

Appendix 6

Web-GIS

WebGIS System Development II-1a

Brief review about WebGIS and
WebGIS Components



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WebGIS System Development II-1a

Joel Bandibas
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WebGIS System Development II-1a

- I. Brief review about WebGIS and WebGIS Components
- II. Brief review about PostgreSQL/PostGIS Database Creation
- III. Brief review about PostgreSQL/PostGIS Table Creation
- IV. Database Population
- V. Brief review about Web Map Service (WMS)

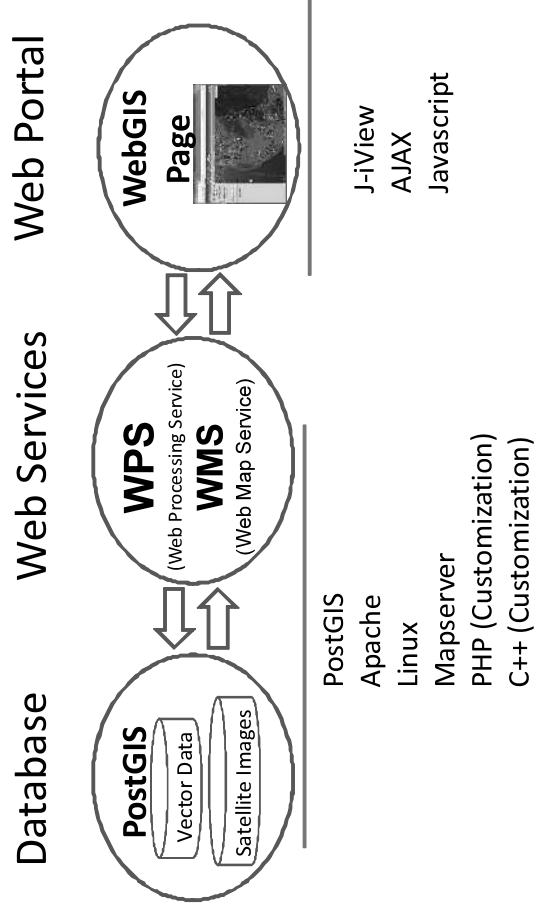


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WEBGIS

Information System that allows users to view, edit and manipulate spatial data over the WEB. Most WebGIS are powered by Web Processing Service (WPS) and Web Map Service (WMS).

Major Components of a WebGIS System



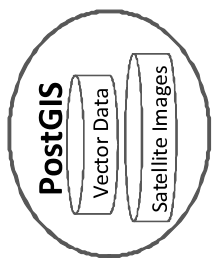
POSTGRESQL (Postgres)

- is an object-relational database management system (ORDBMS) available for many platforms including Linux, FreeBSD, Solaris, Microsoft Windows and Mac OS X.
- PostgreSQL is developed by the PostgreSQL Global Development Group
- It implements the majority of the SQL:2008 standard (Wikipedia).



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Database



POSTGRESQL -> PostGIS

PostGIS a spatially enabled PostgreSQL. PostGIS database is a PostgreSQL with Geogmetry and Spatial Reference System columns.

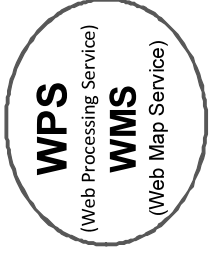


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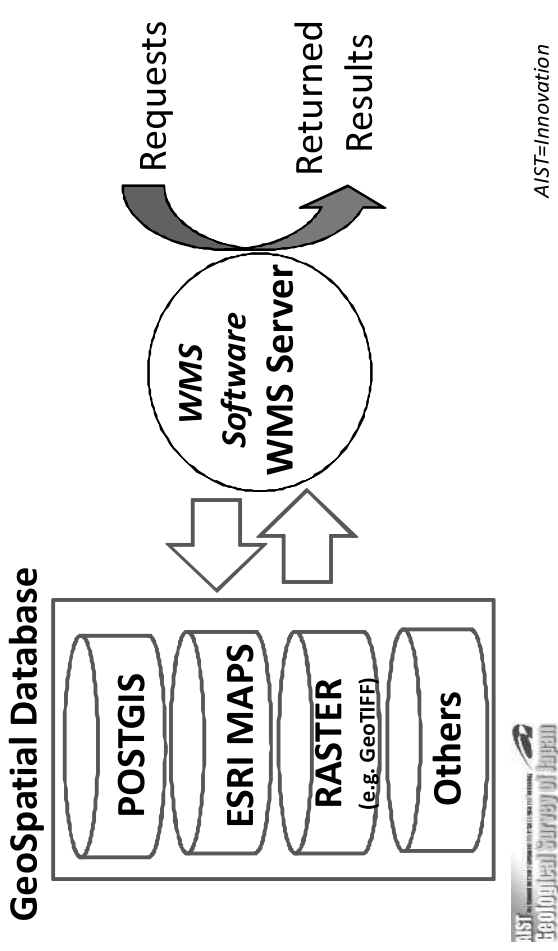


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Web Services



Web Map Service (WMS)



