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# Pattern-based architecture of a system for systematic review of clinical trials

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# Introduction

## What are clinical trials?

- Are research studies used to find the best ways to detect, prevent or treat certain diseases
- Used by clinicians, researchers or medical decision makers as medical evidence to inform their treatment decisions and improve patient care



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# Introduction



**How do clinicians or medical decision makers find enough evidence for medical decisions?**

- Perform a systematic Review of medical literatures



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# Introduction

## What is systematic review of clinical trials?

Formulation of research question

Search Abstracts/titles (5645 search results )

Abstracts screening

Reviewer 1

Reviewer 2

Reviewers meet and agree on the selected abstracts/titles

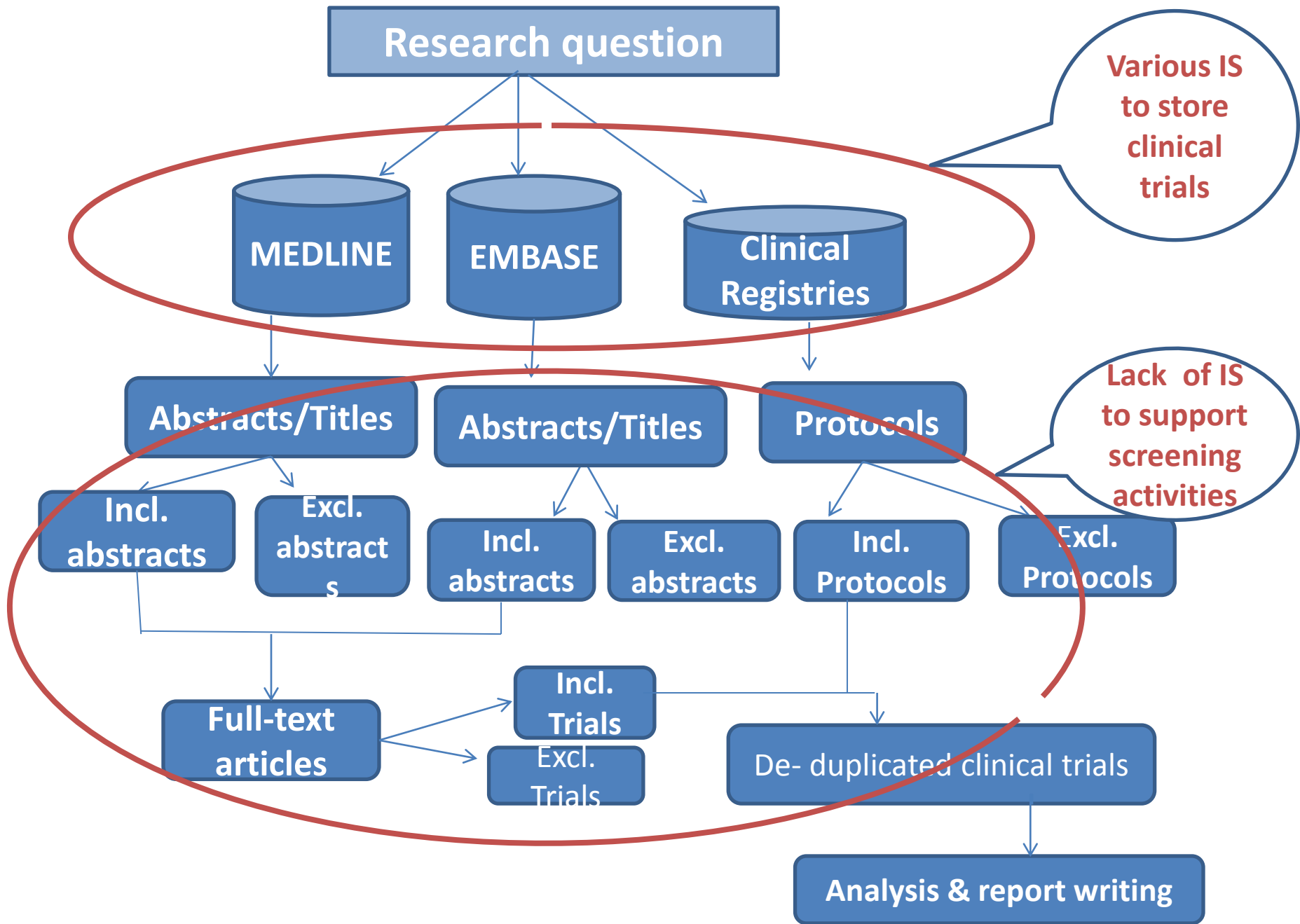
Full-text articles screening(141 articles) & data extraction

