Data-driven systems

BME AUT
Automatizálási és
Alkalmazott
Informatikai Tanszék

Data-driven systems

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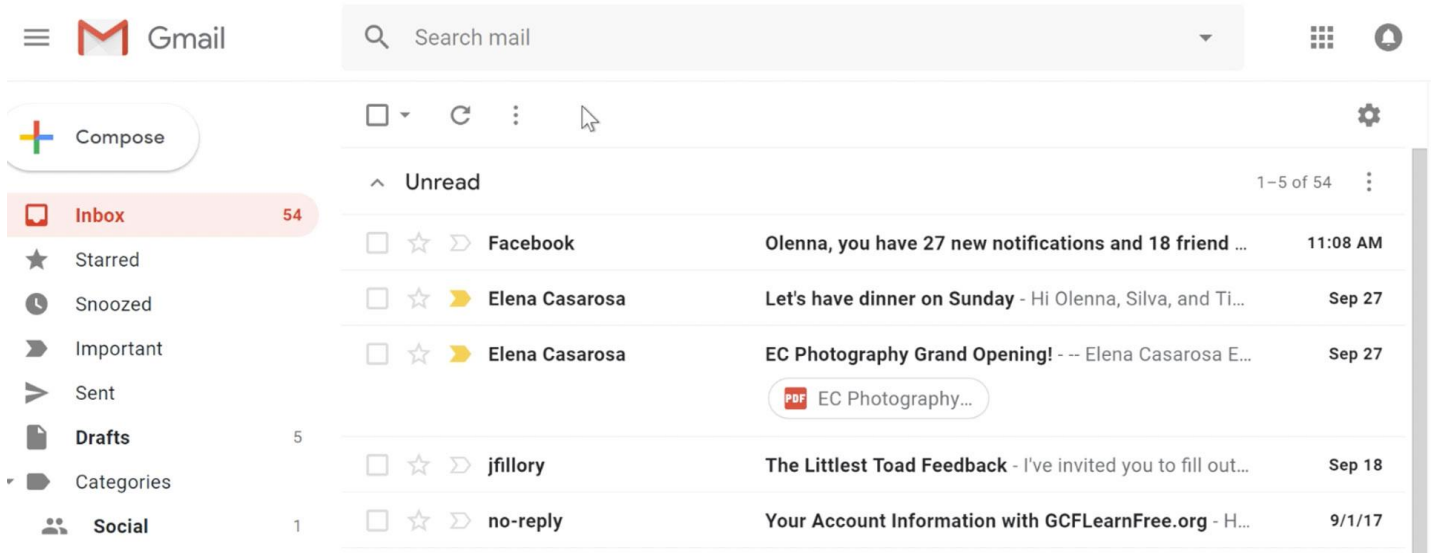