Web Services

- Web Coverage Service (WCS)
- Web Coverage Processing Service (WCPS)
- Web Feature Service (WFS)
- Web Map Service (WMS)
- Web Map Tile Service (WMTS)
- Web Processing Service (WPS)

Web Map Service (WMS)

Requests

Required

- **GetCapabilities** - returns parameters about the WMS and the available layers
- **GetMap** - returns a map image

Optional

- GetFeatureInfo
- DescribeLayer
- GetLegendGraphic

Web Map Service (WMS)

Request Examples

GetCapabilities

`http://ows.geogrid.org/GSJ_CCOP_Combined_Bedrock_and_Superficial_Geology_and_Age/wms?SERVICE=WMS&VERSION=1.1.1&REQUEST=GetCapabilities&`



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Web Map Service (WMS)

Request Examples

GetMap

`http://ows.geogrid.org/GSJ_CCOP_Combined_Bedrock_and_Superficial_Geology_and_Age/wms?REQUEST=GetMap&SERVICE=WMS&VERSION=1.1.1&LAYERS=EASIA_CCOP_2M_Combined_BLT_SLT_BA&FORMAT=image/png&SRS=EPSG:4326&BBOX=92.190331,-16.633300,155.954768,47.612849&WIDTH=256&HEIGHT=256`



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Result

```
WMT_MS_Capabilities version="1.1.1">
<Service>
<Name>OGC:WMS</Name>
<Title>GSJ CCOP Combined Bedrock and Superficial Geology and Age</Title>
<Abstract>This is the geological map produced and compiled by the Coordinating
Committee for Geoscience Programmes in East and Southeast Asia (CCOP). The attribute
each polygon includes the bedrock and superficial geology information and age.</Abstra
<KeywordList>
<keyword>Bedrock</keyword>
<keyword>Surficial</keyword>
<keyword>Geology</keyword>
<keyword>Age</keyword>
<keyword>OneGeology</keyword>
<keyword>East Asia</keyword>
<keyword>continent@Asia</keyword>
<keyword>subcontinent@Eastern Asia</keyword>
<keyword>geographicarea@Eastern Asia</keyword>
<keyword>dataproducer@Coordinating Committee for Geoscience Programmes in
East and Southeast Asia</keyword>
```



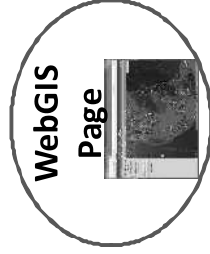
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Result



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Web Portal



Web Map Service (WMS) WMS Clients

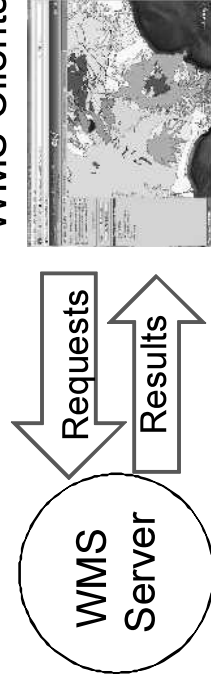
1. Open Source
OpenLayers
OneGeology
2. Commercial
Google Maps
Google Earth
Bing Maps
3. GSJ-AIST Dedicated WMS Client
J-iView

Web Map Service (WMS)

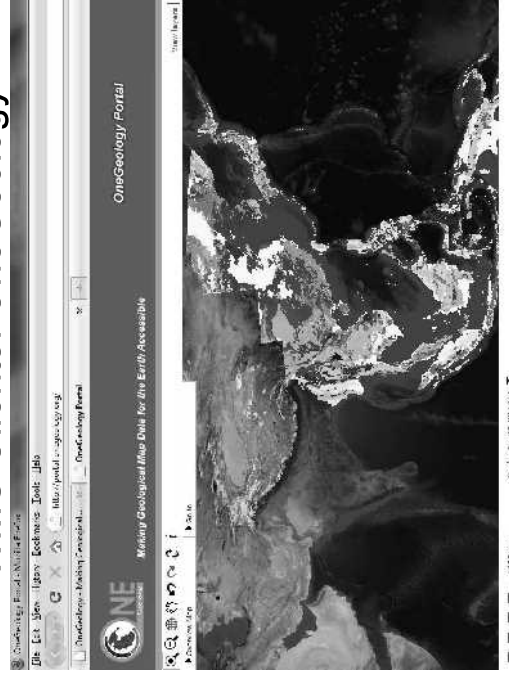
WMS Clients

WMS Clients are software that provide Graphic User Interface for implementing WMS requests (mostly GetMap request) and viewing results.

