Domain Driven Design

Zero to Hero

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creditas

Schedule

- Basic Concepts
- Ubiquitous Language
- Domain Expert
- Domain Model
- Architectures types
  - DDD,
  - Smart UI,
  - …
- **Strategic Design**
  - Bounded Context
  - Context Maps
  - Domain Events
  - Event Storming
- **Tactical Design** (building blocks)
  - Layered Architecture
  - Entities
  - Value Objects
  - Aggregates
  - Domain Services
  - Factories
  - Repositories
- CQRS
- SOA
  - Event Driven Architecture
- Event Sourcing
- Final Thoughts

Domain Expert

Ubiquitous Language

What is a **Domain Model**?

Domain == problem

Model == solution

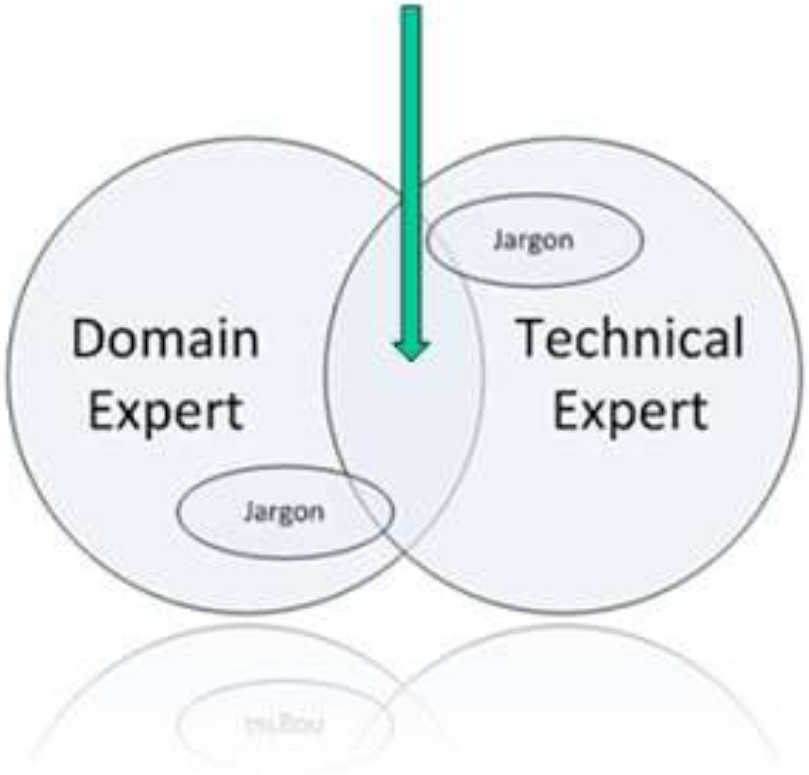
Distilled knowledge

“The model isn’t just the knowledge in a domain expert's head; it is a rigorously organized and selective abstraction of that.”
- Eric Evans

Can be expressed in several ways:

- **Code**
- Diagrams
- Written Documentation

Ubiquitous Language



C#

```
public class Livro
{
    public int Id { get; private set; }
    public int Titulo { get; private set; }
    public Autor Autor { get; private set; }
    public bool Revisado { get; private set; }
    public DateTime DataRevisao { get; private set; }
    public Usuario Revisor { get; private set; }

    public Livro(string titulo, Autor autor)...

    public void Revisar(Usuario revisor)
    {
        if (Revisado)
            throw new InvalidOperationException("O livro já foi revisado.");

        Revisado = true;
        DataRevisao = DateTime.Now;
        Revisor = revisor;
    }

    public void Publicar()...
}
```

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    }

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```

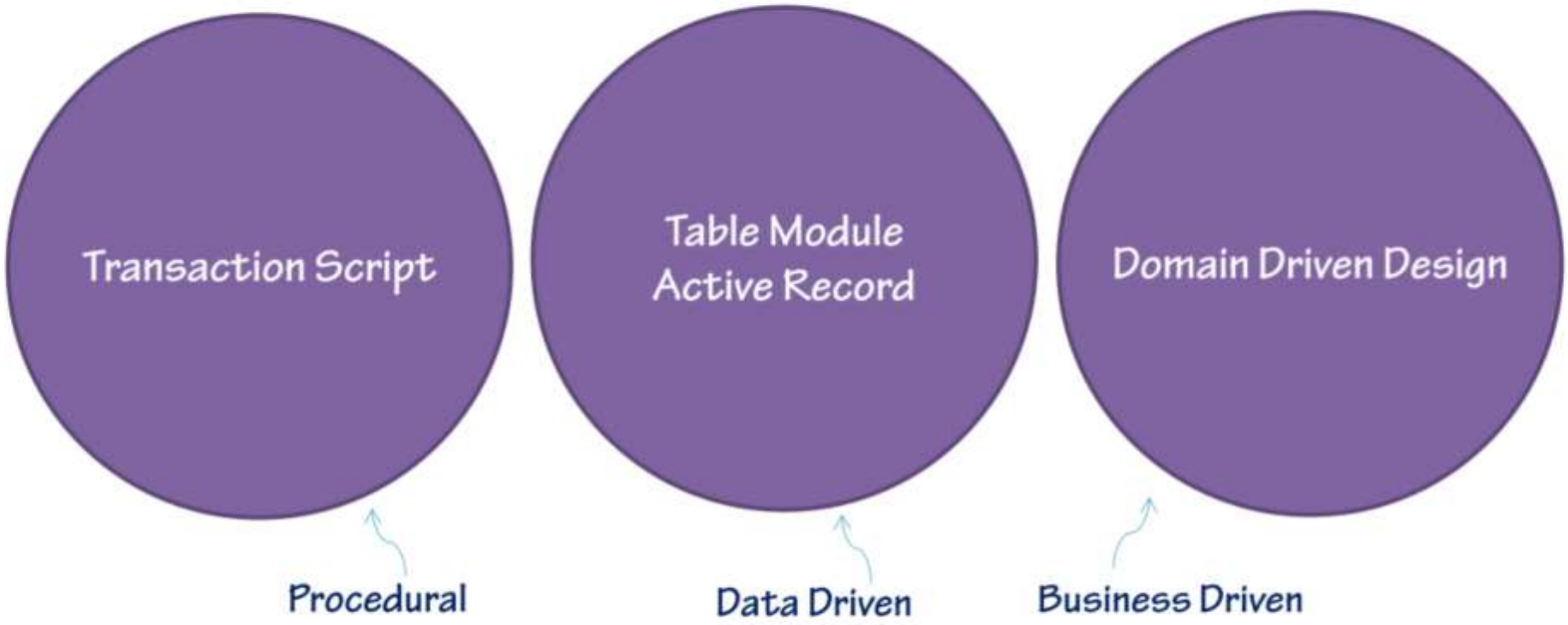
```ruby
class Livro
  attr_reader :id, :titulo, :autor, :revisado, :data_revisao, :revisor

  def initialize(titulo, autor)
    @titulo = titulo
    @autor = autor
  end

  def revisar(revisor)
    fail "O livro já foi revisado" unless revisado

    @revisado = true
    @data_revisao = Time.now
    @revisor = revisor
  end

  def publicar()
    # ...
  end

end
```

