Understanding Common Android Architectural Patterns

Omri Erez

SOFTWARE ENGINEER

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God Class / Object

- Contains a high number of components
- Components are coupled
- A very lengthy class
- Avoid them at all cost

Activity

CoinModel

CryptoCoinEntity

Tracker:
- Activity lifecycle
- Location

bindViews

MyCryptoAdapter

Network Logic for API request

Persist data to local storage

RecyclerView

EntityToModelMapperTask

Runtime permission logic

Read data from local storage

Common Architectural Patterns

MVC: Model - View - Controller

MVP: Model - View - Presenter

MVVM: Model - View - ViewModel

MVC: Model View Controller

MVC

Model

- Represents the data models
- Manages the data’s states
- Includes the business logic of our application
- Often used across different parts of our app

MVC

View

- Essentially it’s our layouts and views
- The way we represent the data
- Renders the user interface

Controller

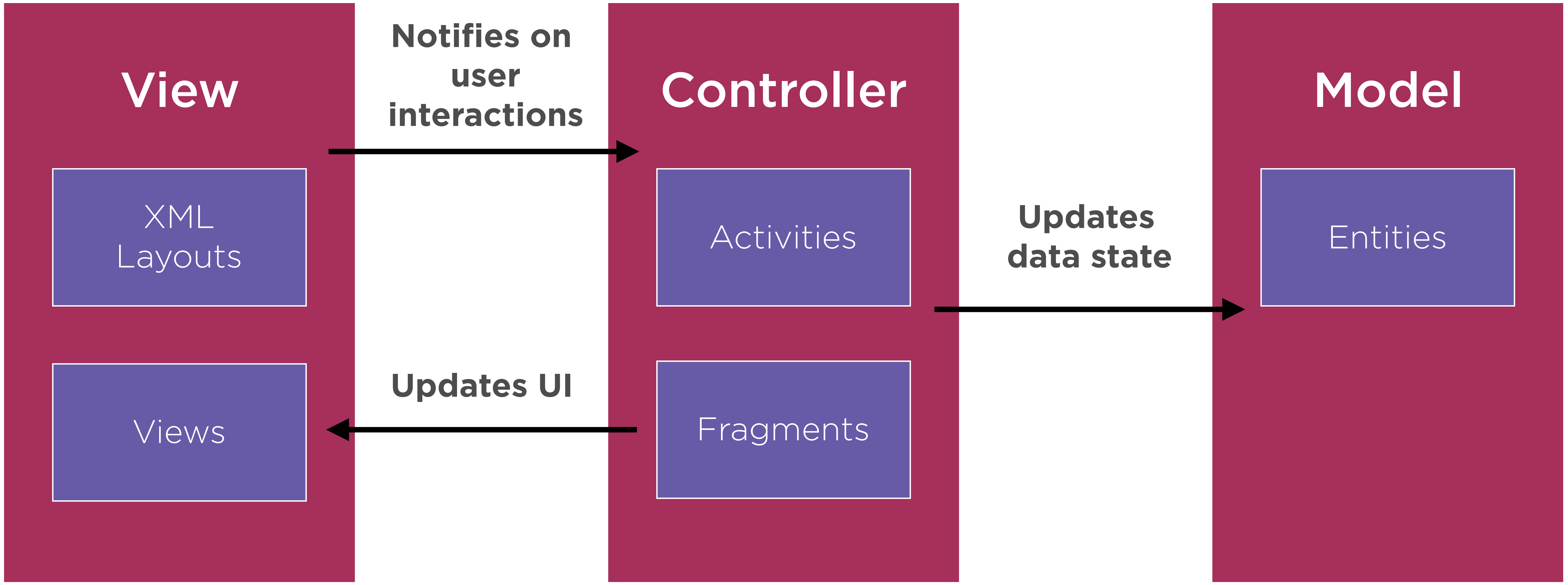
MVC

- Essentially it’s our activities and fragments

- Includes user’s interactions with our app

- The communication channel between our views and models

MVC Diagram


View
XML Layouts
Views
Notifies on user interactions
Updates UI
Controller
Activities
Fragments
Updates data state
Model
Entities

MVP: Model View Presenter

MVP

Model

- Same as in the MVC pattern

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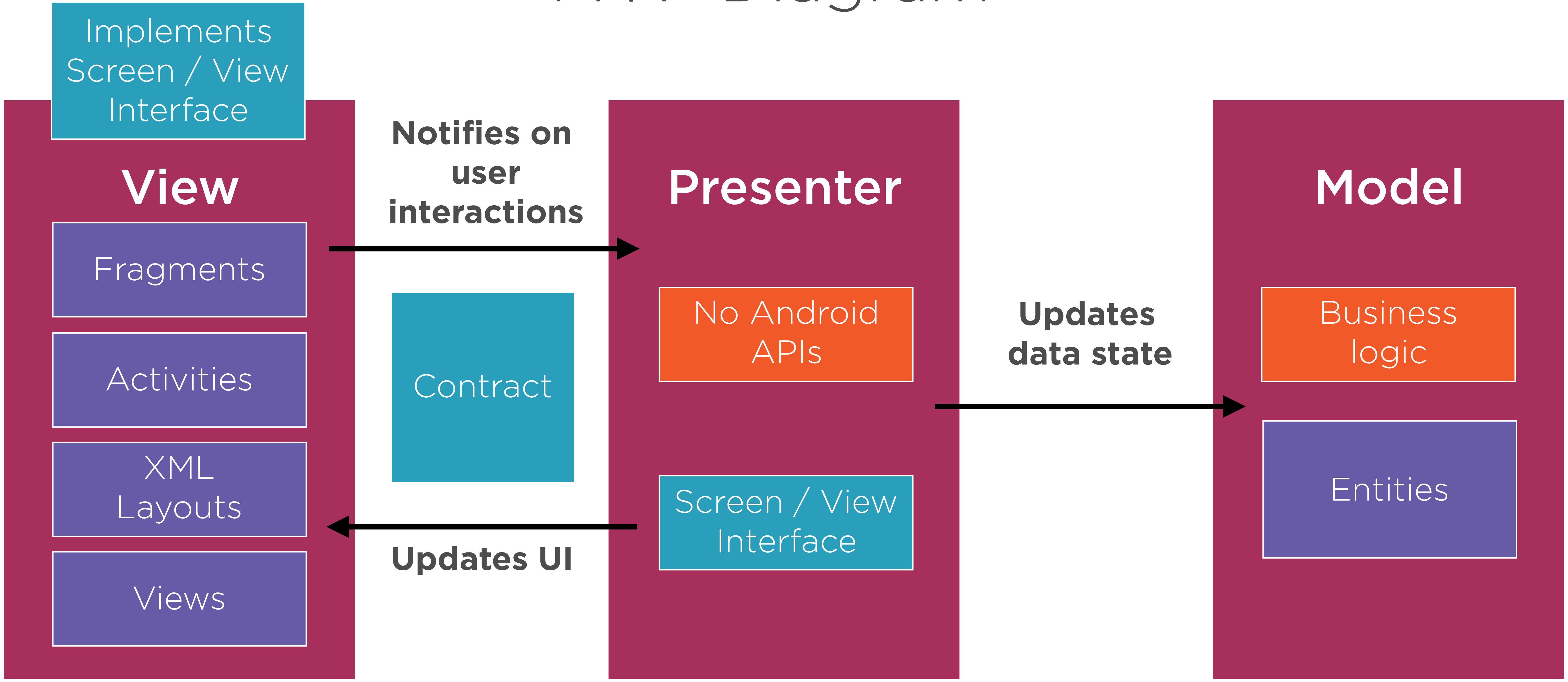
- Our XML Layouts and views
- Our activities and fragments:
  - In the Android world the two are strongly bonded with the views
  - Will implement an interface for the presenters actions

Presenter

MVP

- Has no relation to our views (Unlike MVC)
- Operations are invoked by our view (Activities or fragments)
- Views update is done via the view’s interface

MVP Diagram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Business logic
Entities

MVVM: Model View ViewModel

MVVM

- Using the Data Binding library from Google
- Minimize views binding code
- Views bindings logic is implemented in the XML layout