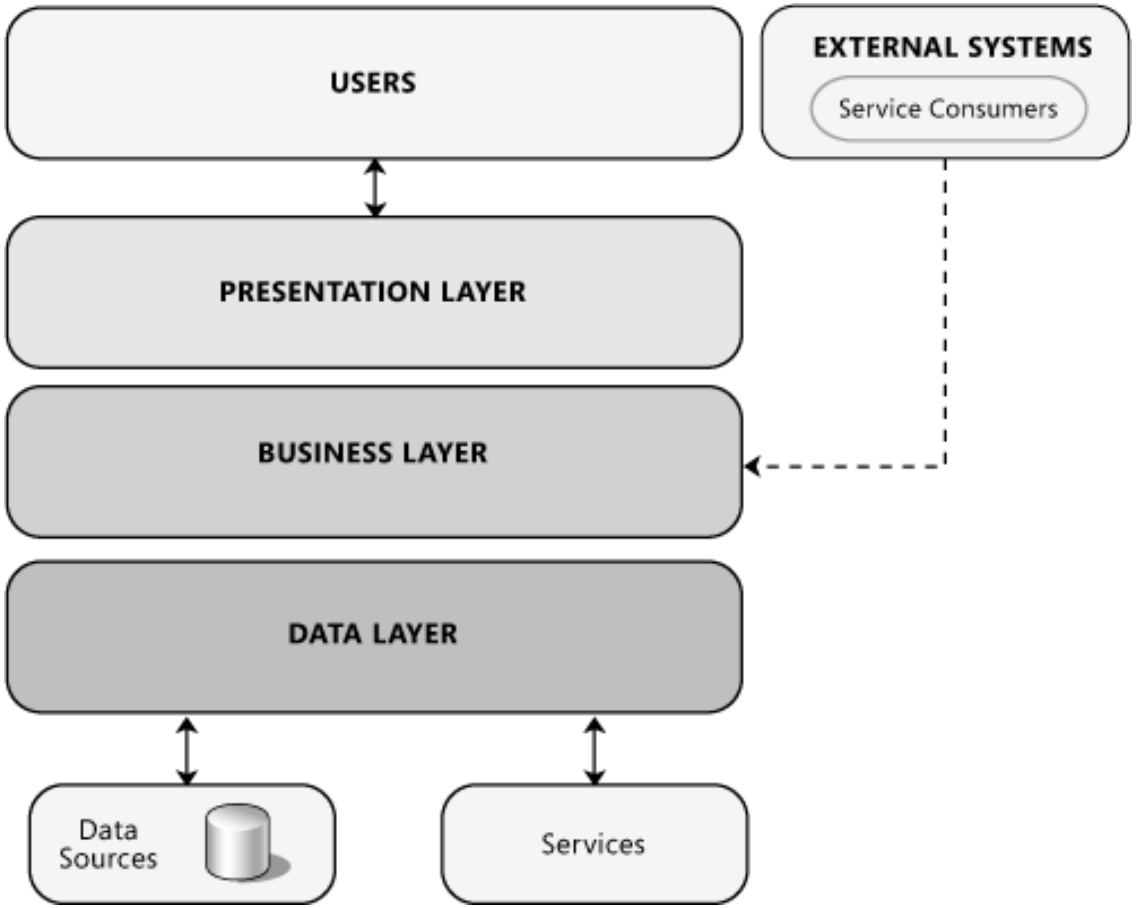
- Website
- Mobile app
- POP3 protocol
- Delay sending an email
- Attachments

- Staring
- Categorization
- Multilingual UI
- ...

What is not typically data-driven?