Ruby

Before we start

- An iterative process
- Business involvement (domain experts)
- Being fluent with Object-Oriented (OO) programming paradigm
- Being familiar with SOLID principles

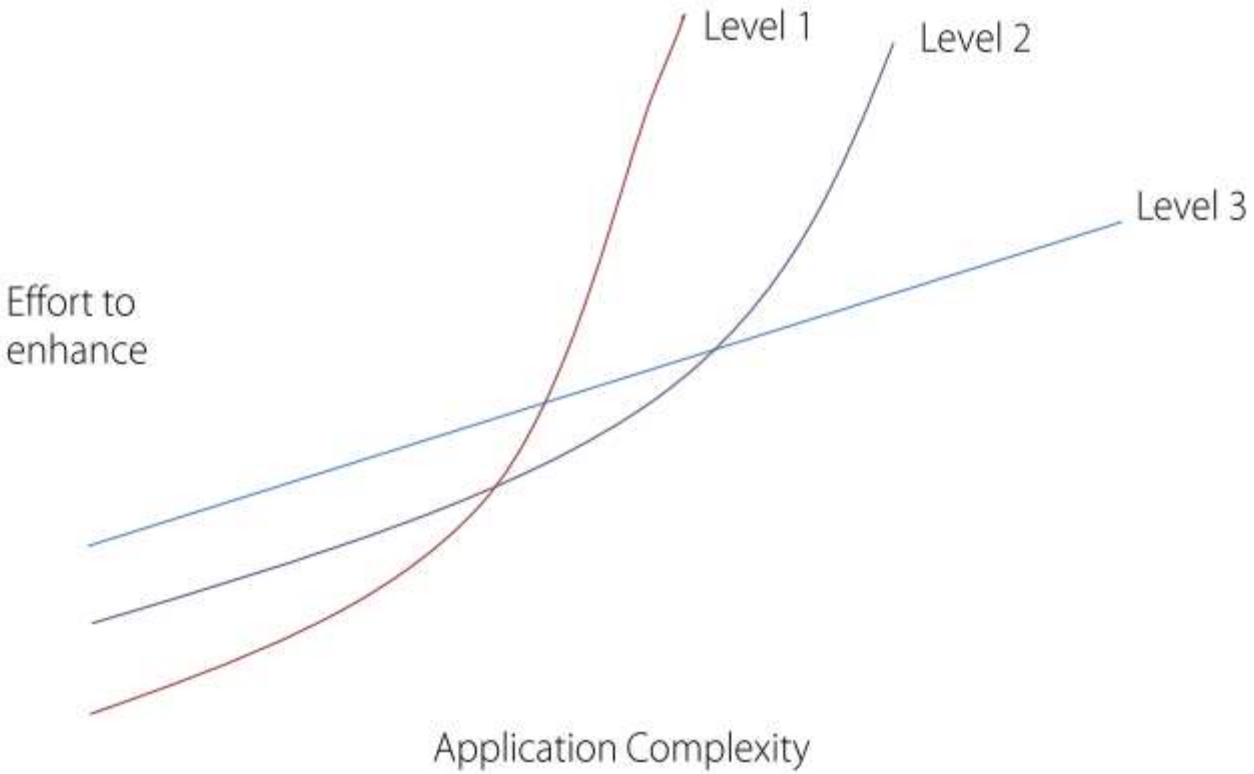
What's your focus?



