# OpenLayers + PostGIS Tutorials

**Spatial Databases Spring 2017**
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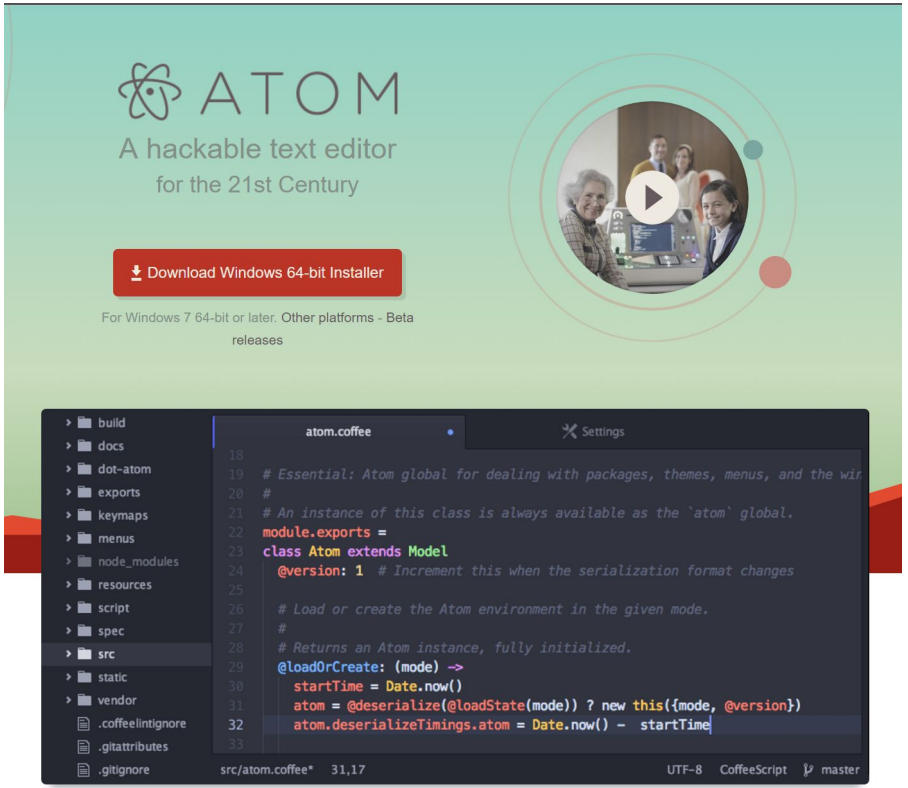
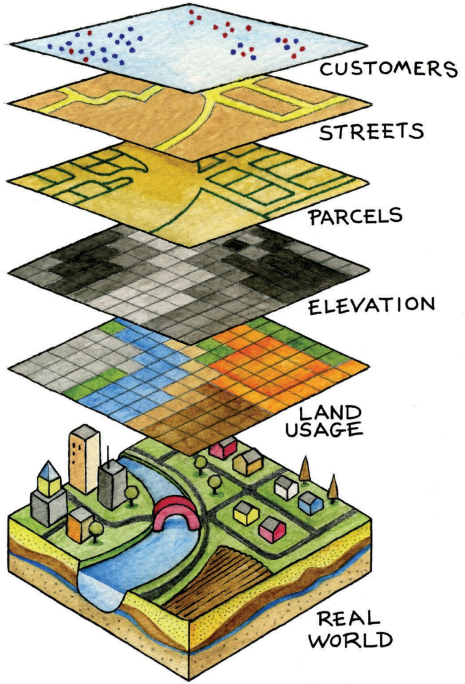
**2017-03-23**