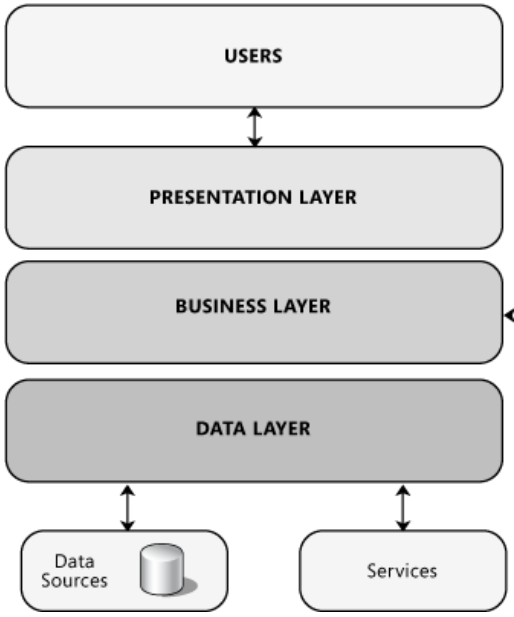
Three-tier architectures

Three-tier architecture



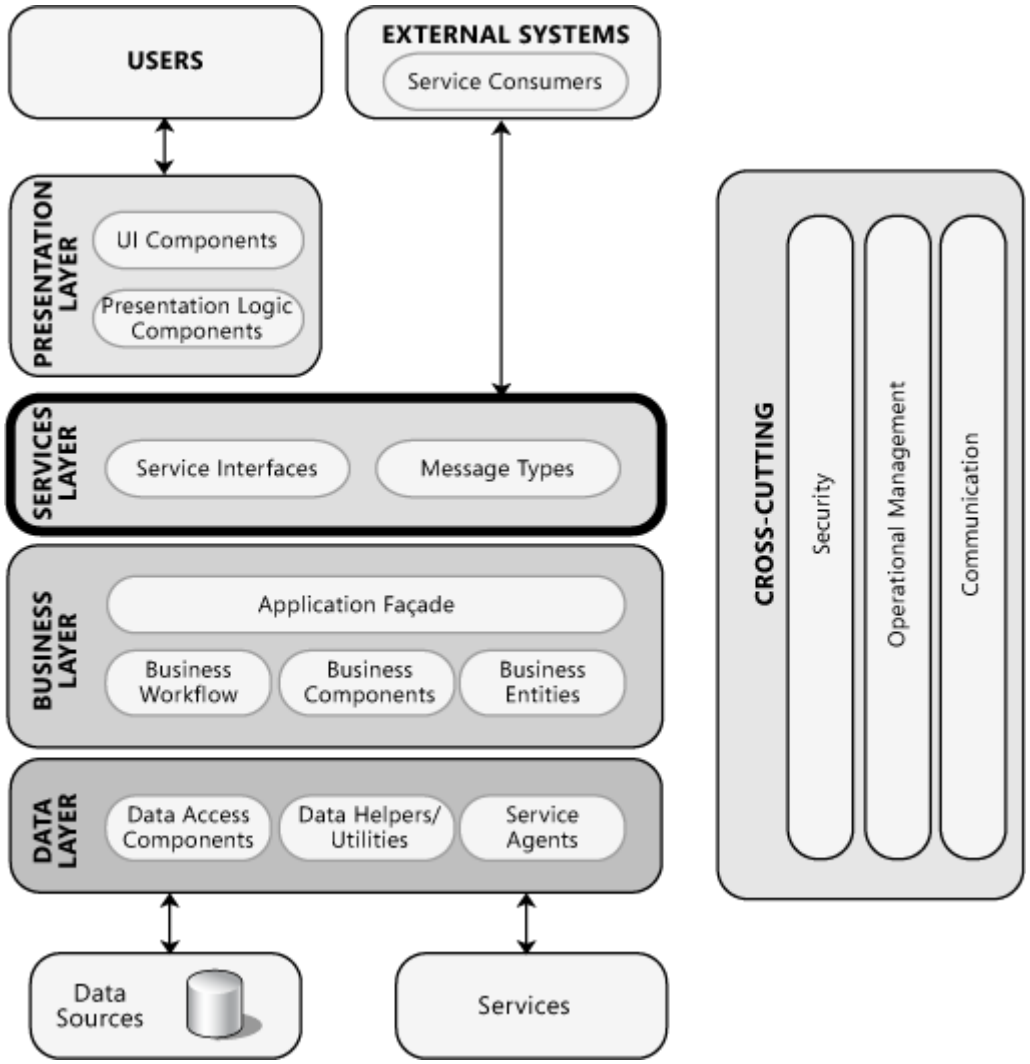
Microsoft Application Architecture Guide, 2nd Edition
https://docs.microsoft.com/en-us/previous-versions/msp-n-p/ee658109%28v%3dpandp.10%29

Layers and tiers



- Logical layer
  - Separation of responsibility
  - Horizontal / vertical
  - Interface - replaceable implementation
- Physical layer: tier
  - Network infrastructure, topology
  - Performance
  - Security boundaries
  - Scalability

