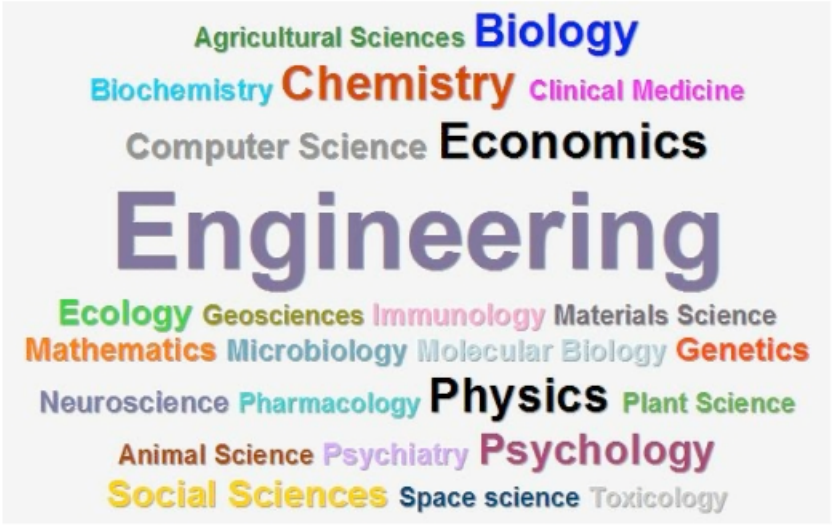
Understanding the Domain

Terminology

1. What is a domain?
2. Domain experts?
3. Intro to ACME Travels

English Language definition of *Domain*

> A sphere of knowledge, influence, or activity



Business perspective of *Domain*

> A field | industry in which the business operate

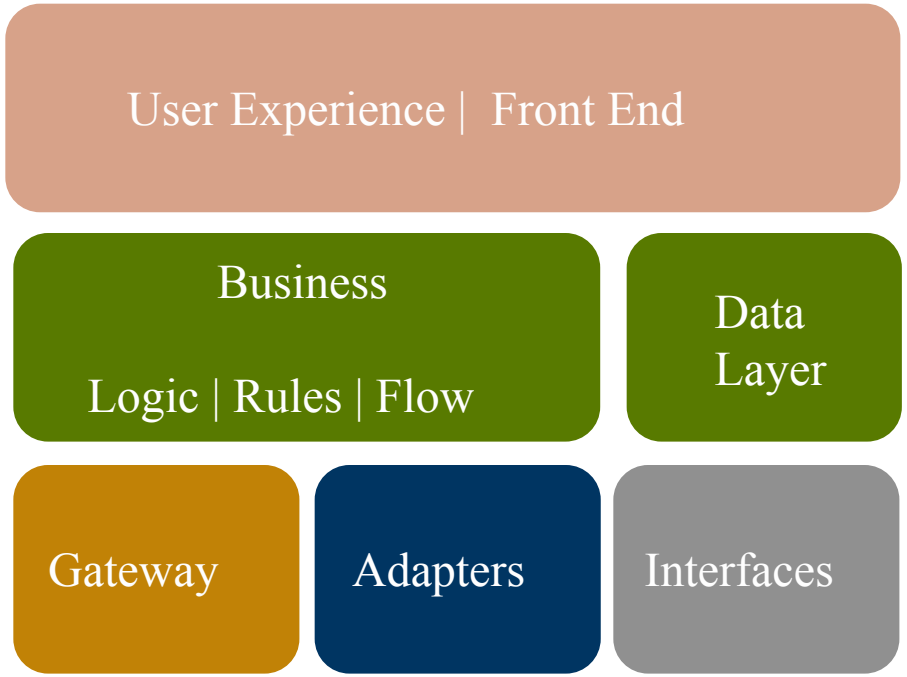
Banking	Oil & Gas	Retail	… …
CHASE		Walmart	
Bank of America	bp	Flipkart	

Technology perspective of *Domain*

> Represents the problem space

eCommerce

eCommerce



Software perspective of *Domain*

Represents the problem space

eCommerce

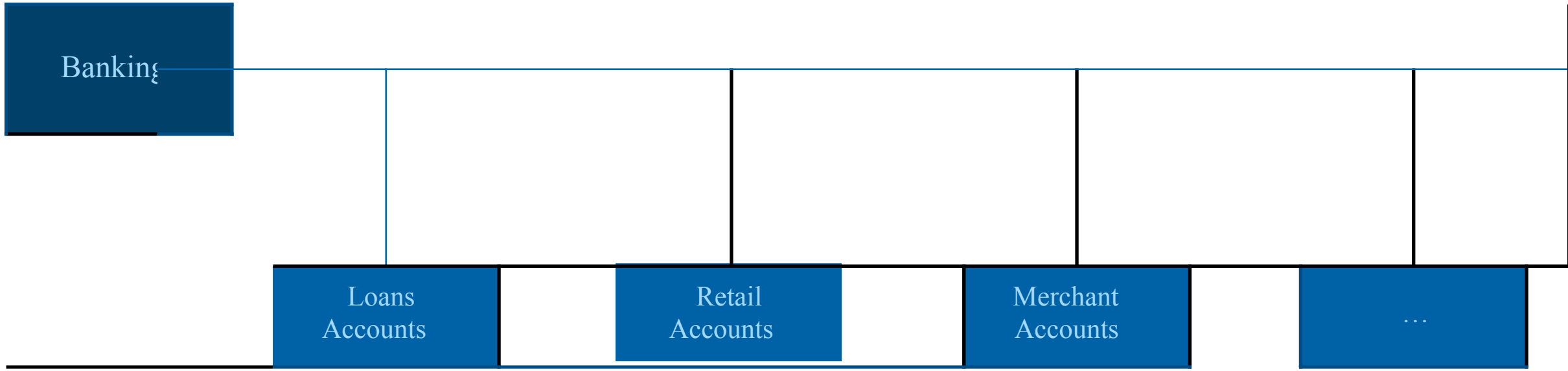
Social Media

Media Streaming

Resource Planning

Sub - Domains

Each domain consists of Sub -Domains



Domain Experts *a.k.a.* Subject Matter Experts or SME

Thorough understanding of the domain

Banking

Accounts Expert

Domain Experts *a.k.a.* Subject Matter Experts or SME

NO one expert knows everything about the domain !!!

Banking

Retail Accounts Expert

Merchant Accounts Expert

Loans Accounts Expert

Compliance & Regulatory

ACME Travel

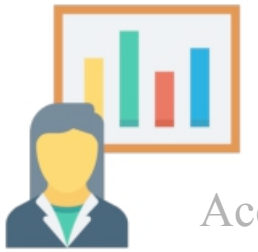
Travel & Leisure industry

Travel Advisor

There are multiple experts within a domain !!!

Travel Advisor

Partner Contracts



Accounts

Customer Support

… …

Quick Exercise

What domain are you in?

Subdomains within that domain?

List out the domain experts you work with?

Quick Review

Domain = A sphere of knowledge, influence, or activity

- Made up of MULTIPLE Sub - domains
- Multiple Domain Experts needed to support business functions

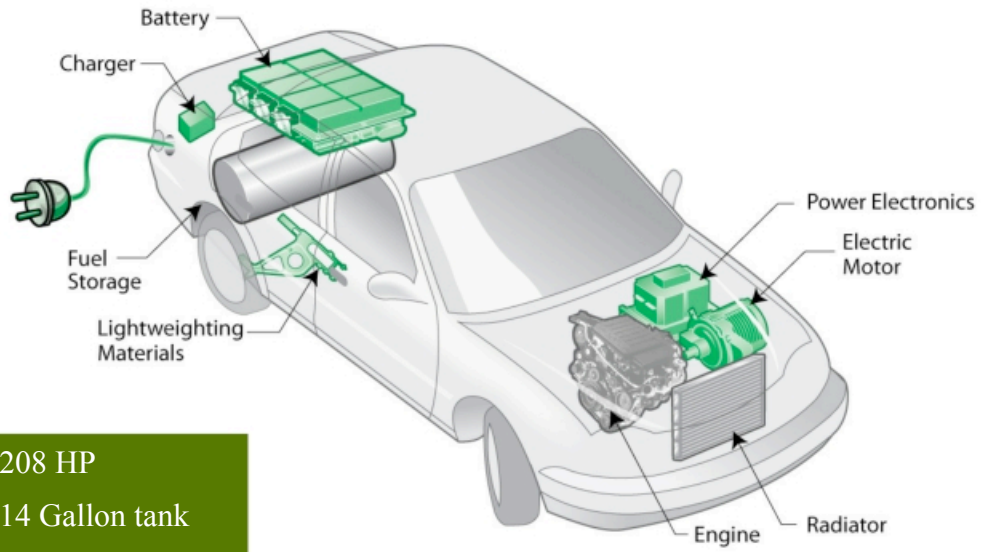
Architecture & Design

Understanding the idea behind modeling

1. Conceptual Models
2. Architectural Models
3. Architecture Vs. Design

Conceptual Models

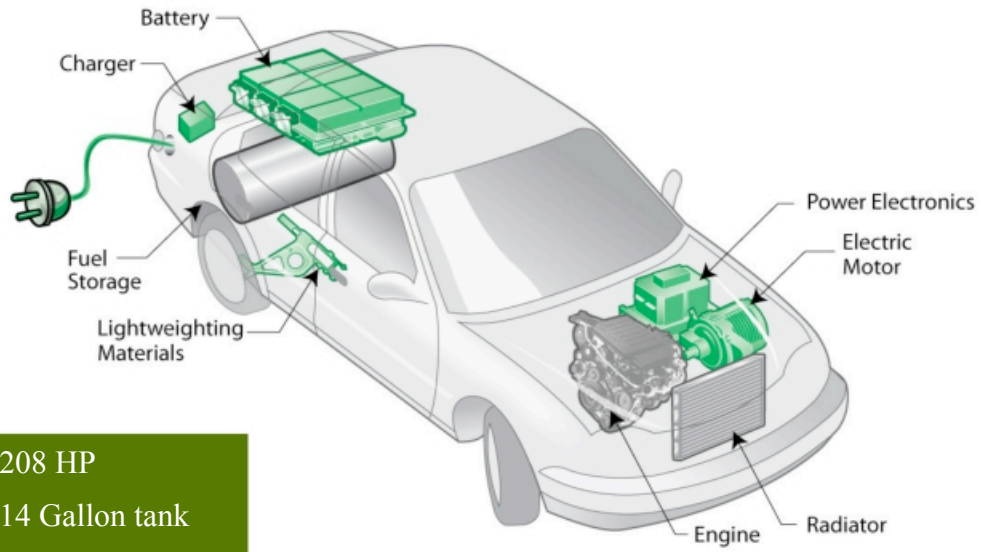
> A representation of a system made from composition of concepts



