

# Website Architecture

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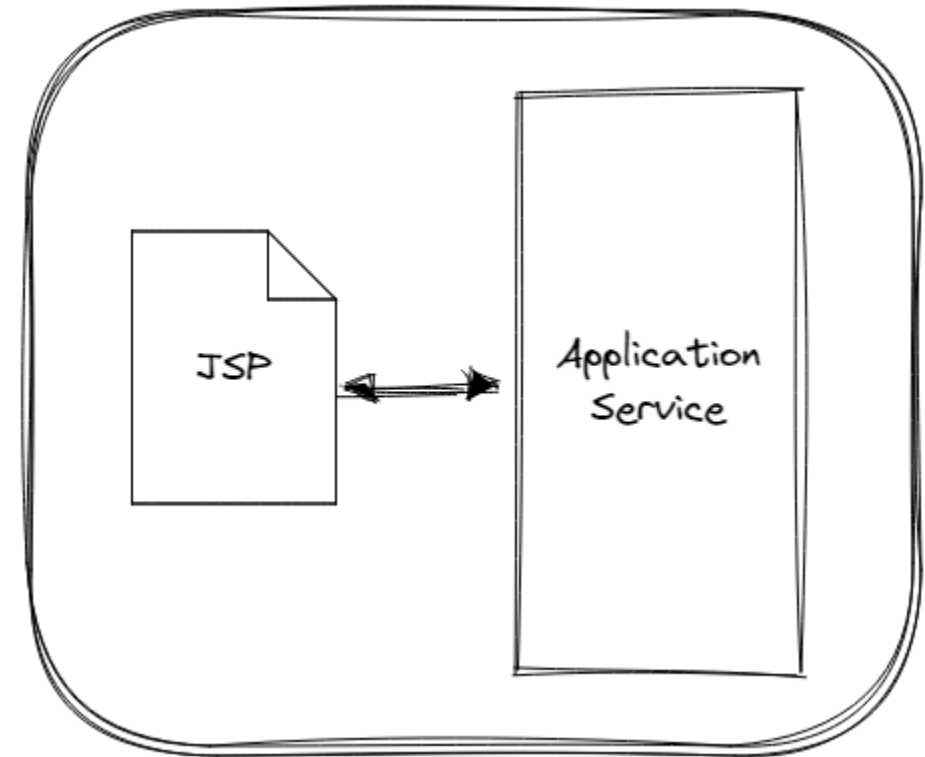
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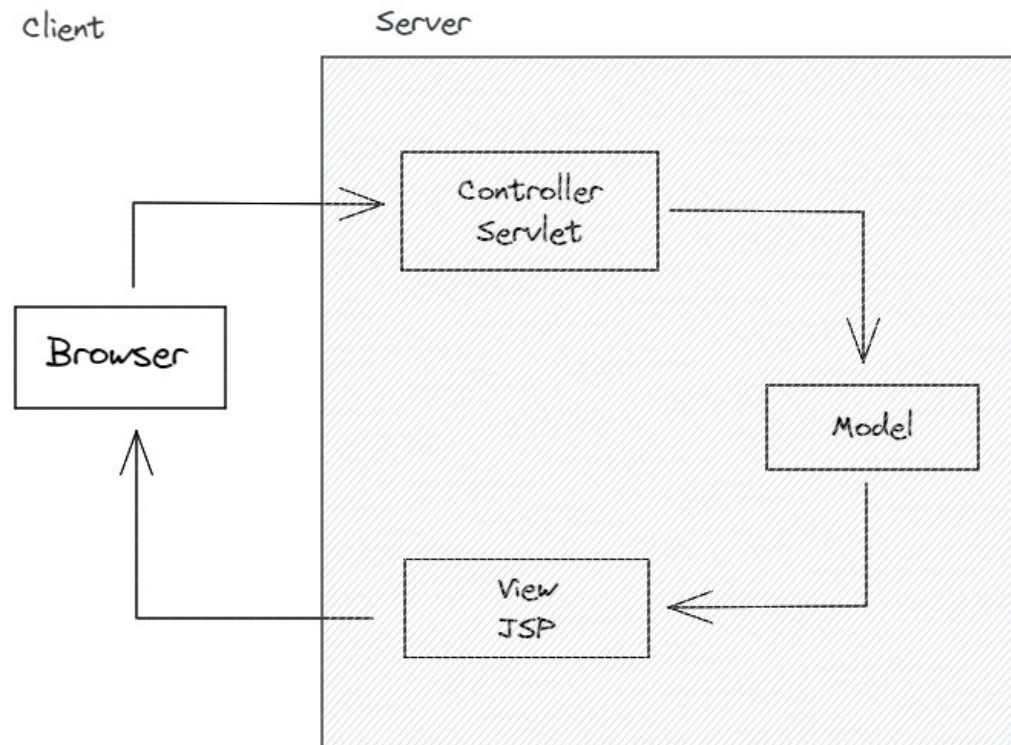
# No MVC