Architecture Selection

MVP	Flagship product
Junior team	Senior Team
Small team	Large Team
Simple Domain	Complex domain
Tight timeline	Flexible timeline
Short lifespan	Long-term
No security concerns	Security matters
Little chance for reuse	Known need for reuse

Choice by Complexity



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The Two Sides of Domain-Driven Design

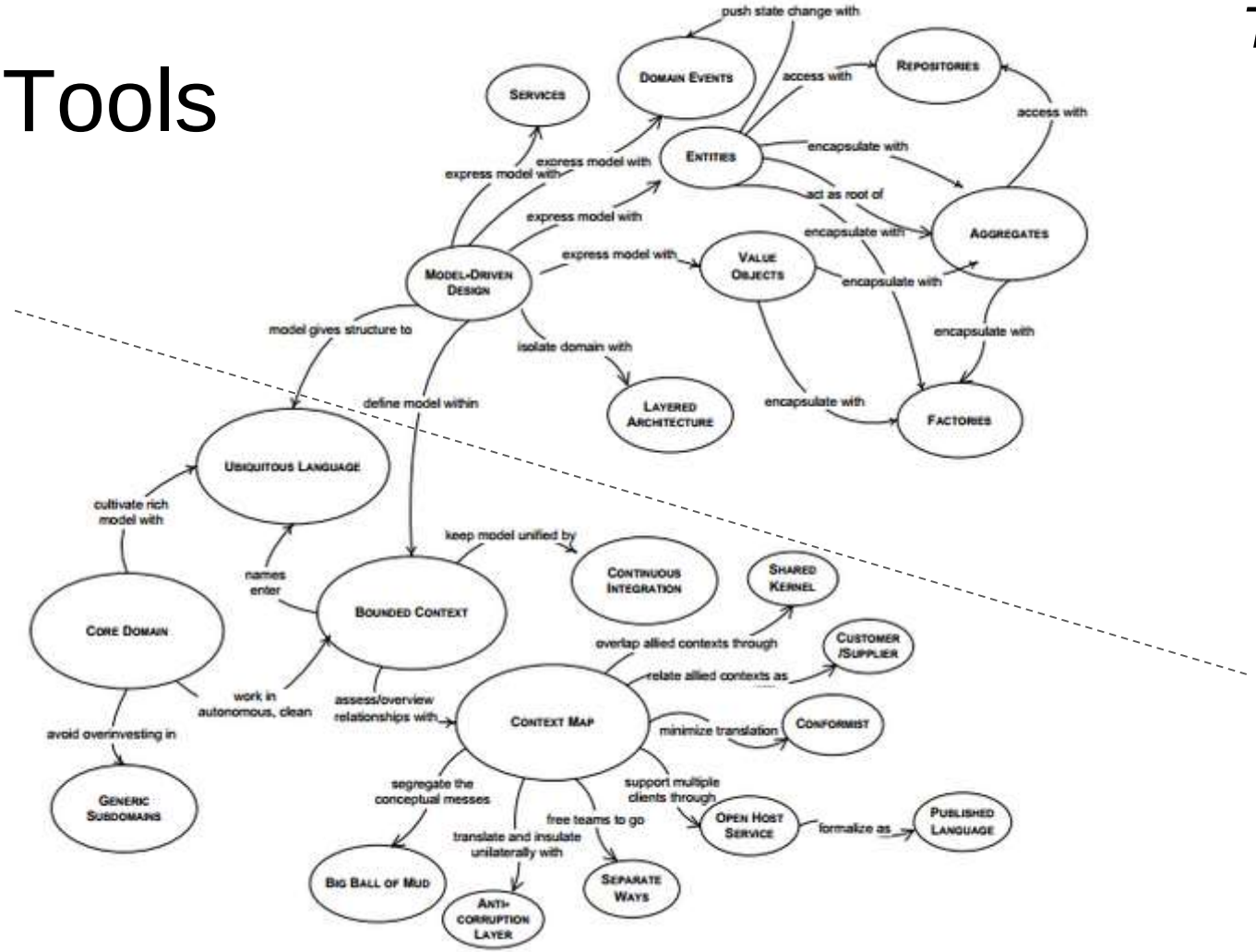
Tactical

vs

Strategic

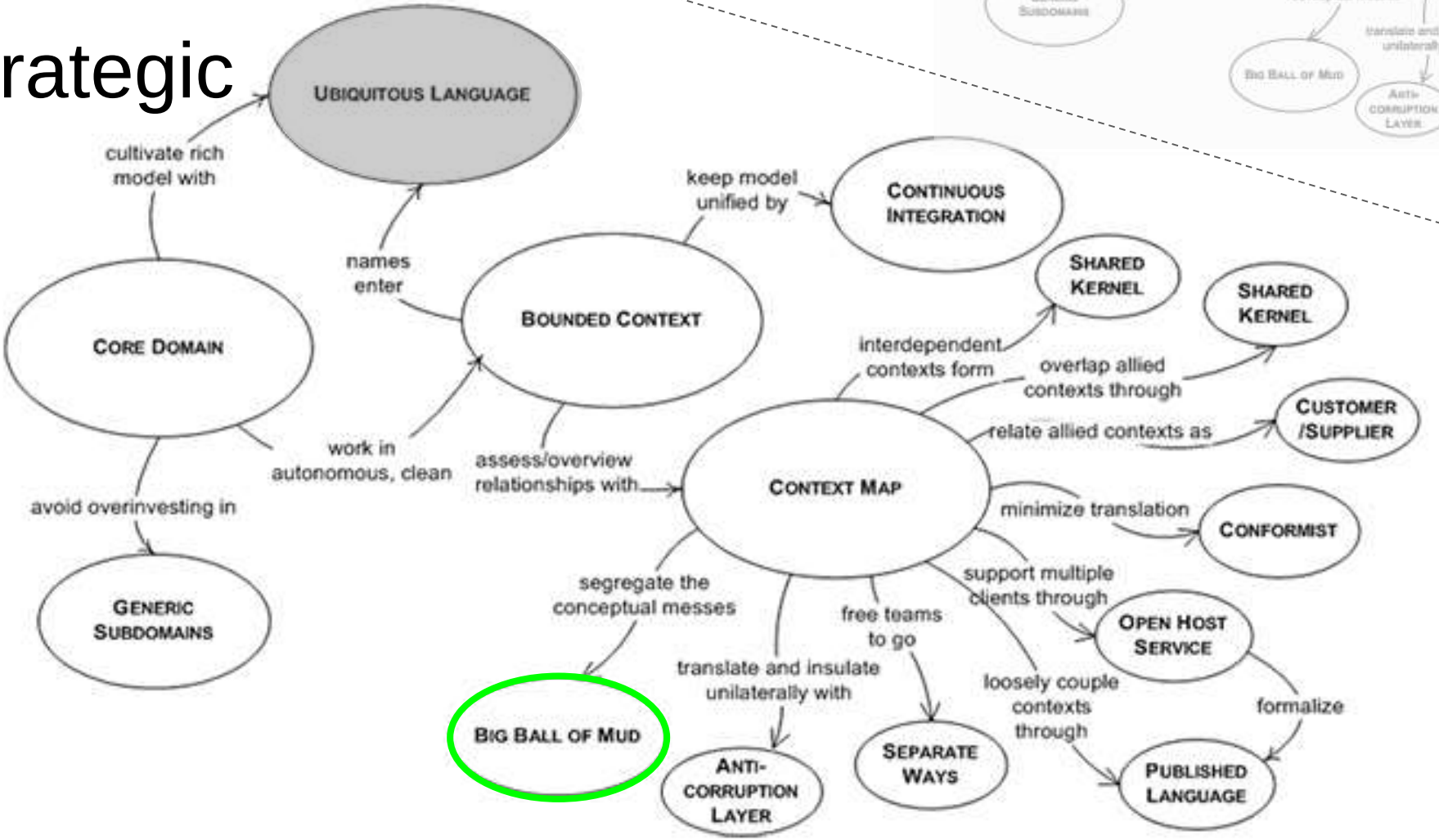
DDD Tools

Tactical



Strategic