Reviewer 1

Reviewer 2

Reviewers meet & agree on the extracted data

Data analysis and report writing



Research question

MEDLINE

EMBASE

Clinical Registries

Abstracts/Titles

Abstracts/Titles

Protocols

Incl. abstracts

Excl. abstracts

Incl. abstracts

Excl. abstracts

Incl. Protocols

Excl. Protocols

Full-text articles

Incl. Trials

Excl. Trials

De-duplicated clinical trials

Analysis & report writing

Various IS to store clinical trials

Lack of IS to support screening activities

# Introduction

## What is the problem definition?

- Clinical trials are scattered
- Clinical trials are not accessible or reusable
- Lack of IS to perform systematic review in a single point of view



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# Introduction

## Research questions

*How can software patterns improve the quality of software architecture of a system for systematic review of clinical trials?*

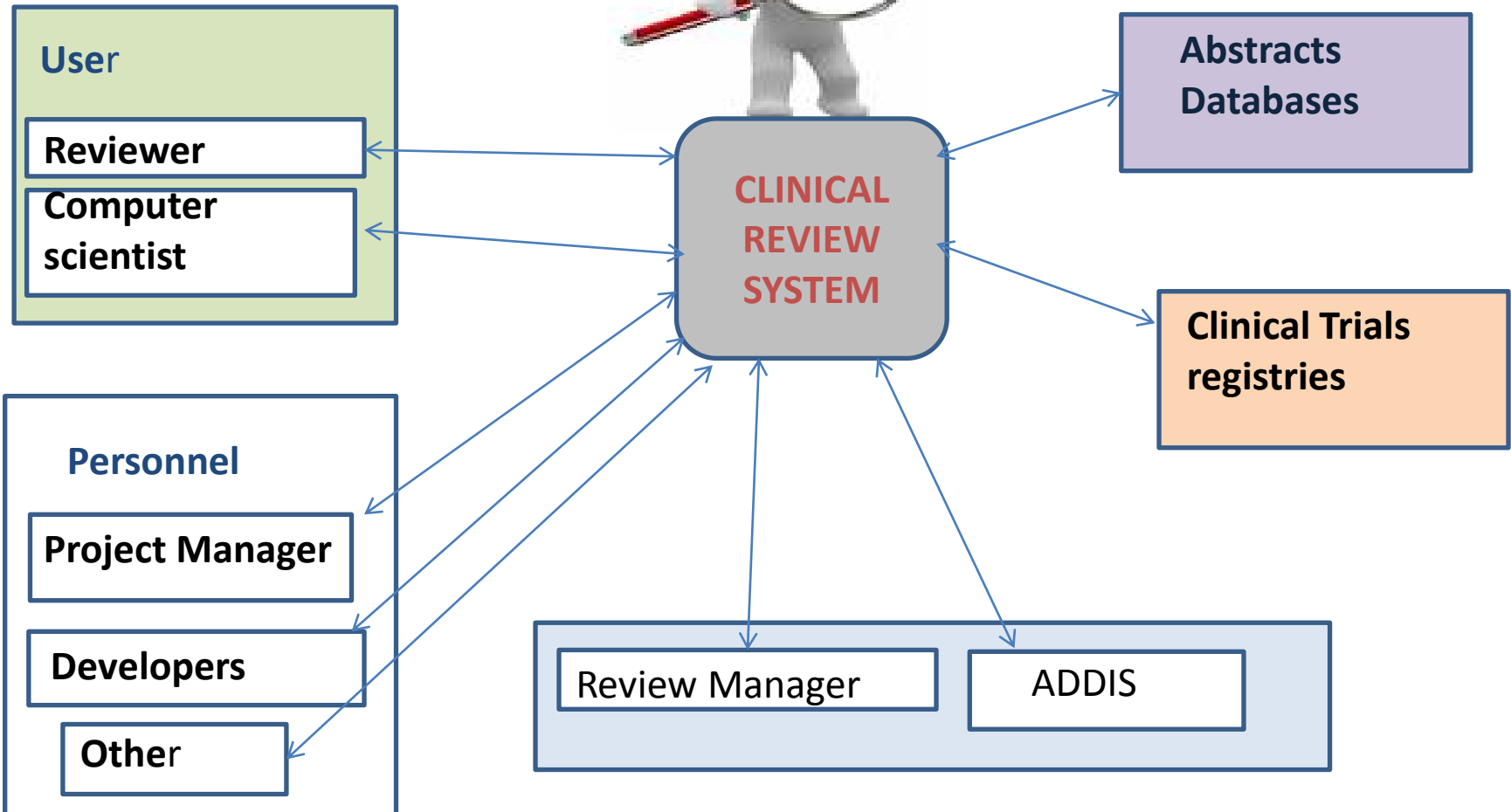


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# Architectural vision



# Requirements

## Key drivers

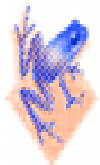
## Stakeholders

<b>Usability</b>	<b>Reviewers, computer scientists, RevMan/ADDIS</b>
<b>Interoperability</b>	<b>Abstracts databases, Clinical trial registries</b>
<b>Re-usability</b>	<b>Computer scientists, Reviewers, RevMan/ADDIS</b>
<b>Intergrability</b>	<b>Computer scientists</b>
<b>Scalability</b>	<b>Project Manager, Developers</b>

# Requirements

## Functional requirements of the new system

- Searching
- Abstracts screening
- Full-text screening
- Process clinical trials



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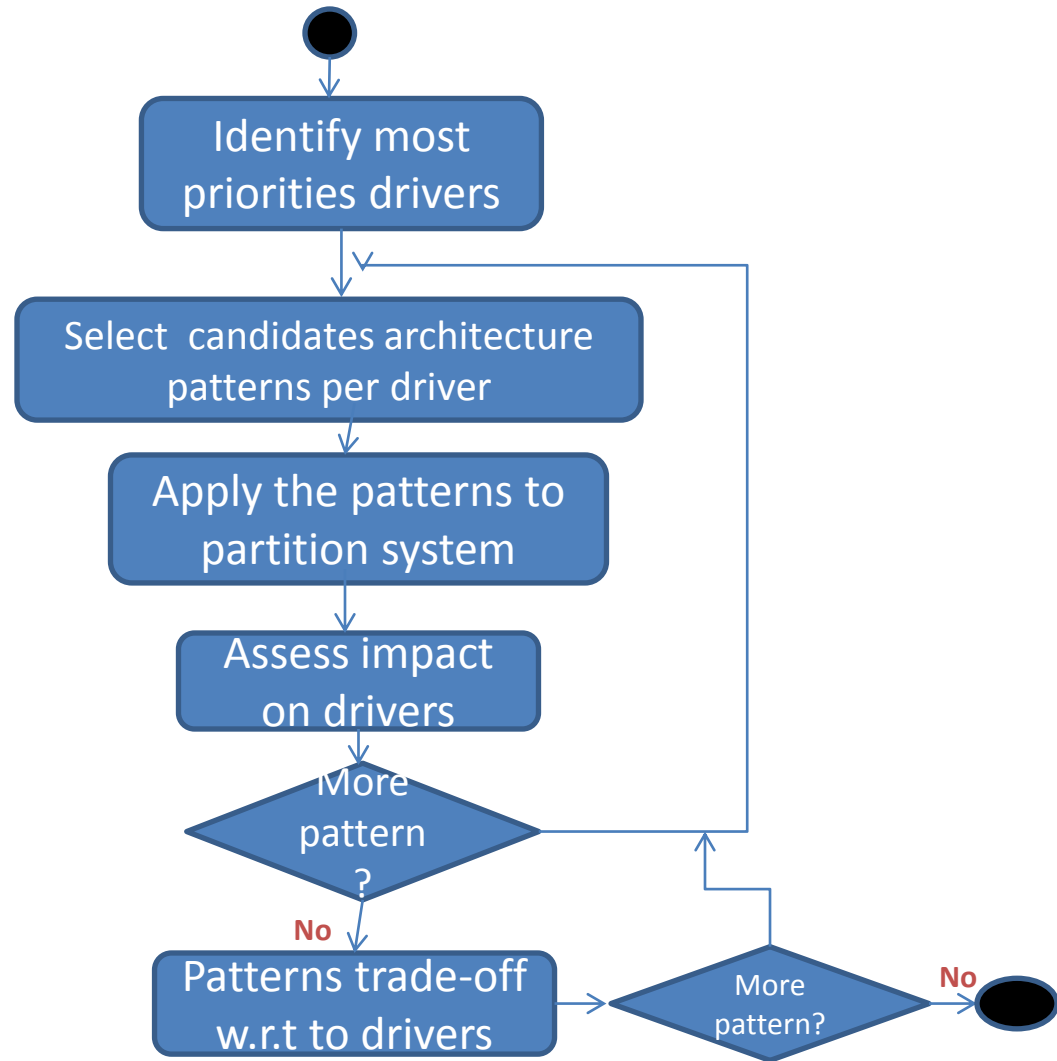
# Analysis

