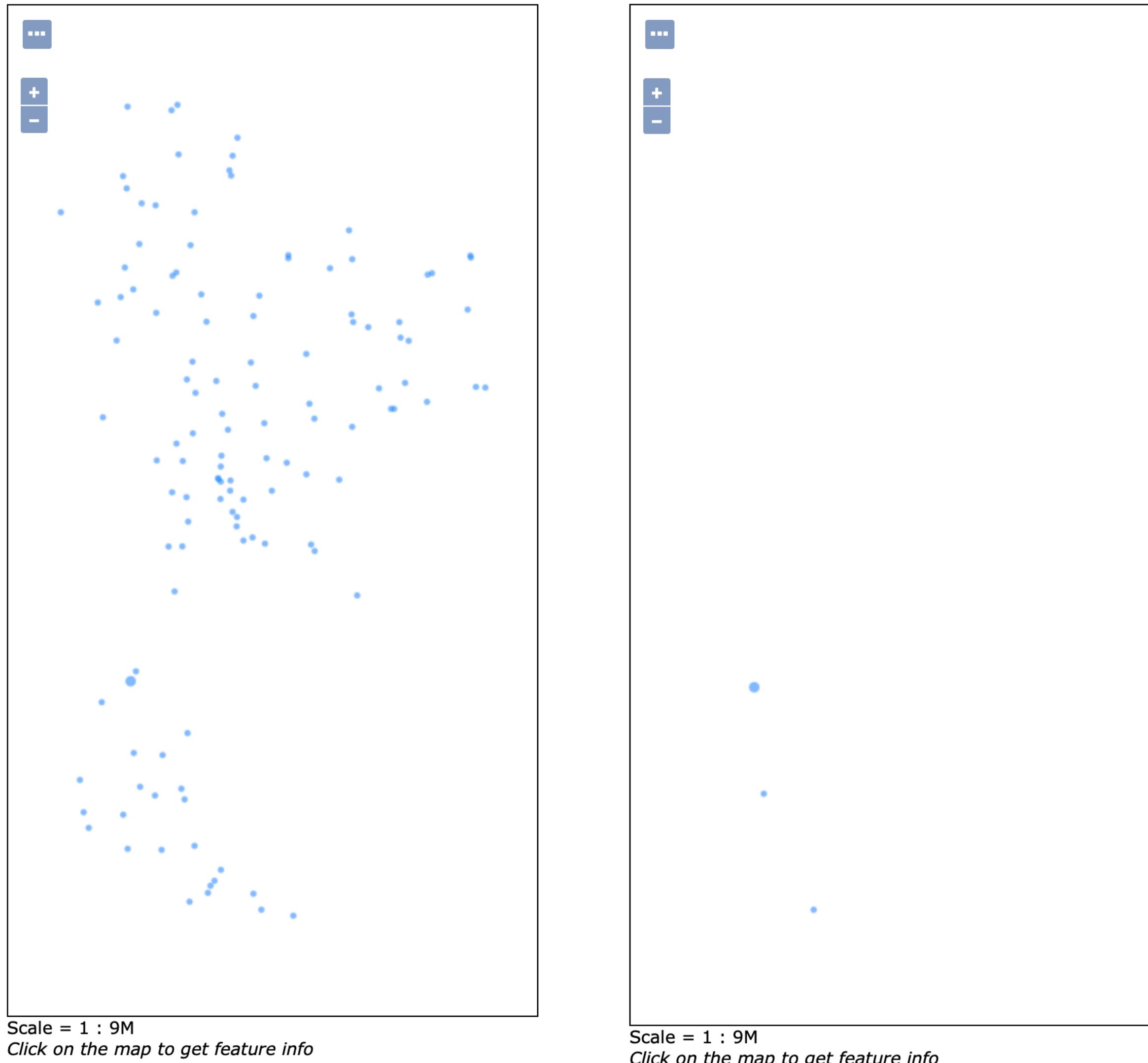
**Security:**

- Settings
- Authentication
- Passwords
- Users, Groups, Roles
- Data
- Services
- WPS security

**Monitor:**

- Activity

# CQL (Common Query Language)

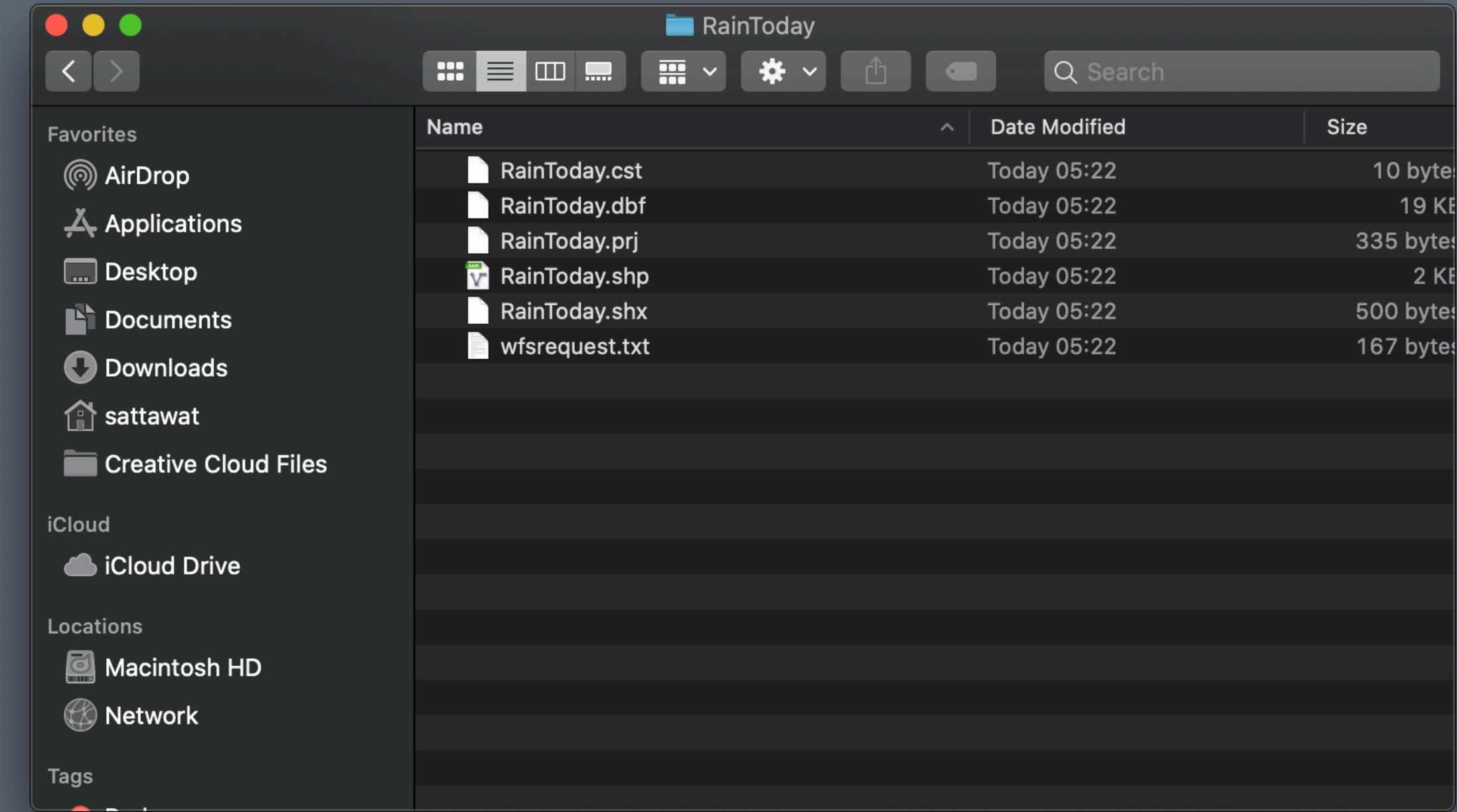
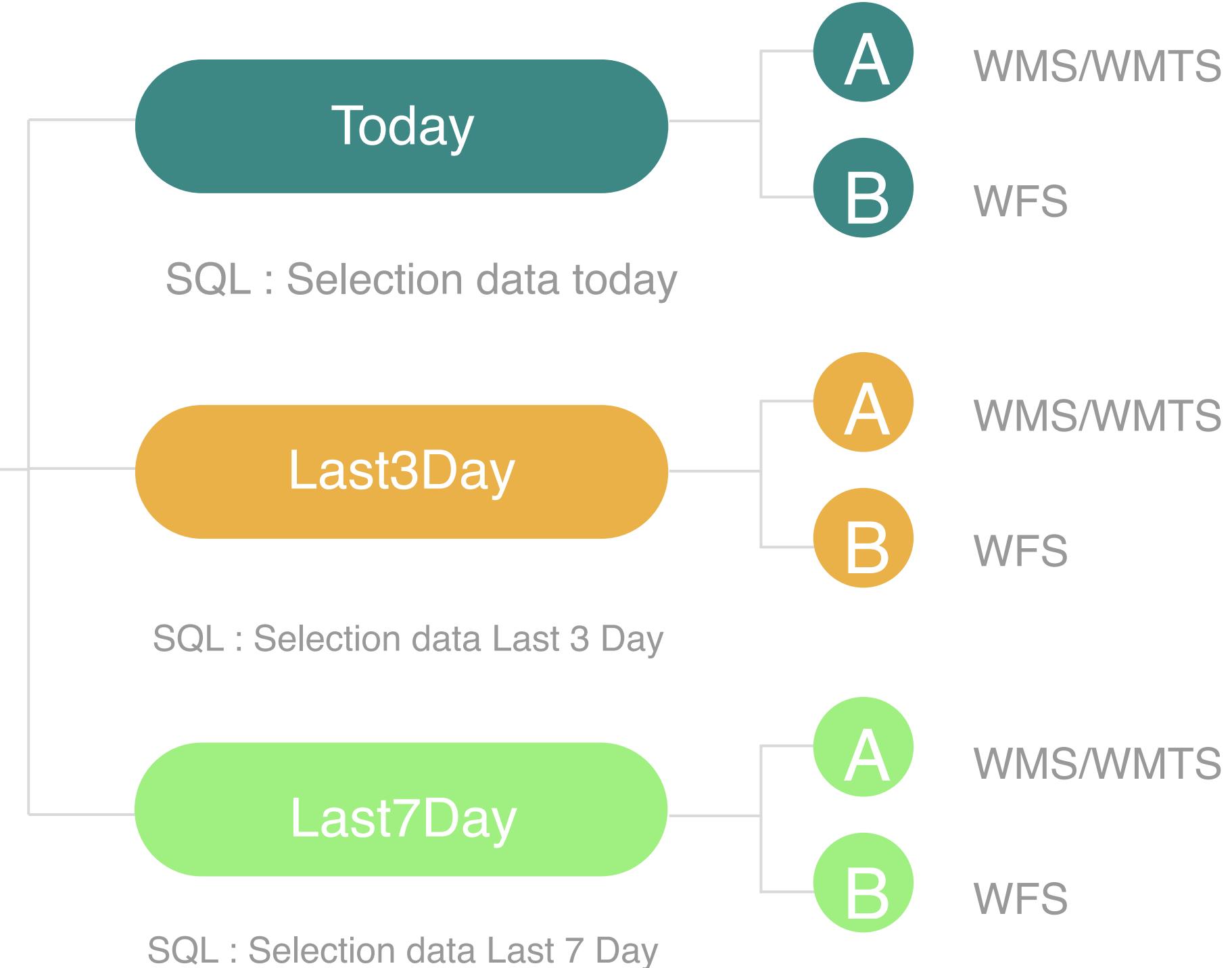
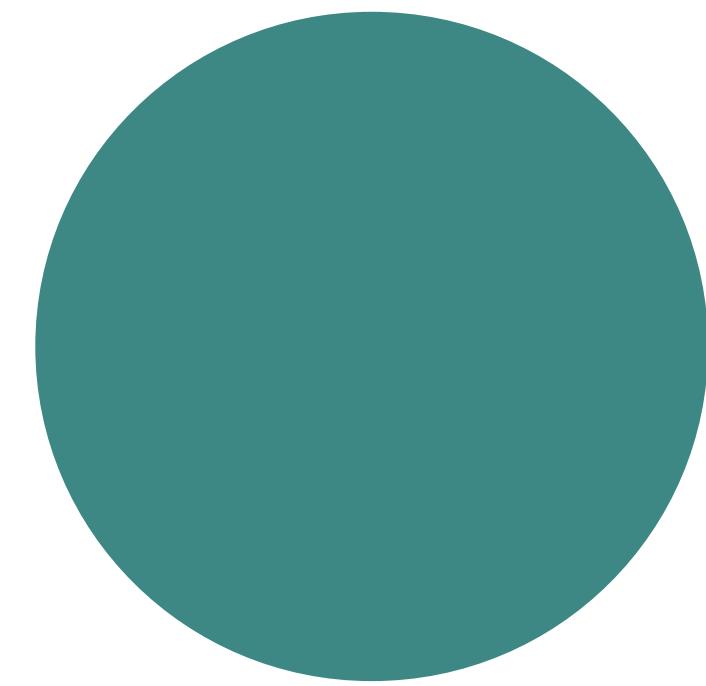