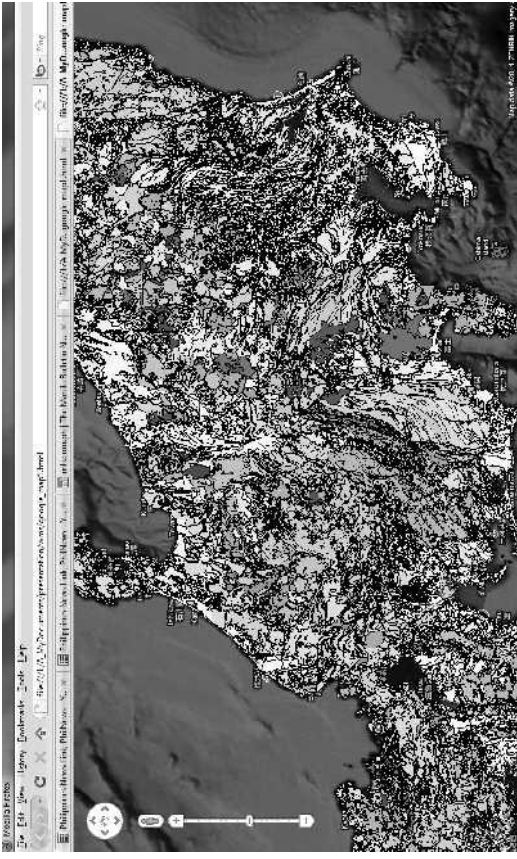
WMS Clients



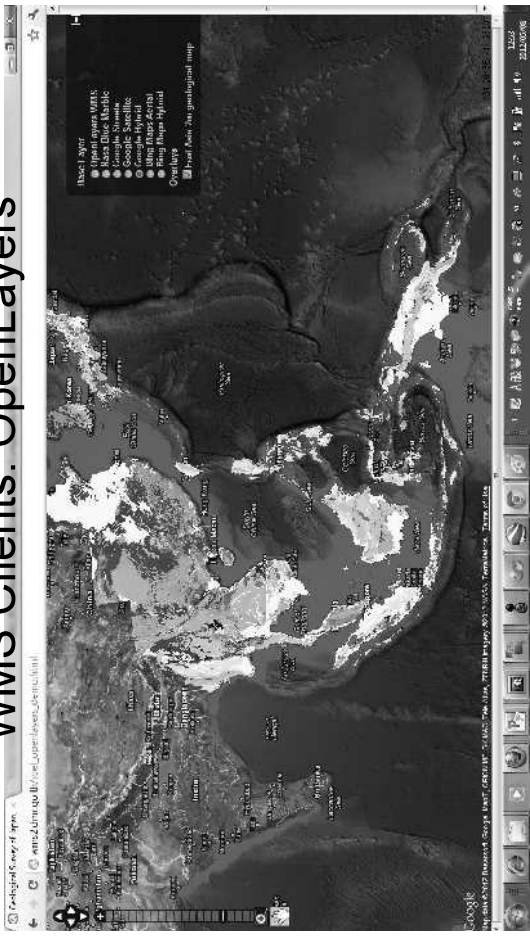
Web Map Service (WMS) WMS Clients: OneGeology



Web Map Service (WMS) WMS Clients: Google Maps (Google Maps API)



Web Map Service (WMS) WMS Clients: OpenLayers



WMS Clients: Google Earth API

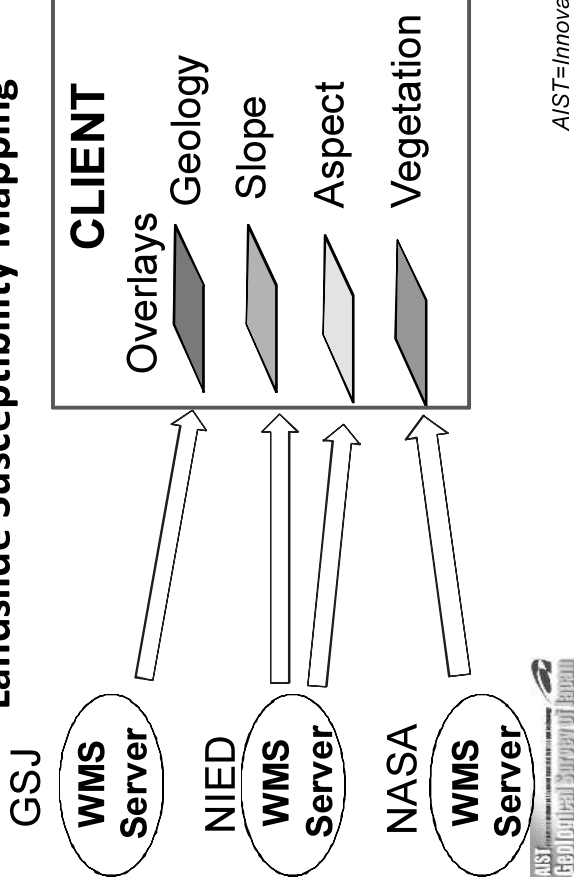


Web Map Service (WMS) WMS Clients: J-iView



Web Map Service (WMS)

Landslide Susceptibility Mapping



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Creating Database

Command:

```
createdb Database_Name
```

Spatially enable the database

```
$psql -f postgis.sql -d Database_Name
```

```
$psql -f patial_ref_sys.sql -d Database_Name
```



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WebGIS System Development II-1a

Brief review about PostgreSQL/PostGIS Database Creation



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Creating Database

```
$su - postgres
```

```
$/usr/local/pgsql/bin/createdb PHL_DB
```

```
$cd /usr/local/pgsql/bin
```