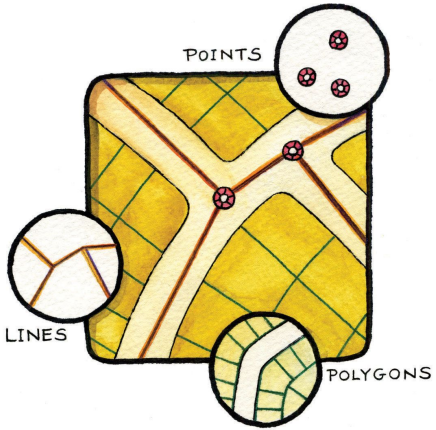
# Preparing Text Editor

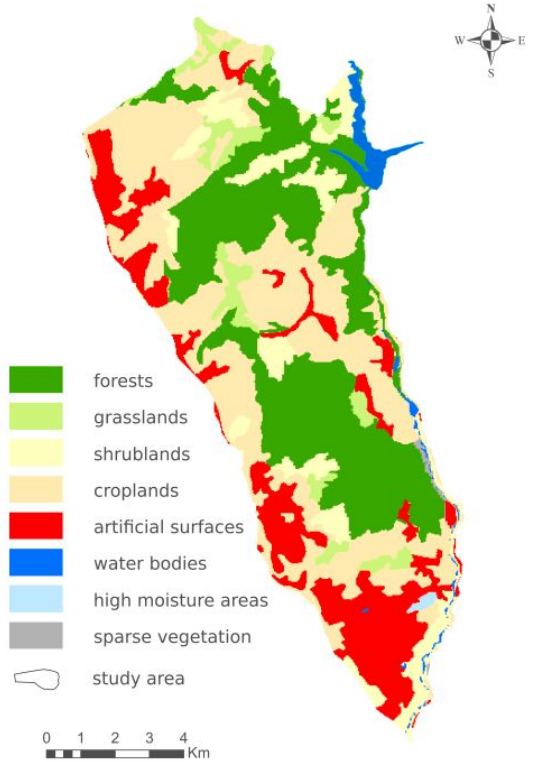
- https://atom.io/



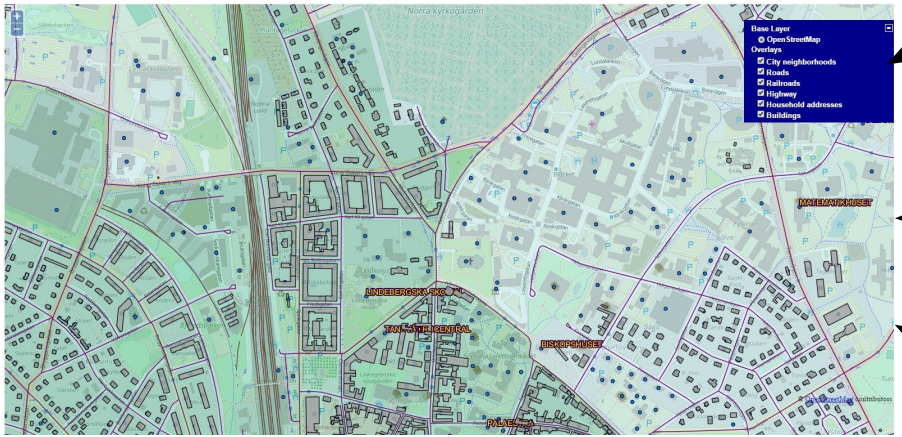
# Introduction



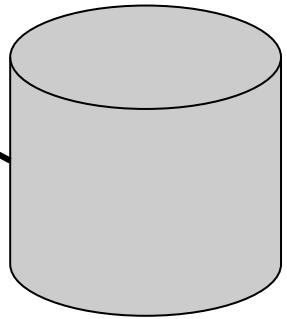



# Introduction




Map client


GeoJson



Spatial Databases

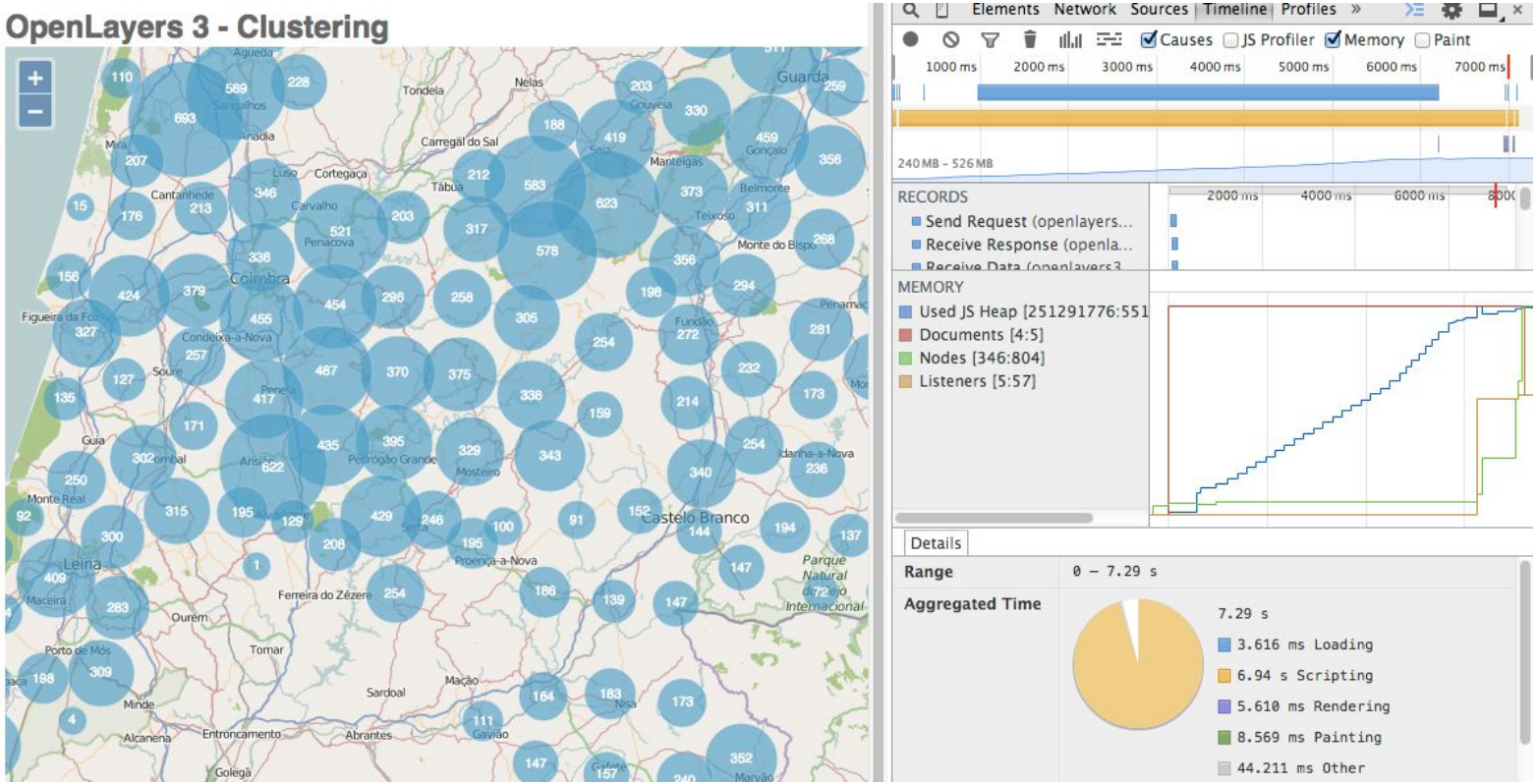
# OpenLayers?

- An open source client-side Javascript framework for overlaying maps from various map sources
- OpenLayers makes it easy to put a dynamic map in any web page.
- OpenLayers released under the FreeBSD License