N-tier architecture



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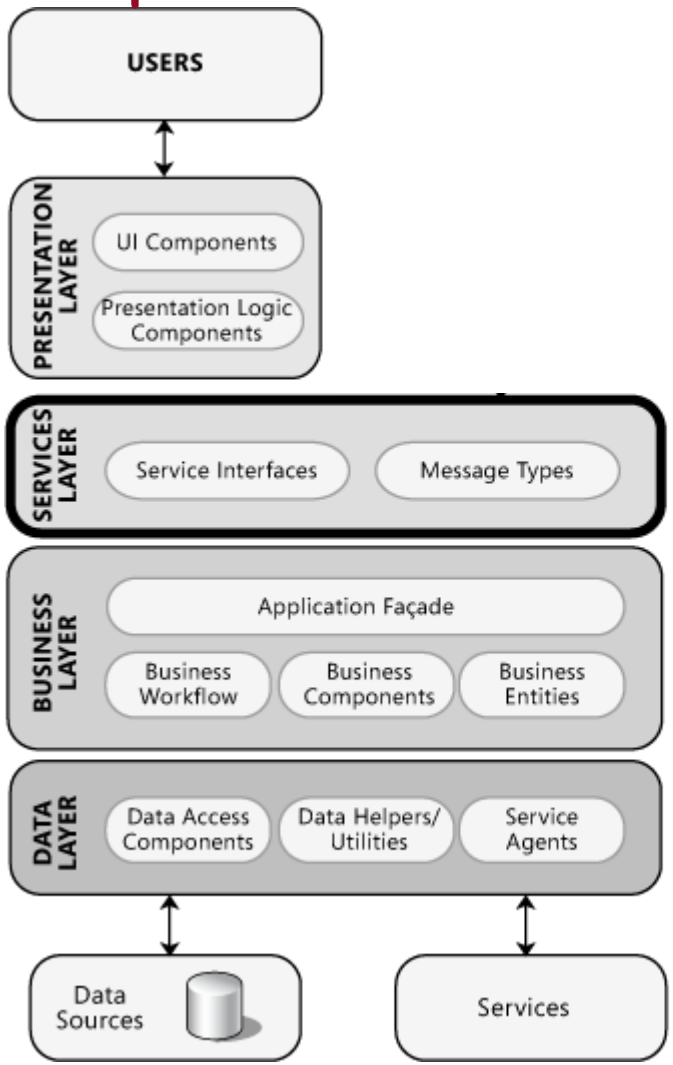
Example Gmail