Spatially enable the database

```
$psql -f /usr/local/pgsql/share/contrib/postgis-1.5/postgis.sql -d PHL_DB
```

```
$psql -f /usr/local/pgsql/share/contrib/postgis-1.5/spatial_ref_sys.sql -d PHL_DB
```

Postgres Password: joelbandibas



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Creating Database

```
$su - postgres  
$/usr/local/pgsql/bin/createdb PHL_DB  
$cd /usr/local/pgsql/bin
```

Spatially enable the database

```
$psql -f /usr/local/pgsql/share/contrib/postgis-1.5/postgis.sql -d PHL_DB  
$psql -f /usr/local/pgsql/share/contrib/postgis-1.5/spatial_ref_sys.sql -d PHL_DB
```

Postgres Password: joelbandibas



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Table Creation

Shapefile to PostGIS Table

```
shp2pgsql -W LATIN1 -s epsg_code shape_fname  
table_name dbname > output_file.sql
```

```
psql -d dbname -f output_file.sql
```



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WebGIS System Development II-1a

**Brief review about PostgreSQL/PostGIS
Table Creation**



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Table Creation

Shapefile to PostGIS Table

```
shp2pgsql -W LATIN1 -s 4326  
/home/co2_trainee/training_phl_group  
/sample_data/east_asia_geology.shp east_asia_geology_table  
PHL_DB > phl.sql
```

```
$psql -f phl.sql -d PHL_DB
```



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Linux Console

Inputting maps to the database

```
shp2pgsql -W LATIN1 -s epsg_code shape_fname table_name  
dbname > output_file.sql
```

```
psql -d dbname -f output_file.sql
```

e.g.

```
$shp2pgsql -W LATIN1 -s 4326  
/home/co2_trainee/training_phl_group  
/sample_data/east_asia_geology.shp east_asia_geology_table  
PHL_DB > phl.sql
```

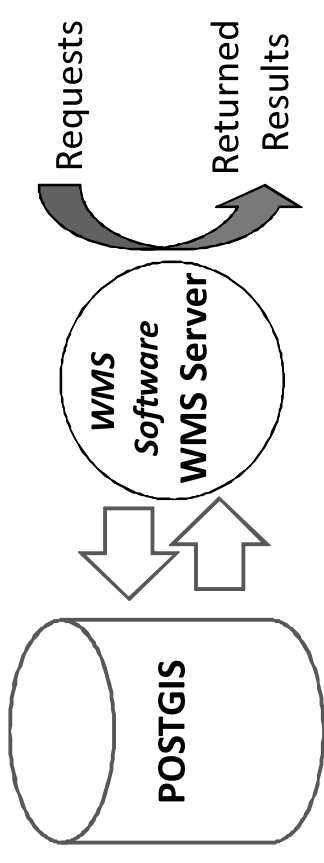
```
$psql -f phl.sql -d PHL_DB
```



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Creating Web Map Service (WMS)

GeoSpatial Database



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WebGIS System Development II-1a

Brief review about Web Map Service (WMS) Formulation



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Creating WMS

Two Documents Needed for WMS

1. MapFile
2. WMS Script

Creating WMS Service

MapFiles

```
MAP
NAME OGC_WMS
STATUS ON
SIZE 256 256
EXTENT 92.190331 -16.633300 155.954768 47.612849
UNITS dd
IMAGECOLOR 255 255 255
IMAGETYPE gif
PROJECTION
"init=epsg:4326"
END

East Asia Extent: WGS84 (epsg:4326)

Min X: 92.19
Min Y: -16.63
Max X: 155.954
Max Y: 47.612
```

Creating WMS Service

Edit MapFiles

```
CLASSITEM "geo_des"

class
name "Q_S: Sedimentary Rocks, Quaternary"
expression "Q_S: Sedimentary Rocks, Quaternary "
color 255 255 203
End

class
name "NQ_S: Sedimentary Rocks, Neogene to Quaternary"
expression "NQ_S: Sedimentary Rocks, Neogene to Quaternary "
color 255 255 153
End

class
name "N3Q_S: Sedimentary Rocks, Late Neogene to Quaternary"
expression "N3Q_S: Sedimentary Rocks, Late Neogene to Quaternary "
color 255 255 101
end
```

For POLYGON

Creating WMS Service

Edit MapFiles

```
LAYER
NAME east_asia_geology_table
METADATA
WMS_TITLE "Geological Map of East Asia"
WMS_ABSTRACT "Autogenerated map file"
WMS_SRS "EPSG:32648 EPSG:4326 ESRI:54004 EPSG:4612 EPSG:4301 EPSG:900913"
END

connectiontype postgis
connection "user=postgres password=joelbandibas dbname=PHL_DB host=localhost port=5432"
data "the_geom from east_asia_geology_table using unique gid"

TYPE POLYGON
STATUS ON
DUMP TRUE
PROJECTION
"init=epsg:4326"
END
```

Creating WMS Service

Edit MapFiles

```
CLASSITEM "mineral"

class
name "Gold"
expression "Au"
style
symbol "Circle"
color 236 61 156
outlinecolor 0 0 0
size 15
end
end

class
name "Cu"
expression "Copper"
style
symbol "Circle"
color 72 104 122
outlinecolor 0 0 0
size 15
end
end
```