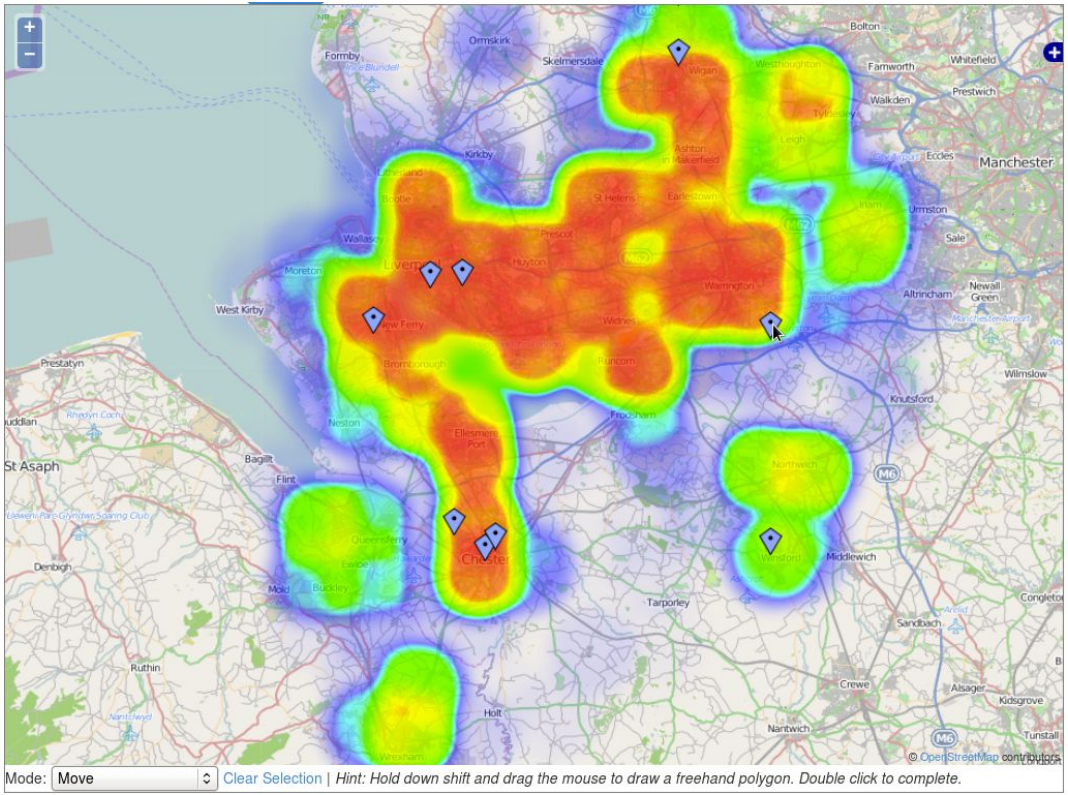
# OpenLayers - Map tiles


# OpenLayers - Vector data on map

# OpenLayers - Visualize clustering result on map



# OpenLayers - Heatmap



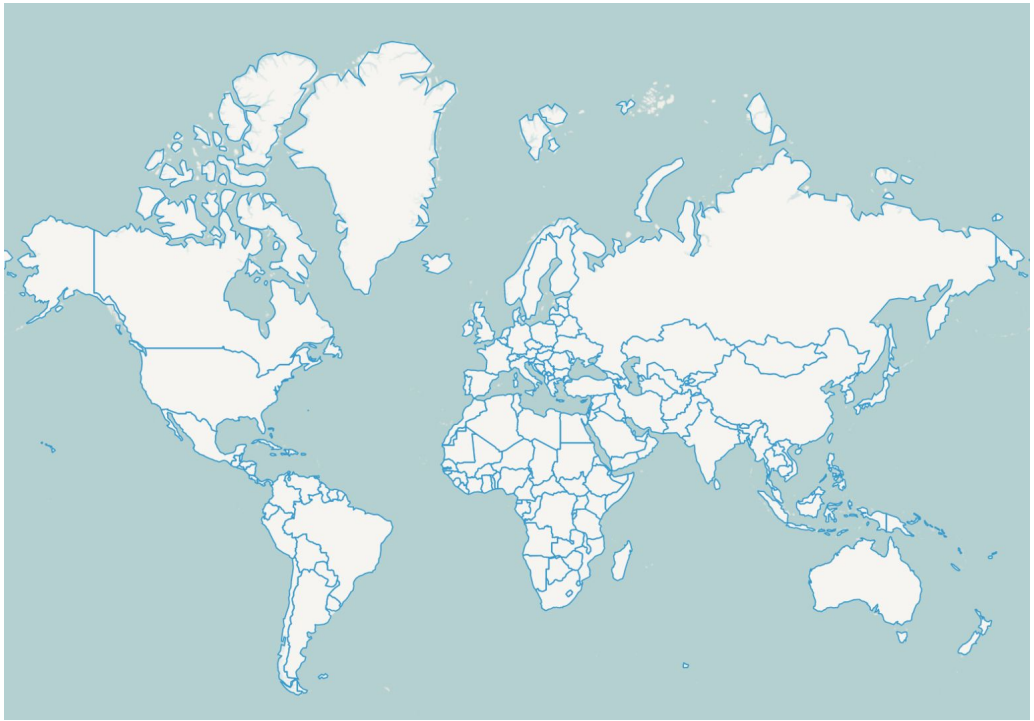
# OpenLayers Tutorial 1 - Quick Start

- Include OpenLayers

<script src="https://openlayers.org/en/v4.0.1/build/ol.js" type="text/javascript"></script>

- You can get the code in this url
  https://github.com/hgryoo/ol-postgis-tutorial/blob/master/codes/quick_start.html

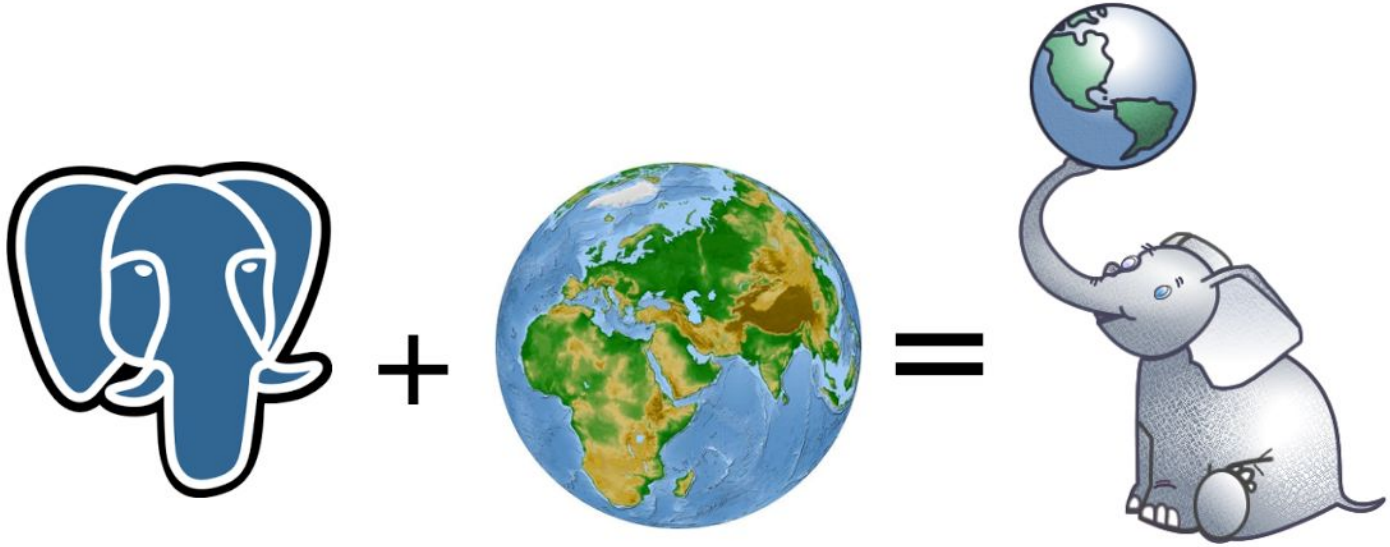
# OpenLayers Tutorial 2
## - Draw Vector map from file source



# Spatial Databases?

- Spatial databases store and manipulate spatial objects like any other object in the database.

# PostGIS?



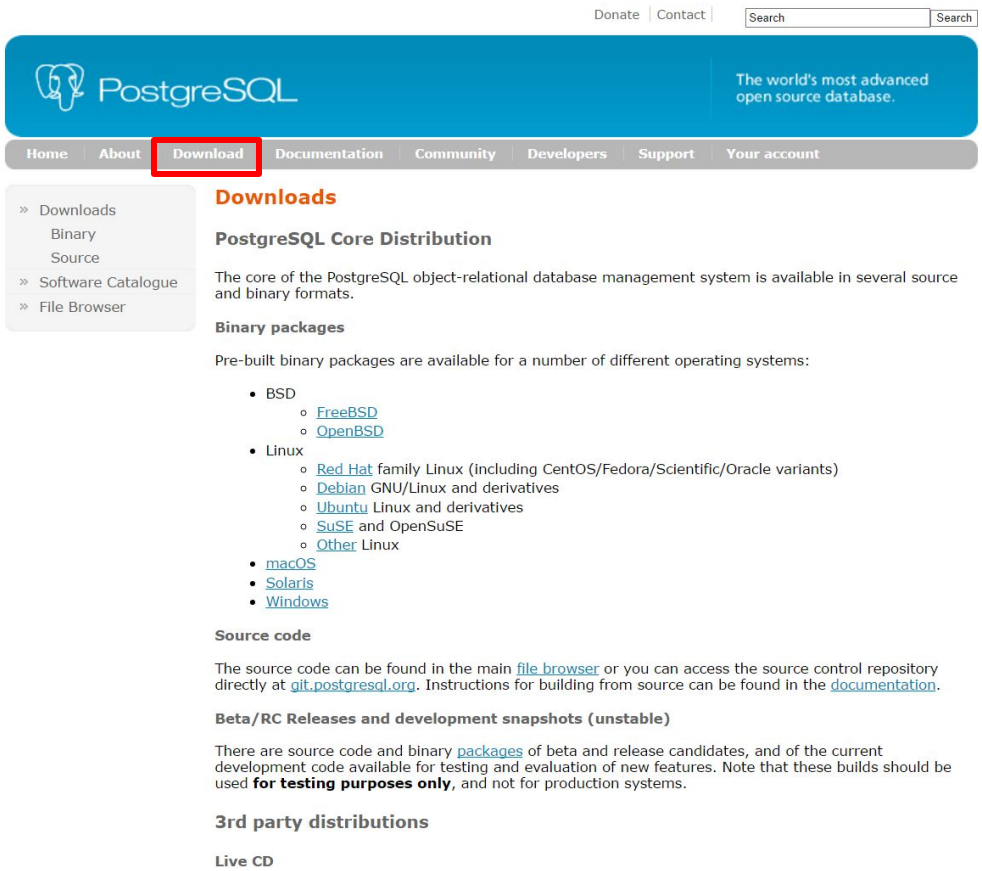
# PostGIS?