Strategic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interdependent contexts form
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CUSTOMER /SUPPLIER
relate allied contexts as
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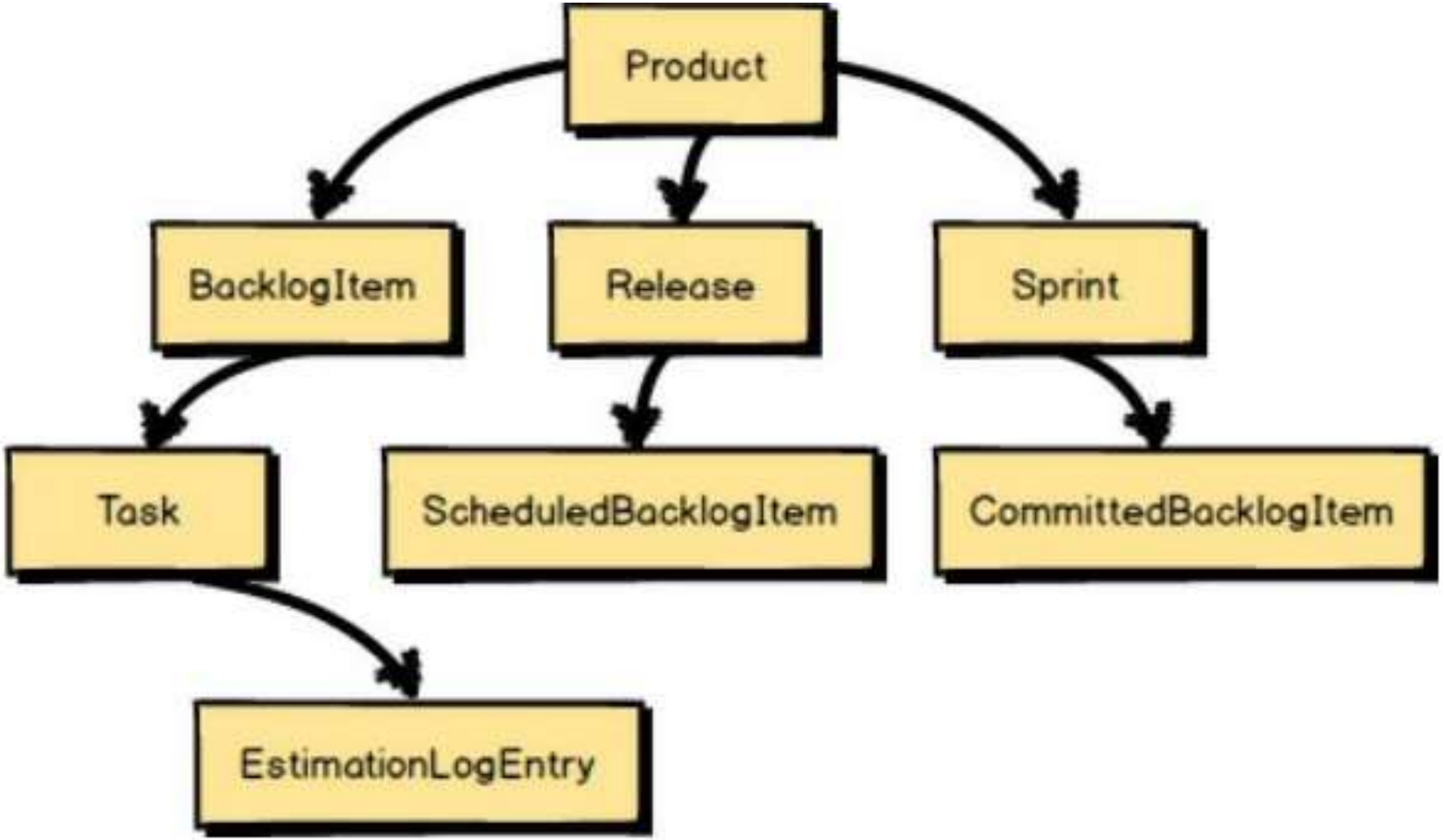
minimize translation
CONFORMIST
GENERIC SUBDOMAINS
segregate the conceptual messes
support multiple clients through
OPEN HOST SERVICE
free teams to go
translate and insulate unilaterally with
loosely couple contexts through
formalize
BIG BALL OF MUD
ANTI-CORRUPTION LAYER
SEPARATE WAYS
PUBLISHED LANGUAGE