Without Data Binding

```
class CoinViewHolder extends RecyclerView.ViewHolder {

    TextView tvNameAndSymbol;
    TextView tvPriceAndVolume;
    ImageView ivIcon;

    public CoinViewHolder(View itemView) {
        super(itemView);
        tvNameAndSymbol = itemView.findViewById(R.id.tvNameAndSymbol);
        tvPriceAndVolume = itemView.findViewById(R.id.tvPriceAndVolume);
        ivIcon = itemView.findViewById(R.id.ivIcon);
    }
}
```

Without Data Binding

```
@Override
public void onBindViewHolder(CoinViewHolder holder, int position) {

    final CoinModel model = mItems.get(position);
    holder.tvNameAndSymbol.setText(model.name);
    holder.tvPriceAndVolume.setText(model.priceUsd);

}
```

With Data Binding

```xml
<?xml version="1.0" encoding="utf-8"?>
<layout xmlns:android="http://schemas.android.com/apk/res/android">
    <data>
        <variable
            name="coin"
            type="com.pluralsight.cryptobam.MainActivity.CoinModel" />
    </data>
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:layout_gravity="center_vertical"
        android:layout_marginLeft="16dp"
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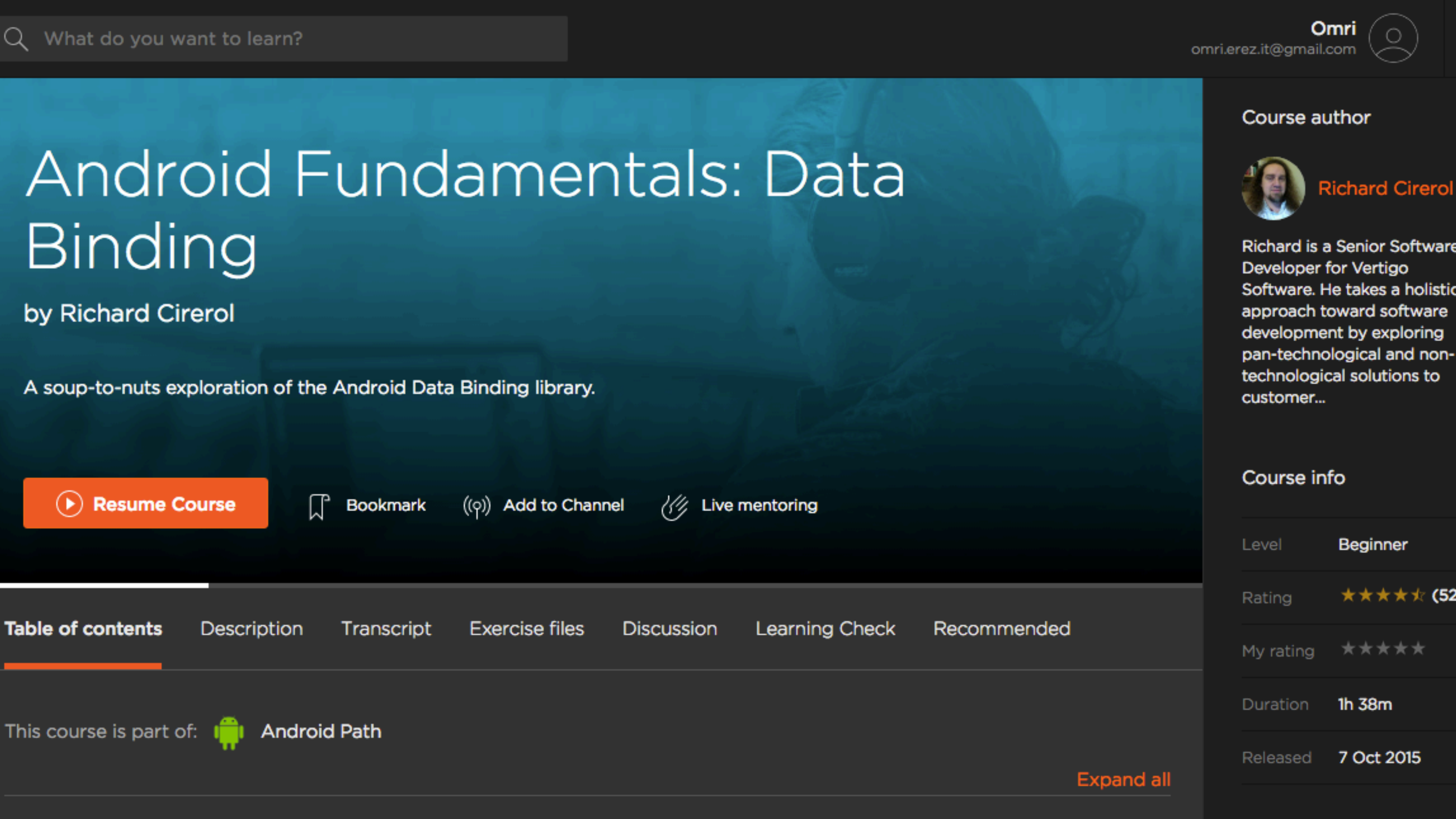

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Course info

Level	Beginner
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Model and View

- Same as in the MVP pattern

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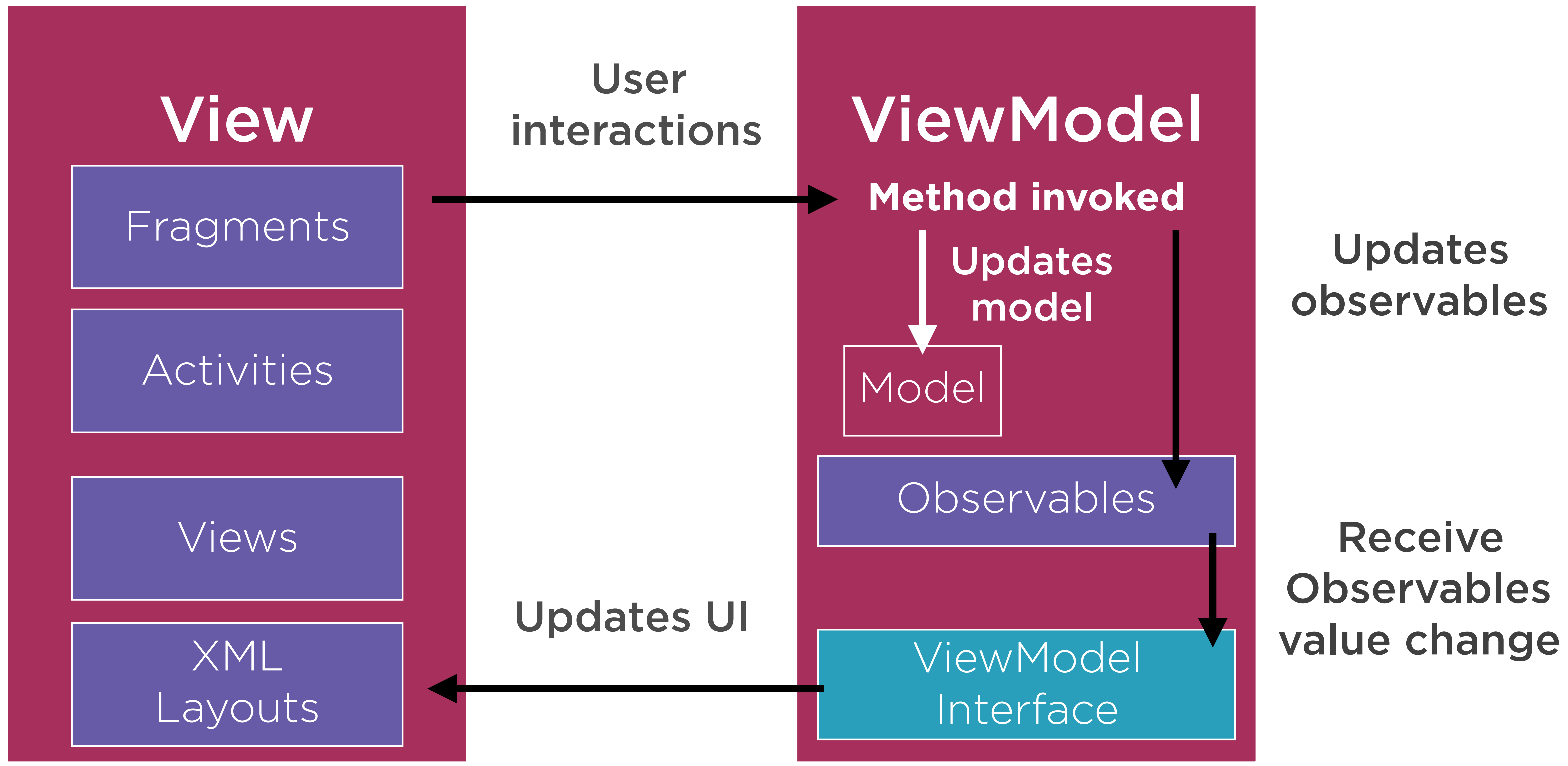
ViewModel

- Contains the Model
- Uses observable variables for update values
- On each value update, the relevant views will be updated