For POINT

Testing Your WMS

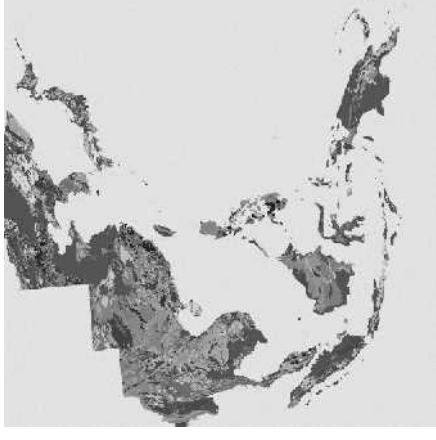
GetCapabilities Result

```
WMT_MS_Capabilities version="1.1.1">
<Service>
  <Name>OGC:WMS</Name>
  <Title>GSJ MGB Combined Bedrock and Superficial Geology and Age</Title>
  <Abstract>This is the geological map produced and compiled by the Mines and
  Geosciences Bureau (MGB) of the Philippines. The attribute of each polygon
  includes the bedrock and superficial geology information and age.</Abstract>
  <KeywordList>
    <Keyword>Bedrock</Keyword>
    <Keyword>Surficial</Keyword>
    <Keyword>Geology</Keyword>
    <Keyword>Age</Keyword>
    <Keyword>OneGeology</Keyword>
    <Keyword>Philippines</Keyword>
    <Keyword>continent@Asia</Keyword>
    <Keyword>subcontinent@South-eastern Asia</Keyword>
    <Keyword>geographicarea@Philippines</Keyword>
    <Keyword>dataproducer@Mines and Geoscience Bureau of the
  Philippines</Keyword>
  
```

Creating WMS Service

Testing Your WMS

GetMap Result after pointing a browser to the GetMap URI



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Creating WMS Service

Testing Your WMS

GetMap

GetMap Universal Resource Identifier (URI)

URI Format

```
WMS URL?REQUEST=GetMap&SERVICE=WMS&VERSION=1.1.1&LAYERS=Layer
Name&FORMAT=image/png&SRS=EPSG:4326&BBOX=102,10,108,15&WIDTH=256&
HEIGHT=256
```

URI Format

```
http://ccop-
geoinfo.org/ows/group/co2_ph/least_asia_geology_table_wms?REQUEST=GetMap&SERVICE=W
MS&VERSION=1.1.1&LAYERS=east_asia_geology_table&FORMAT=image/png&SRS=EPSG:4326
&BBOX=92.19,-16.63,155.95,47.612849&WIDTH=512&HEIGHT=512
```

Exercise 1

Implement GetCapabilities and GetMap for the WMS at

http://onegeology-asia.org/ows/GSJ_Combined_Bedrock_and_Superficial_Geology_and_Age/wms

Exercises

Display the following WMSs using the client at

http://ccop-geoinfo.org/my_client.html

1. http://jcbwebgis.com/cgi-bin/wms/group/onegeology_new/east_asia_2m_wms?
2. http://jcbwebgis.com/cgi-bin/wms/group/onegeology_new/thailand_1m_wms?
3. http://jcbwebgis.com/cgi-bin/wms/group/onegeology_new/malaysia_pen_1m_wms?
4. http://jcbwebgis.com/cgi-bin/wms/group/onegeology_new/myanmar_1m_wms?
5. http://jcbwebgis.com/cgi-bin/wms/group/onegeology_new/cambodia_geology_wms?
6. http://jcbwebgis.com/cgi-bin/wms/group/onegeology_new/japan_1m_wms?
7. http://jcbwebgis.com/cgi-bin/wms/group/onegeology_new/vietnam_new_1m_wms?
8. http://jcbwebgis.com/cgi-bin/wms/group/onegeology_new/indonesia_1m_wms?
9. http://jcbwebgis.com/cgi-bin/wms/group/onegeology_new/philippine_geological_map_1m_wms?
10. http://jcbwebgis.com/cgi-bin/wms/group/groundwater/vietnam_groundwater_wms?
11. http://jcbwebgis.com/cgi-bin/minerals_wms/asean_gold_wms?
12. http://jcbwebgis.com/cgi-bin/minerals_wms/loindo_2012_wms?