208 HP
14 Gallon tank
70 kWH battery

Objective of Conceptual Models

1. Enhance the understanding of the designers
2. Conveying the ideas to stakeholders
3. Provide a point of reference to create detailed specifications
4. Documentation for future reference



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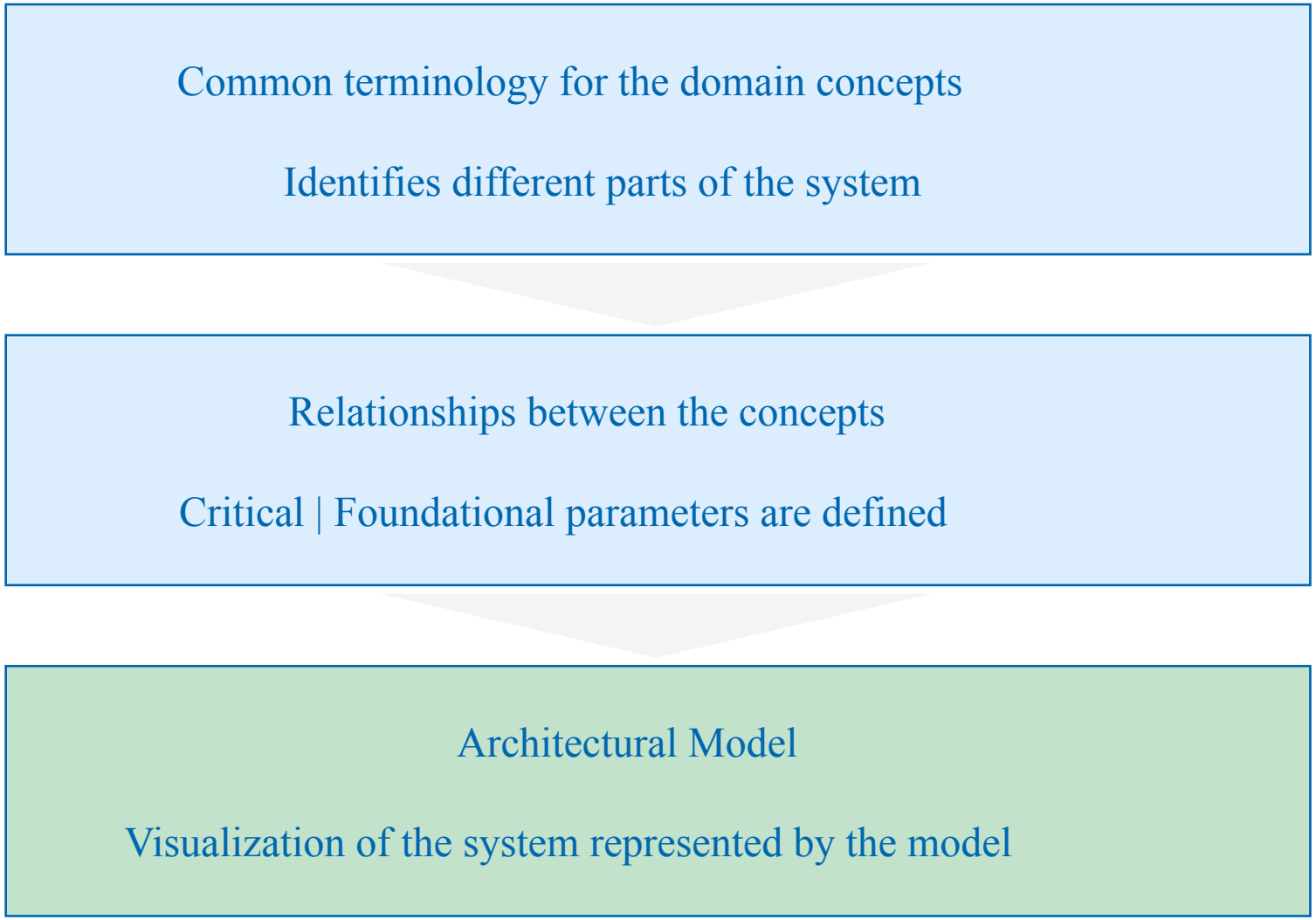
Software : Conceptual Models



Architectural Model

a.k.a. architecture

Structured representation of a solution that meets the requirements in the problem space

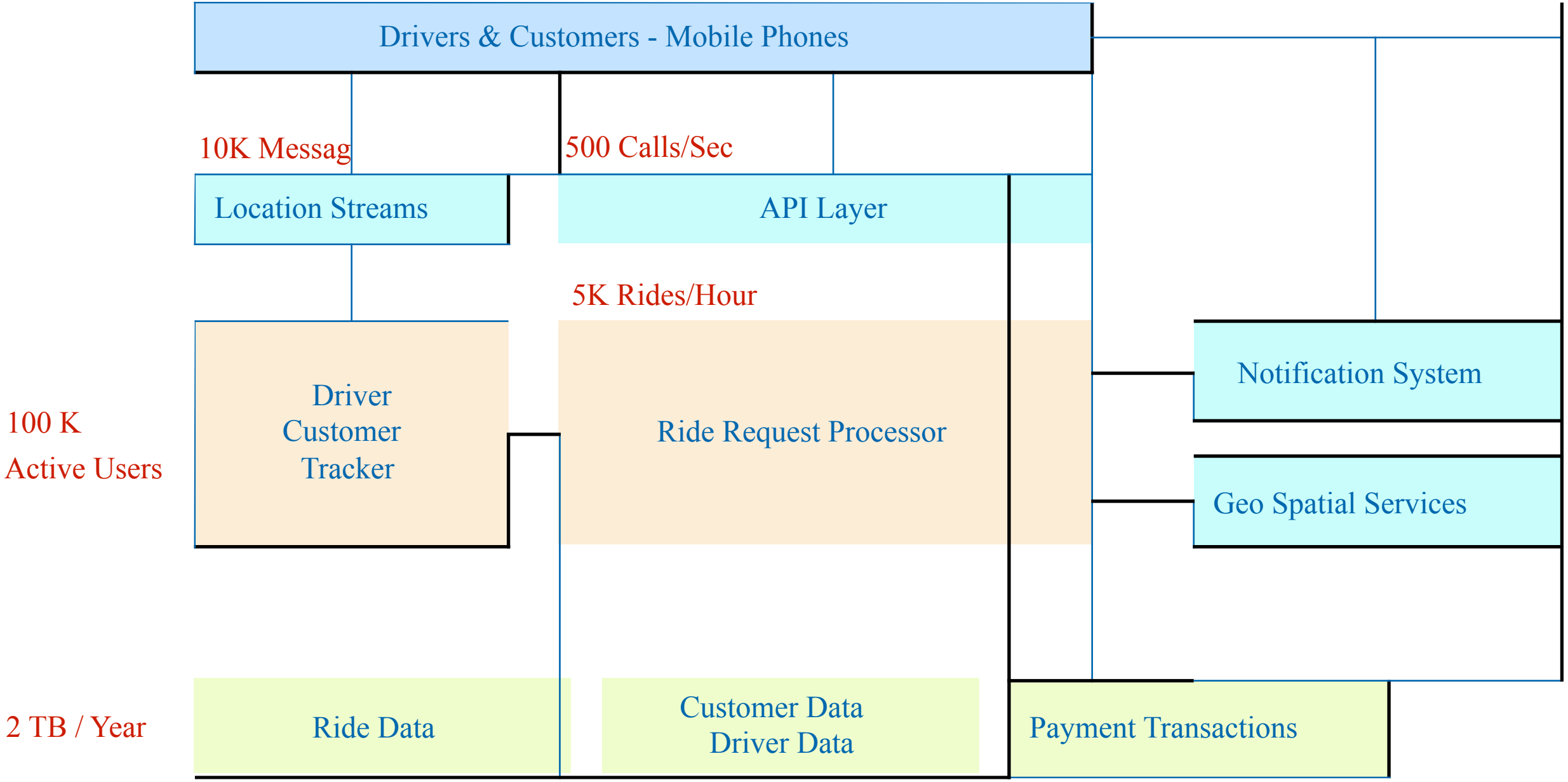
- High level abstraction of parts of the end solution
- Presents a view of how the requirements will be met
- Assist in answering the questions posed by different stakeholders