PostgreSQL is a high-performance object-relational database management system.
PostGIS extends spatial data capabilities to Postgres

- Spatial databases store/manipulate spatial objects
- Spatial data types : point, line, polygon, ...
- Spatial indexing to support efficient processing of spatial operations
- Spatial functions to query of spatial properties and relationships

# PostgreSQL Installation (1/8)

- https://www.postgresql.org/



# PostgreSQL Installation (2/8)

## Windows installers

### Interactive installer by EnterpriseDB

Download the installer certified by EnterpriseDB for all supported PostgreSQL versions.

This installer includes the PostgreSQL server, pgAdmin; a graphical tool for managing and developing your databases, and StackBuilder; a package manager that can be used to download and install additional PostgreSQL tools and drivers. Stackbuilder includes management, integration, migration, replication, geospatial, connectors and other tools.

This installer can run in graphical or silent install modes.

The installer is designed to be a straightforward, fast way to get up and running with PostgreSQL on Windows.

*Advanced users* can also download a zip archive of the binaries, without the installer. This download is intended for users who wish to include PostgreSQL as part of another application installer.

### Graphical installer by BigSQL

Download the graphical installer from BigSQL for all supported versions.

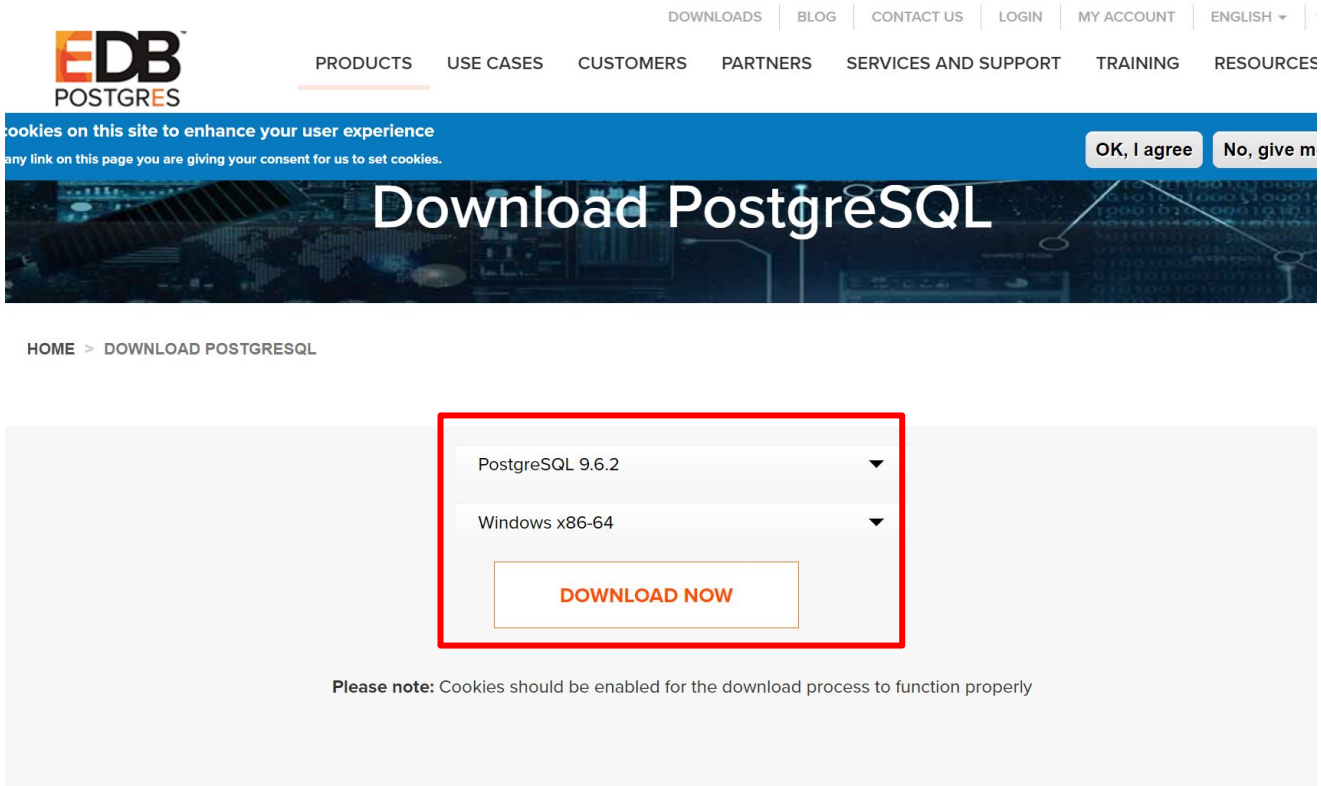
This distribution includes the PostgreSQL server, a graphical component manager, command line and graphical tools for managing databases, plus many open source community components.

Integrated components include web and desktop developer tools, geospatial, provisioning & management, compatibility & migration, backup/restore, integration with external databases (Cassandra, Oracle, SQL Server, Hadoop), and procedural languages (Python, Perl, Java, and TCL).

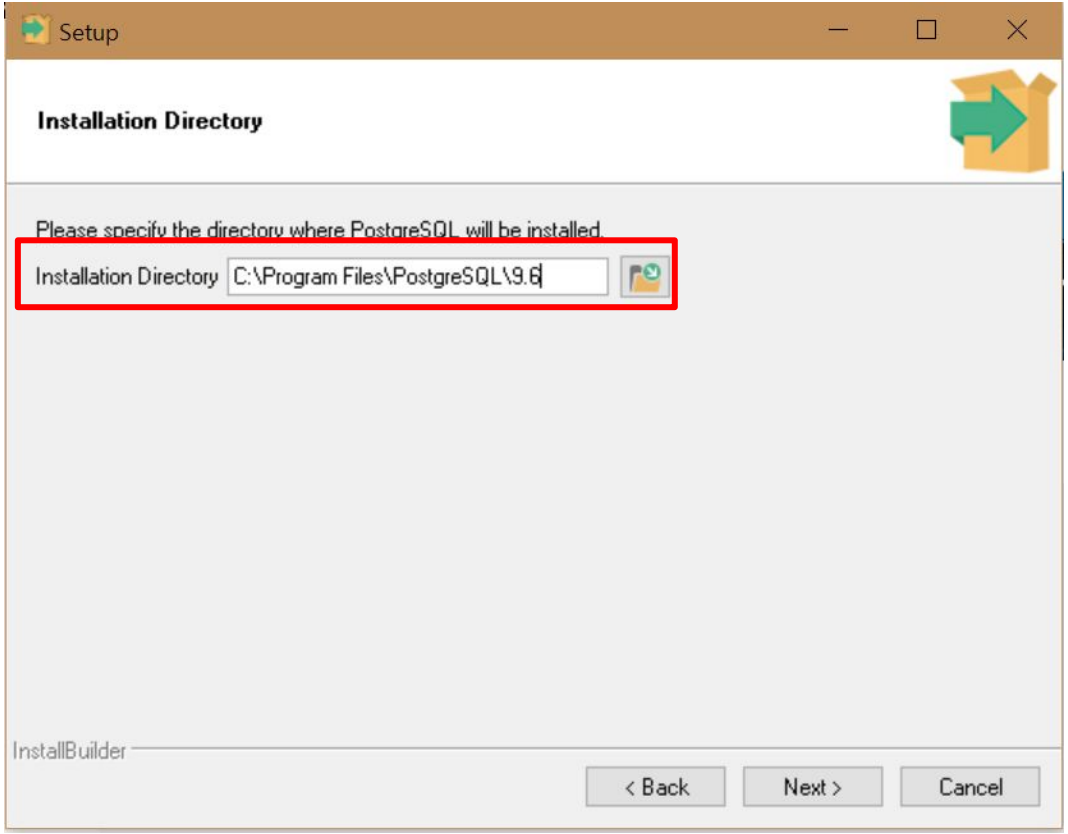
This distribution is a fast, developer-friendly way to get a complete PostgreSQL environment installed and running. It uses an open source toolchain to build PostgreSQL and extensions, which simplifies cross-platform development of extensions.