Exercise 3

<http://150.29.14.124/phpPgAdmin/index.php>

id: postgres

WebGIS System Development II-1b

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WebGIS System Development II

PostGIS and Simple Features



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WebGIS System Development II

- I. PostGIS and Simple Features
- II. PostGIS and Spatial Information Processing Functions
- III. Spatial Queries and Sequential Query Language (SQL)
- IV. SQL Formulation and Implementation(SQL)



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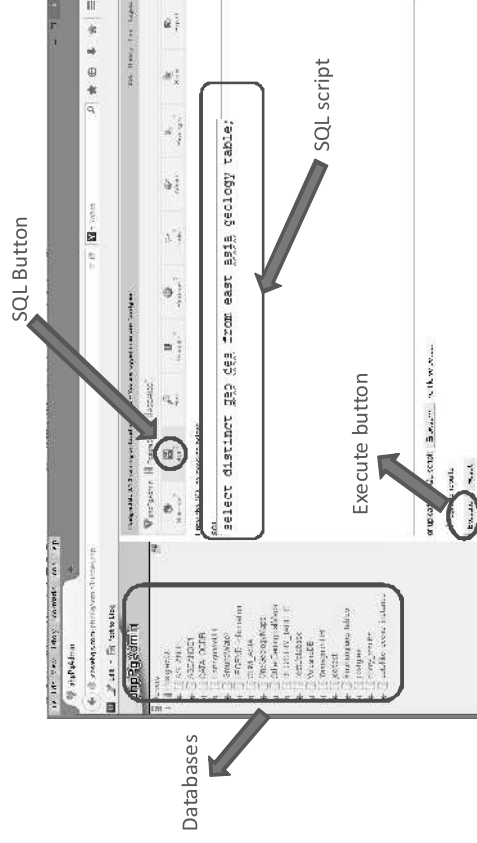
Simple Features

PostGIS supports “Simple Features” objects defined by OGC. It also supports the “Simple Features SQL”. In PostGIS, spatial objects are expressed in two standard ways: The **Well-Known Text (WKT)** and **Well-Known Binary (WKB)**.



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Sample SQLs using the Functions Login to phpPgAdmin



Sample SQLs using the Geometry Processing Functions

byte WKB = ST_AsBinary(geometry)

Actual SQL

```
select ST_AsBinary(the_geom) from myanmar_minerals_table  
where GID=1;
```

Sample SQLs using the Geometry Processing Functions

byte WKB = ST_AsBinary(geometry)

Actual SQL

```
select ST_AsBinary(the_geom) from myanmar_minerals_table  
where GID=1;
```

Sample SQLs using the Geometry Processing Functions

text WKT = ST_AsText(geometry)

Actual SQL

```
select ST_AsText(the_geom) from myanmar_minerals_table  
where GID=1;
```


Sample SQLs using the Geometry Processing Functions

geometry = ST_GeomFromWKB(bytea WKB, SRID)

Actual SQL

```
select ST_GeomFromWKB(the_geom,4326)
from myanmar_minerals_table where GID=1;
```

Sample SQLs using the Geometry Processing Functions

An example of inserting spatial object into a database using one of the aforementioned functions:

```
INSERT INTO geotable (the_geom)
VALUES (ST_GeomFromText('POINT(-126.4 45.32)',
4326));
```



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Sample SQLs using the Geometry Processing Functions

geometry = ST_GeometryFromText(text WKT, SRID)

e.g.

Point Location: *Longitude=-126.4; Latitude=45.32*
WKT='POINT(-126.4 45.32)'

Actual SQL

```
select ST_GeometryFromText('POINT(-126.4 45.32)',4326);
```

WebGIS System Development II

Spatial Queries and Sequential Query Language (SQL)



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Spatial Queries and Sequential Query Language (SQL)

SQL Format

select distinct geological_description_column
from table_name;

Determine all mineral types found in Myanmar

select distinct geo_des from east_asia_geology_table;

Spatial Queries and Sequential Query Language (SQL)

Extracting records containing gold from Myanmar Database

SQL Format

select * from table_name where column_name='Gold' ;

Extracting records (sites) containing gold using Myanmar data.

select * from myanmar_minerals_table where
mineral_co='Gold' ;

Spatial Queries and Sequential Query Language (SQL)

*Extracting polygon with geology
"K_Mi: Intermediate Grade Metamorphic Rocks, Cretaceous" from
east_asia_geology_table*

The SQL

select * from east_asia_geology_table where geo_des='K_Mi:
Intermediate Grade Metamorphic Rocks, Cretaceous' ;

Spatial Queries and Sequential Query Language (SQL)

Spatial Query

*Querying the database involving geometry. Question like
"Which polygon is nearest or covers Bangkok" could be
answered using spatial query.*

The SQL to answer that above question:

(Central Location Bangkok): Longitude: 100.47; Latitude: 13.75

WKT of Location: POINT(100.47 13.75)

EPSG Code for WGS84: 4326

Operator:

float ST_Distance(geometry g1, geometry g2);

The SQL:

```
select * from east_asia_geology_table  
ORDER by ST_Distance(the_geom, ST_Geomfromtext('POINT(100.47 13.75)',4326)) ASC  
LIMIT 1;
```

Querying the Database Using
phpPgAdmin and Sequential Query Language (SQL)

Spatial Query

*Querying the database involving geometry. Question like
"Which known mineral site is nearest to Nay Pyi Taw" could be
answered using spatial query.*

The SQL to answer that above question:

(Central Location of Nay Pyi Taw (City Hall): Longitude: 96.129; Latitude: 19.744

WKT of Location: POINT(96.129 19.744)

EPSG Code for WGS84: 4326)

Operator:

float **ST_Distance**(geometry *g1*, geometry *g2*);