- Static HTML webpages are pre-written and stored on a web server.
- To dynamically generate HTML files, one can use Perl, C or C++ to output strings directly to the browser via the Common Gateway interface (CGI).
- When a webpage is very complex, it is not so easy to output pages by concatenating strings.
  - Mark the variables with special tags and then parse those tags to generate HTML pages dynamically
  - ASP, JSP, PHP, and etc.
- Straight forward development
- No concept of front end.
- High coupling; difficult to maintain



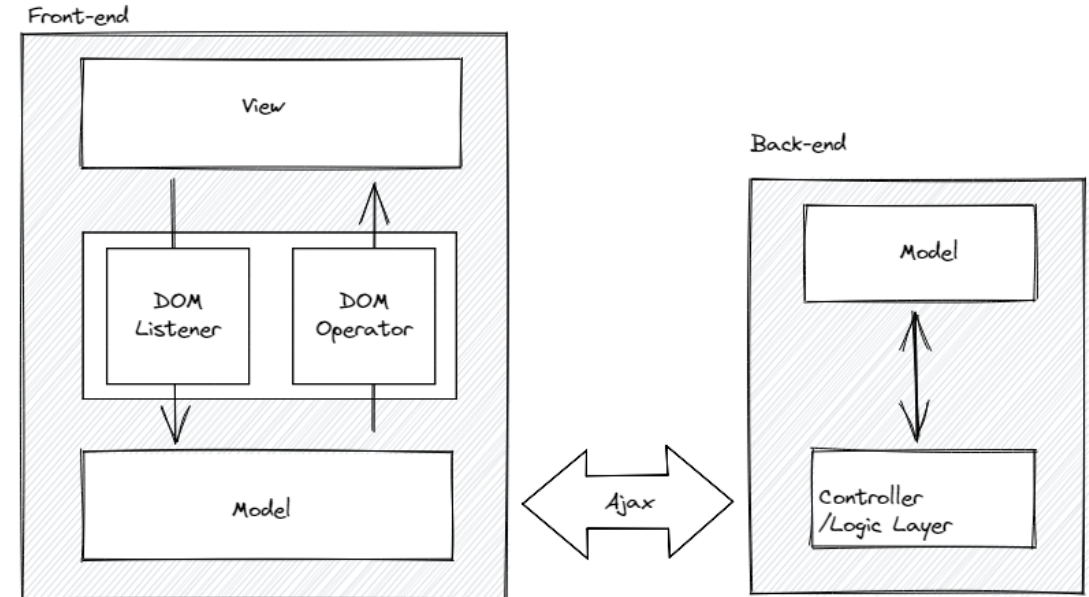
# MVC architecture

- Generation of MVC architecture
  - Model: maintaining data
  - View: representation
  - Controller: an interface layer, business logics
- Have both the front-end and the back-end code in one framework.
- The front and back ends are separated to some extent, but not really separated.
- Most of the web development framework, including Spring MVC, Ruby rails.