CQL ==> Rain > 5 mm

```
http://localhost:8082/geoserver/foss4g-2029/wms?  
service=WMS  
&version=1.1.0  
&request=GetMap  
&layers=foss4g-2029:RainToday  
&bbox=97.93333333,6.41666667,105.0235,19.96138889  
&width=402&height=768  
&srs=EPSG:4326  
&format=application/openlayers  
&CQL_FILTER=rain>5
```

# Data service WFS

• • •



```

http://localhost:8082/geoserver/foss4g-2019/ows?
service=WFS
&version=1.0.0
&request=GetFeature
&format_options=CHARSET=UTF-8
&typeName=foss4g-2029:RainToday
&outputFormat=SHAPE-ZIP
  
```

# WFS View params

• • •

Create new SQL view

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

View Name: RainBydate

SQL statement:

```
Select "name", "to_date", "rain", "geom"
from "TMD_join"
WHERE "to_date" = %to_date%
```

SQL view parameters:

- Name: to\_date, Default value: '2019-10-30', Validation regular expression: ^[\w\d\\$]+\$
- Escape special SQL characters

Attributes:

Name	Type	SRID	Identifier
name	String		<input type="checkbox"/>
to_date	Date		<input type="checkbox"/>
rain	Double		<input type="checkbox"/>
geom	Geometry	4326	<input type="checkbox"/>

**Save** **Cancel**

## WFS Provide by date

[http://localhost:8082/geoserver/foss4g-2019/ows?  
service=WFS  
&version=1.0.0  
&request=GetFeature  
&format\\_options=CHARSET=UTF-8  
&typeName=foss4g-2019:RainBydate  
&outputFormat=SHAPE-ZIP  
&viewparams=date:2019-10-30](http://localhost:8082/geoserver/foss4g-2019/ows?service=WFS&version=1.0.0&request=GetFeature&format_options=CHARSET=UTF-8&typeName=foss4g-2019:RainBydate&outputFormat=SHAPE-ZIP&viewparams=date:2019-10-30)

# WFS View params

• • •

## Create new SQL view

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

View Name  
RainBydate-date

SQL statement

```
Select "name","to_date","rain","geom" from
"TM_D_join"
WHERE "to_date" = '%start_date%' or "to_date"
<= %end_date%'
```

SQL view parameters

Guess parameters from SQL Add new parameter Remove selected

Name	Default value	Validation regular expression
<input type="checkbox"/> end_date	2019-10-30	^[w\d\\$]+\$
<input type="checkbox"/> start_date	2019-10-31	^[w\d\\$]+\$

Escape special SQL characters

Attributes

Refresh  Guess geometry type and srid

Name	Type	SRID	Identifier
name	String		<input type="checkbox"/>
to_date	Date		<input type="checkbox"/>
rain	Double		<input type="checkbox"/>
geom	Geometry	4326	<input type="checkbox"/>

**Save** **Cancel**

## WFS Provide by Start date to End date

[http://localhost:8082/geoserver/foss4g-2019/ows?  
service=WFS  
&version=1.0.0  
&request=GetFeature  
&format\\_options=CHARSET=UTF-8  
&typeName=foss4g-2019:RainBydate  
&outputFormat=SHAPE-ZIP  
&viewparams=start\\_date:2019-10-30;  
end\\_date:2019-11-01](http://localhost:8082/geoserver/foss4g-2019/ows?service=WFS&version=1.0.0&request=GetFeature&format_options=CHARSET=UTF-8&typeName=foss4g-2019:RainBydate&outputFormat=SHAPE-ZIP&viewparams=start_date:2019-10-30;end_date:2019-11-01)

# Processing Buffer Using PostGIS

• • •

The screenshot shows the pgAdmin 4 interface. On the left is the 'Browser' tree, which includes 'Extensions', 'Foreign Data Wrappers', 'Languages' (with 'public' selected), 'Schemas (2)', 'Tables (4)' (including 'Centroids', 'TMD-today', 'TMDStation', 'spatial\_ref\_sys', 'Trigger Functions', 'Types', 'Views (6)' containing 'TMD\_data', 'TMD\_join', 'geography\_columns', 'geometry\_columns', 'raster\_columns', and 'raster\_overviews'), and 'topology'. Other schemas listed are 'postgis', 'postgres', 'sattawat', 'sattawat2', and 'test'. The main area shows a SQL query window with the following code:

```

1 SELECT "WmoNumber", "rain",
2 ST_Buffer("TMD_join".geom,0.05::double precision) AS the_geom
3 FROM public."TMD_join"
4 where "rain" > 10
5
6
7

```

Below the query is a 'Create - View' dialog box. It has tabs for 'General', 'Definition', 'Security', and 'SQL'. The 'Definition' tab is active, showing the same SQL code. The 'Data Output' tab displays a table with 20 rows of data, each with columns 'WmoNumber' (character varying), 'rain' (double precision), and 'the\_geom' (geometry). The 'Definition' tab also contains the same SQL code.

สถานที่ที่อยู่ในรัศมีที่มีปริมาณน้ำฝนมากกว่า 10 มม. ใช้การอ้างอิงจากสถานีตรวจวัด โดยใช้ความสามารถของ PostGIS

## Using function

1. ST\_Buffer for create buffer
2. ST\_Contains for create point in polygon

# Processing Buffer Using PostGIS

• • •

The screenshot shows the pgAdmin 4 interface. On the left is the 'Browser' pane, which lists various database objects like extensions, schemas, tables, and views. In the center, a 'Query' window displays a SQL script:

```

1 SELECT "WmoNumber", "rain",
2 ST_Buffer("TMD_join".geom,0.05::double precision) AS the_geom
3 FROM public."TMD_join"
4 where "rain" > 10
5
6
7

```

A 'Create - View' dialog is open over the query window. It has tabs for General, Definition, Security, and SQL. The 'Definition' tab contains the same SQL script. Below the tabs is a 'Data Output' section with a table preview showing columns: WmoNumber, rain, double precision, and the\_geom geometry. The table body lists 20 rows of data. At the bottom of the dialog are buttons for Save, Cancel, and Reset.