MVVM Diagram



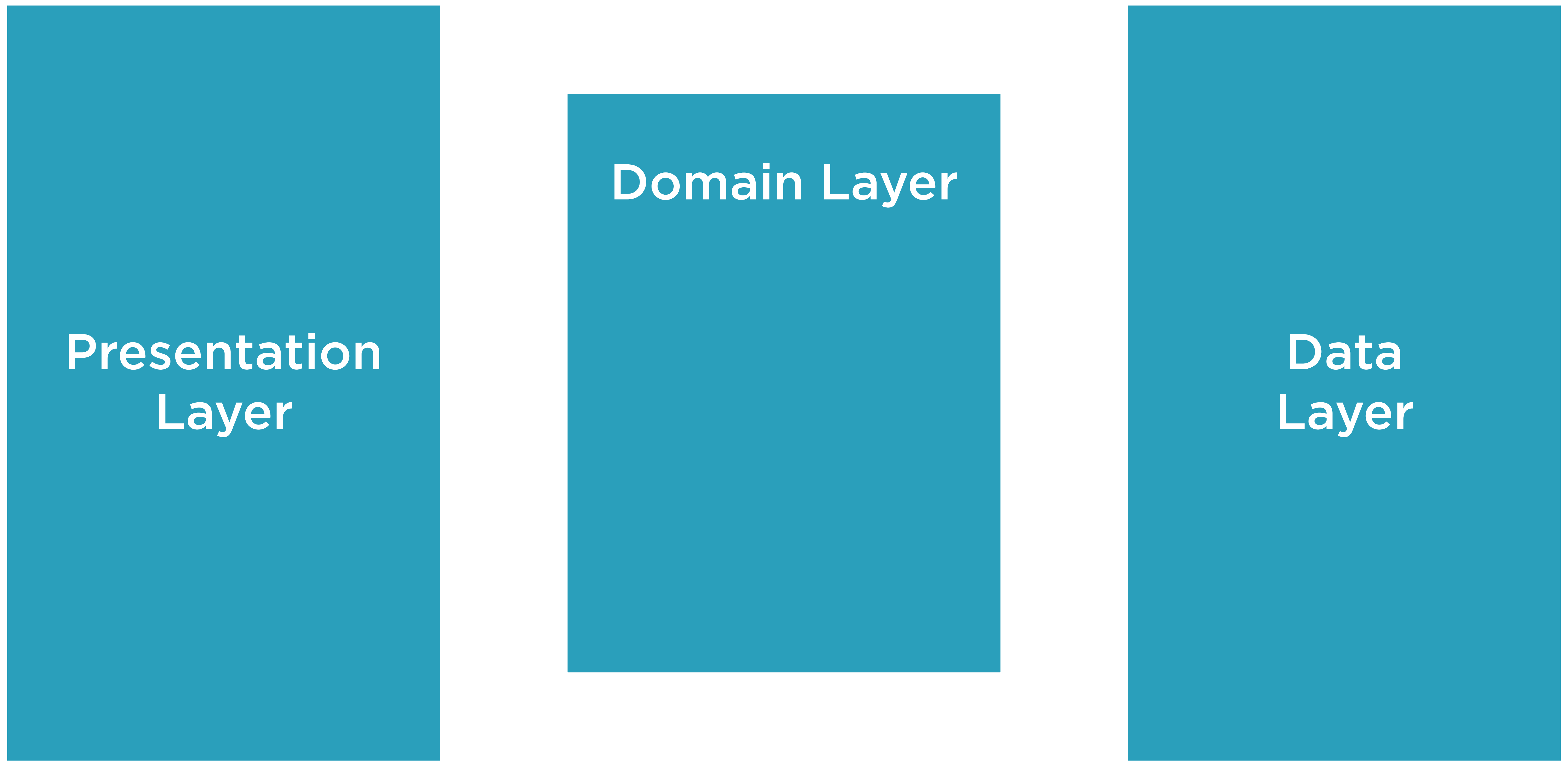
Comparison

Primitive Types and Objects Size

PATTERN	Dependency on Android APIS	XML Complexity	Unit testability	Modular & SRP
MVC Controller	High	Low	Difficult	No
MVP Presenter	Low	Low	Good	Yes
MVVM ViewModel	Low - No dependency	Medium	Great	Yes

The Clean Architecture

The Clean Architecture



Presentation Layer

- Android components: activities, services, fragments etc.
- Custom views
- Presenters

Domain Layer

- Entities

- Screen interfaces

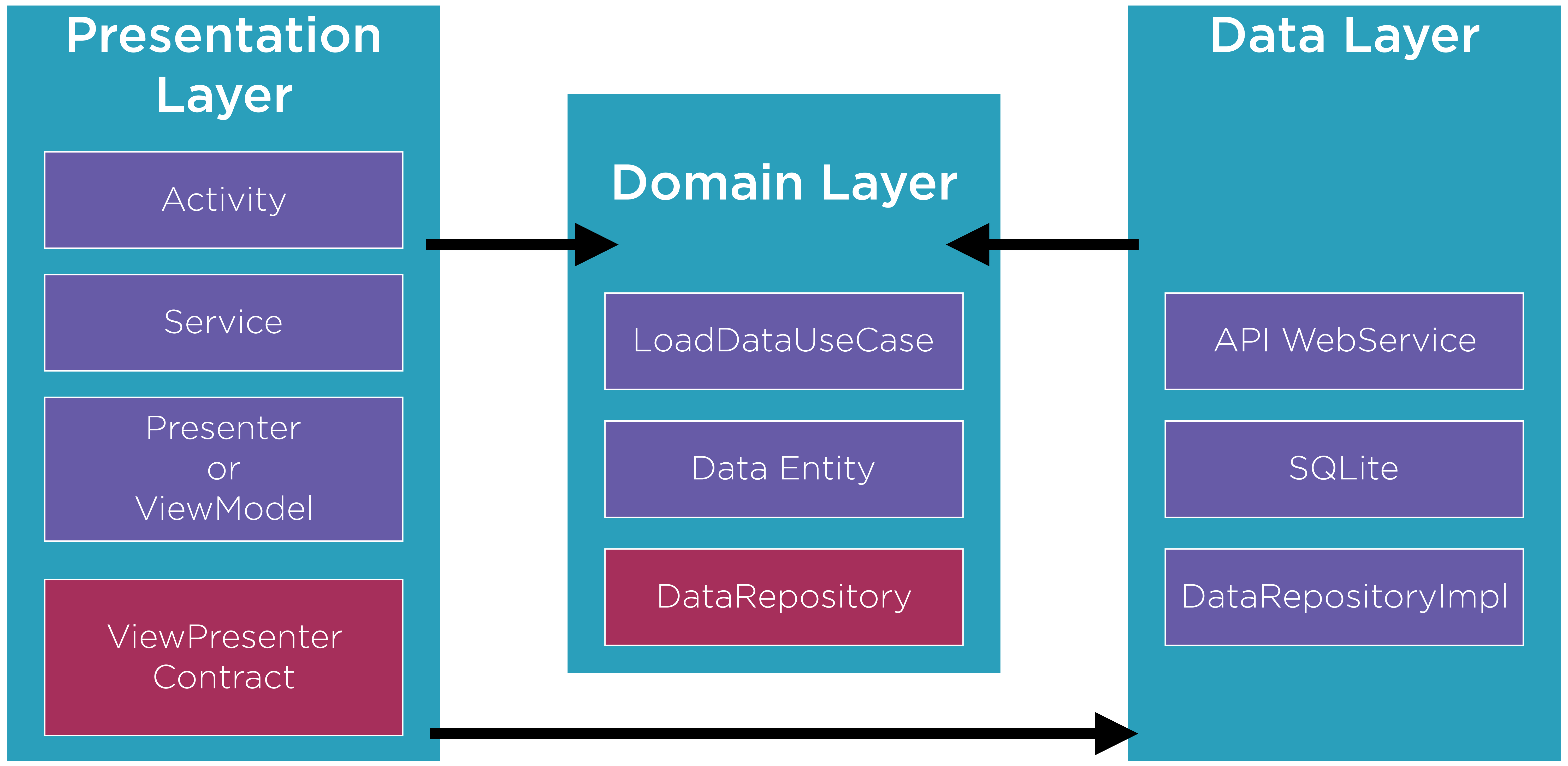