Architecture Vs. Design

Difference is in the level of details & focus

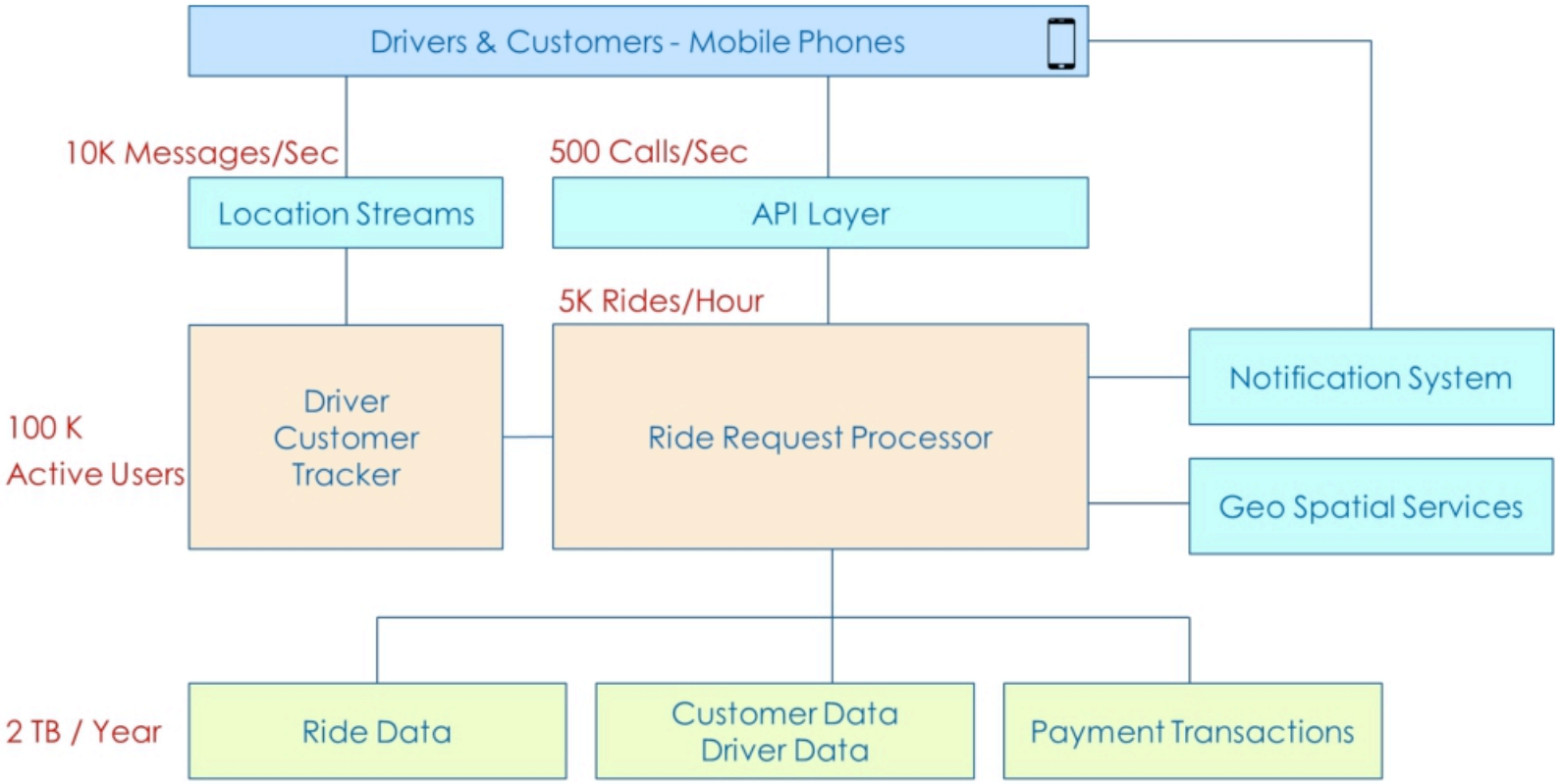
- **Architecture** = High Level | Skeleton | Long term focus
- **Design** = Relatively detailed | Focus on implementation

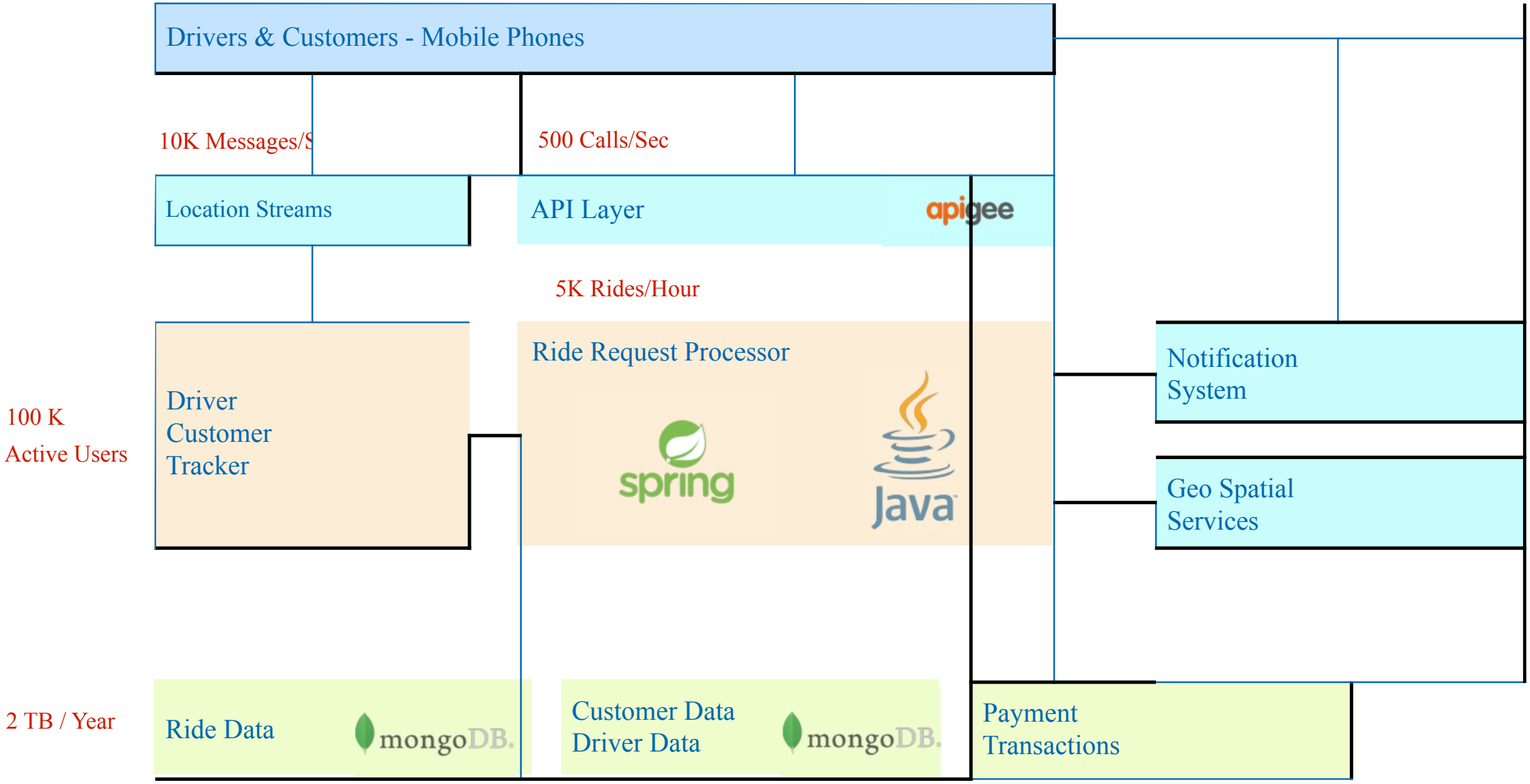
Architecture & Design for a Rideshare System


Drivers & Customers - Mobile Phones
10K Messag
500 Calls/Sec
Location Streams
API Layer
5K Rides/Hour
Driver
Customer
Tracker
Ride Request Processor
Notification System
Geo Spatial Services
100 K
Active Users
2 TB / Year
Ride Data
Customer Data
Driver Data
Payment Transactions

Quick Exercise

Think about the design




Drivers & Customers - Mobile Phones
10K Messages/S
500 Calls/Sec
Location Streams
API Layer
apigee
5K Rides/Hour
100 K
Active Users
Driver
Customer
Tracker
Ride Request Processor
spring
Java
Notification
System
Geo Spatial
Services
2 TB / Year
Ride Data
mongoDB.
Customer Data
Driver Data
mongoDB.
Payment
Transactions

Quick Review

Conceptual Model = A set of concepts & their relationships

Architectural Model = A structured representation of a solution

Design = A structured representation of a solution that is closer to the implementation

Modelling & Architecture style

Common Modeling Techniques and Architectural Styles

1. Modelling techniques
2. Architectural Styles
3. Intro to Domain Driven Design

Model Diagrams

Multiple ways of modelling

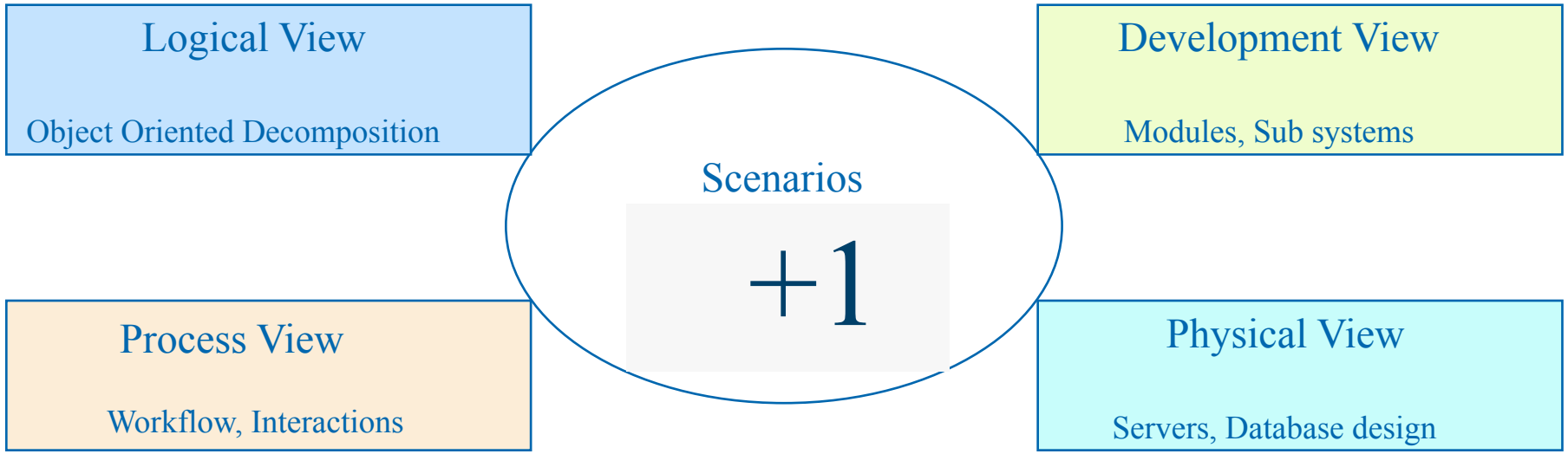
- Purpose
- Perspective | Viewpoint
- Level of Details