Big Ball of Mud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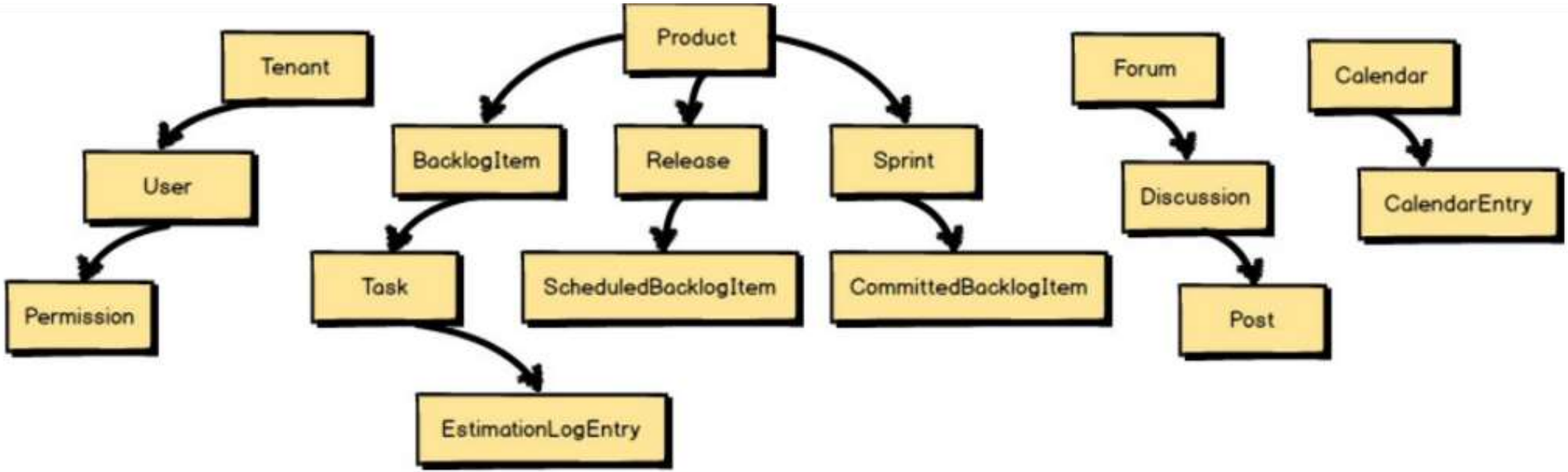
Release
Sprint
Task
ScheduledBacklogItem
CommittedBacklogItem
EstimationLogEntry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Forum