Advanced users can also download a command line version of the distribution, for scriptable installs or embedding with other applications.

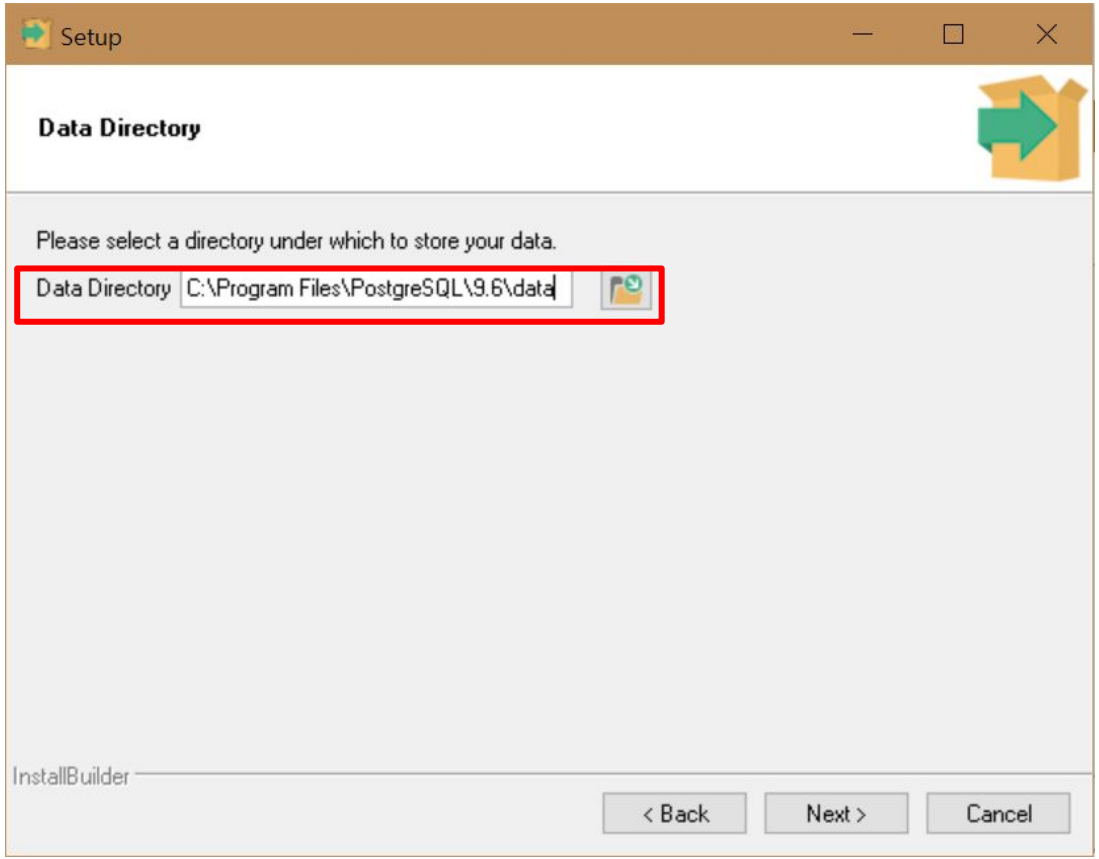
# PostgreSQL Installation (3/8)



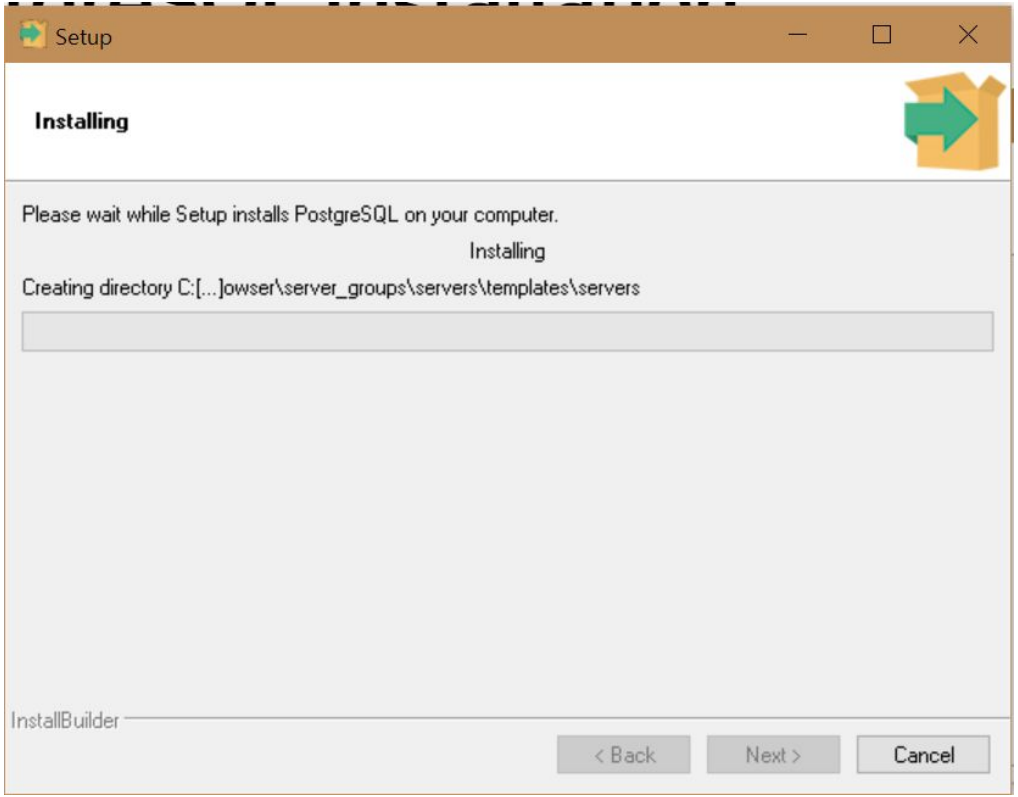
# PostgreSQL Installation (4/8)