Models are NOT mutually exclusive i.e.; you may create multiple models for the same system

4+1 Architectural View Model

4 +1 Architectural View Model

Describe the architecture from viewpoints of multiple stakeholders



Stakeholder Interests | Concerns

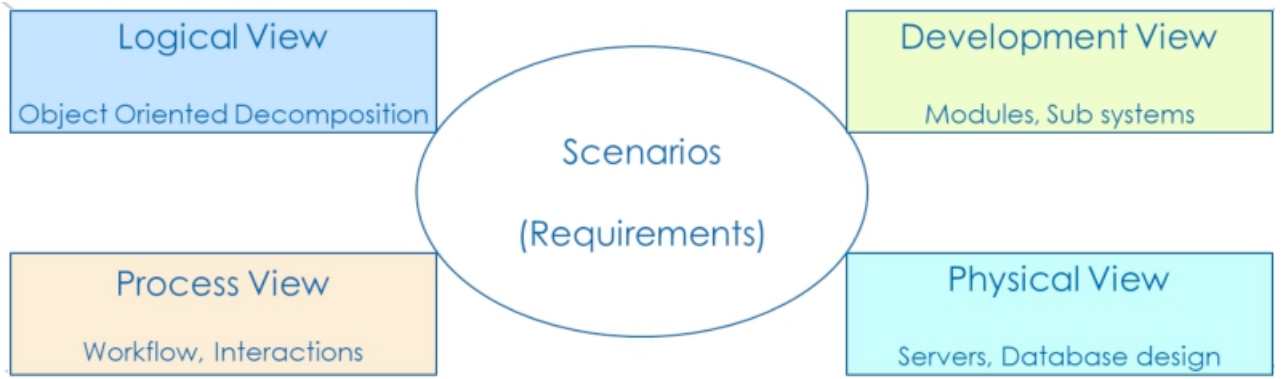
Architect

Executives

Developer

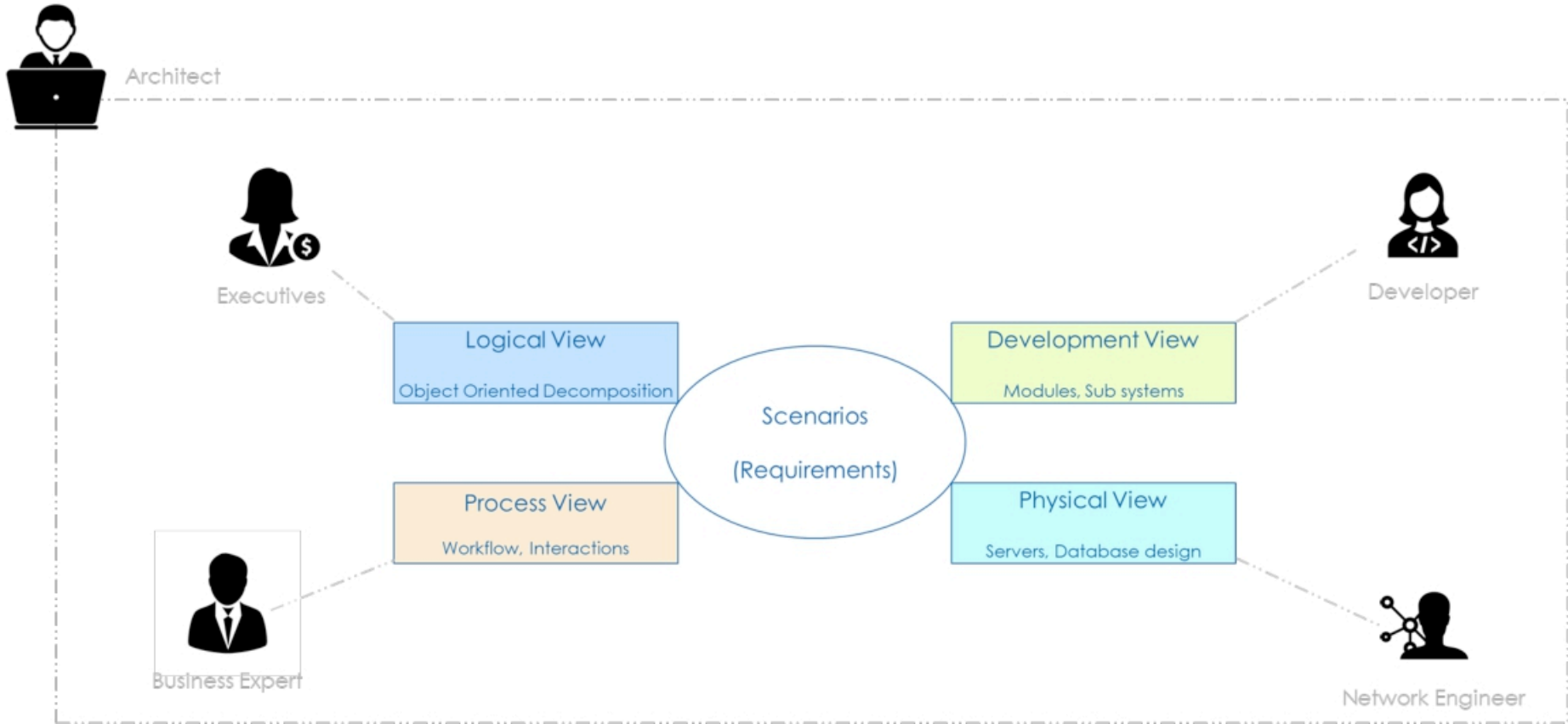
Business Expert

Network Engineer



Quick Exercise

List out the stakeholders in your organization



http://www.omg.org/uml

Please go through basic UML notation & diagrams on your own

http://www.omg.org/uml

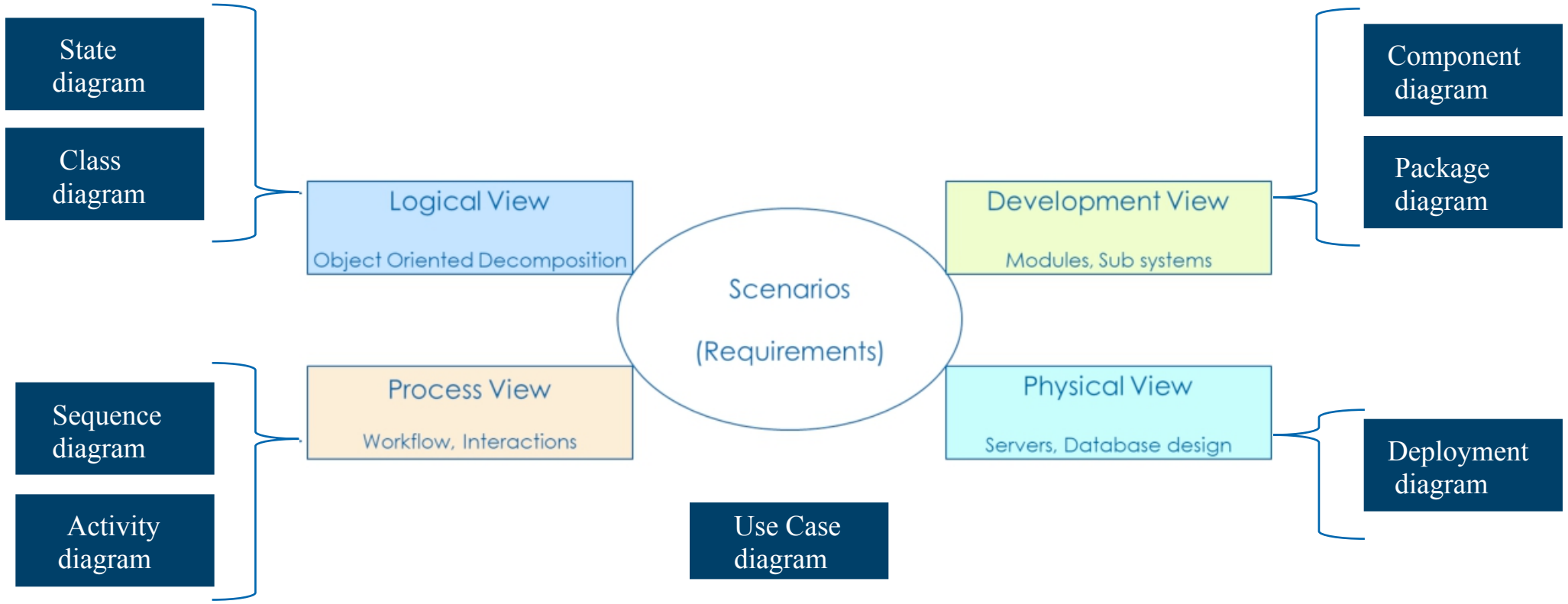
A standard set of diagrams

A standard set of notations

Please go through basic UML notation & diagrams on your own

A standard set of diagrams (14)

http://www.omg.org/uml



Software Architecture Styles

Reusable architectural pattern which may be used as a solution to a commonly occurring problem