**SELECT**

**"Centroids"."amp\_code",  
"Centroids"."amp\_nam\_t",  
"Centroids"."geom"  
from "Centroids","rain\_10"**

**where**

**ST\_Contains("rain\_10".the\_geom  
, "Centroids".geom)**

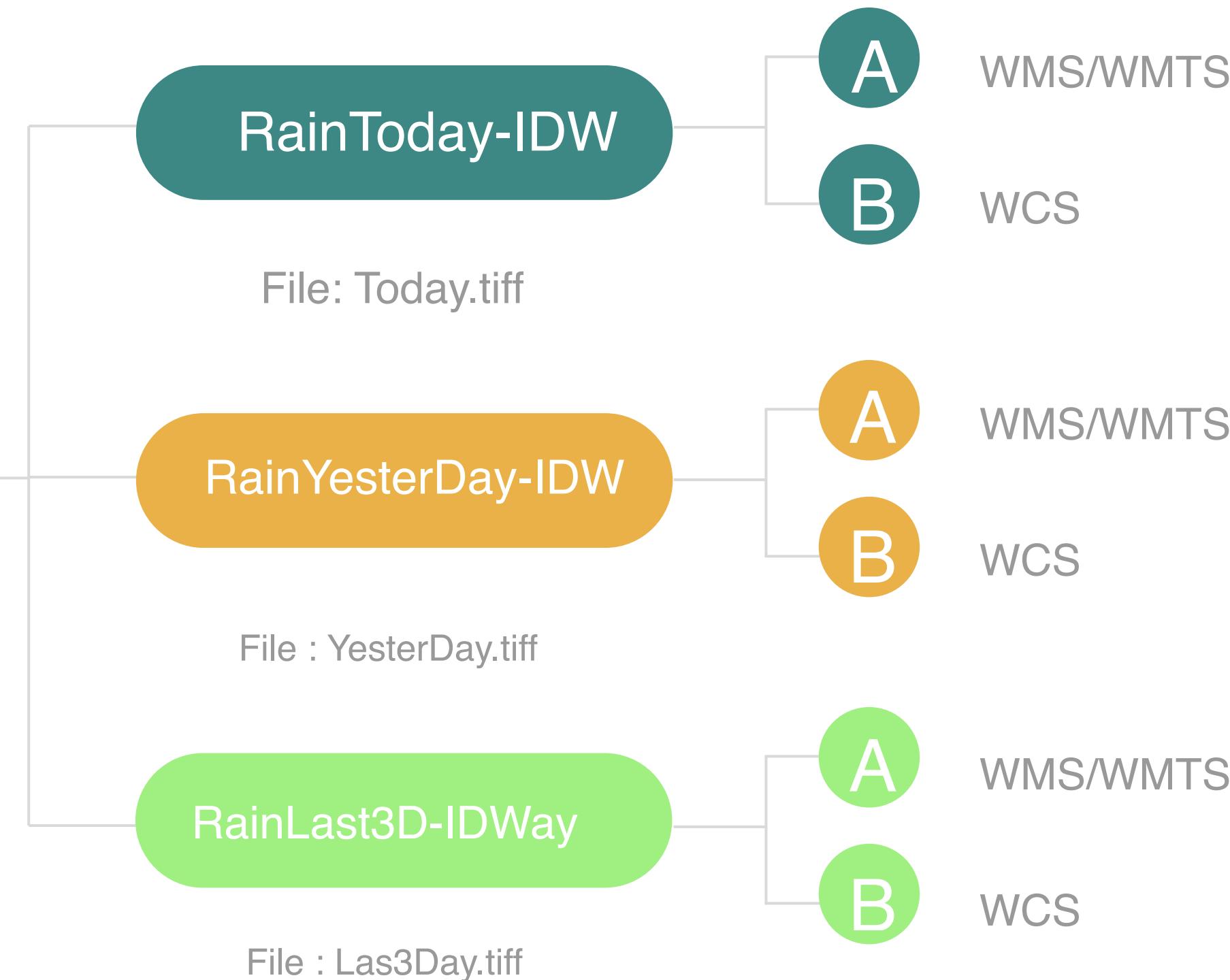
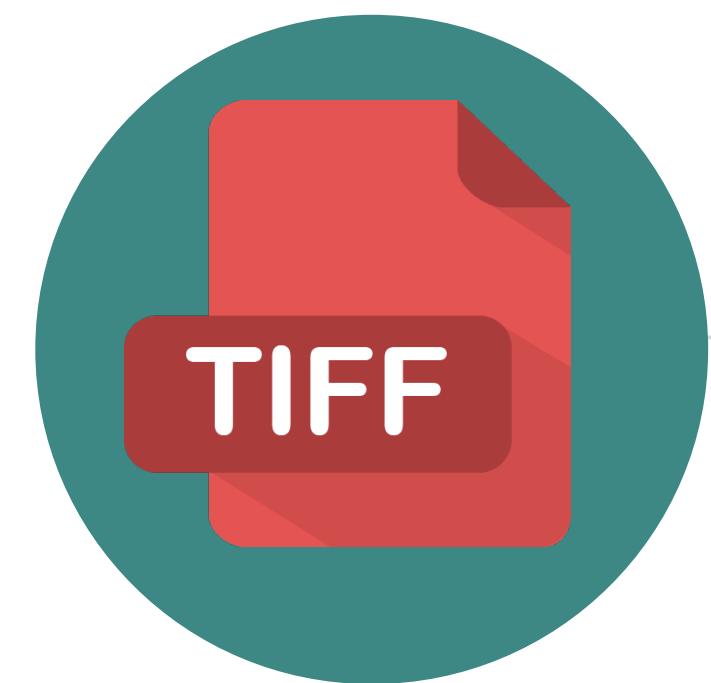


i-bitz company limited  
THE GEOMATICS COMPANY



# Create Raster Layer

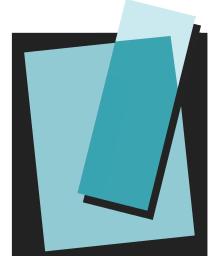
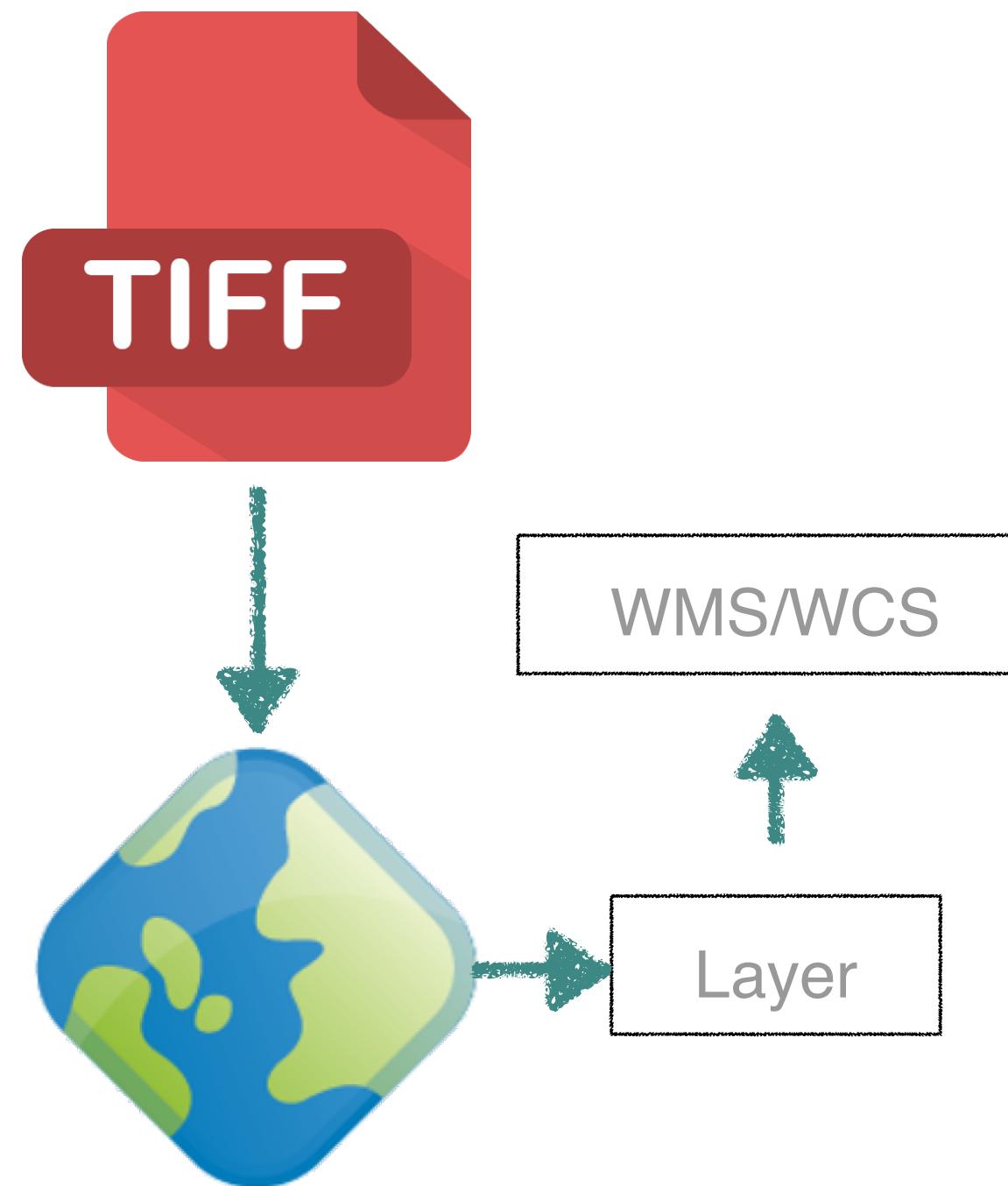
...