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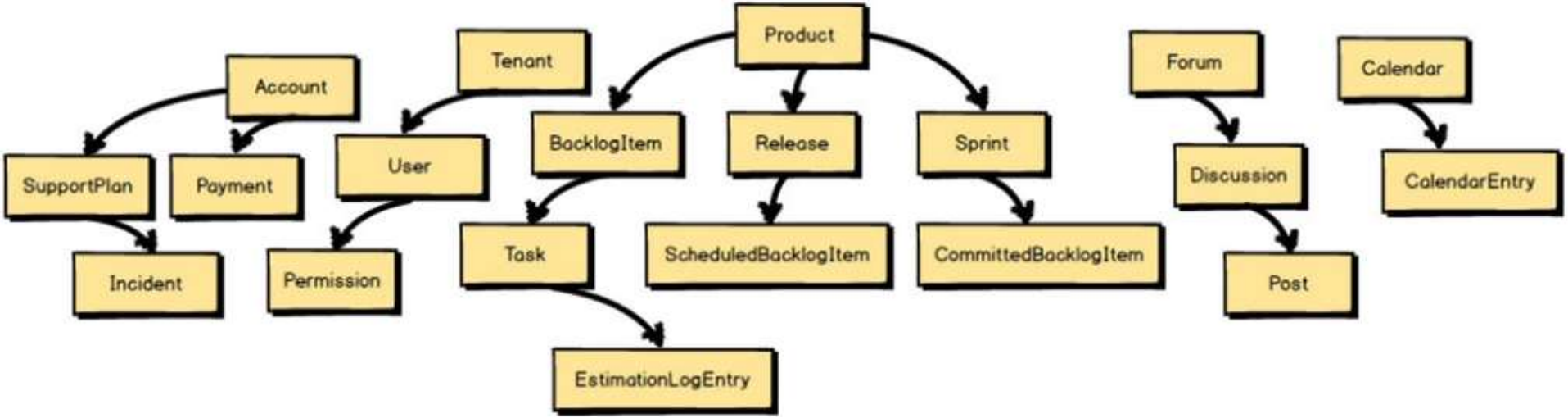
Post
Calendar
CalendarEntry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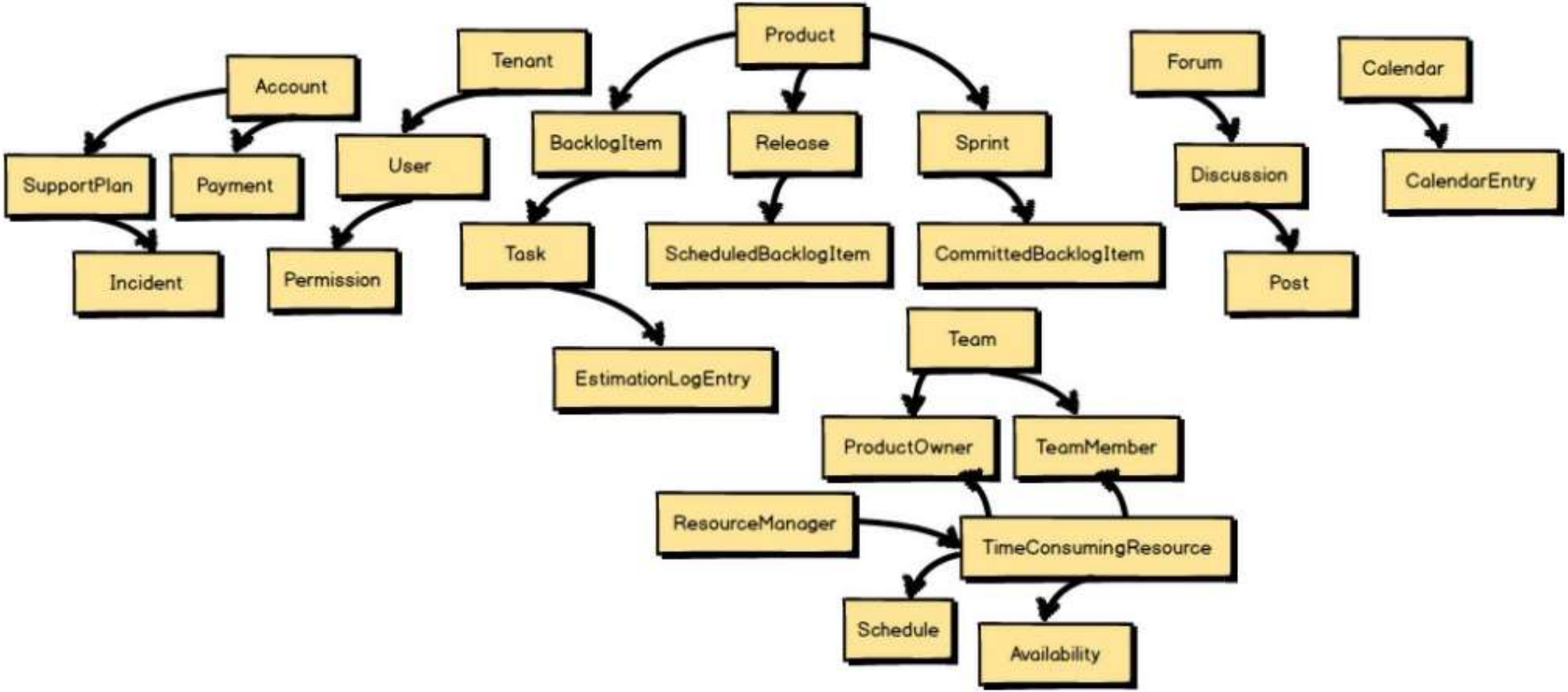
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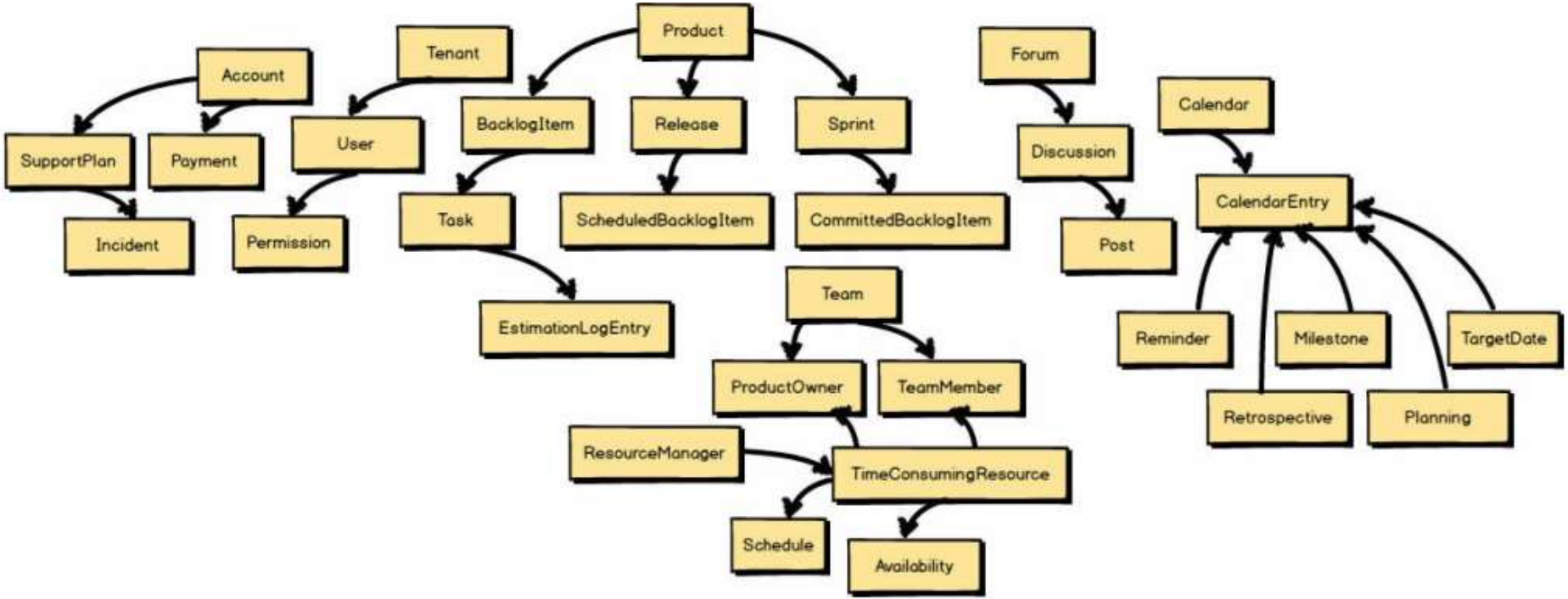