HTML, CSS

Android components

REST interface

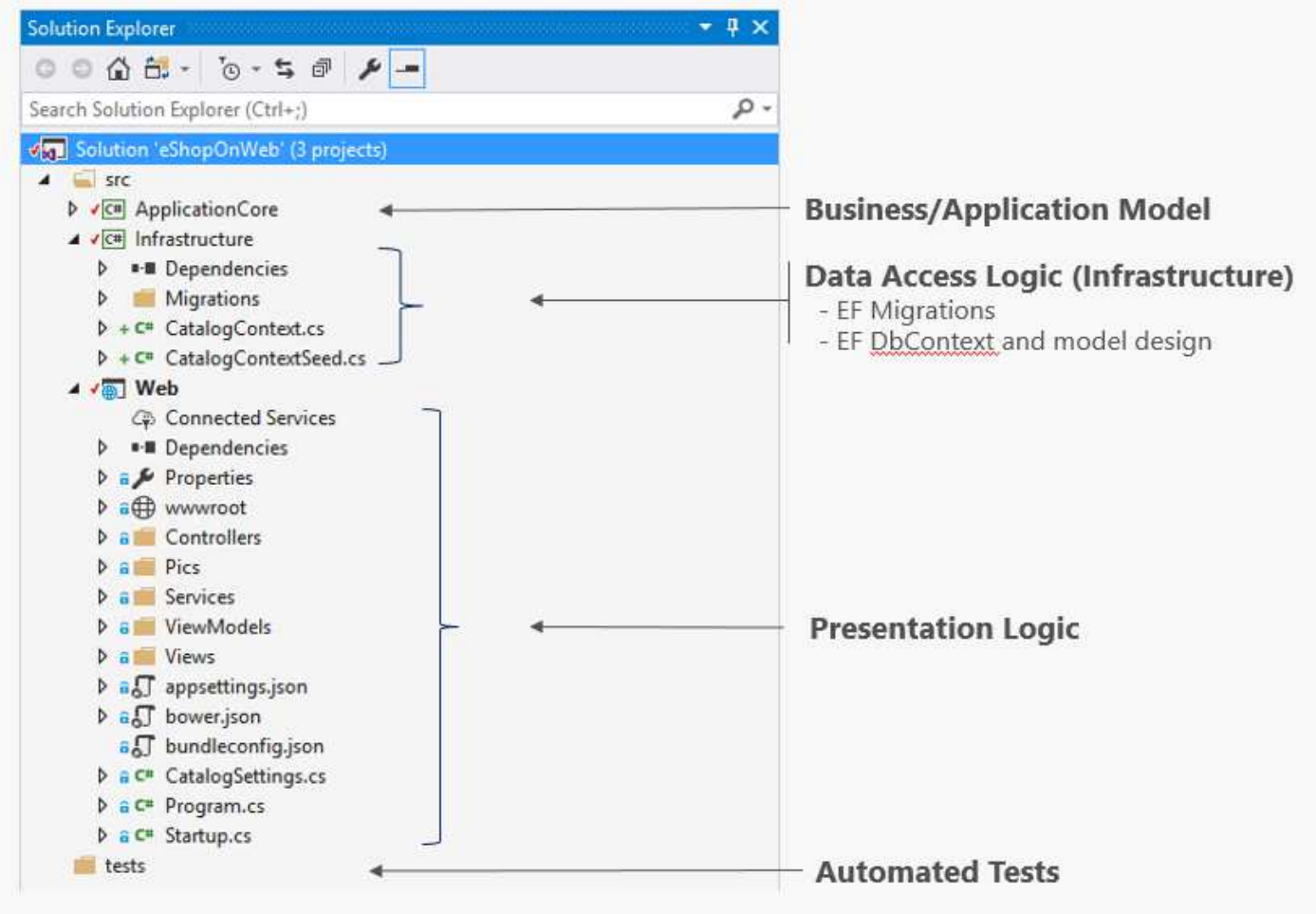
Search within emails, staring, delayed sending