- Use cases

- Pure Java / Kotlin - Android free

Data Layer

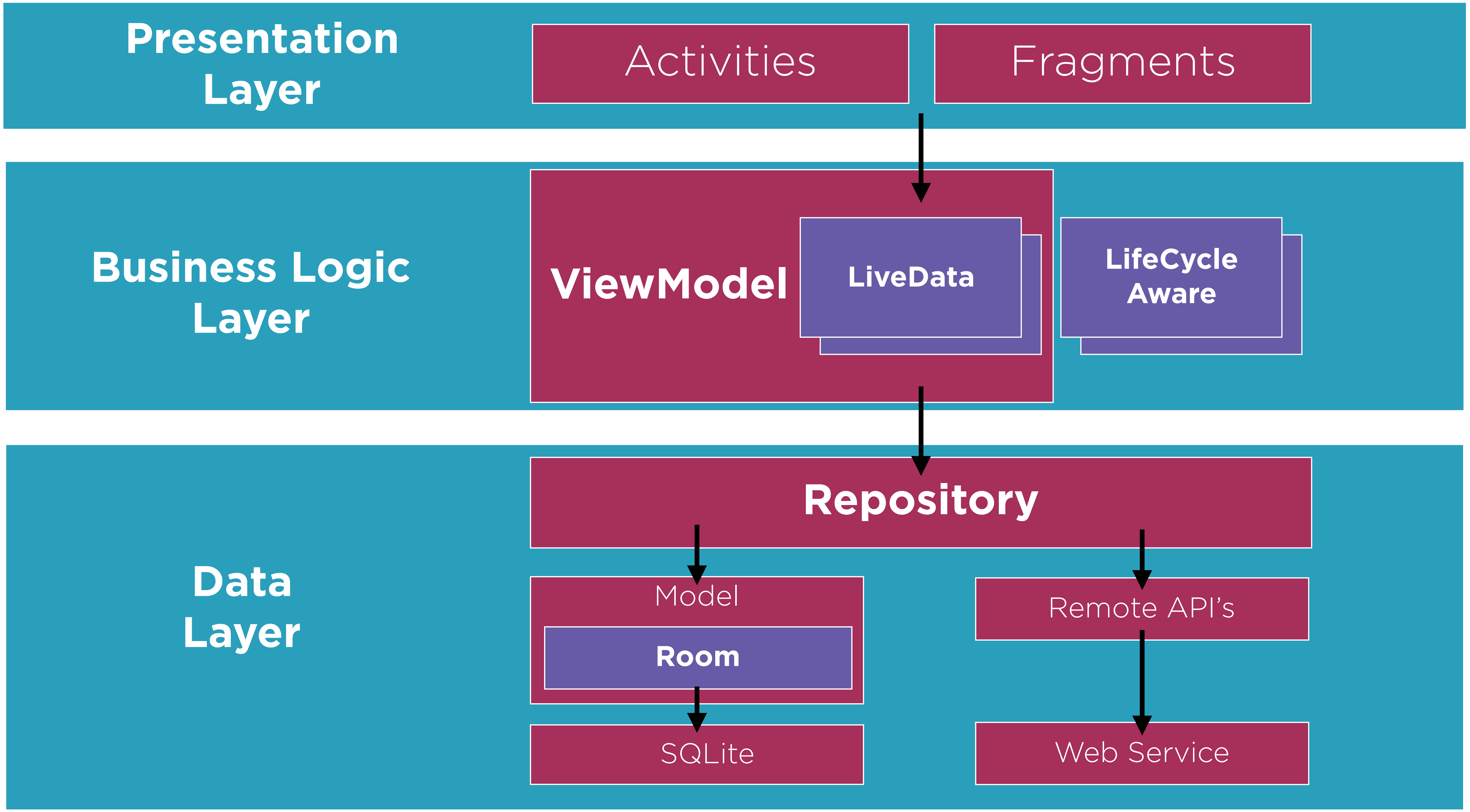
- External Apis access
- Local storage components
- Memory & disk caches

The Clean Architecture



Advantages

- Modular approach
- Each module can be tested separately
- Domain layer can be reused for other JVM applications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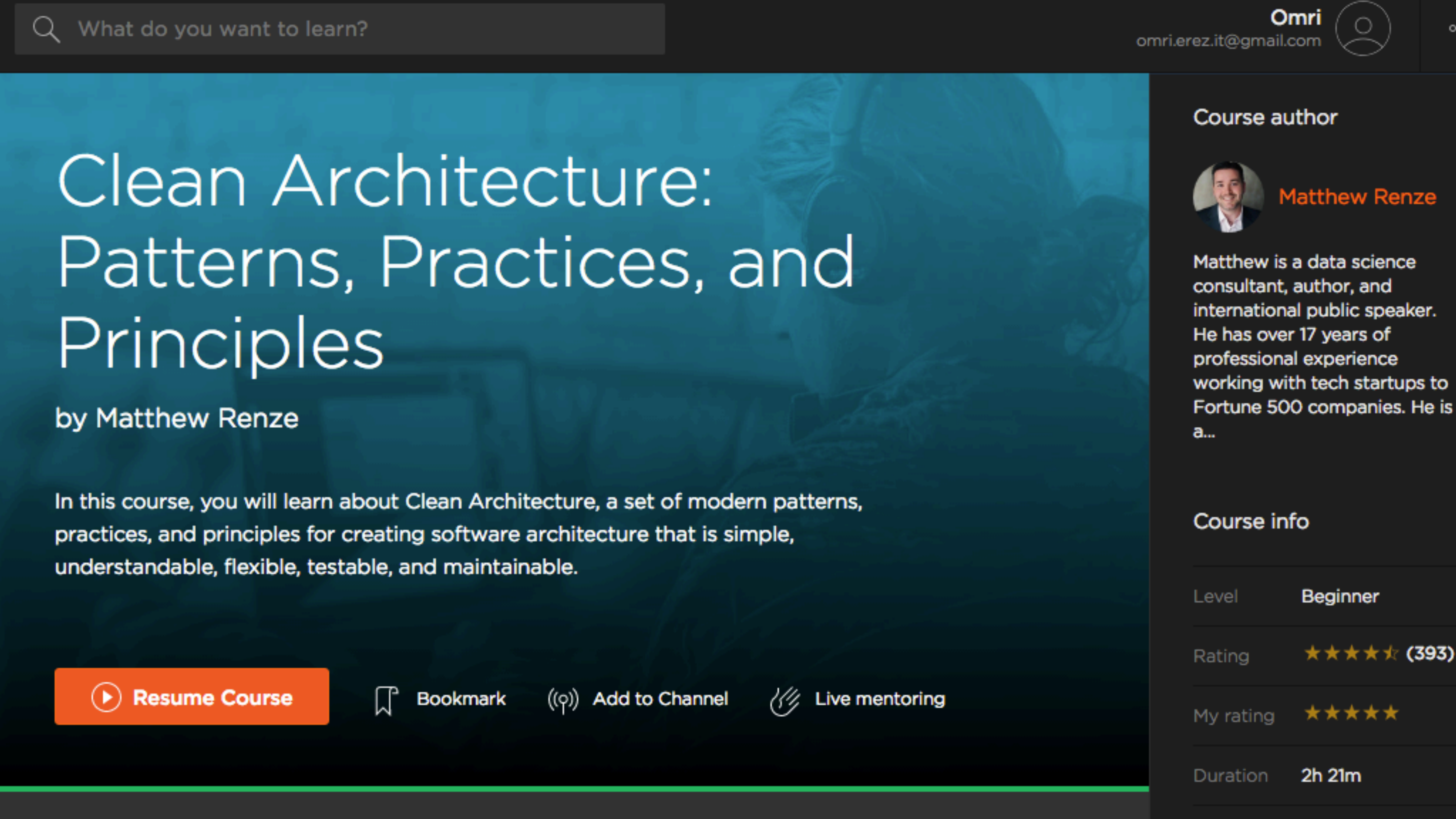

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Summary

Common architectural patterns

- God classes