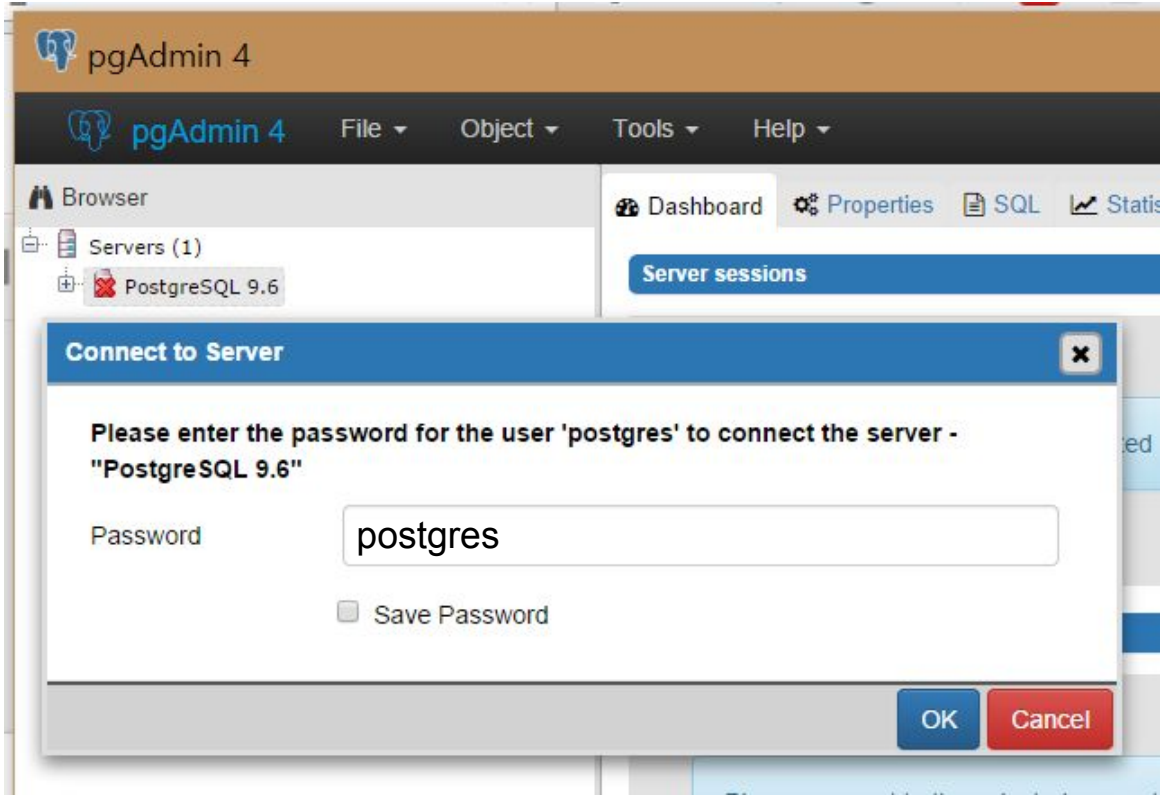
# PostgreSQL Installation (5/8)



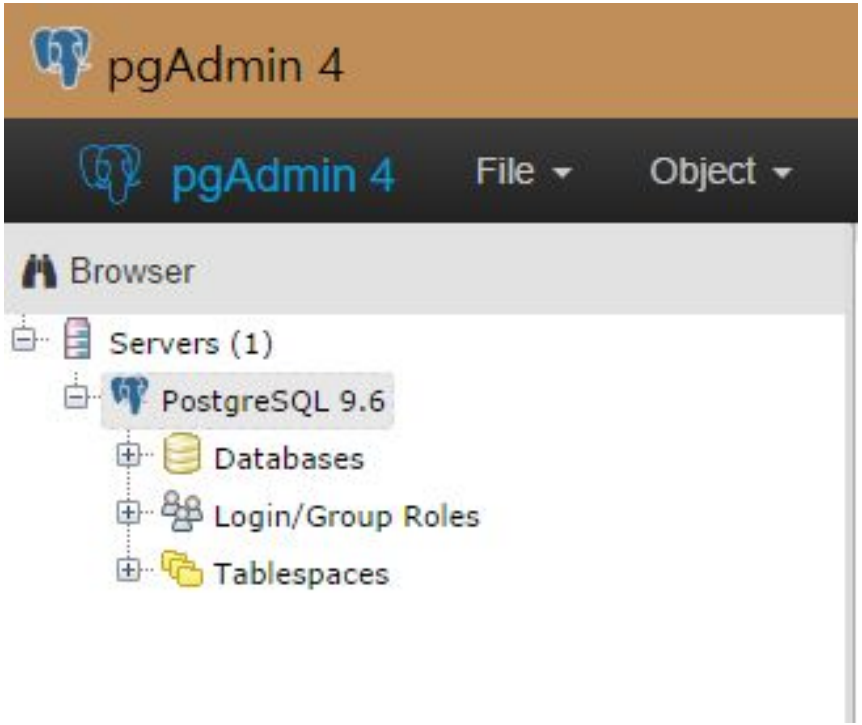
# PostgreSQL Installation (6/8)



# PostgreSQL Installation (7/8)



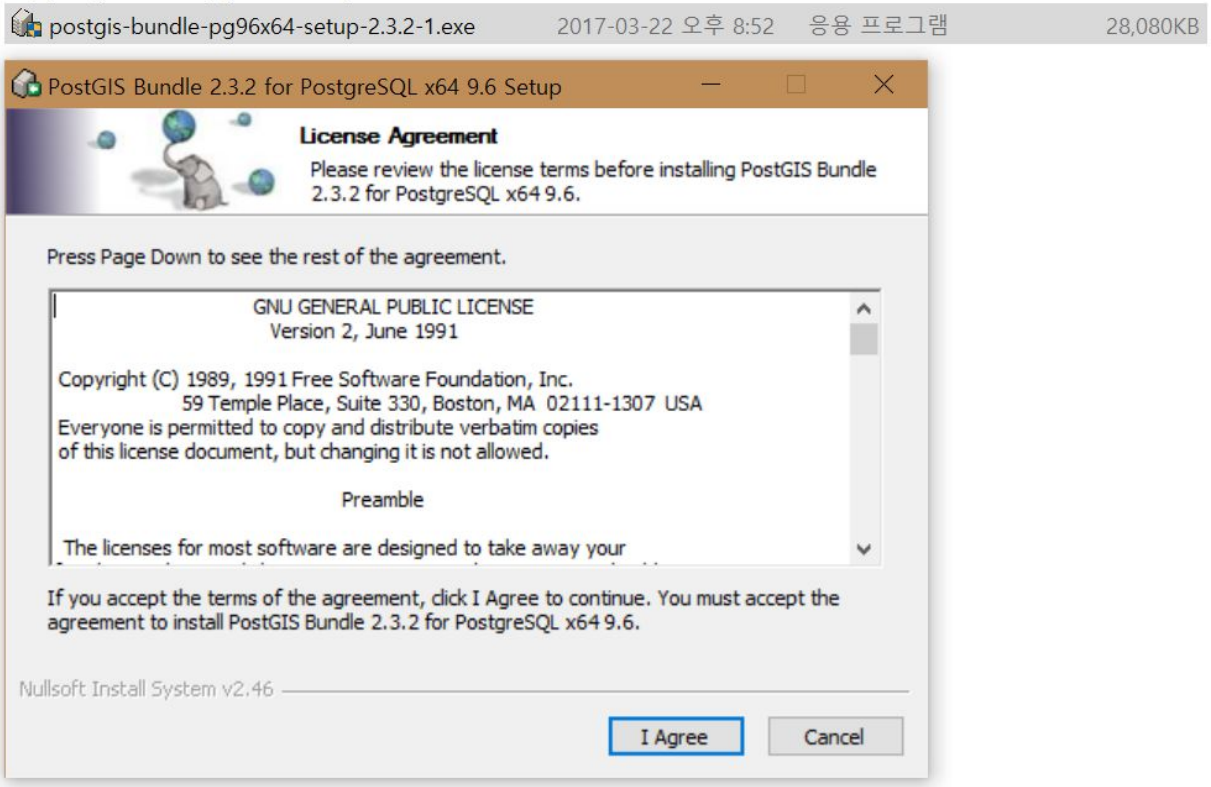
# PostgreSQL Installation (8/8)