Message, attachment

Database

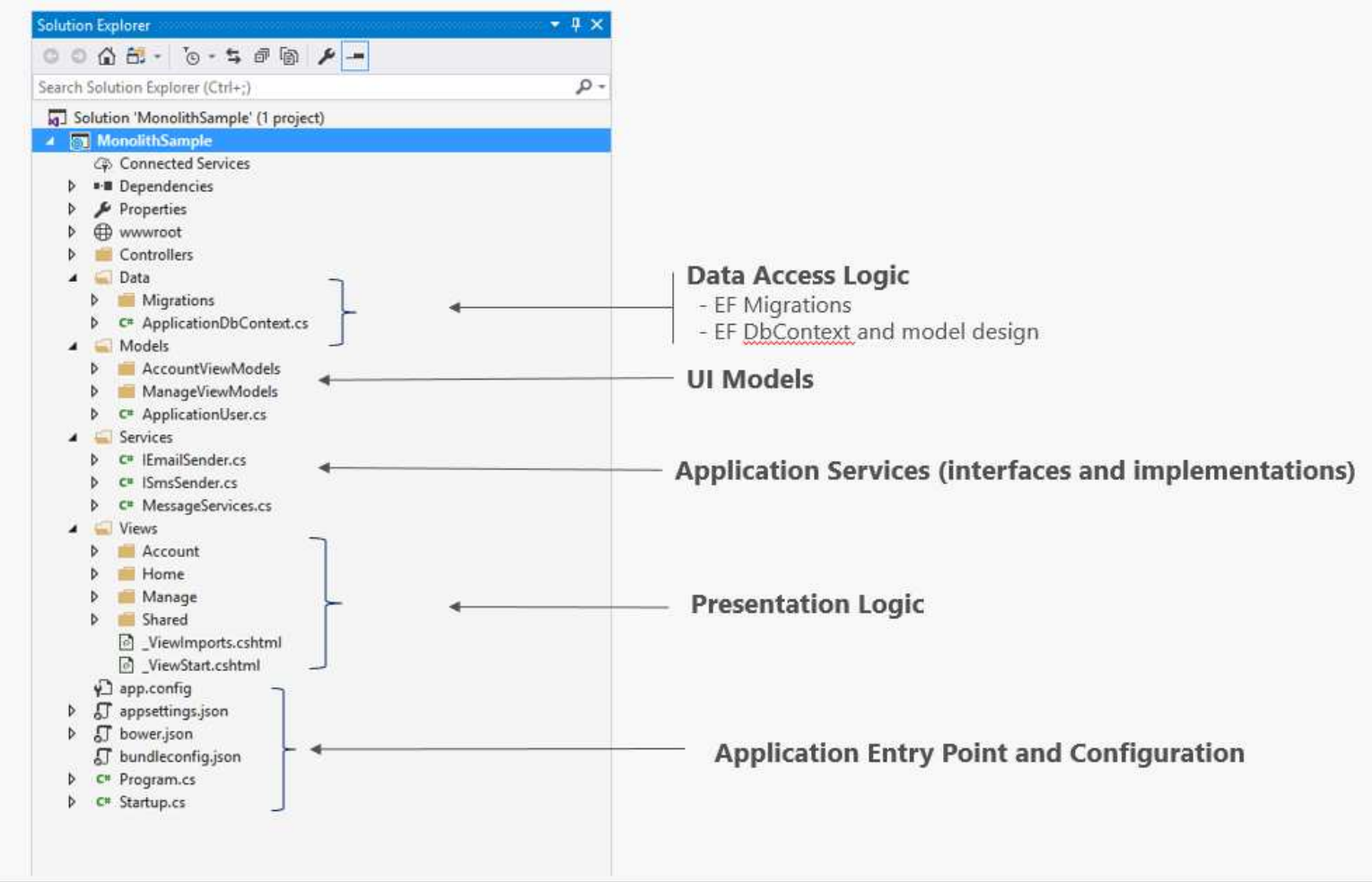
Google Drive attachments

Layered source code structure / 1



Kép forrása: https://docs.microsoft.com/en-us/dotnet/architecture/modern-web-apps-azure/common-web-application-architectures

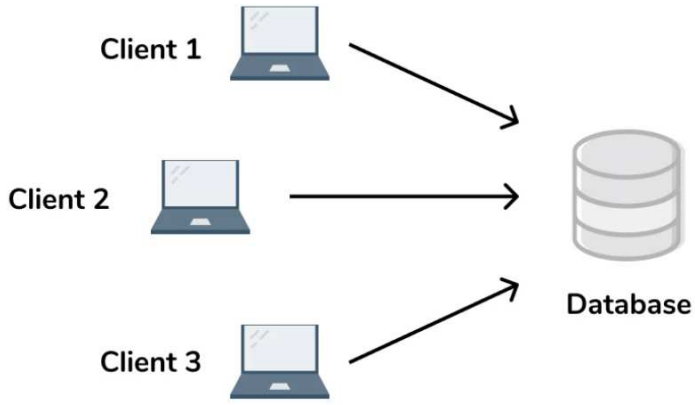
Layered source code structure / 2



Kép forrása: https://docs.microsoft.com/en-us/dotnet/architecture/modern-web-apps-azure/common-web-application-architectures