- Differences between MVC MVP and MVVM
- The Clean architecture

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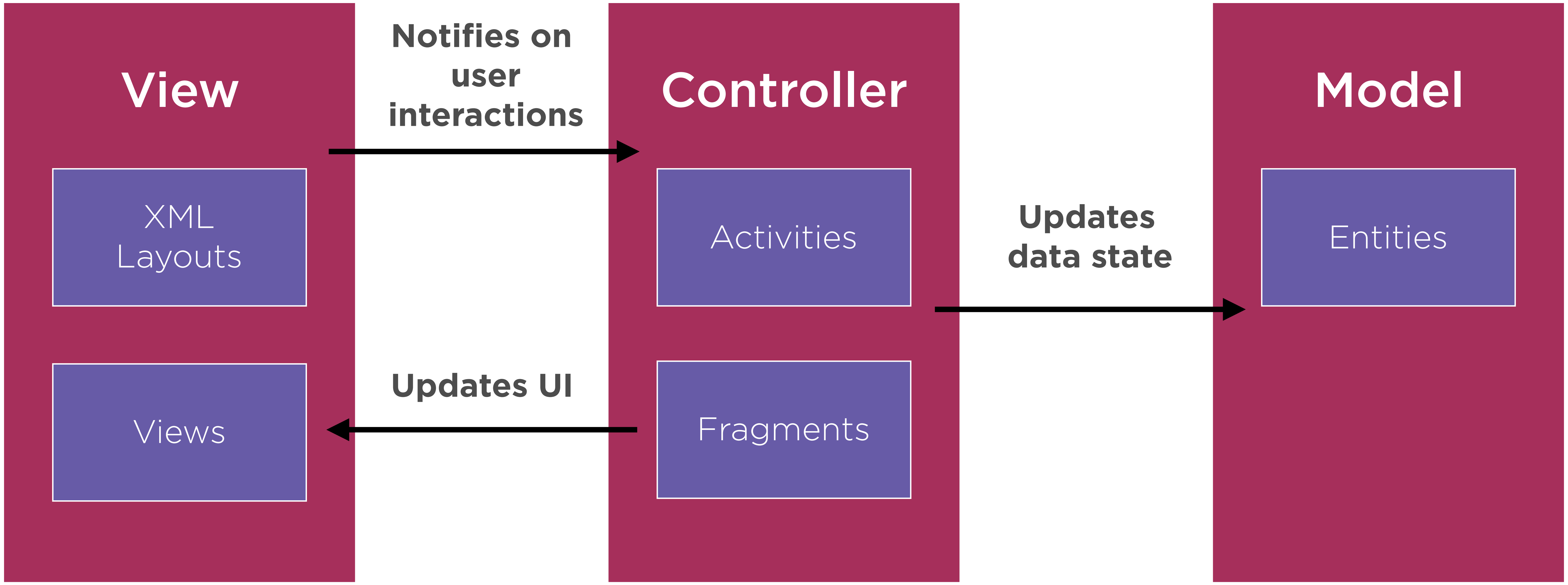
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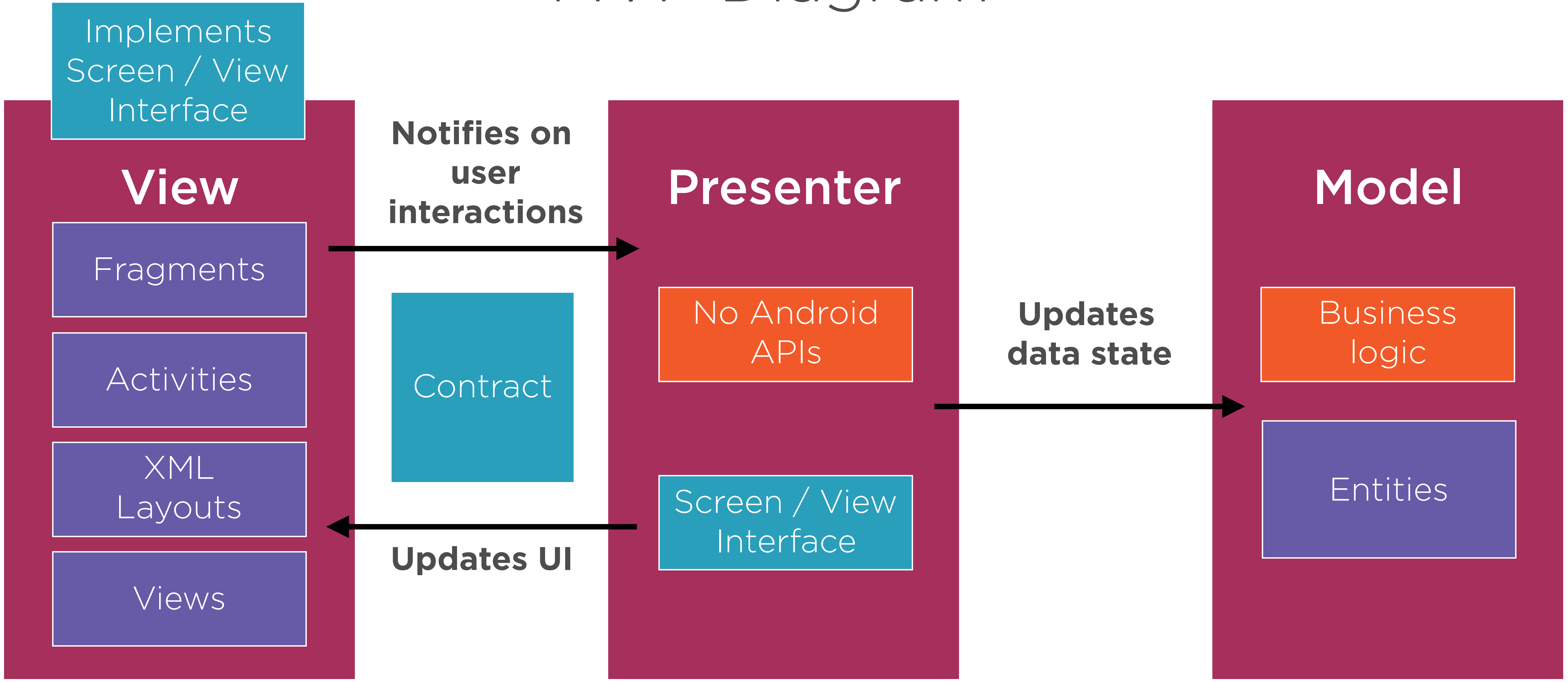
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No Android Dependencies

=

More Testable and Decoupled

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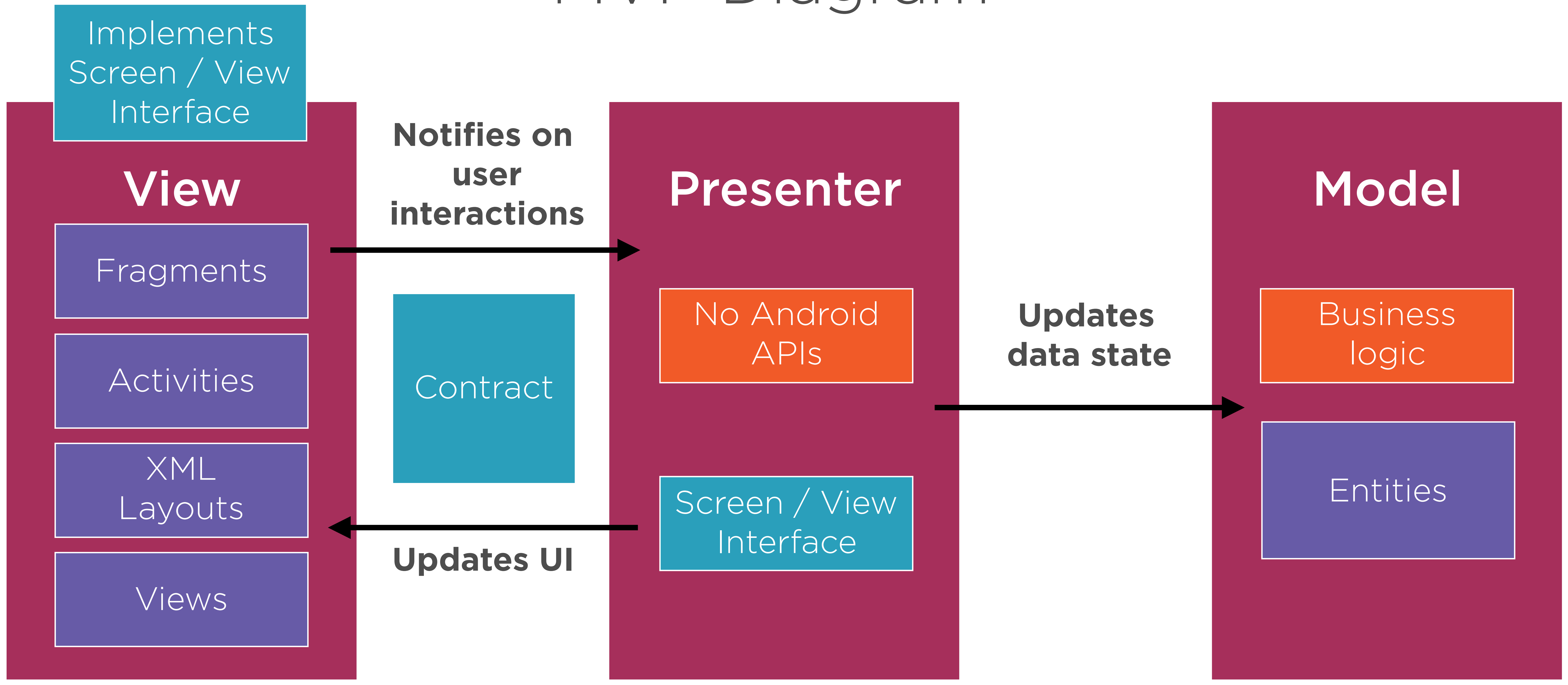
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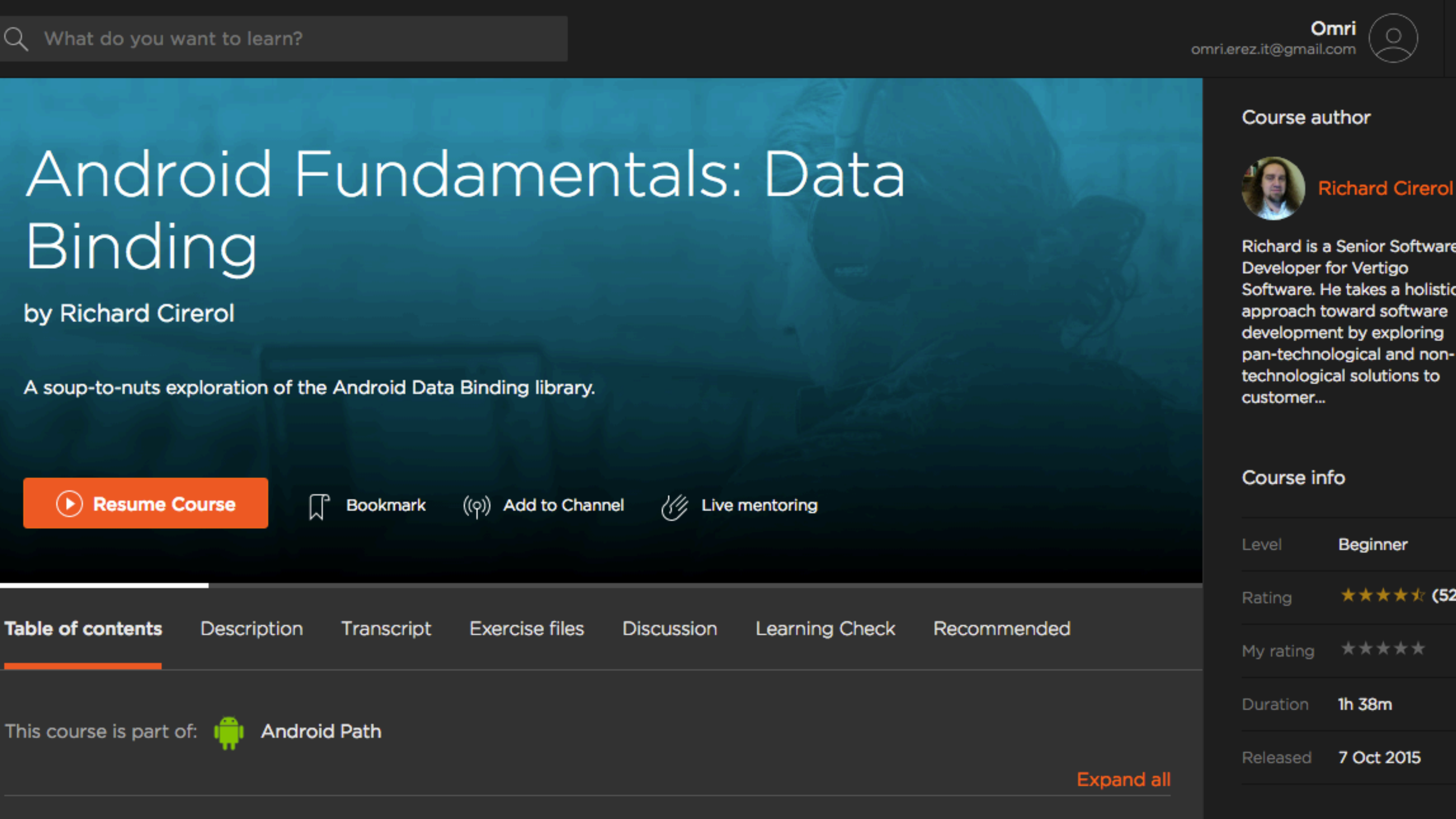