Architectural Styles

Categorized based on the *Key Focus Area*

Communication

- Service Oriented Architecture (SOA)
- Message Bus Architecture

Structure

- Layered architectures
- Object Oriented Architecture & Design

Architectural Styles

> Categorized based on the *Key Focus Area*

Deployment

- Client Servers
- 3 Tier Architecture

Data

- Database Centric Design
- Data Flow Diagrams

Architectural Styles

Categorized based on the *Key Focus Area*

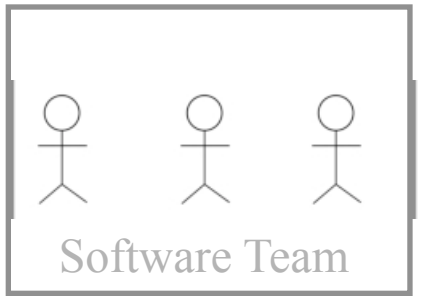
Domain

· Domain Driven Design

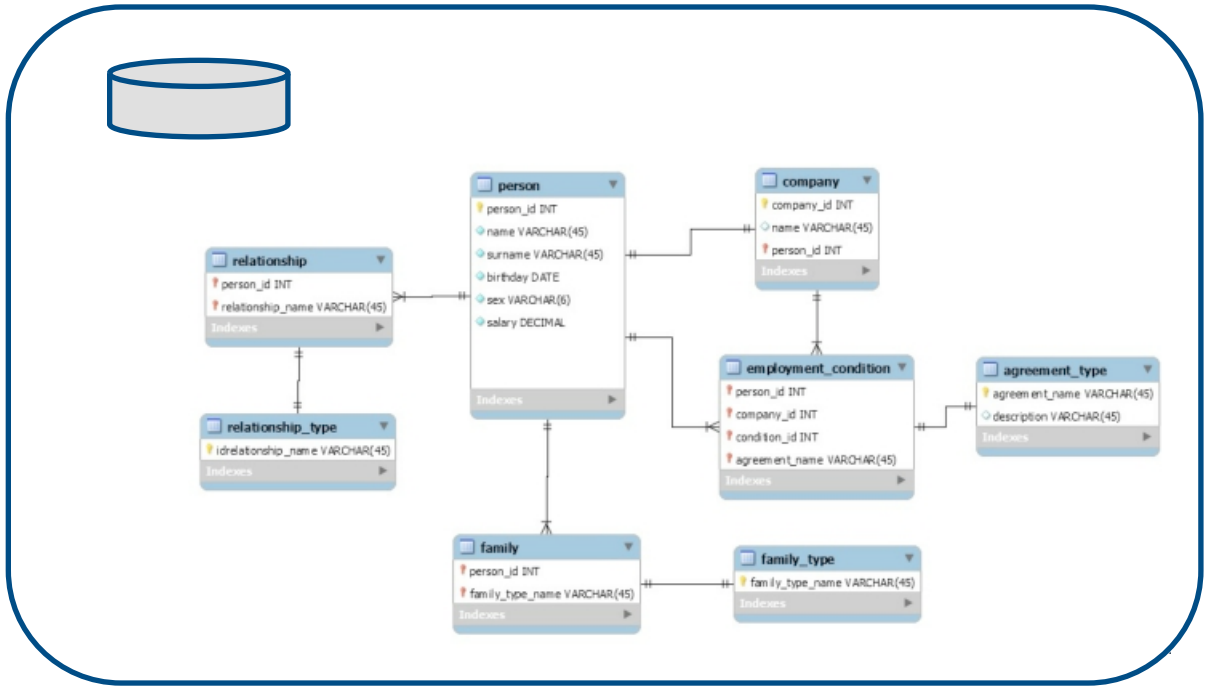
Focus is on Business Domain rather than technology

Data Centric Architecture

> Focus is on core data in the domain

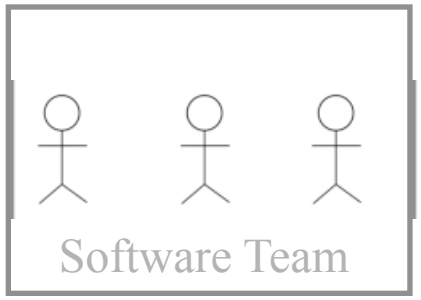


Develops



Process Centric Architecture

Focus is on core use cases in the business



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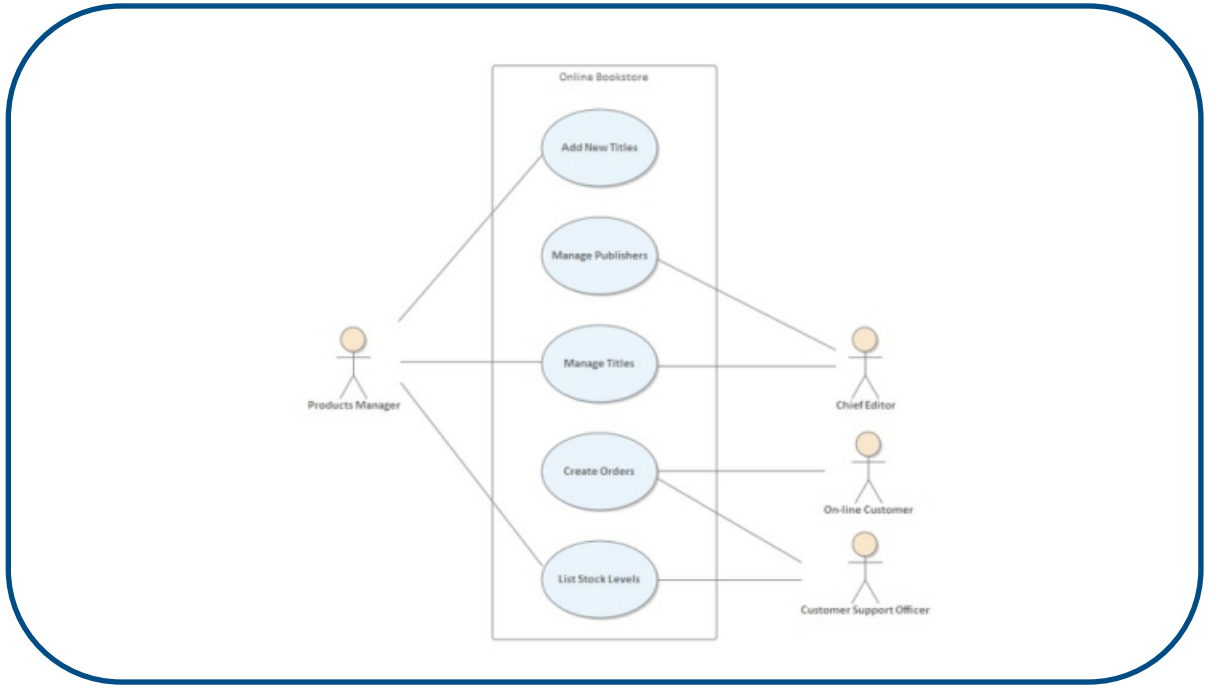
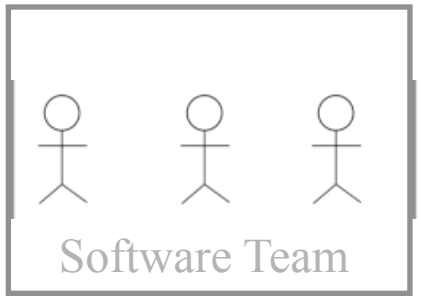
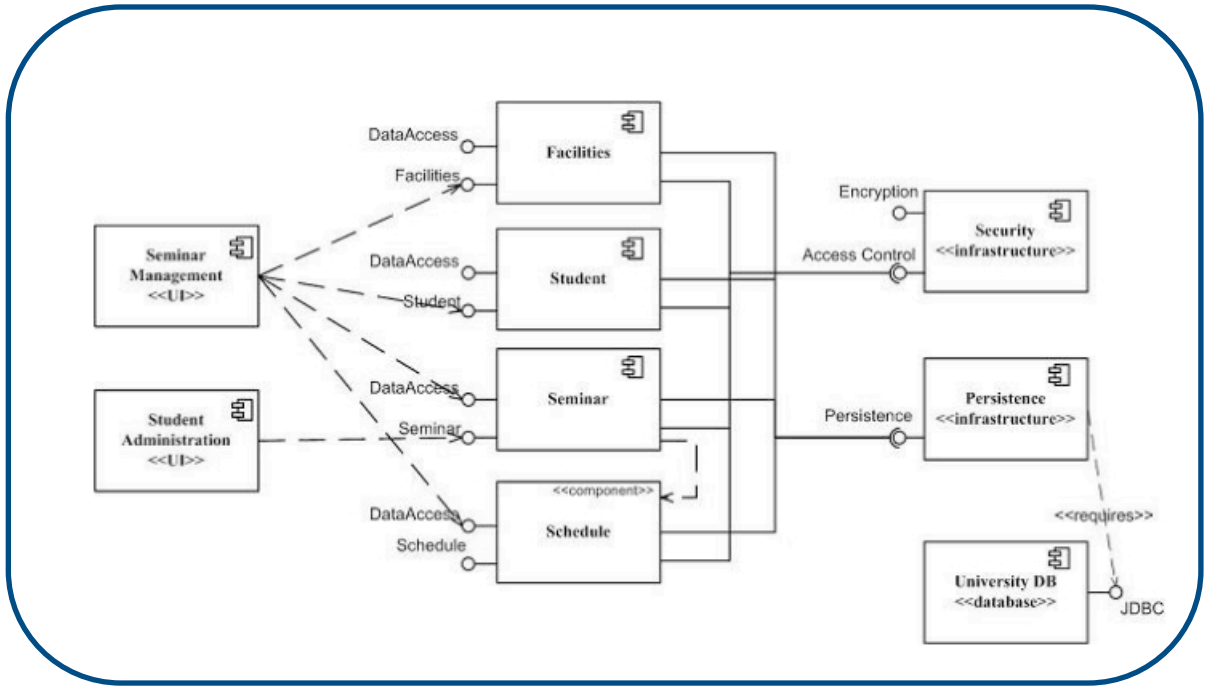


Services Centric Architecture (SOA | REST)