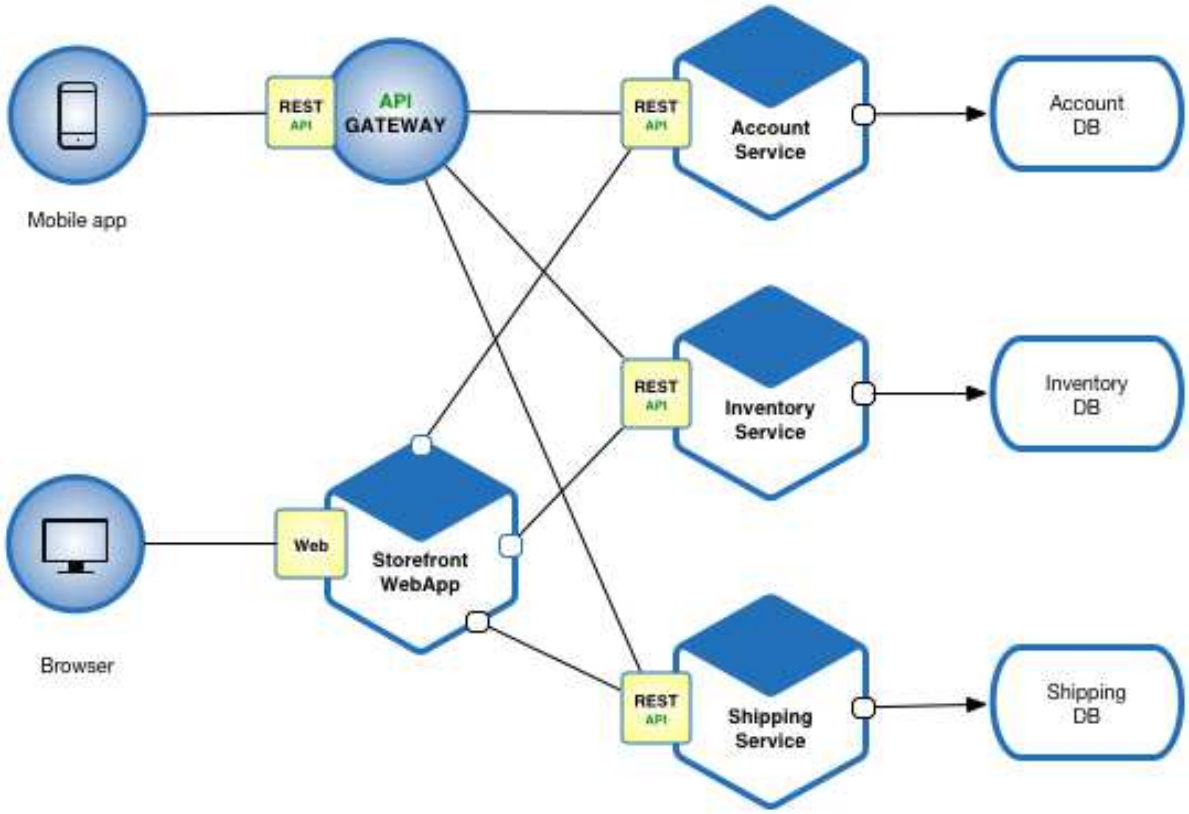
Two vs. three layer/tier architectures

- Two layers
  - The logic is in the UI and/or data layer
  - No logical separation ☹
- Different
  - Authentication/Authorization
  - Scaling
  - Performance
  - Security
  - …



Microservices

- Loose coupling, strong vertical cut
- It can be installed and versioned independently



Semester overview

Data Layer

- MS SQL Server
- MongoDB
- Concurrent transactions
- Platform specific programming
- Query optimization
- Semi-structured data (XML, JSON)

Data Access and Business Logic Layer

- Data Access Layer
  - Java, .NET
- OR mapping
- LINQ, Entity Framework
- JPA, SpringData
- SOAP, REST
  - ASP.NET Core Web API