Team
EstimationLogEntry
ProductOwner
TeamMember
ResourceManager
TimeConsumingResource
Schedule
Availability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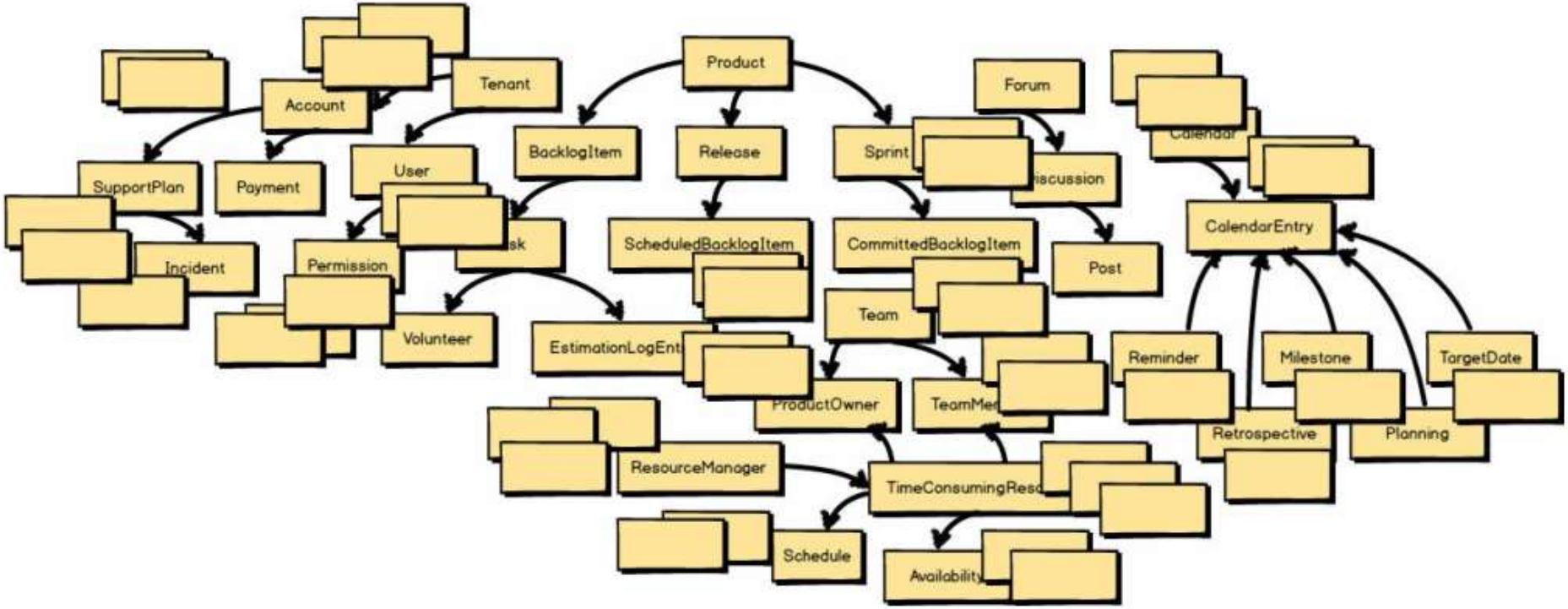