## Software patterns

- Express a relation between a certain context, a problem and a solution to support software engineering design and best practices
- Used to provides the design approaches of the entire software architecture

# Analysis

## Pattern-Driven Architectural Partitioning



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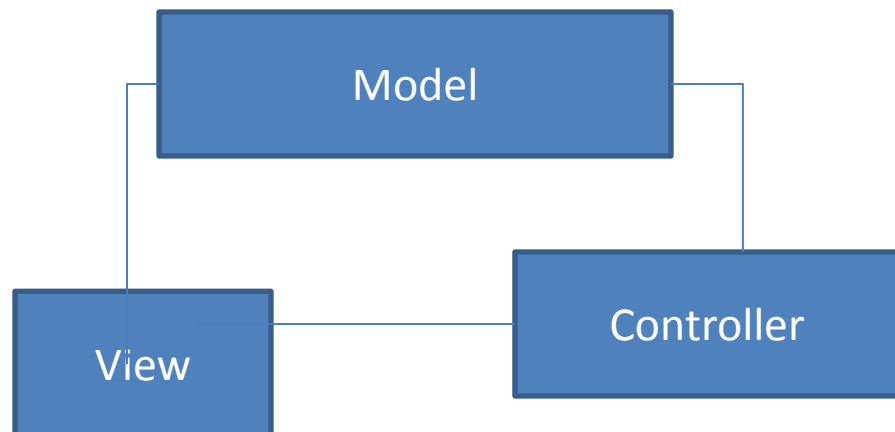