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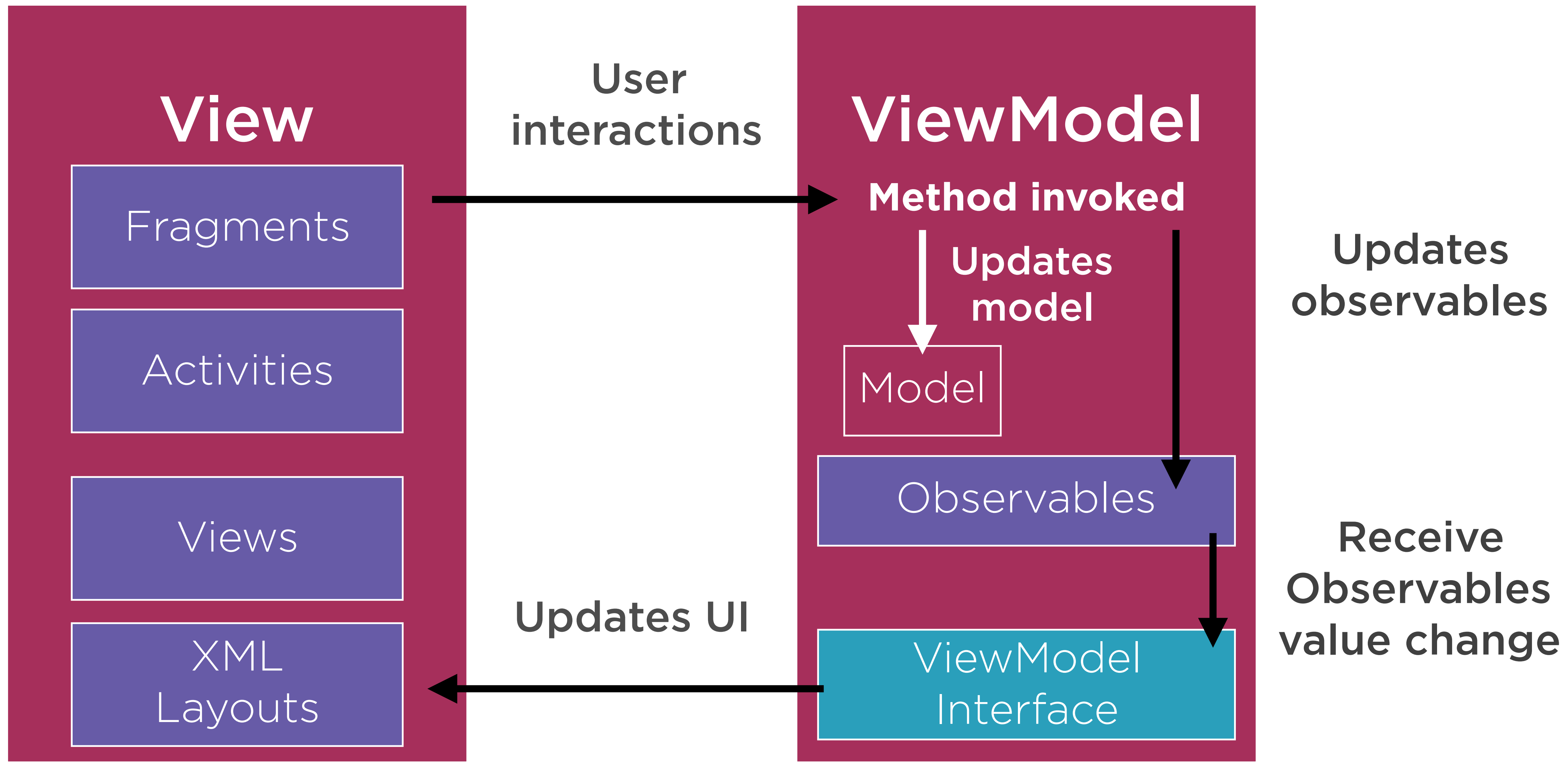

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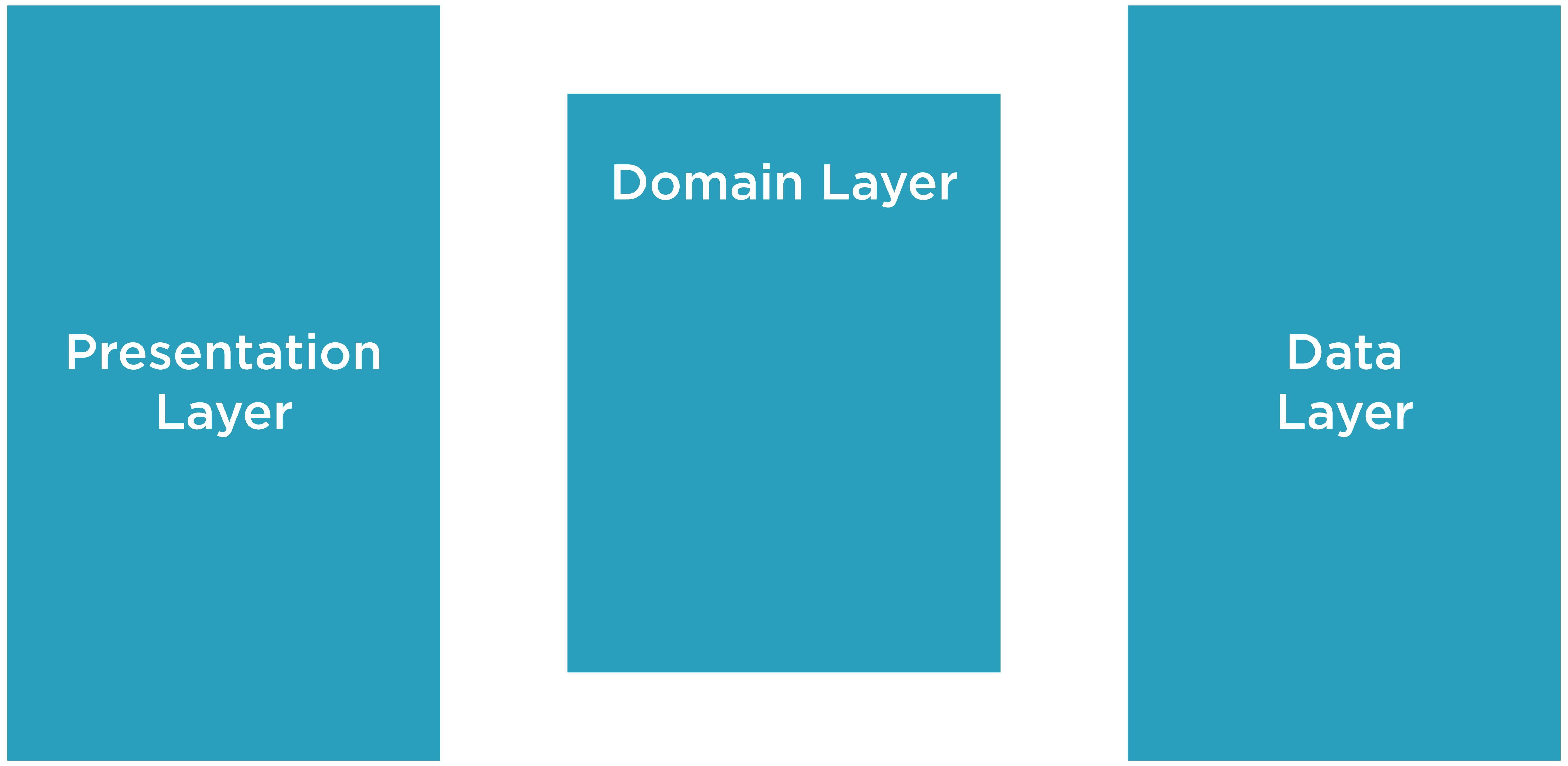

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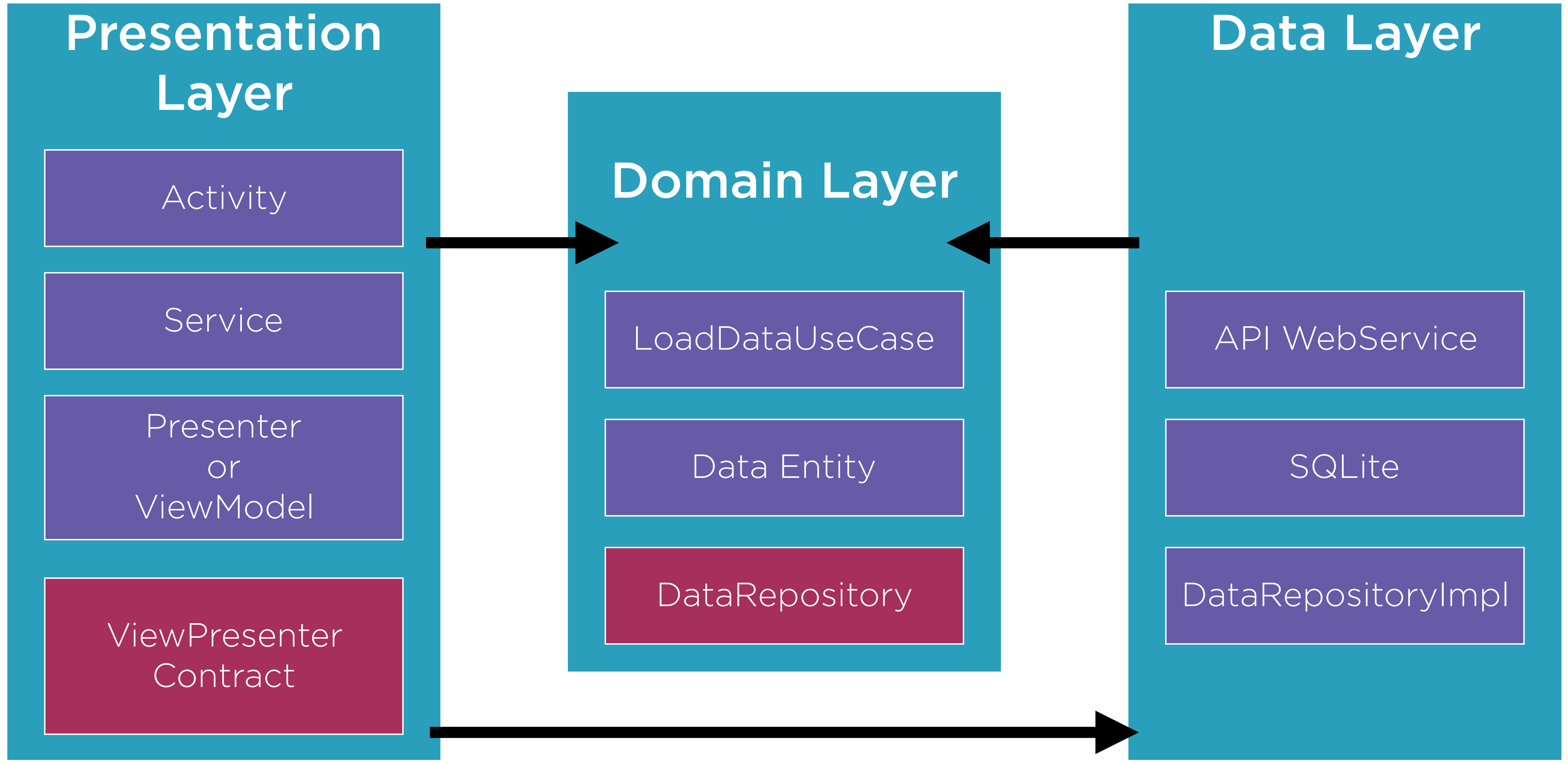

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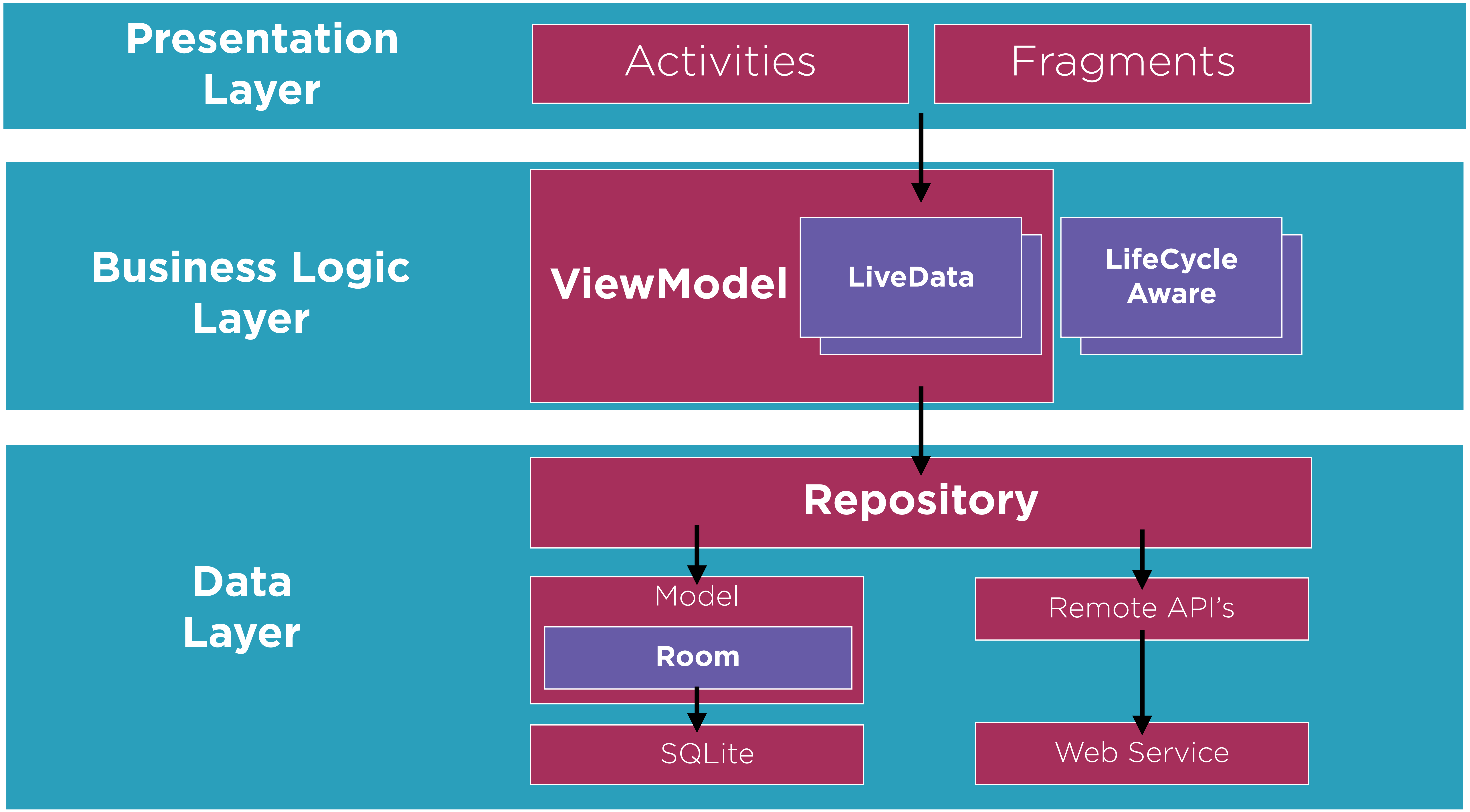
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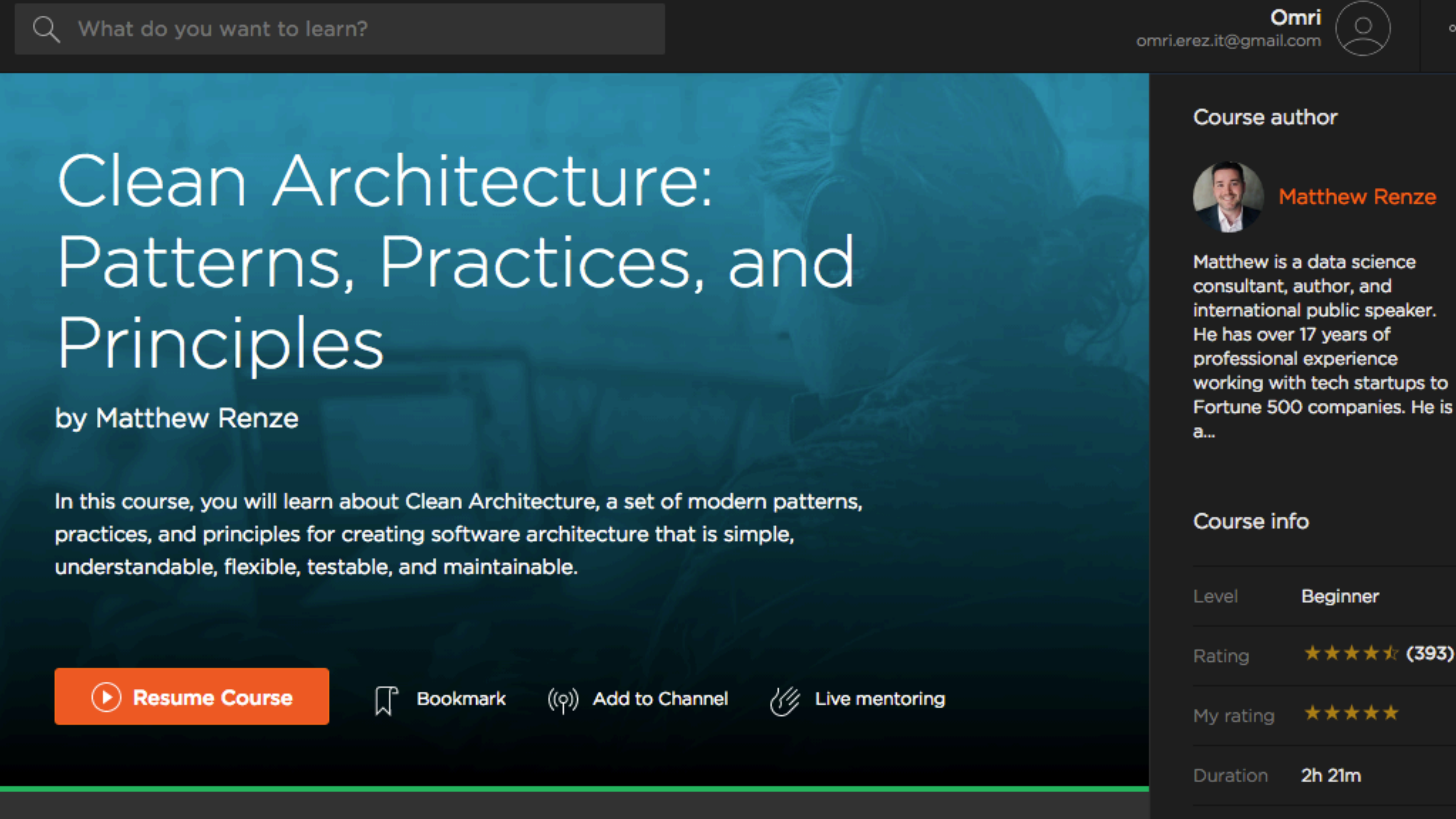

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