> Focus is on core capabilities exposed as services

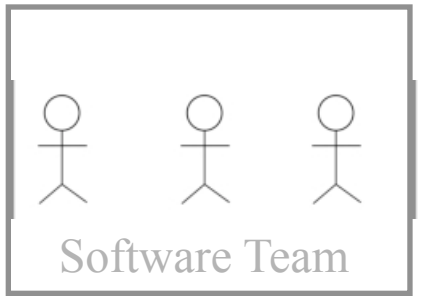


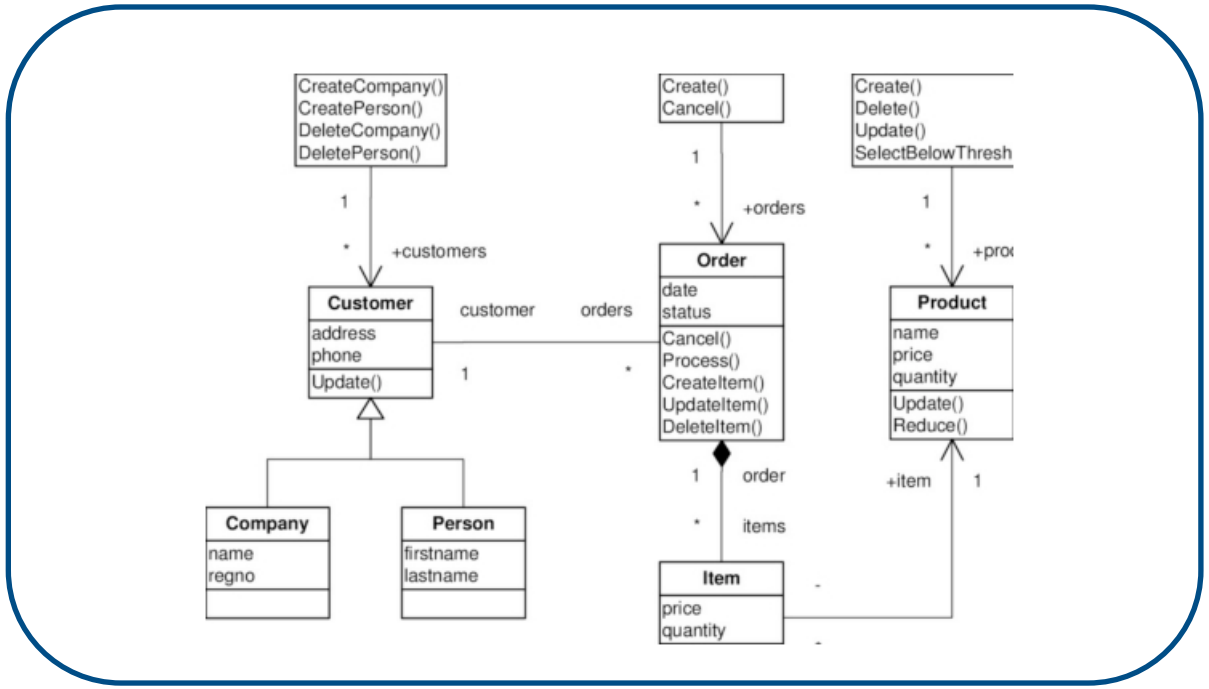
Develops



Object Oriented Architecture (OOA)

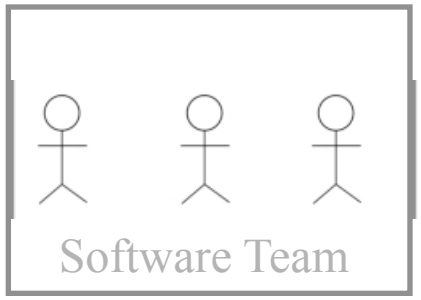
Focus is on identifying real work objects classes

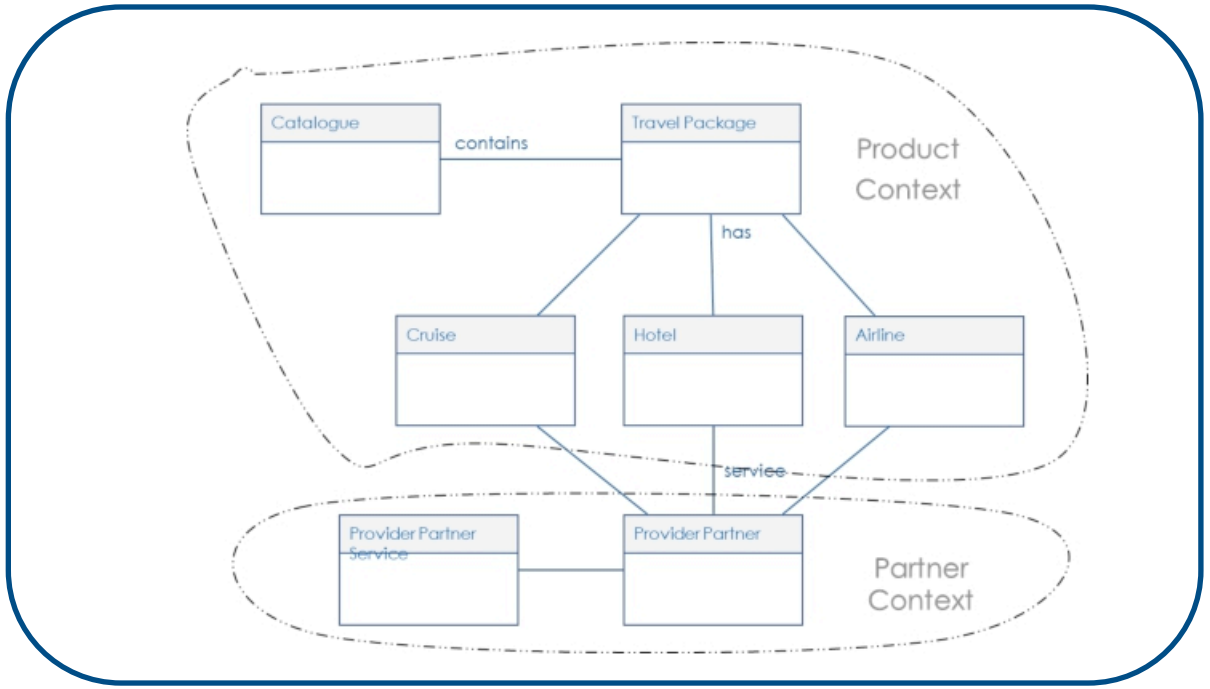




Domain Driven Design

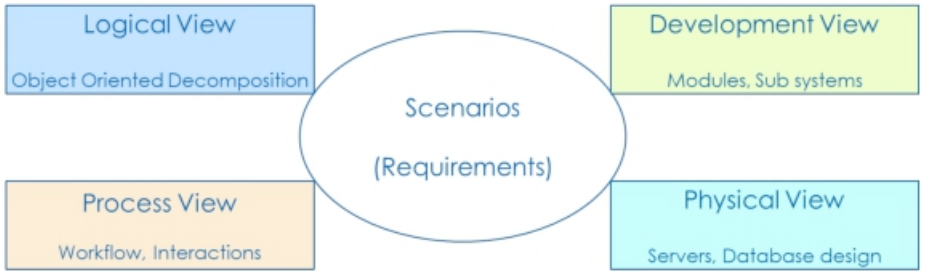
> Focus is on the business domain





Review

- Architects create models using different modeling techniques



- There are multiple architectural styles

  - Domain Driven Design = focusses on Business Domain

Domain Models

Understanding the business domain

1 Domain model

2 Elements of a Domain model

WHY do businesses invest in software?

WHY do businesses invest in software?

- To fulfill some need(s) of the business | enterprise

Reduce manual labor
Increase Efficiency
Competitive Edge
… …

WHY do businesses invest in software?

- To Solve some Business Problem(s)

Reduce manual labor	*Redce*Automation;*the size*Machine*of te workforce*Learning*to s*
Increase Efficiency	*Custmer*Workflow*complaints*engines; Tools*about long respon*
Competitive Edge	*Competitors*Customer loyalty;*are pulling*Business*away*Intellig
… …	…

Business Problems

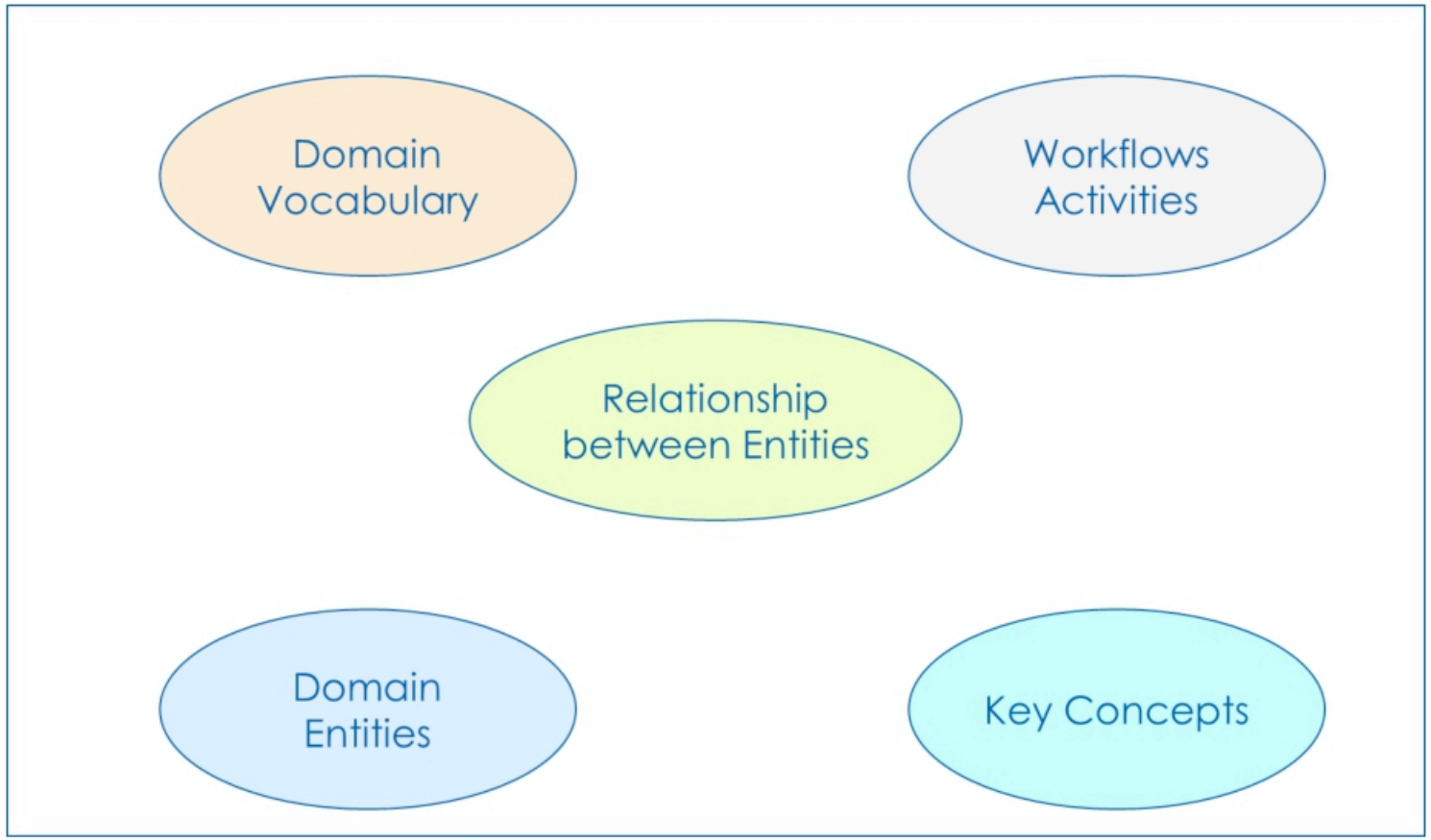
Current or long-term challenges & issues faced by the business that may prevent the business from achieving its goals.