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# Analysis

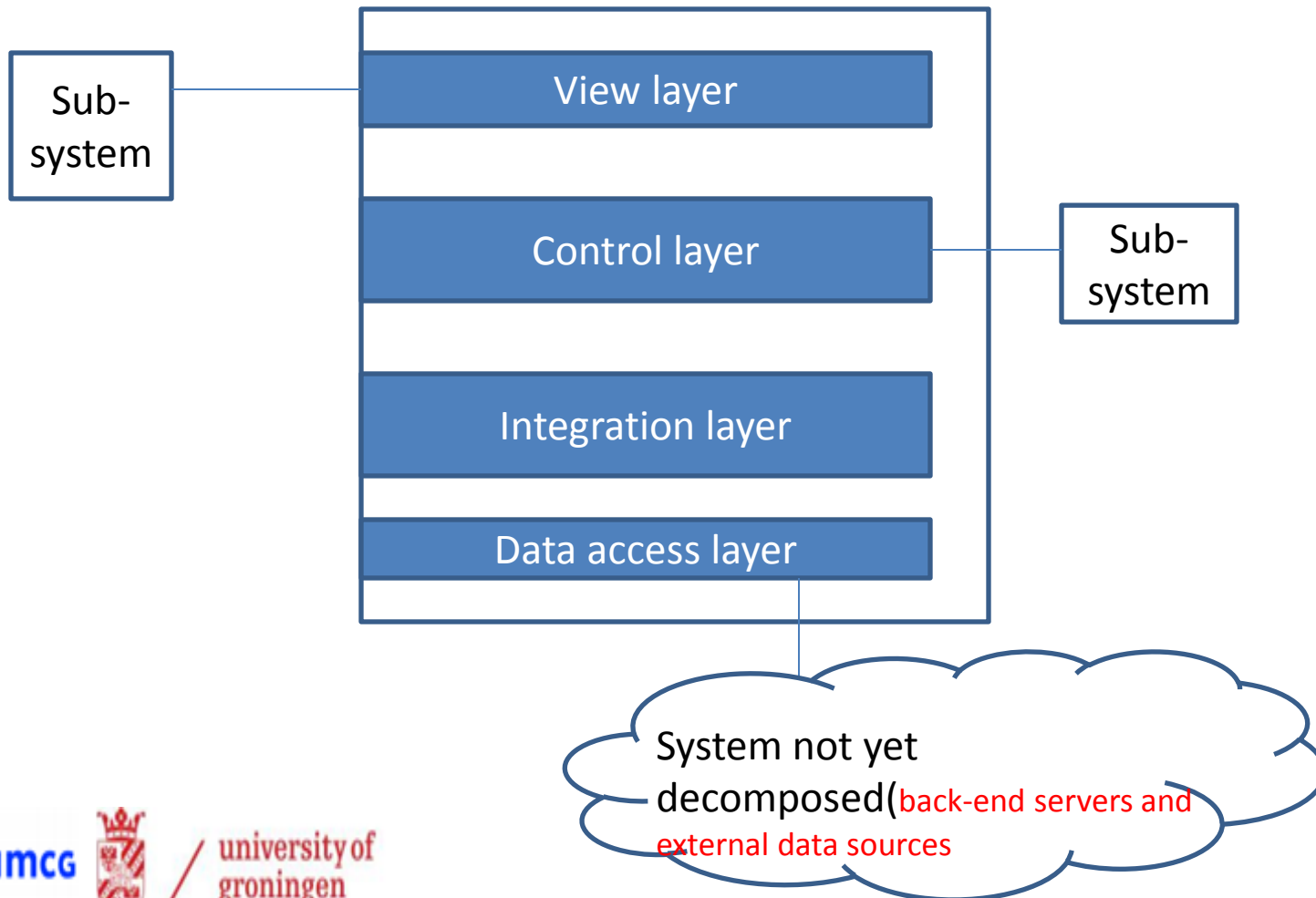
**For example:** we need to decompose the front-end server of our new system, consider **usability** as the our most priority driver