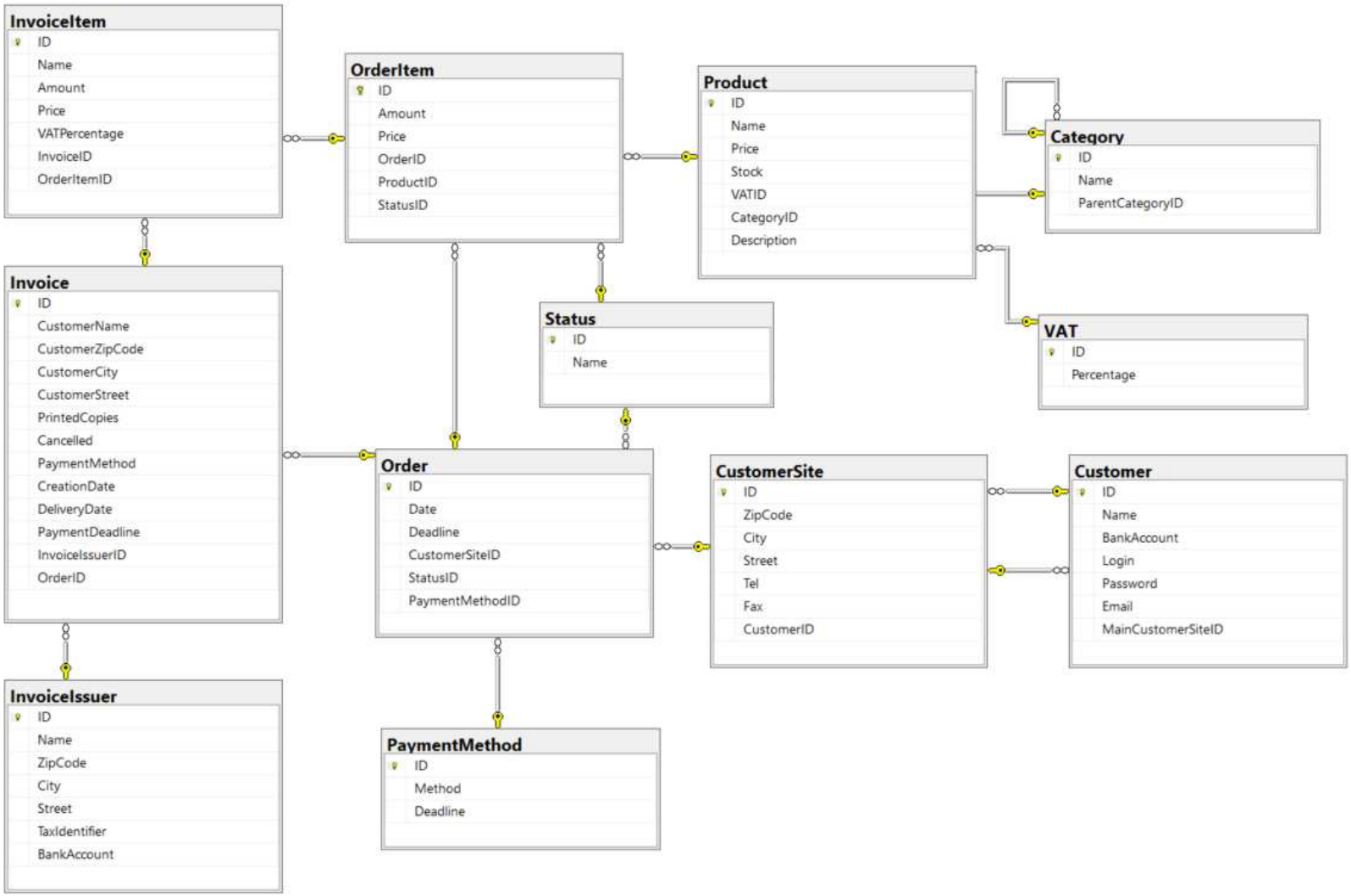
Seminar (laboratory class)

1. Transactions
2. Programming MS SQL Server
3. Entity Framework
4. Working with MongoDB
5. JPA
6. REST WebAPI

Sample database

- Retail web application (selling toys)
- Inventory
- Product categories in a hierarchy
- Customers and shipping addresses
- Orders and their status
- Invoicing

Data model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Name
Price
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VATID
CategoryID
Description
Category
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Name
ParentCategoryID
Invoice
ID
CustomerName
CustomerZipCode
CustomerCity
CustomerStreet
PrintedCopies
Cancelled
PaymentMethod
CreationDate
DeliveryDate
PaymentDeadline
InvoiceIssuerID
OrderID
Status
ID
Name
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ID
Percentage
Order
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