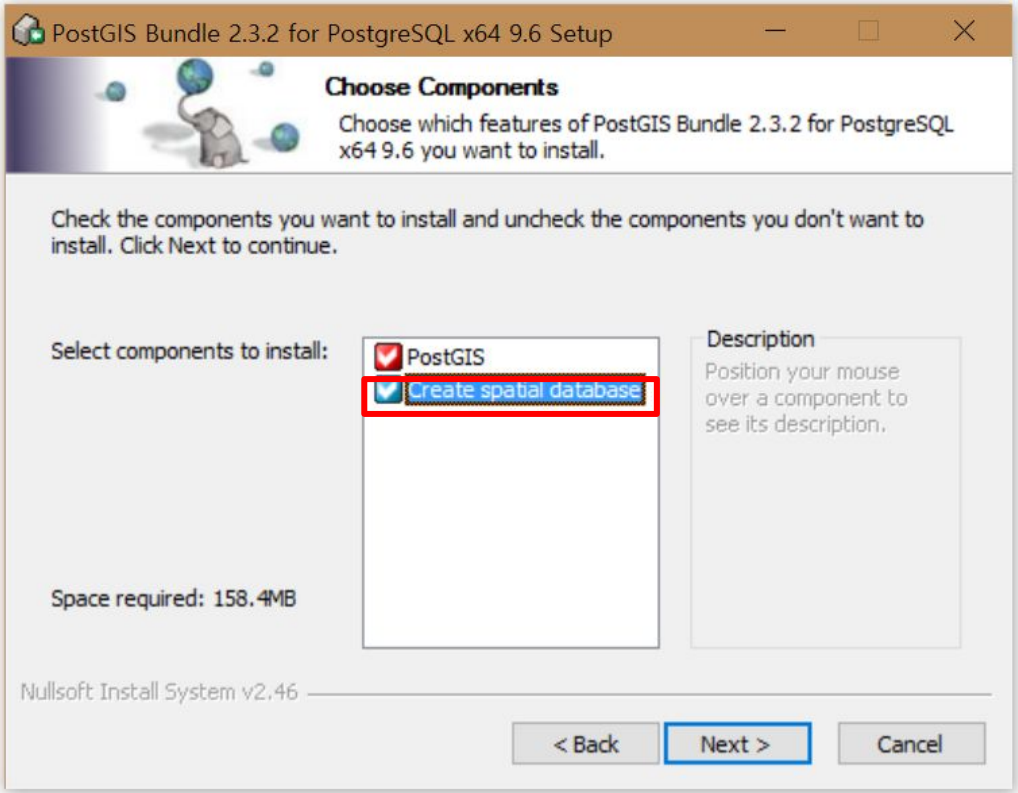
# PostGIS Installation(1/4)

- Download at http://postgis.net/

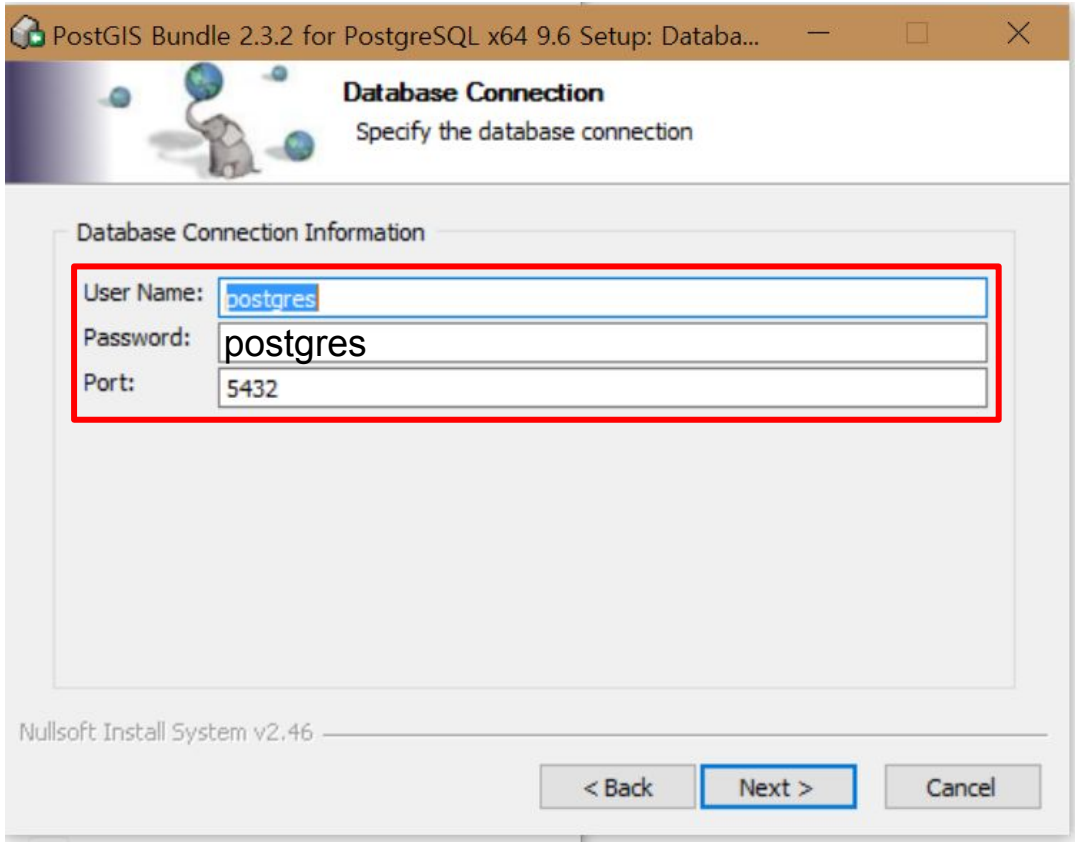
# PostGIS Installation (2/4)



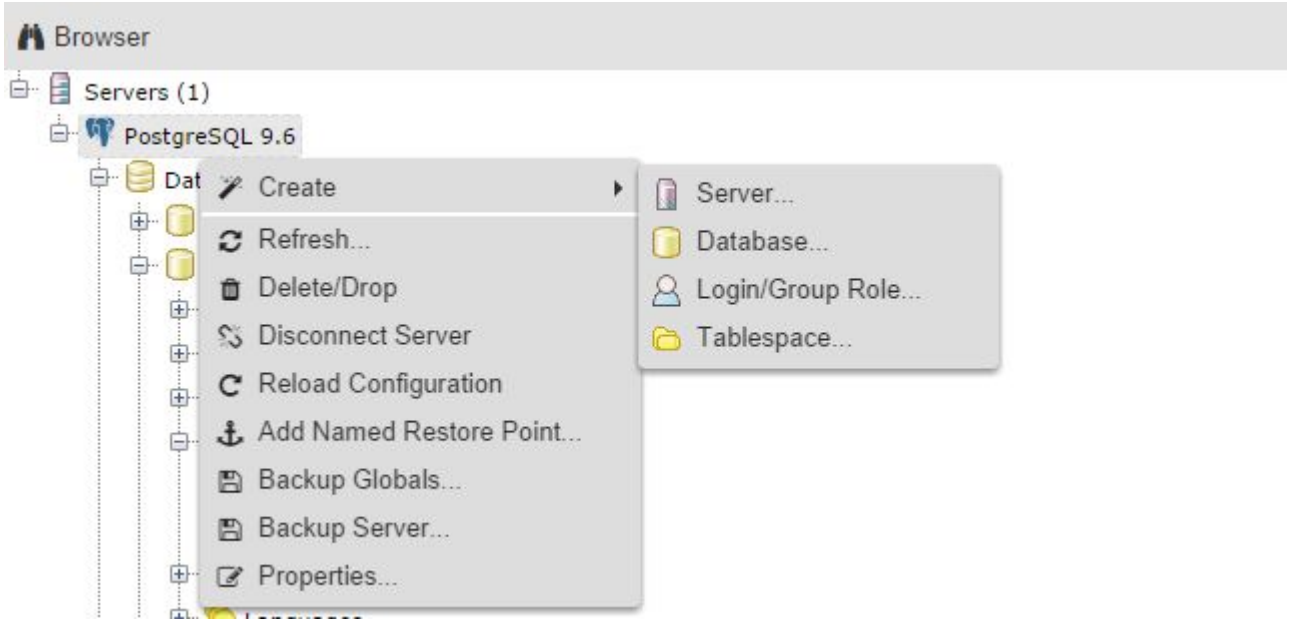
# PostGIS Installation (3/4)