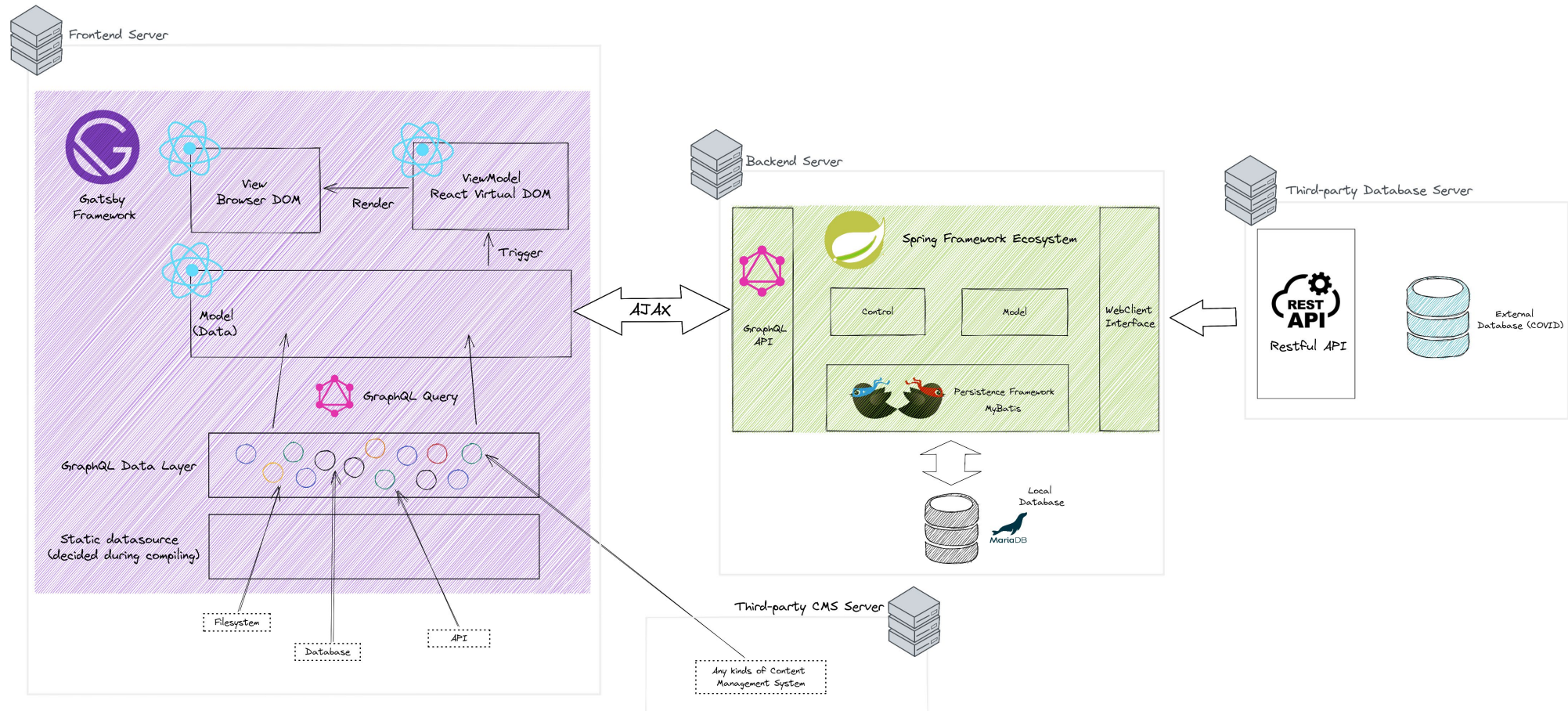


# Separation of the view layer

- AJAX (Asynchronous JavaScript and XML) makes the responsibilities of the front-end and back-end clear.
- Split the view layer to a different server/domain for teamwork.
- Drastic development of the front end.
  - MV-MVVM(Model-View-ViewModel)
- In the MVVM architecture,
  - View in MVC has its own model layer
  - the data change will be automatically update view (ReactJS)
  - User's interaction to the View will automatically update model (Native ReactJS cannot)