The SQL:

```
select * from myanmar_minerals_table
ORDER by ST_Distance(the_geom, ST_Geomfromtext('POINT(96.129 19.744)',4326 )) ASC
LIMIT 1;
```

Spatial Queries and Sequential Query Language (SQL)

Spatial Query

*Question like "Which site containing gold is nearest to Nay Pyi
Taw, Myanmar" could be answered using spatial query.*

Operator:

float **ST_Distance**(geometry *g1*, geometry *g2*);

The SQL:

```
select * from myanmar_minerals_table where mineral_co='Gold' ORDER by
ST_Distance(the_geom, ST_Geomfromtext('POINT(96.129 19.744)',4326 )) ASC
LIMIT 1;
```

Querying the Database Using

phpPgAdmin and Sequential Query Language (SQL)

Spatial Query

*Querying the database involving geometry. Question like
"Which known mineral site is nearest to Nay Pyi Taw" could be
answered using spatial query.*

The SQL to answer that above question:

(Central Location of Nay Pyi Taw (City Hall): Longitude: 96.129; Latitude: 19.744

WKT of Location: POINT(96.129 19.744)

EPSG Code for WGS84: 4326)

Operator:

float **ST_Distance**(geometry *g1*, geometry *g2*);

The SQL:

```
select * from myanmar_minerals_table
ORDER by ST_Distance(the_geom, ST_Geomfromtext('POINT(96.129 19.744)',4326 )) ASC
LIMIT 1;
```

Querying the Database Using phpPgAdmin and Sequential Query Language (SQL)

Spatial Query

Displaying the distance between Nay Pyi Taw and all sites with Gold.

Distance in Radiance

The SQL:

```
select mineral_co,mine_depos, ST_Distance
(
the_geom,
ST_Geomfromtext('POINT(96.129 19.744)',4326 )
)
from myanmar_minerals_table
where mineral_co='Gold';
```

Distance in Meters (Myanmar is UTM 46N; EPSG Code: 23946

The SQL:

```
select mineral_co,mine_depos, ST_Distance
(
ST_Transform(the_geom,23946) ,
ST_Transform(ST_Geomfromtext('POINT(96.129 19.744)',4326 ),23946)
)
from myanmar_minerals_table
where mineral_co='Gold';
```

Spatial Queries and Sequential Query Language (SQL)

Spatial Query: Distance

*The distance between Bangkok and the nearest polygon with "K_Mi:
Intermediate Grade Metamorphic Rocks, Cretaceous" could be determined
answered using spatial query.*

Distance in Radiance

The SQL:

```
select geo_des , ST_Distance
(
the_geom,
ST_Geomfromtext('POINT(100.47 13.75)',4326 )
)
from east_asia_geology_table
where geo_des='K_Mi: Intermediate Grade Metamorphic Rocks, Cretaceous'
ORDER by ST_Distance(the_geom, ST_Geomfromtext('POINT(100.47 13.75)',4326 )) ASC
LIMIT 1;
```

Spatial Queries and Sequential Query Language (SQL)

Spatial Query

Determining the Distance

Distance in Meters (Thailand is UTM 47N; EPSG Code: 24047)

The SQL:

```
Select geo_des, ST_Distance
(
    ST_Transform(the_geom, 24047),
    ST_Transform(ST_Geomfromtext('POINT(100.47 13.75)', 4326), 24047)
)
from east_asia_geology_table
where geo_des='K_Mi: Intermediate Grade Metamorphic Rocks, Cretaceous'
ORDER by ST_Distance(the_geom, ST_Geomfromtext('POINT(100.47 13.75)', 4326)) ASC LIMIT 1;
```

Creating and Populating Table Using Spreadsheet Data and SQL

gid	mineral_co	mine_depos	state_devi	township	reserve_to	longitude	latitude
0	Barite	Konesut	Kayah	Loikaw	0.0045	97.18	19.87
1	Barite	Kyun Taing	Mandalay	Pyin Oo Lwin	0.003831	96.45	22.20
2	Barite	Chanpelun	Mandalay	Kyaukse	400	96.31	21.66
3	Barite	Ngaok Twin	Mandalay	Kyaukse	0.0014	96.30	21.68
4	Barite	Sithar	Mandalay	Pyin Oo Lwin	0.002503	96.42	21.89
5	Barite	Setaw Lay	Mandalay	Patheingyi	0.063	96.25	21.91
6	Barite	Nyaung Ye	Mandalay	Kyaukse	0.002	96.34	21.68
7	Barite	Taungpatlan	Mandalay	Kyaukse	0.010585	96.31	21.69
8	Barite	Dahatpin	Mandalay	Kyaukse	0.0018	96.30	21.72
9	Barite	Dattaw	Mandalay	Pyin Oo Lwin	0.004	96.40	21.98
10	Barite	Naungpain	Mandalay	Pyin Oo Lwin	0.002	96.45	22.22
11	Barite	Padaukpin	Mandalay	Kyaukse	0.000975	96.34	21.68

The SQL Format:

```
CREATE TABLE Table_Name (column_name datatype, column_name datatype, column_name datatype ...);
```