To understand the problem, architects MUST understand the domain first !!!

Domain Model

Organized and structured knowledge of the domain that is relevant for solving a business problem

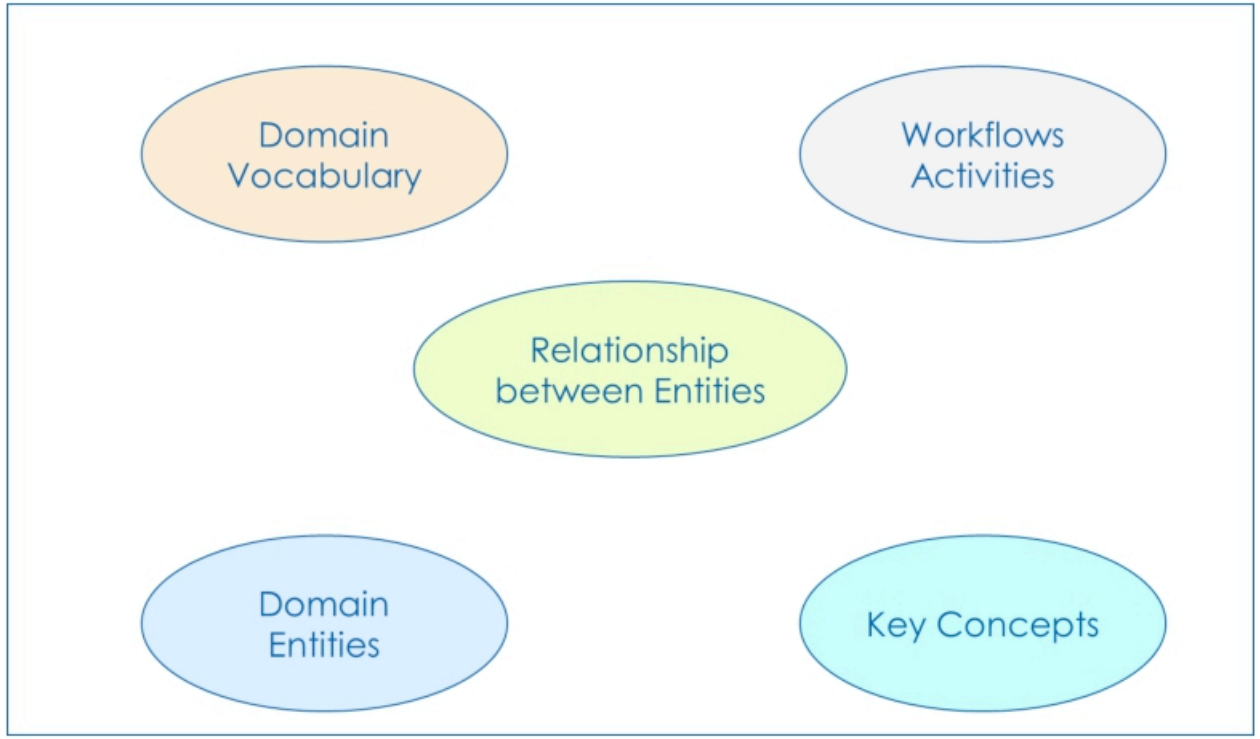
Domain Model



May contain additional knowledge

Review

- Domain Model = Structured Knowledge
  - Purpose = Solution for a Business Problem



Enterprise Domain Models

Also Known as "Aggregate" / "Unified " Domain Model

Knowledge crunching

Enterprise Domain Models

What challenges does DDD address?

WHO in your Organization *REALLY* understands your Org's Business Processes?

Domain Experts *a.k.a.* Subject Matter Experts or SME

Complex Domains - NO one expert knows everything about the domain !!!

Banking

Retail Accounts Expert

Merchant Accounts Expert

Loans Accounts Expert

Compliance & Regulatory

Domain Experts

a.k.a. Subject Matter Experts or SME

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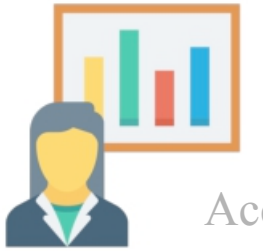
ACME Travel

Travel Advisor

Partner Contracts



Accounts

Customer Support

Knowledge Crunching

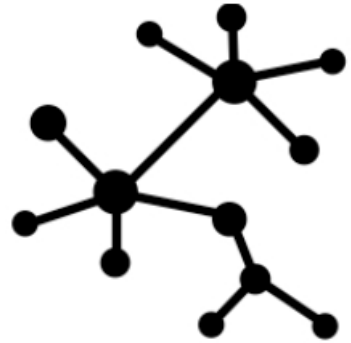
Teams process the knowledge received from the Domain Experts into domain models

This process is referred to as Knowledge Crunching

Knowledge Crunching

Technology Team

Domain Experts

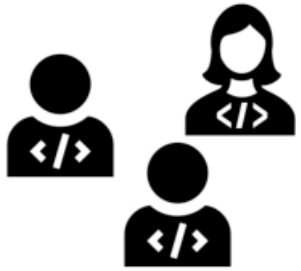


Structured Domain Knowledge

Technology Team

Led by an experienced technologist

- IT Lead e.g., Architect, Lead Developer ….



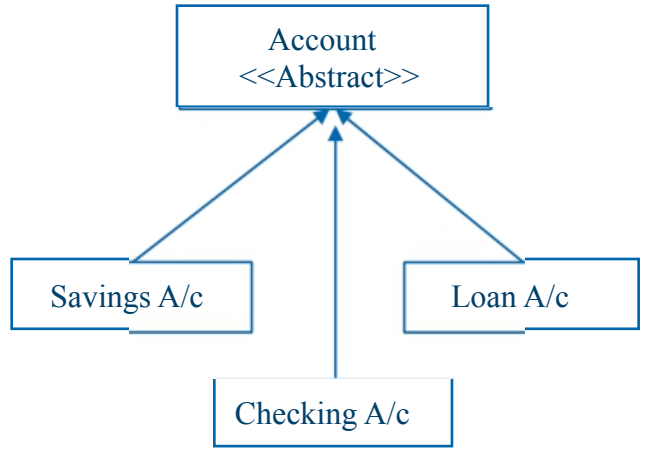
- Team members e.g., Developers, Analyst ….

Knowledge Crunching

Software Development Team

Banking Experts

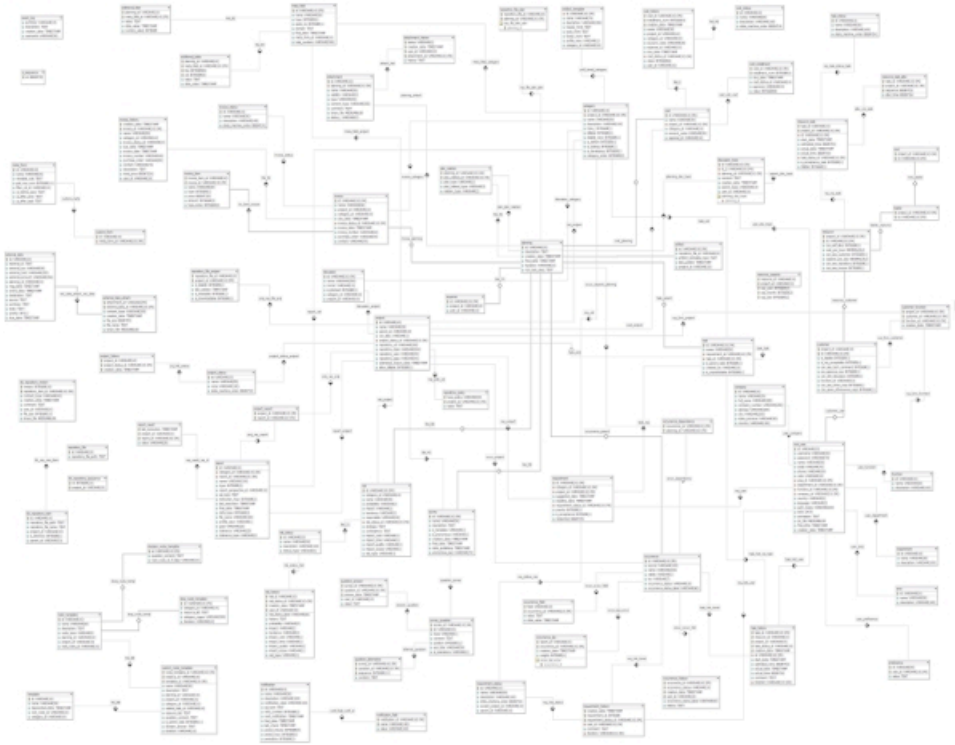
Domain Experts

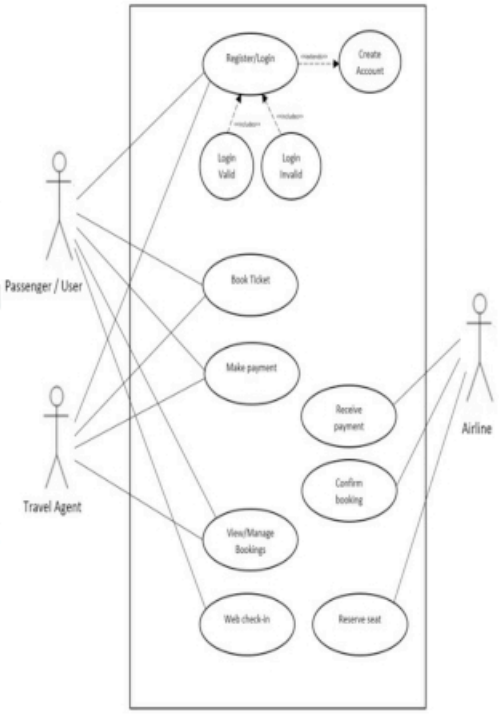


Structured Domain Knowledge

Enterprise Models

Knowledge was gathered from multiple experts to create an enterprise domain model