1. RainToday-IDW
2. RainResterday-IDW
3. RainLast3day-IDW

# Data service WCS

•••



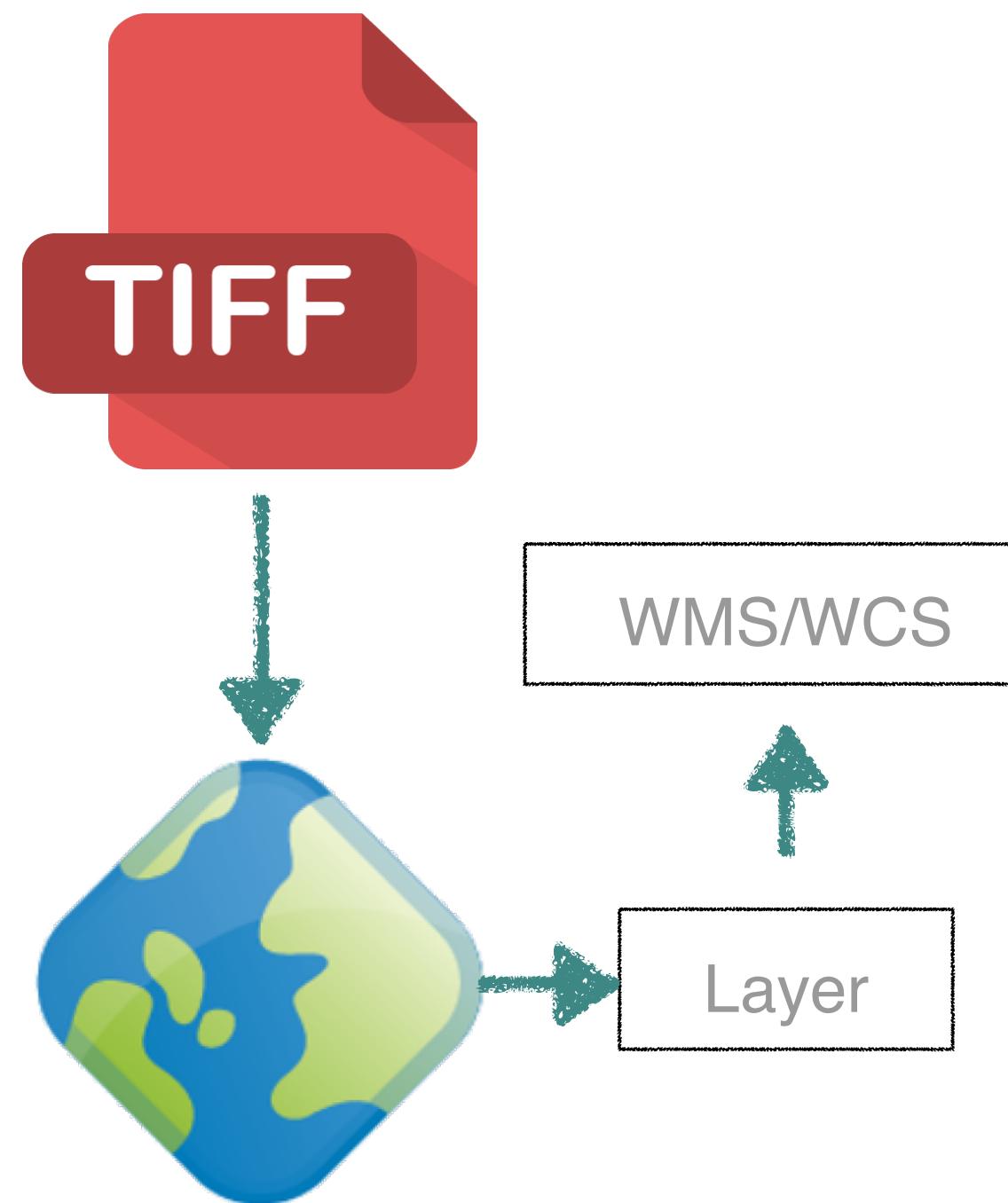
## Request : GetCapabilities

[http://localhost:8082/geoserver/ows?  
service=wcs&version=1.0.0&request=GetCapabilities](http://localhost:8082/geoserver/ows?service=wcs&version=1.0.0&request=GetCapabilities)

```
<wcs:ContentMetadata>
  <wcs:CoverageOfferingBrief>
    <wcs:description>Generated from GeoTIFF</wcs:description>
    <wcs:name>Phuket-Vichit:DEM</wcs:name>
    <wcs:label>DEM</wcs:label>
    <wcs:lonLatEnvelope srsName="urn:ogc:def:crs:OGC:1.3:CRS84">
      <gml:pos>98.22959174894233 7.450577754629645</gml:pos>
      <gml:pos>98.51158610417316 8.228418977091476</gml:pos>
    </wcs:lonLatEnvelope>
    <wcs:keywords>
      <wcs:keyword>TH83</wcs:keyword>
      <wcs:keyword>WCS</wcs:keyword>
      <wcs:keyword>GeoTIFF</wcs:keyword>
    </wcs:keywords>
  </wcs:CoverageOfferingBrief>
  <wcs:CoverageOfferingBrief>
    <wcs:description>Generated from GeoTIFF</wcs:description>
    <wcs:name>foss4g-2029:RainToday-IDW</wcs:name>
    <wcs:label>RainToday-IDW</wcs:label>
    <wcs:lonLatEnvelope srsName="urn:ogc:def:crs:OGC:1.3:CRS84">
      <gml:pos>97.2937 5.562737800000001</gml:pos>
      <gml:pos>105.686780115 20.514644399</gml:pos>
    </wcs:lonLatEnvelope>
    <wcs:keywords>
      <wcs:keyword>2019-10-31</wcs:keyword>
      <wcs:keyword>WCS</wcs:keyword>
      <wcs:keyword>GeoTIFF</wcs:keyword>
    </wcs:keywords>
  </wcs:CoverageOfferingBrief>
</wcs:ContentMetadata>
```

# Data service WCS

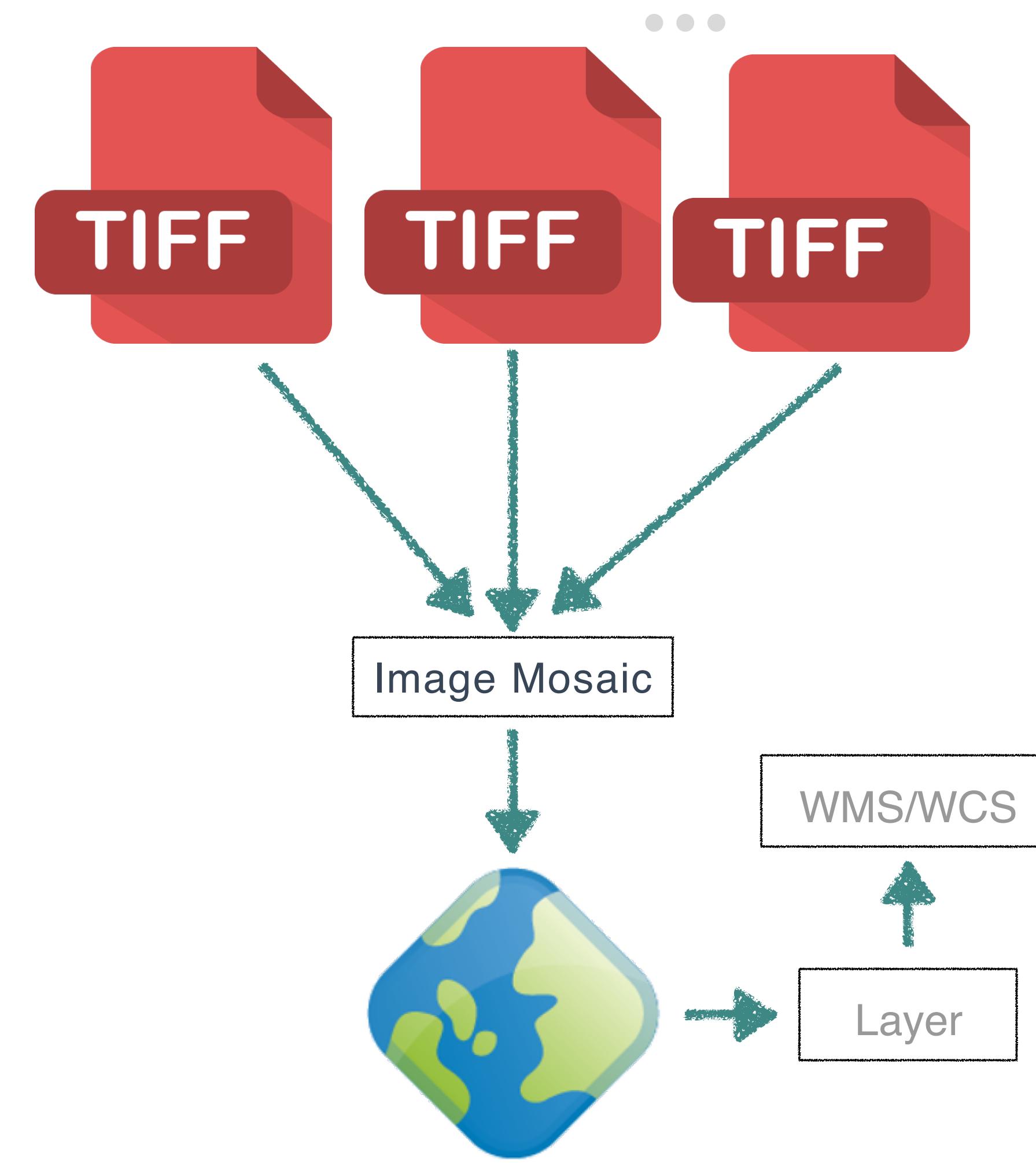
...