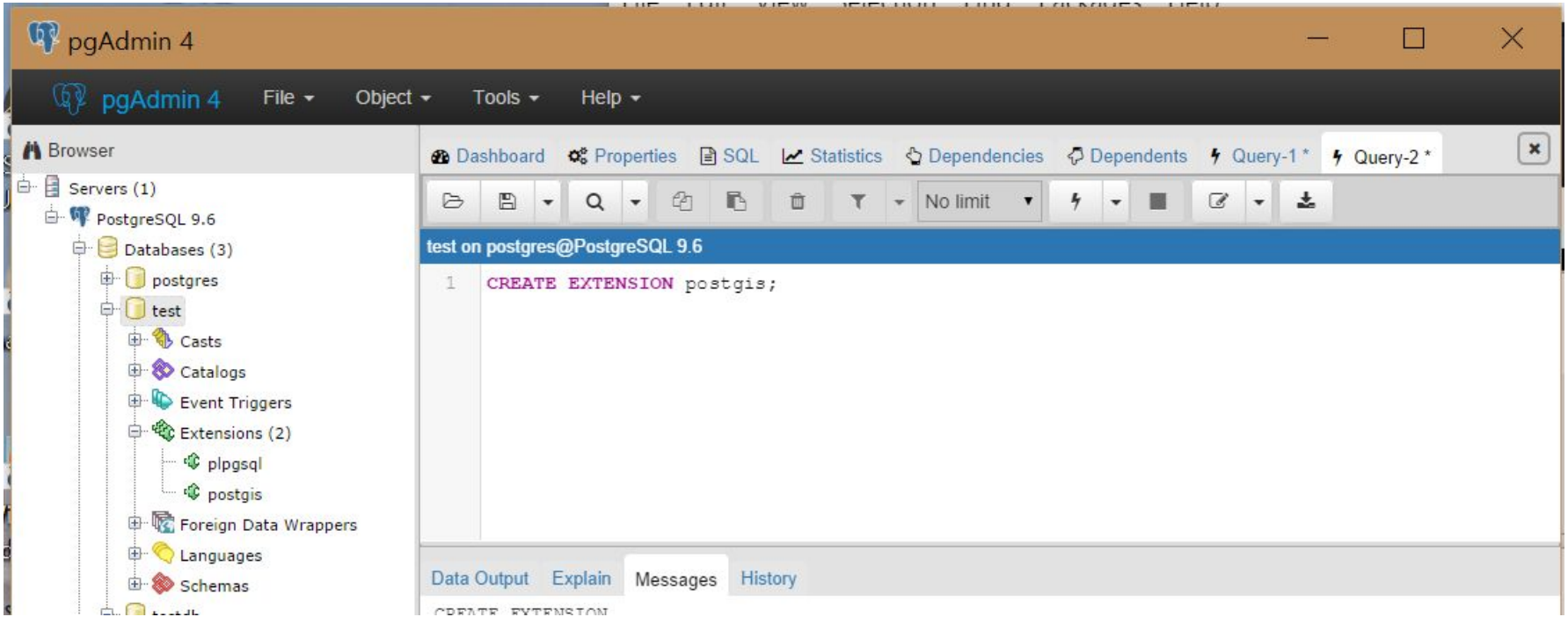
# PostGIS Installation (4/4)



# PostGIS - Create Database



# PostGIS - Enable PostGIS Extension



# PostGIS - Create Table with Geometry

```
CREATE TABLE world (
        id SERIAL PRIMARY KEY,
        name VARCHAR(50),
        geom GEOMETRY
);
```

# PostGIS - Insert SQL

INSERT INTO world (name, geom)

VALUES ('South Korea',

**ST_GeomFromGeoJSON('{"type":"Polygon","coordinates":[[[128.349716,38.612243],[129.21292,37.432392],[129.46045,36.784189],[129.468304,35.632141],[129.091377,35.082484],[128.18585,34.890377],[127.386519,34.475674],[126.485748,34.390046],[126.37392,34.93456],[126.559231,35.684541],[126.117398,36.725485],[126.860143,36.893924],[126.174759,37.749686],[126.237339,37.840378],[126.68372,37.804773],[127.073309,38.256115],[127.780035,38.304536],[128.205746,38.370397],[128.349716,38.612243]]]}')**)

# PostGIS - Select SQL

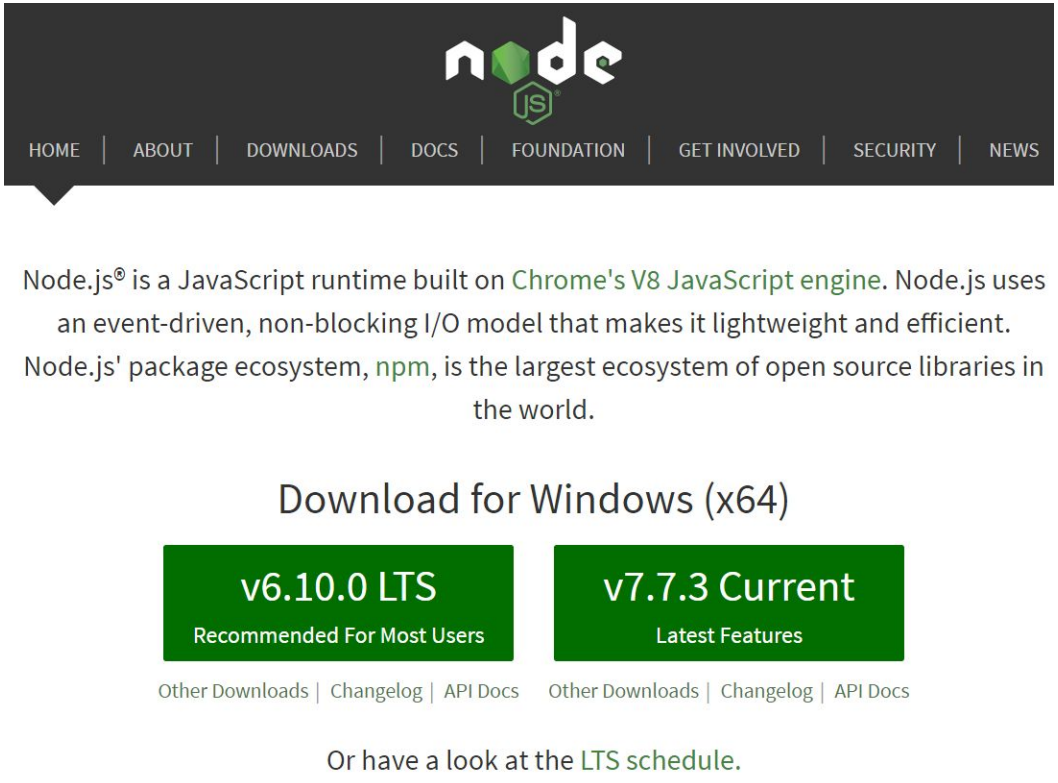
- SELECT id, name, **ST_ASTEXT(geom)**
  FROM world;

- SELECT id, name, ST_ASTEXT(geom), **ST_AREA(geom) AS area**
  FROM world;

- SELECT id, name, ST_ASTEXT(geom)
  FROM world
  **WHERE ST_AREA(geom) < 10**

# Node.js Installation

- Download at https://nodejs.org/



# Next Tutorials

GeoServer