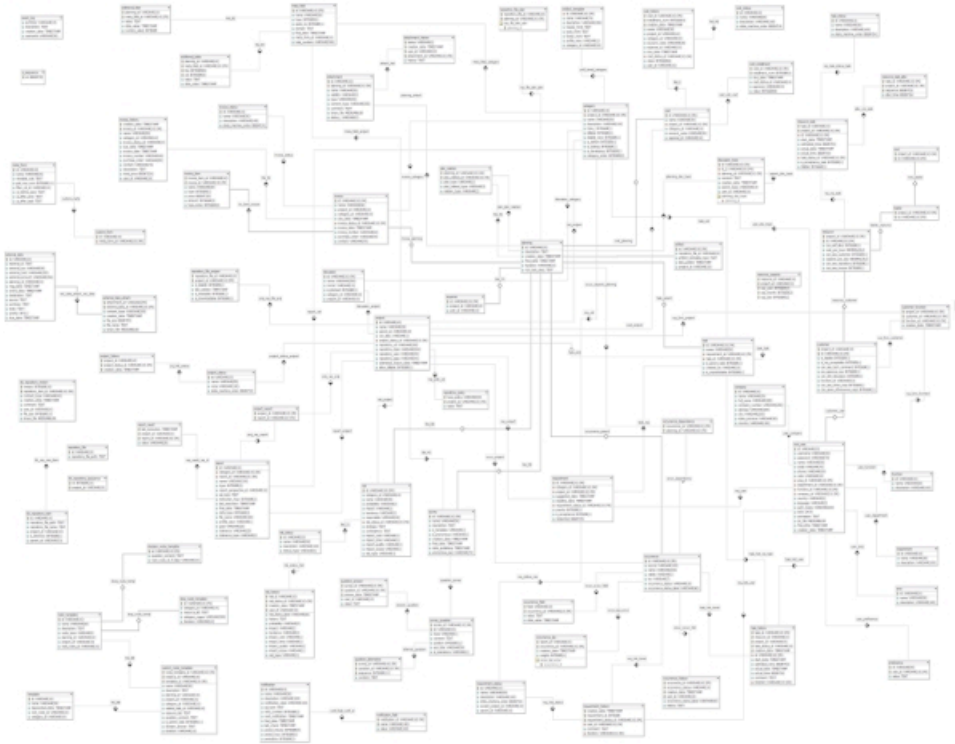


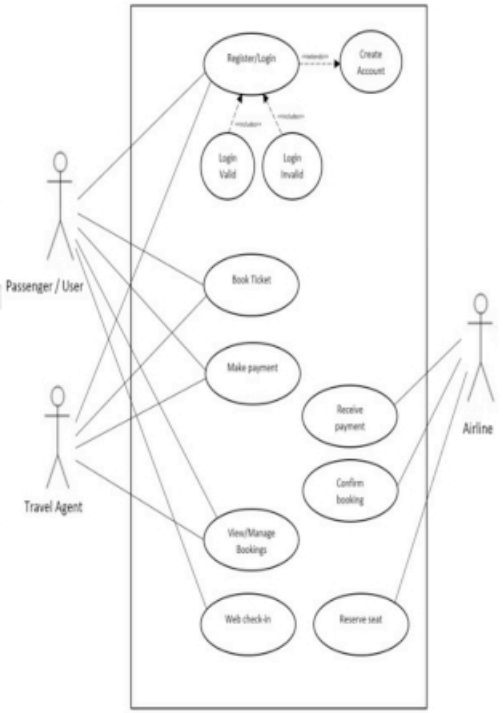
Enterprise Models

Also known as Unified Models

Also known as Canonical Models

Also known as Aggregate Models





Challenges with Unified models

1. Complexity
2. Ownership
3. Linguistic

1 Complexity

Inherent complexity due to scope and size

Overlapping & Redundant capabilities

2 Ownership

No single expert who own's the entire model

Model falls behind the reality and over time loses its value

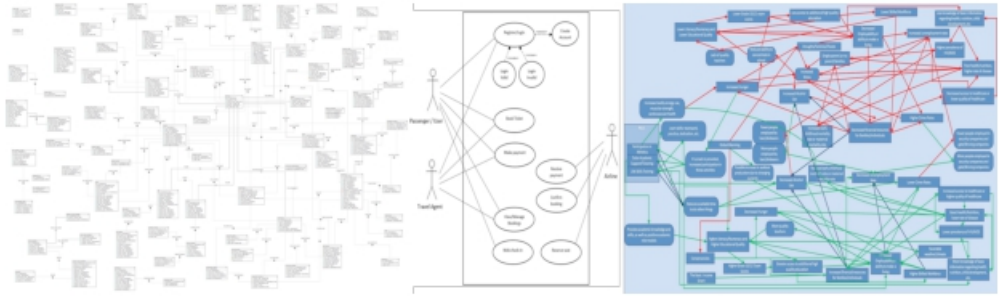
3

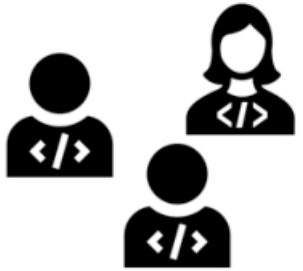
Linguistic

Same business term has different meanings in different domains

Technology teams | Business teams speak different languages

Software Development





Software Development Team

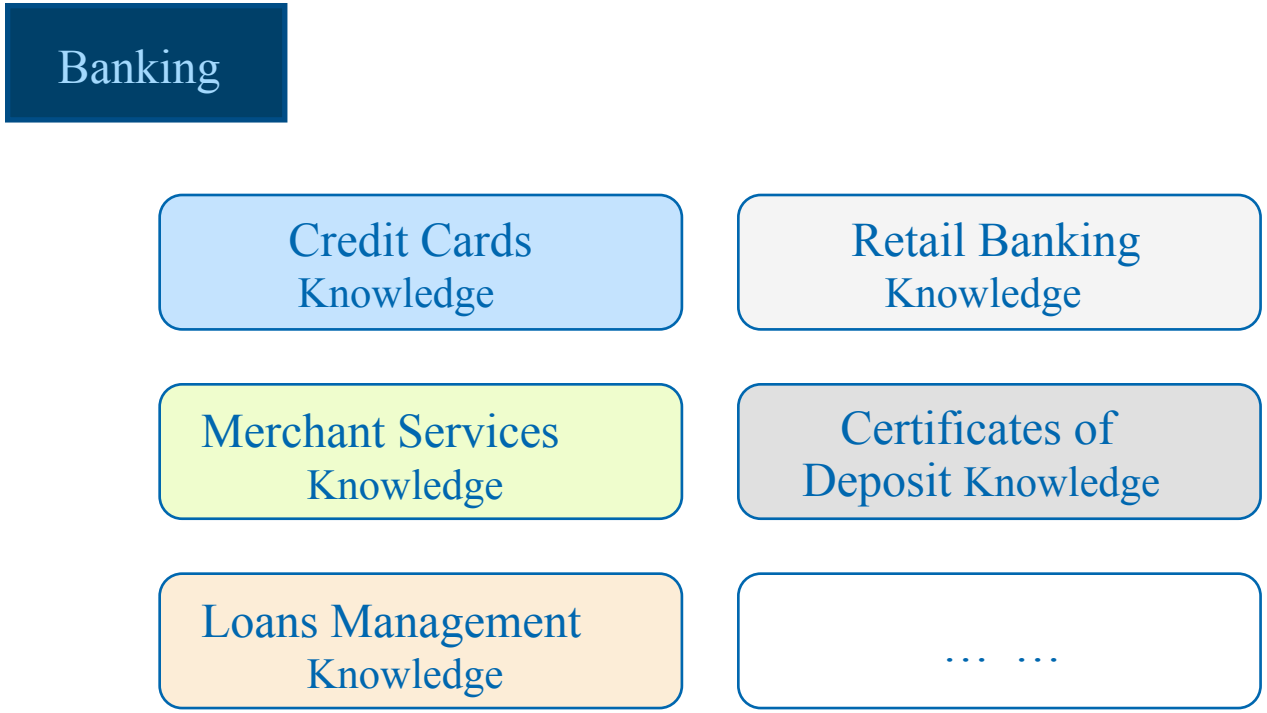
Technical Design

Code

Product

Aggregate Domain Models *a.k.a.* Holistic/Enterprise Domain Model

A domain model that covers all the facets of the domain



Addressing the Challenges

Domain Driven Design approach provides principles and patterns to address the challenges faced with developing complex domain models

Review

- Knowledge Crunching = Creating the Domain Model
- Multiple challenges with creating models for complex domains
- DDD addresses these challenges