## Request : GetCoverage

```
http://localhost:8082/geoserver/ows?service=wcs  
&version=1.0.0  
&request=getcoverage  
&format=geotiff  
&bbox=97,5,106,21  
&width=1000&height=1800  
&crs=epsg:4326  
&interpolation=nearest:neighbor  
&coverage=foss4g-2019:RainToday-IDW
```

# ImageMosaic



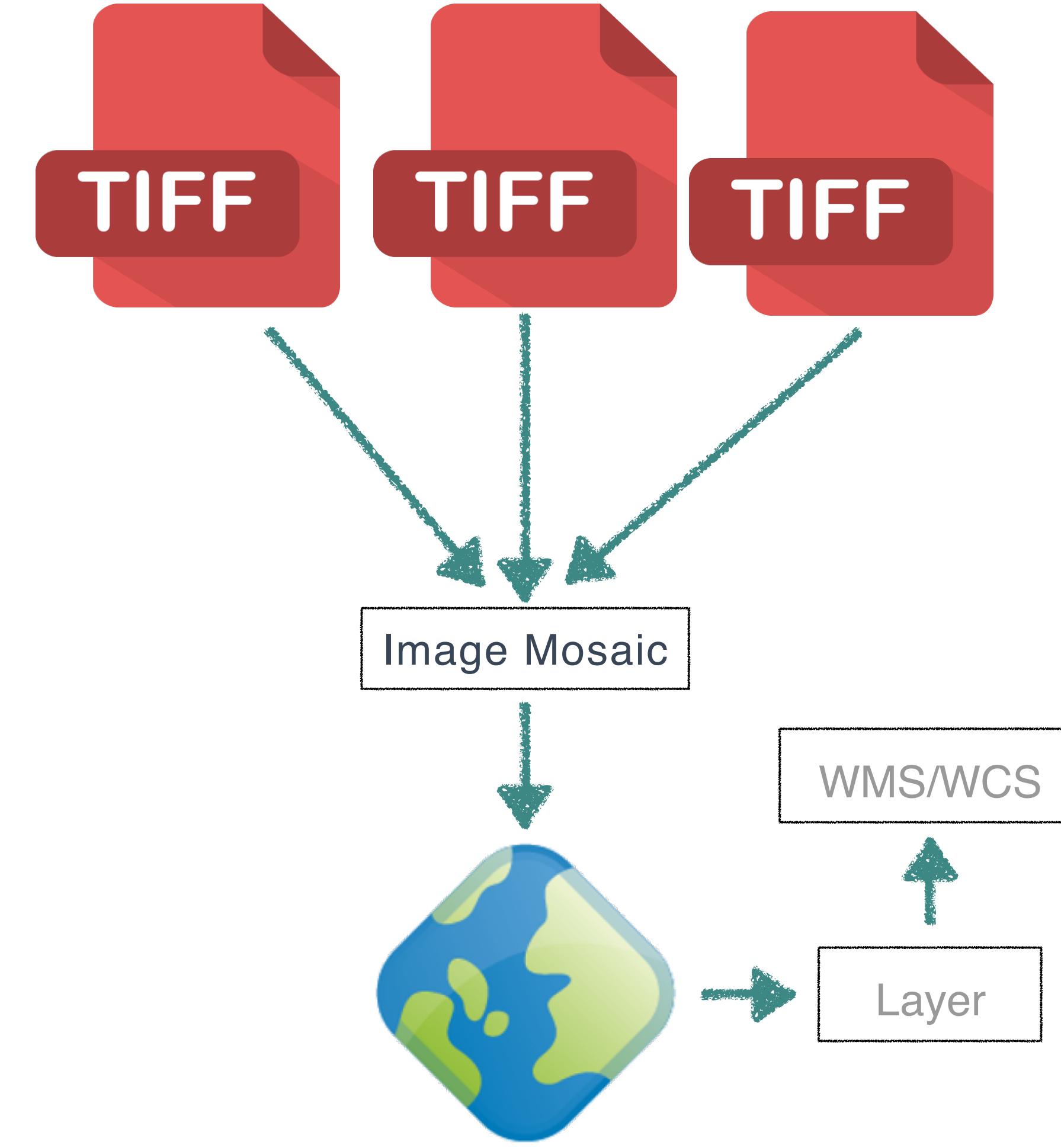
## Create file

Name	Date Modified	Size
im_2019-10-29.tif.aux.xml	Today 17:03	324 bytes
im_20191029.tif	Today 17:00	103 KB
im_20191029.tif.aux.xml	Today 17:03	324 bytes
im_20191030.tif	Today 17:00	103 KB
im_20191030.tif.aux.xml	Today 17:03	324 bytes
im_20191031.tif	Today 12:52	103 KB
im_20191031.tif.aux.xml	Today 17:03	325 bytes
indexer.properties	Today 16:44	160 bytes
timeregex.properties	Today 16:43	14 bytes

- indexer.properties
- timeregex.properties

# ImageMosaic

...

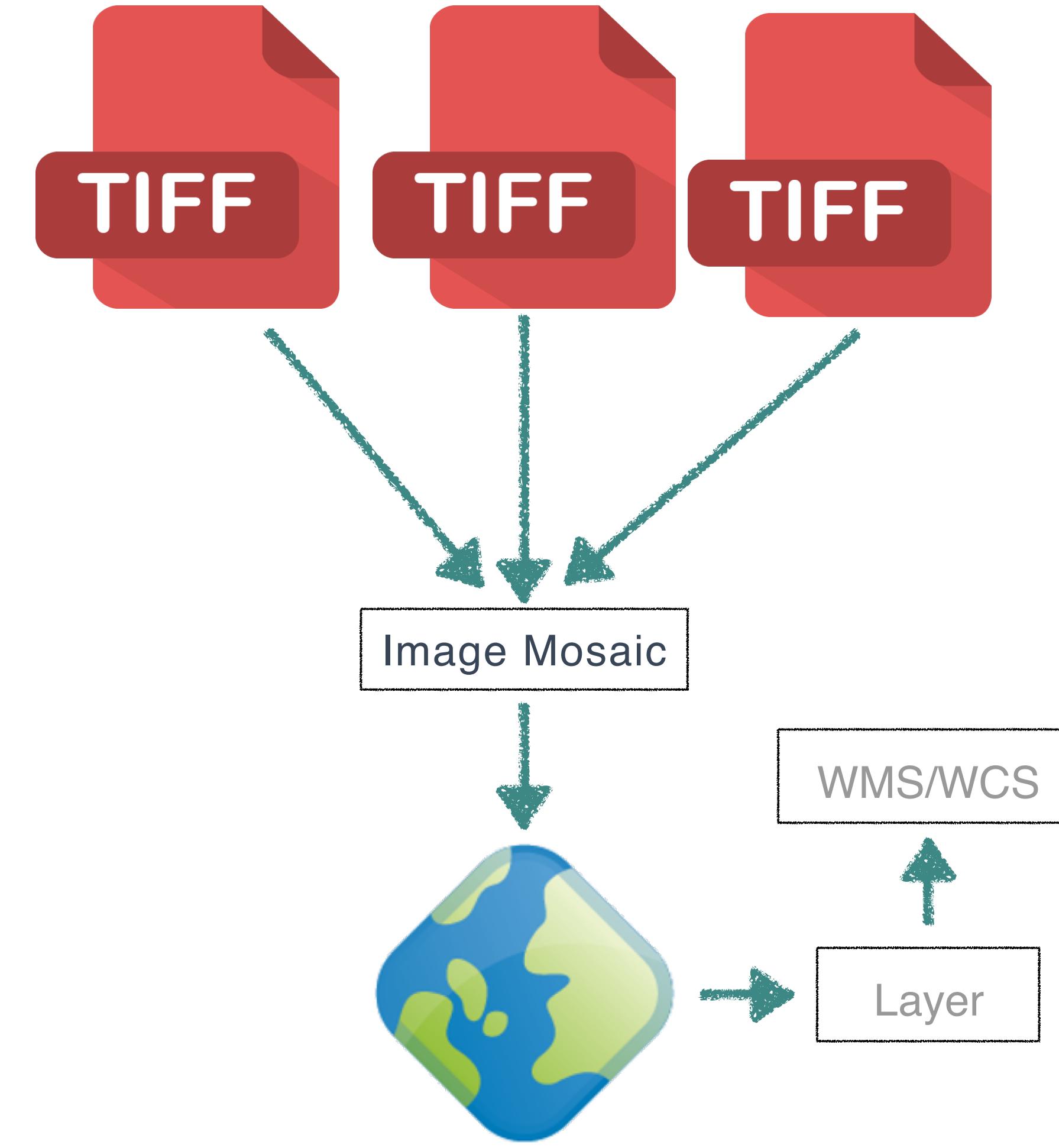


## WMS Provide by date

```
http://localhost:8082/geoserver/foss4g-2019/wms?service=WMS  
&version=1.1.0  
&request=GetMap  
&layers=foss4g-2019:ImageMosaic  
&bbox=97.2937,5.562737800000001,105.686780115,20.514644399  
&width=431&height=768  
&srs=EPSG%3A4326  
&format=application/openlayers  
&TIME=2019-10-30
```

# ImageMosaic

...