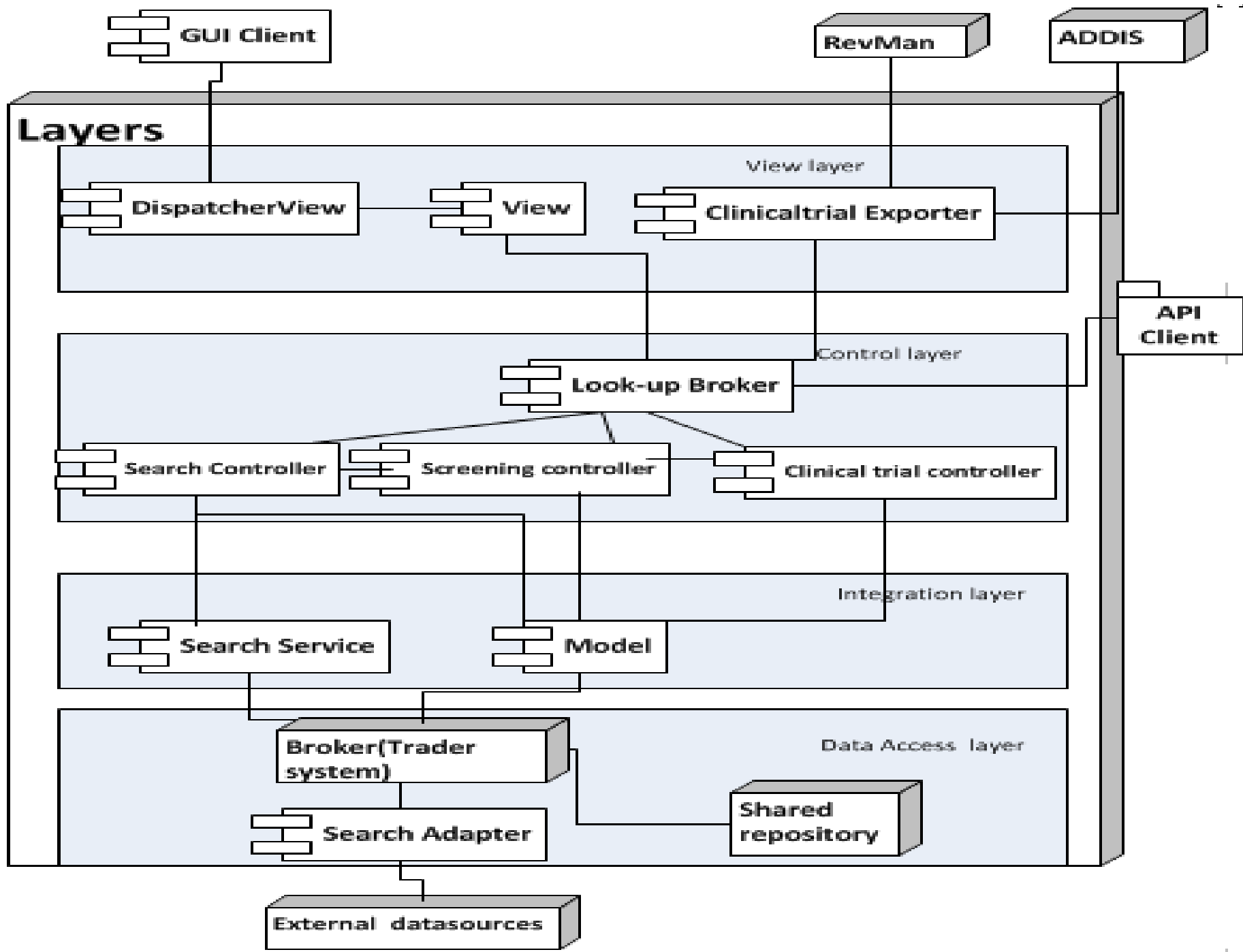
Examine the **Model-View-Controller pattern** as the pattern that can solve the design problems.



# Analysis

## The architecture of front-end servers





# Analysis

Identify(16 patterns)



Used to  
decompose front-  
end servers

Patterns	Key Drivers
Model-View Controller	Usability, reusability
Dispatch-View	Usability, Re-usability
Layers	Intergrability, Re-usability
Look-up broker	scalability
Share repository	Re-usability, Intergrability
Broker(trader system)	Interoperability, scalability
User information and Aggregation(search adapter )	Usability, Interoperability

Used to decompose  
back-end servers  
and external data  
sources

# Results

- **Reduce manual work of performing systematic review**
- **Data are stored in a well structured format**
- **Reduces duplication of effort for reviewers**
- **All steps of systematic review can be performed in a single point of view.**



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# Conclusion

- The systematic review of clinical trials is time consuming and manual work
- This design increase the efficiency of systematic review

# Future research

- The process for data extraction still not yet automated .
- Implementing a collaboration mechanism in our system.
- Identify common name for clinical trials



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Thank you