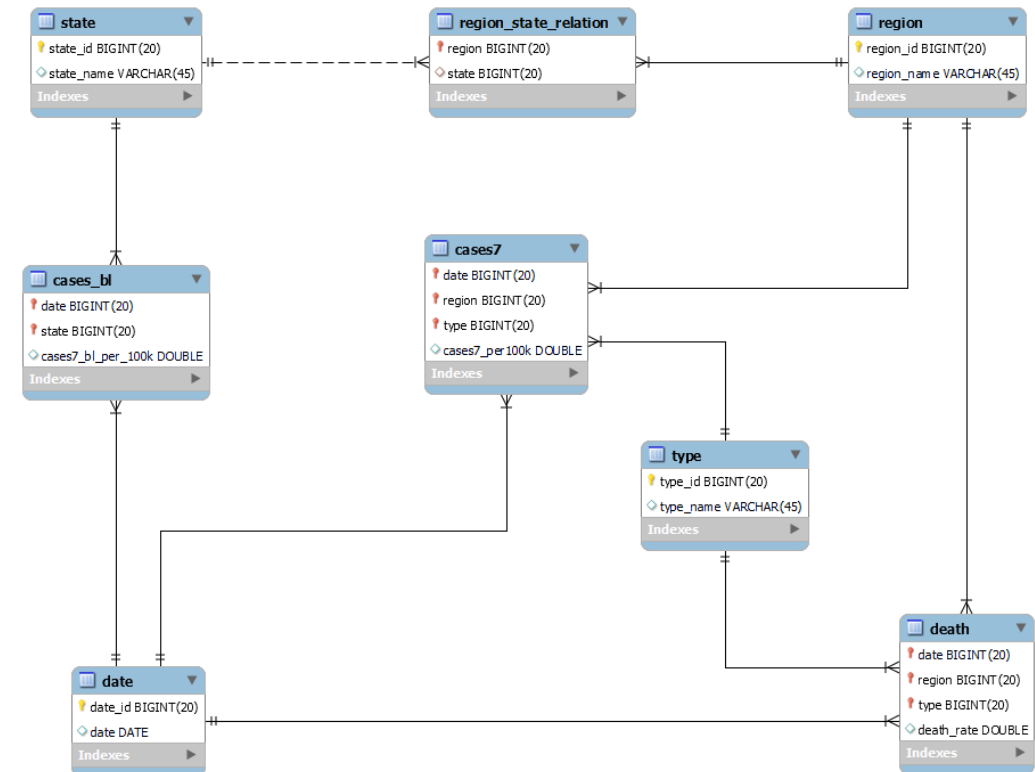
## Solution to the assignment





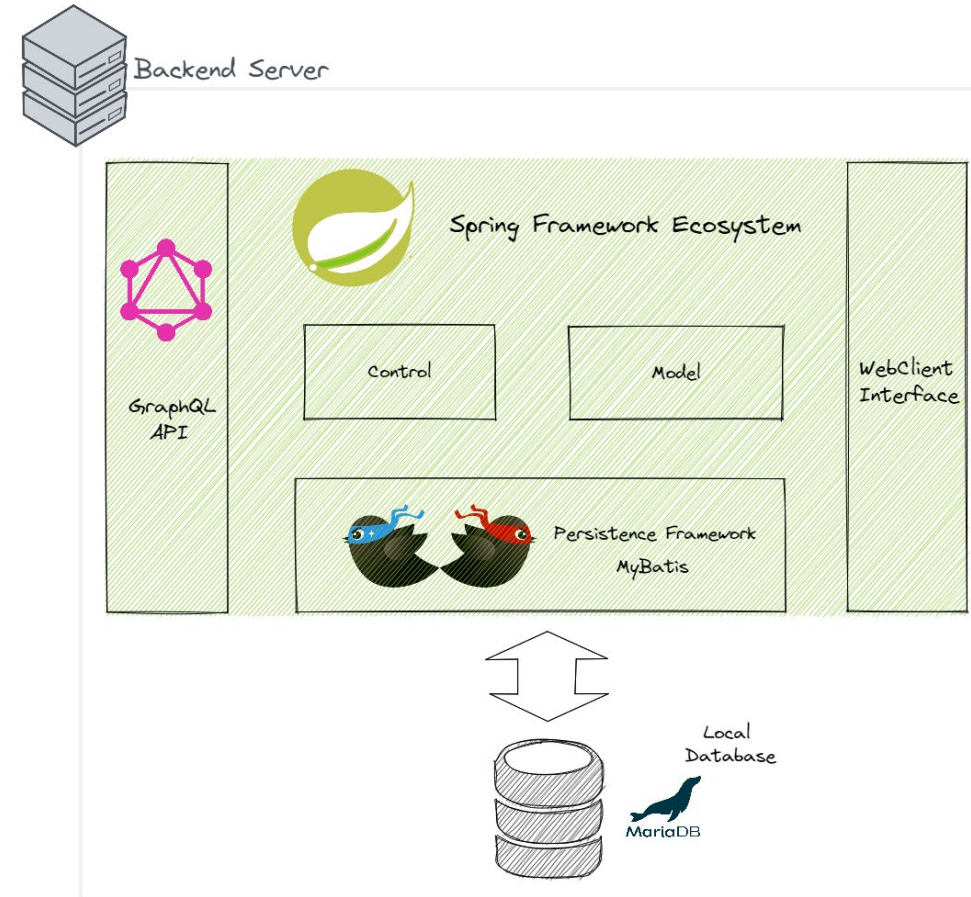
# Database design

- 1NF: all attributes should be atomic
- 2NF: remove partial dependency
  - $A \rightarrow C$  and  $B \rightarrow C$
- 3NF: remove transitive dependency
  - If  $A \rightarrow B$ ,  $B \rightarrow C$  then  $A \rightarrow C$
- 4NF: remove multi-value dependency
  - If  $A \rightarrow B$  and  $A \rightarrow C$