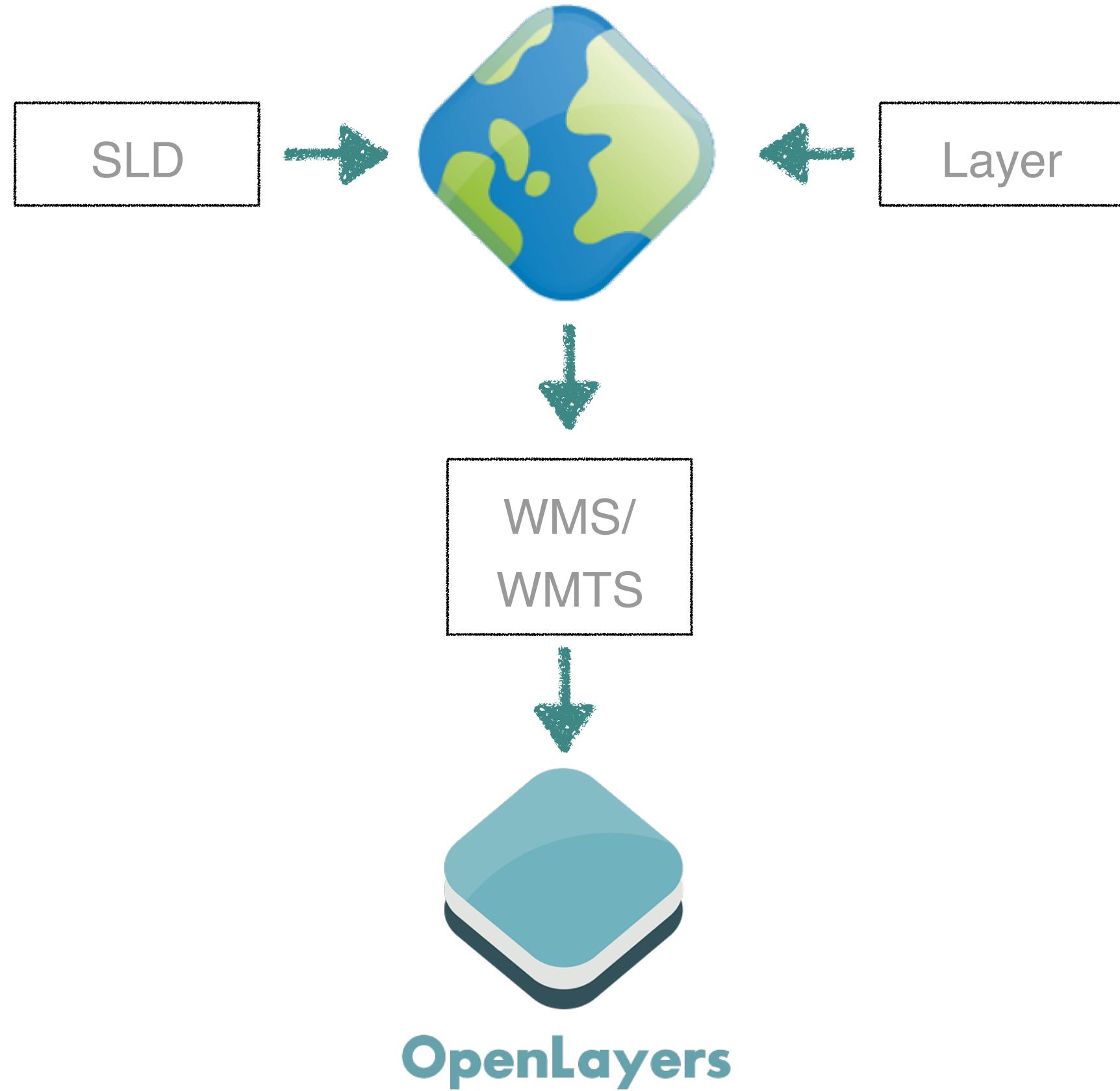


## WCS Provide by date

`http://localhost:8082/geoserver/ows?service=wcs  
&version=1.0.0  
&request=getcoverage  
&format=geotiff  
&bbox=97,5,106,21  
&width=1000&height=1800  
&crs=epsg:4326  
&interpolation=nearest:neighbor  
&coverage=foss4g-2019:ImageMosaic  
&TIME=2019-10-30`

# OpenLayers

• • •



```

view: new ol.View({
  center: ol.proj.fromLonLat([100, 13]),
  zoom: 6
});

var btnShowWms = document.getElementById('showWms');
var btnHideWms = document.getElementById('hideWms');
var showCountry = document.getElementById('showCountry');

btnShowWms.onclick = function() {
  removeExistingWms();
  var wmsSourceProvince = new ol.source.ImageWMS({
    url: 'http://localhost/geoserver/foss4g-2019/wms?',
    params: {
      'LAYERS': 'foss4g-2019:RainToday'
    },
  });

  wmsLayerProvince = new ol.layer.Image({source: wmsSourceProvince});
  map.addLayer(wmsLayerProvince);

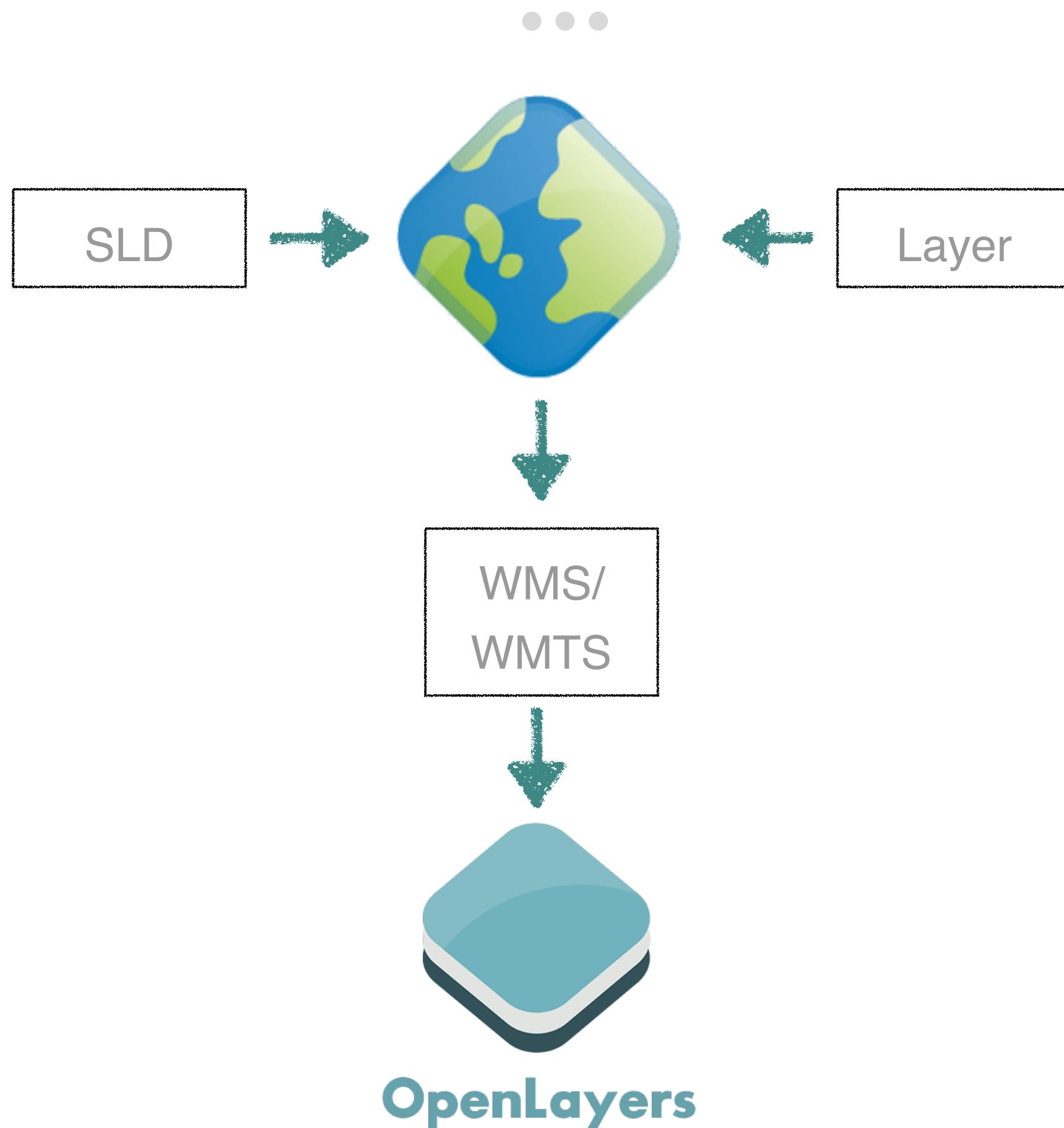
  map.getView().fit(ol.proj.transformExtent([98.464198, 8.182077, 98.250123, 7.723311], 'EPSG:4326')
}

btnHideWms.onclick = function() {
  removeExistingWms();
}

showCountry.onclick = function() {
  map.setView(
    new ol.View({
      center: ol.proj.fromLonLat([100.4833, 13.7500]),
      zoom: 6
    })
);
}

function removeExistingWms() {
  if (typeof wmsLayerProvince === 'object') {
    map.removeLayer(wmsLayerProvince);
  }
}
  