The SQL:

```
CREATE TABLE myanmar_mineral_new (gid integer, mineral_co VARCHAR, mine_depos VARCHAR, state_devi VARCHAR, township VARCHAR, reserve_to FLOAT, longitude FLOAT, latitude FLOAT);
```

Creating and Populating Table Using Spreadsheet Data and SQL

Sample Tabular Data (Myanmar Minerals) (An Excel file saved as text, tab delimited)

gid	mineral_co	mine_depos	state_devi	township	reserve_to	longitude	latitude
0	Barite	Konesut	Kayah	Loikaw	0.0045	97.18	19.87
1	Barite	Kyun Taing	Mandalay	Pyin Oo Lwin	0.003831	96.45	22.20
2	Barite	Chanpelun	Mandalay	Kyaukse	400	96.31	21.66
3	Barite	Ngaok Twin	Mandalay	Kyaukse	0.0014	96.30	21.68
4	Barite	Sithar	Mandalay	Pyin Oo Lwin	0.002503	96.42	21.89
5	Barite	Setaw Lay	Mandalay	Patheingyi	0.063	96.25	21.91
6	Barite	Nyaung Ye	Mandalay	Kyaukse	0.002	96.34	21.68
7	Barite	Taungpatlan	Mandalay	Kyaukse	0.010585	96.31	21.69
8	Barite	Dahatpin	Mandalay	Kyaukse	0.0018	96.30	21.72
9	Barite	Dattaw	Mandalay	Pyin Oo Lwin	0.004	96.40	21.98
10	Barite	Naungpain	Mandalay	Pyin Oo Lwin	0.002	96.45	22.22
11	Barite	Padaukpin	Mandalay	Kyaukse	0.000975	96.34	21.68

Creating and Populating Table Using Spreadsheet Data and SQL

Populating the Table with Data from Text File

gid	mineral_co	mine_depos	state_devi	township	reserve_to	longitude	latitude
0	Barite	Konesut	Kayah	Loikaw	0.0045	97.18	19.87
1	Barite	Kyun Taing	Mandalay	Pyin Oo Lwin	0.003831	96.45	22.20
2	Barite	Chanpelun	Mandalay	Kyaukse	400	96.31	21.66
3	Barite	Ngaok Twin	Mandalay	Kyaukse	0.0014	96.30	21.68
4	Barite	Sithar	Mandalay	Pyin Oo Lwin	0.002503	96.42	21.89
5	Barite	Setaw Lay	Mandalay	Patheingyi	0.063	96.25	21.91
6	Barite	Nyaung Ye	Mandalay	Kyaukse	0.002	96.34	21.68
7	Barite	Taungpatlan	Mandalay	Kyaukse	0.010585	96.31	21.69
8	Barite	Dahatpin	Mandalay	Kyaukse	0.0018	96.30	21.72
9	Barite	Dattaw	Mandalay	Pyin Oo Lwin	0.004	96.40	21.98
10	Barite	Naungpain	Mandalay	Pyin Oo Lwin	0.002	96.45	22.22
11	Barite	Padaukpin	Mandalay	Kyaukse	0.000975	96.34	21.68

The SQL Format:

```
COPY table_name FROM 'text_file_filename';
```

The SQL:

```
COPY myanmar_mineral_new FROM '/home/postgres/sample_mineral_table.txt';
```

Creating and Populating Table Using Spreadsheet Data and SQL

Inserting Geometry Column

The SQL Format:

```
SELECT AddGeometryColumn('table_name','the_geom',SRID,geometry_type,2);
```

The SQL:

```
SELECT AddGeometryColumn('myanmar_mineral_new','the_geom',4326,'POINT',2);
```

Creating and Populating Table Using Spreadsheet Data and SQL

Complete SQL Sequence

The SQL:

```
CREATE TABLE myanmar_mineral_new (gid integer, mineral_co VARCHAR, mine_depos VARCHAR, state_devi VARCHAR, township VARCHAR, reserve_to FLOAT, longitude FLOAT, latitude FLOAT);
```

```
COPY myanmar_mineral_new FROM '/home/co2_trainee/myanmar_mineral_data.txt';
```

```
SELECT AddGeometryColumn('myanmar_mineral_new','the_geom',4326,'POINT',2);
```

```
UPDATE myanmar_mineral_new SET the_geom=GeomFromText('POINT('||longitude||','||latitude||')',4326);
```

Creating and Populating Table Using Spreadsheet Data and SQL

Populating Geometry Column

The SQL Format:

```
UPDATE Table_Name SET the_geom= GeomFromText ('POINT('||long_column||','||lat_column||')',SRID);
```

The SQL:

```
UPDATE myanmar_mineral_new SET the_geom=GeomFromText('POINT('||longitude||','||latitude||')',4326);
```

EXERCISES

1. Formulate an SQL to extract the records containing the mineral Antimony from Myanmar mineral data in your database.
2. Formulate an SQL to show the distances in meters between Yangon (longitude: 96.144; Latitude: 16.793) mineral sites containing Gypsum.
3. Input the mineral data of the Philippines (philippine_minerals.exe) in Excel file into your PostGIS database.