# Spring Ecosystem

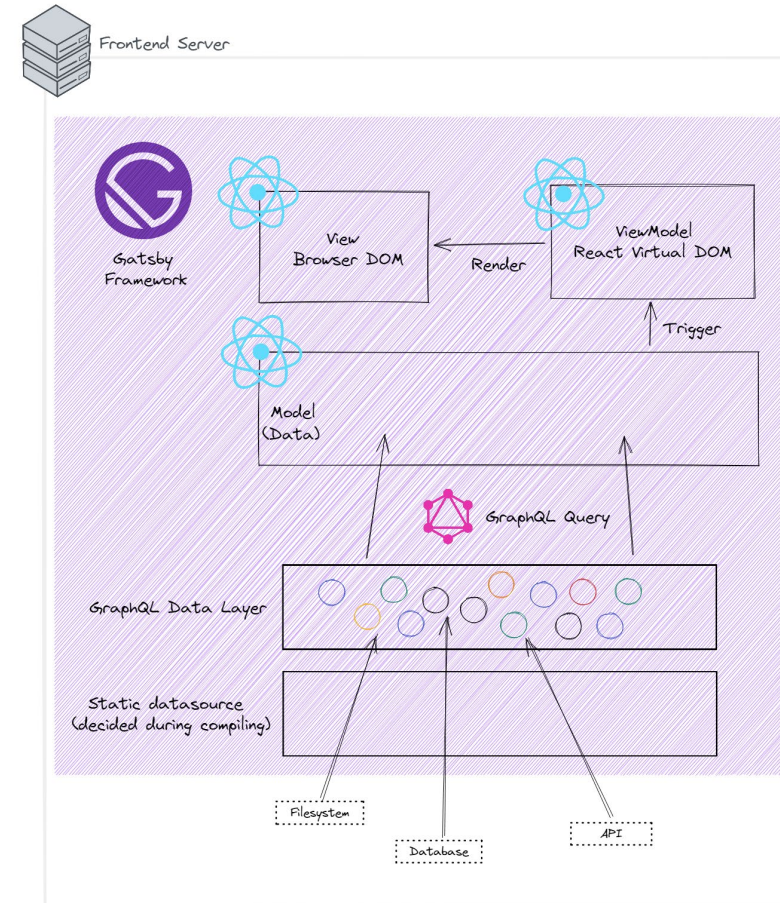
- Provide API in GraphQL format
  - Initiate one request to obtain a resource based on fields
- MyBatis is a persistence layer framework
  - Compared to Hibernate, relatively easy to study if understand SQL (Hibernate is more encapsulated)
  - Exposed sql (both pro and con)



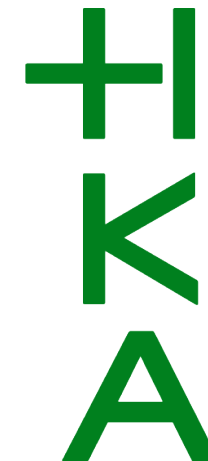


# Gatsby Ecosystem

- ReactJS based
  - Everything write in JavaScript
    - Focusing more on logics (front-end logics)
    - More dynamic (for example the dynamic dropdown menu)
    - Virtual DOM, more efficient
- A HTML translator
  - GraphQL data layer is formed during compiling, it behaves like the database of the front end
  - Good for use third-party headless content management system



# Demonstration



2022-06-04 ▾	FETCH				
Region Name ↑	Region Type	7-day cases	7-day deaths	State Name	Statewide 7-day cases
Ahrweiler	Landkreis	215.360	0.307	Rheinland-Pfalz	266.397
Aichach-Friedberg	Landkreis	340.680	0.318	Bayern	267.219
Alb-Donau-Kreis	Landkreis	169.522	0.348	Baden-Württemberg	213.554
Altenburger Land	Landkreis	88.279	1.486	Thüringen	96.027
Altenkirchen (Westerwald)	Landkreis	284.304	0.413	Rheinland-Pfalz	266.397
Altmarkkreis Salzwedel	Landkreis	198.338	0.513	Sachsen-Anhalt	150.274
Altötting	Landkreis	367.206	0.723	Bayern	267.219
Alzey-Worms	Landkreis	250.163	0.522	Rheinland-Pfalz	266.397
Amberg	Kreisfreie Stadt	183.107	0.458	Bayern	267.219
Amberg-Weizbach	Landkreis	253.403	0.644	Bayern	267.219

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