```

# OpenLayers Call Layer WMS

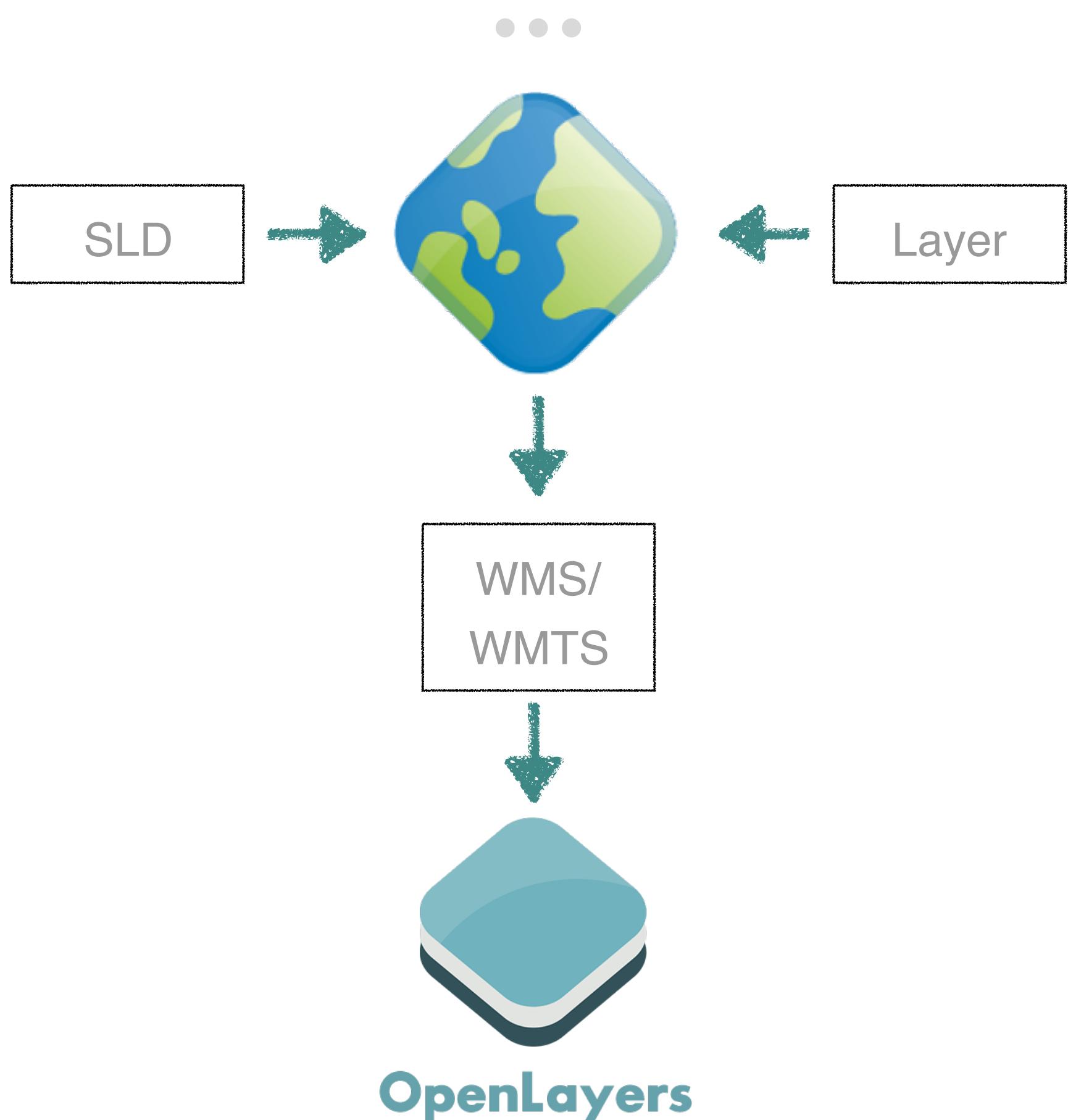


```

<!doctype html>
<html lang="en">
  <head>
    <link rel="stylesheet" href="https://openlayers.org/en/v4.6.5/css/ol.css" type="text/css"/>
    <script src="https://openlayers.org/en/v4.6.5/build/ol.js" type="text/javascript"></script>
    <title>Call WMS</title>
  </head>
  <body>
    <div id="map" class="map"></div>
    <script type="text/javascript">
      var wmsLayerProvince;
      var map = new ol.Map({
        target: 'map',
        layers: [
          new ol.layer.Tile({
            source: new ol.source.OSM()
          })
        ],
        view: new ol.View({
          center: ol.proj.fromLonLat([100, 13]),
          zoom: 6
        })
      });
      var wmsSourceProvince = new ol.source.ImageWMS({
        url: 'http://localhost/geoserver/foss4g-2019/wms?',
        params: {
          'LAYERS': 'RainToday'
        },
        crossOrigin: 'anonymous'
      });

      wmsLayerProvince = new ol.layer.Image({source: wmsSourceProvince});
      map.addLayer(wmsLayerProvince);
    </script>
  </body>
</html>
  
```

# OpenLayers Call Layer WMTS



```
matrixIds[z] = "EPSG:4326:" + z;;
}

resolutions = [
  0.703125, 0.3515625, 0.17578125, 0.087890625,
  0.0439453125, 0.02197265625, 0.010986328125,
  0.0054931640625, 0.00274658203125, 0.001373291015625,
  6.866455078125E-4, 3.4332275390625E-4, 1.71661376953125E-4,
  8.58306884765625E-5, 4.291534423828125E-5, 2.1457672119140625E-5,
  1.0728836059570312E-5, 5.364418029785156E-6, 2.682209014892578E-6,
  1.341104507446289E-6, 6.705522537231445E-7, 3.3527612686157227E-7
];

var map = new ol.Map({
  layers: [
    new ol.layer.Tile({
      source: new ol.source.OSM(),
      opacity: 0.7
    }),
    new ol.layer.Tile({
      opacity: 0.9,
      source: new ol.source.WMTS({
        url: 'http://localhost:8082/geoserver/gwc/service/wmts?',
        layer: 'foss4g-2019:RainToday',
        matrixSet: 'EPSG:4326',
        format: 'image/png',
        projection: projection,
        tileGrid: new ol.tilegrid.WMTS({
          origin: ol.extent.getTopLeft(projectionExtent),
          resolutions: resolutions,
          matrixIds: matrixIds
        }),
        style: '',
        wrapX: true
      })
    })
  ]
});
```

# OpenLayers call to Application

```

view: new ol.View({
  center: ol.proj.fromLonLat([100, 13]),
  zoom: 6
});

var btnShowWms = document.getElementById('showWms');
var btnHideWms = document.getElementById('hideWms');
var showCountry = document.getElementById('showCountry');

btnShowWms.onclick = function() {
  removeExistingWms();
  var wmsSourceProvince = new ol.source.ImageWMS({
    url: 'http://localhost/geoserver/foss4g-2019/wms?',
    params: {
      'LAYERS': 'foss4g-2019:RainToday'
    },
  });

  wmsLayerProvince = new ol.layer.Image({source: wmsSourceProvince});
  map.addLayer(wmsLayerProvince);

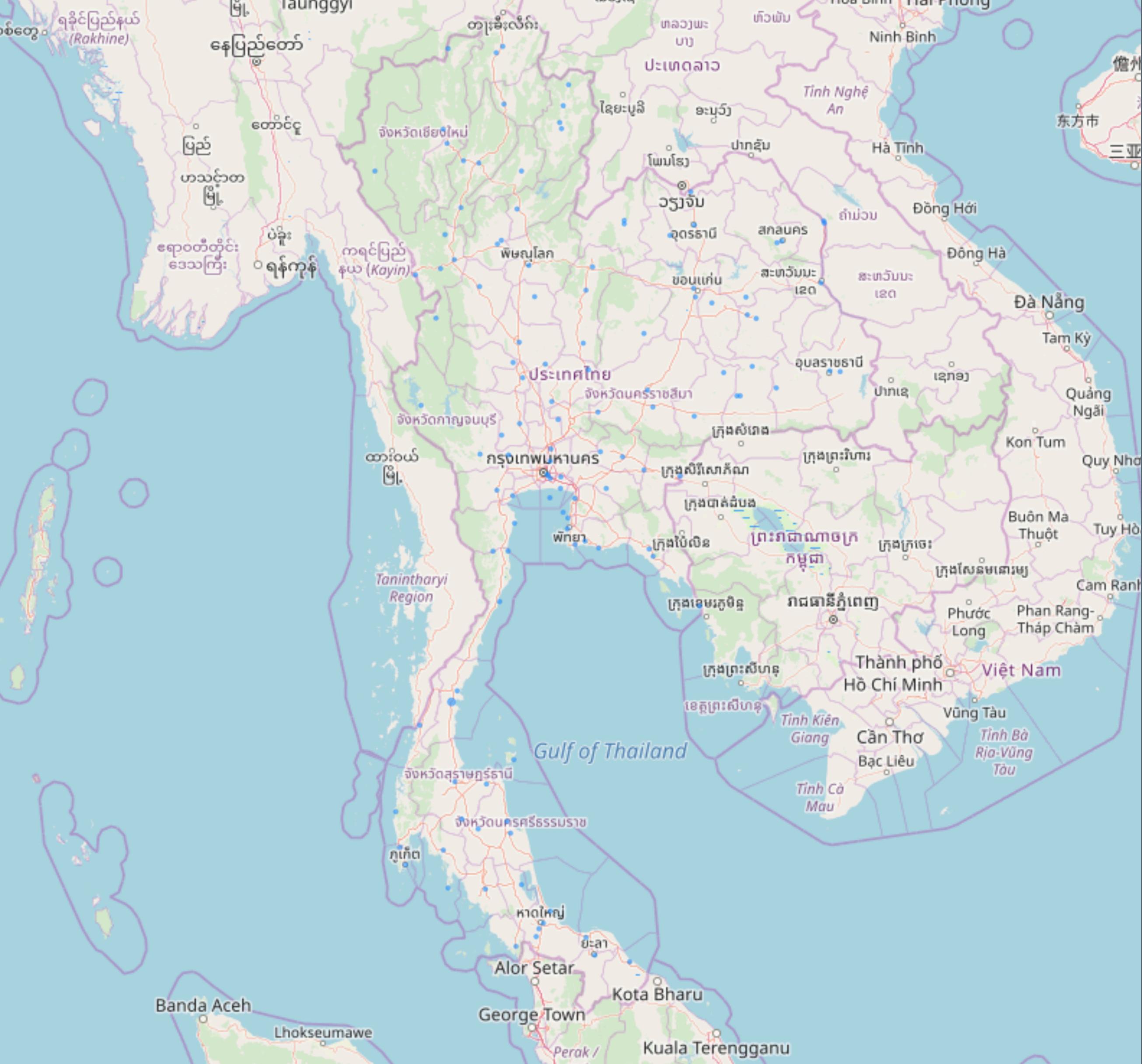
  map.getView().fit(ol.proj.transformExtent([98.464198, 8.182077, 98.250123, 7.723311], 'EPSG:4326')
}

btnHideWms.onclick = function() {
  removeExistingWms();
}

showCountry.onclick = function() {
  map.setView(
    new ol.View({
      center: ol.proj.fromLonLat([100.4833, 13.7500]),
      zoom: 6
    })
  );
}

function removeExistingWms() {
  if (typeof wmsLayerProvince === 'object') {
    map.removeLayer(wmsLayerProvince);
  }
}

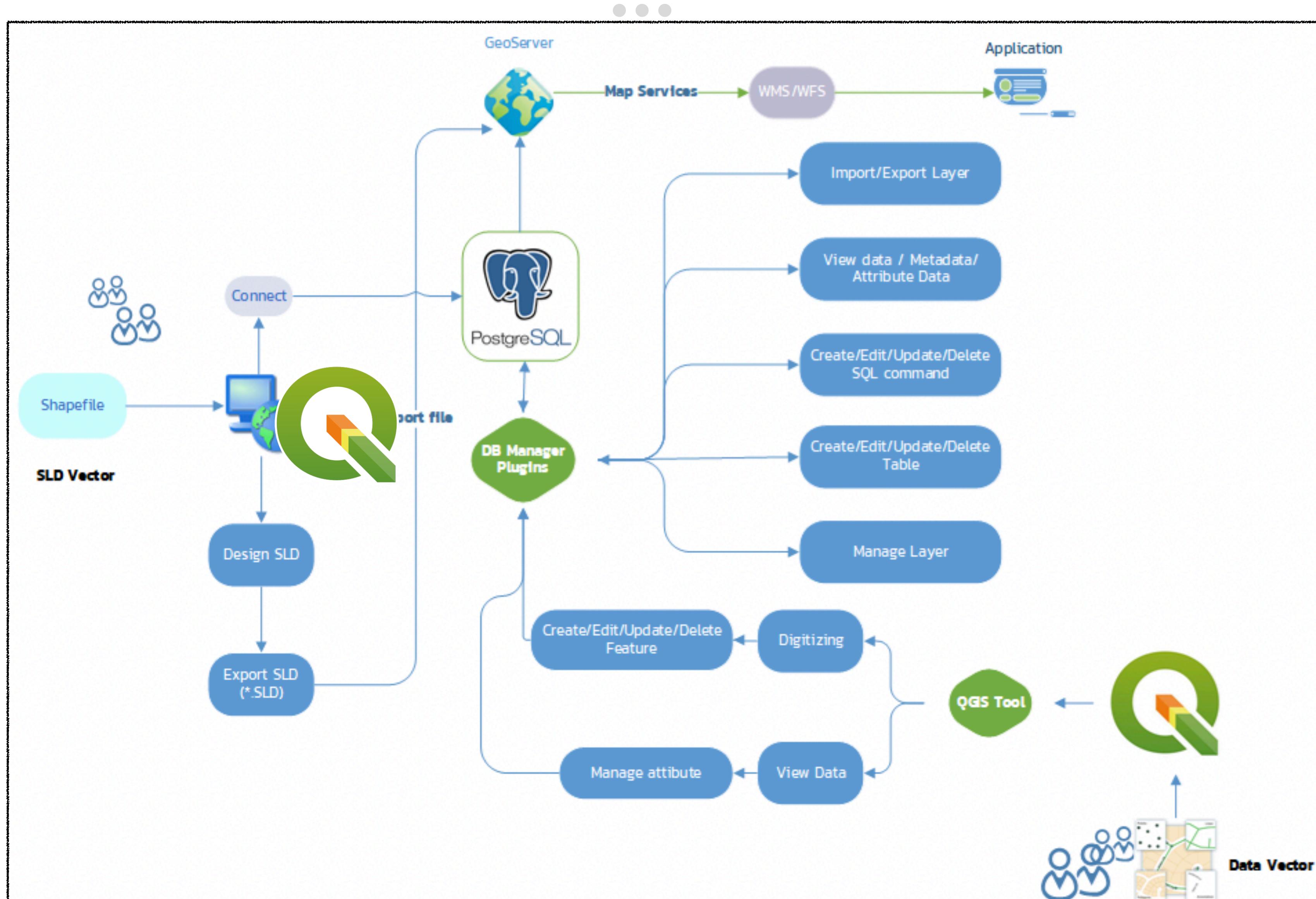
```



i-bitz company limited  
THE GEOMATICS COMPANY



# Concept data service using GeoServer



# Data service



Andaman - The City Dashboard

Display on Application

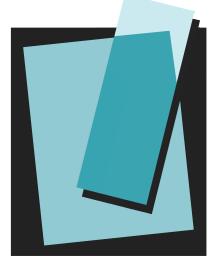


Basic to Advance GeoServer

# GeoServer User Manual

• • •

<https://docs.geoserver.org/stable/en/user/index.html>



i-bitz company limited  
THE GEOMATICS COMPANY



# Interest full course register at ...

● ● ●

The screenshot shows a grid of course offerings:

Course Type	Course Name	Level	Price (excluding vat)	Duration	Topics
Geoserver Basic	QGIS Basic	Basic	7,000 ₧	(9.00 AM - 4.00 PM)	GIS data standards, Shapefile Management, Tables Management, Create Shapefile, Georeferencing, Data management, Geoprocessing Tools, Terrain Analysis, Map Design
	QGIS (Customized Course)	Intermediate	7,500 ₧	(9.00 AM - 4.00 PM)	Shapefile Management, Tables Management, Spatial data analysis, Potential Surface Analysis (PSA), Create report, Create map, Mini project, Customized Course, 20 persons
	Geoserver Basic	Basic	8,500 ₧ (excluding vat)	(9.00 AM - 4.00 PM)	Internet GIS, Brief OGC Standard, Vector Data Management, Raster Data Management, Layers/Layer Group, Styled Layer Descriptor (SLD), Basic Html., Basic Openlayers API, 15 persons
	Docker for GIS Intermediate	Intermediate	13,500 ₧ (excluding vat)	(9.00 AM - 4.00 PM)	Best Practice Installation, Security, Tuning Docker, -
	GIS Web application Intermediate	Intermediate	22,500 ₧ (excluding vat)	( 8.30 AM - 5.30 PM)	HTML5, CSS3, jQuery, Bootstrap, Google Map API, Codeigniter framework (PHP), Create GIS web application, Database with MySQL, Web design Tools, Debugging and Testing, Online and Hosting, 10 persons

<https://gisbuildup.i-bitz.co.th>