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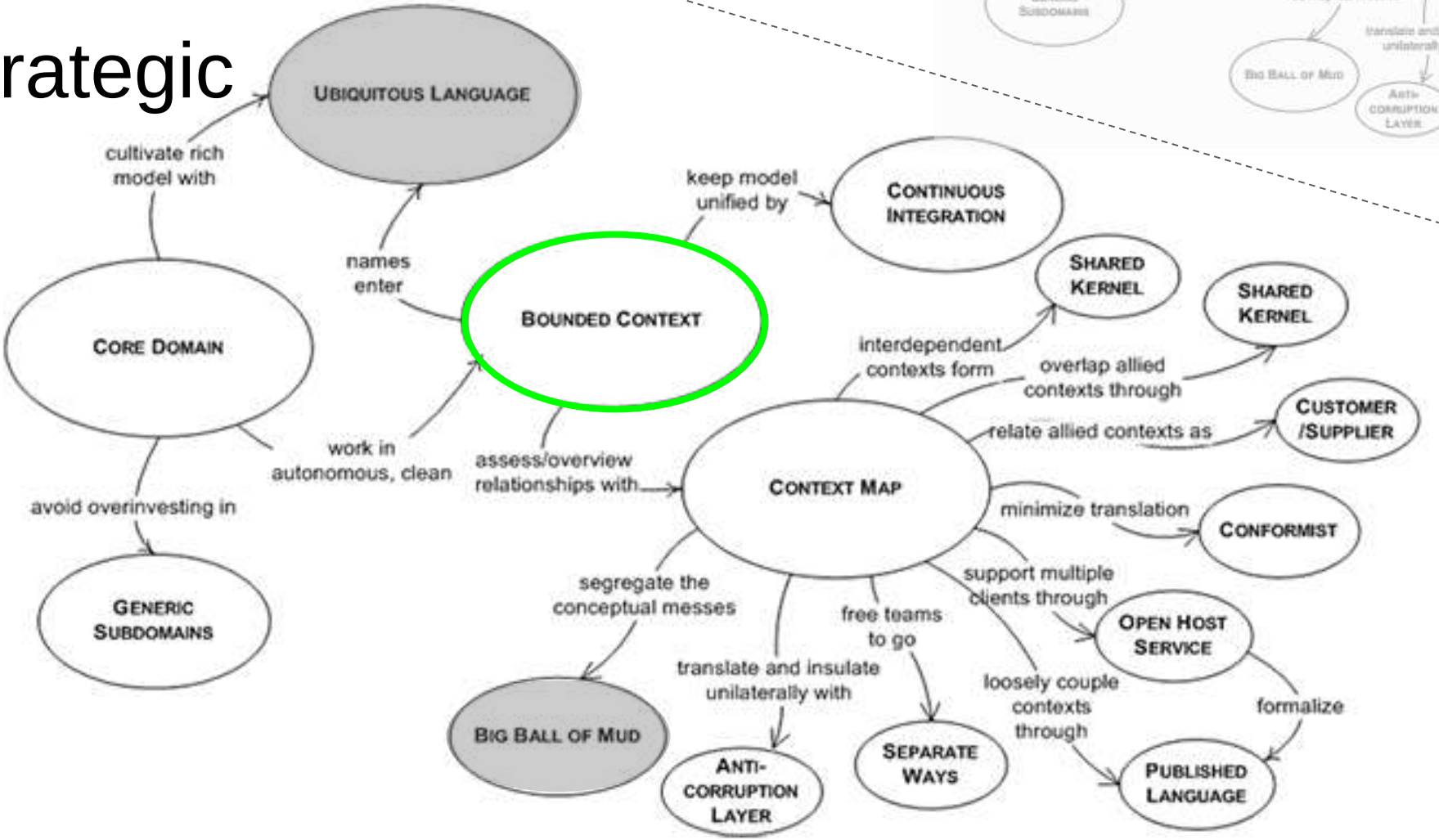
Strategic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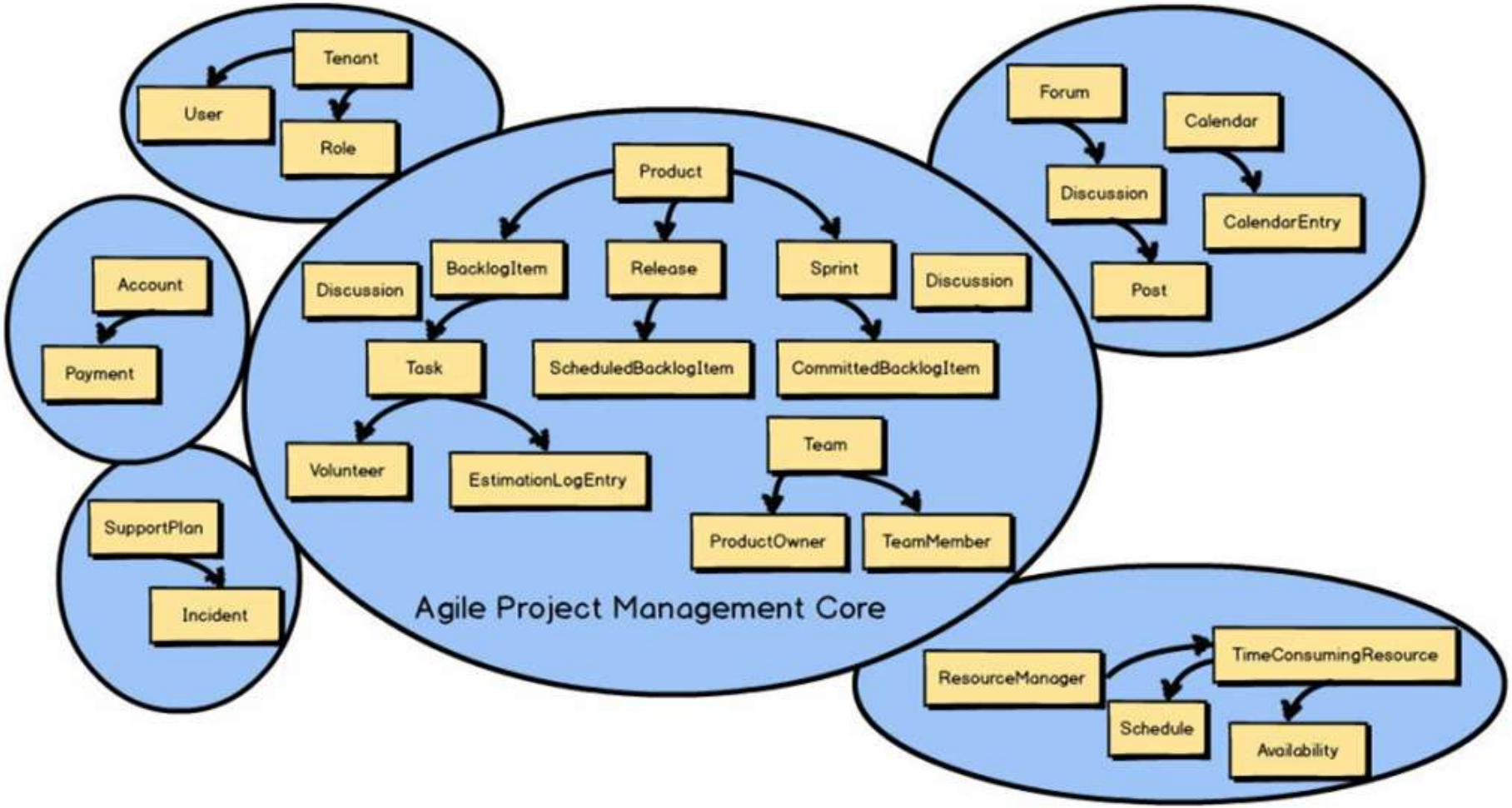
Effective design
with
Bounded Contexts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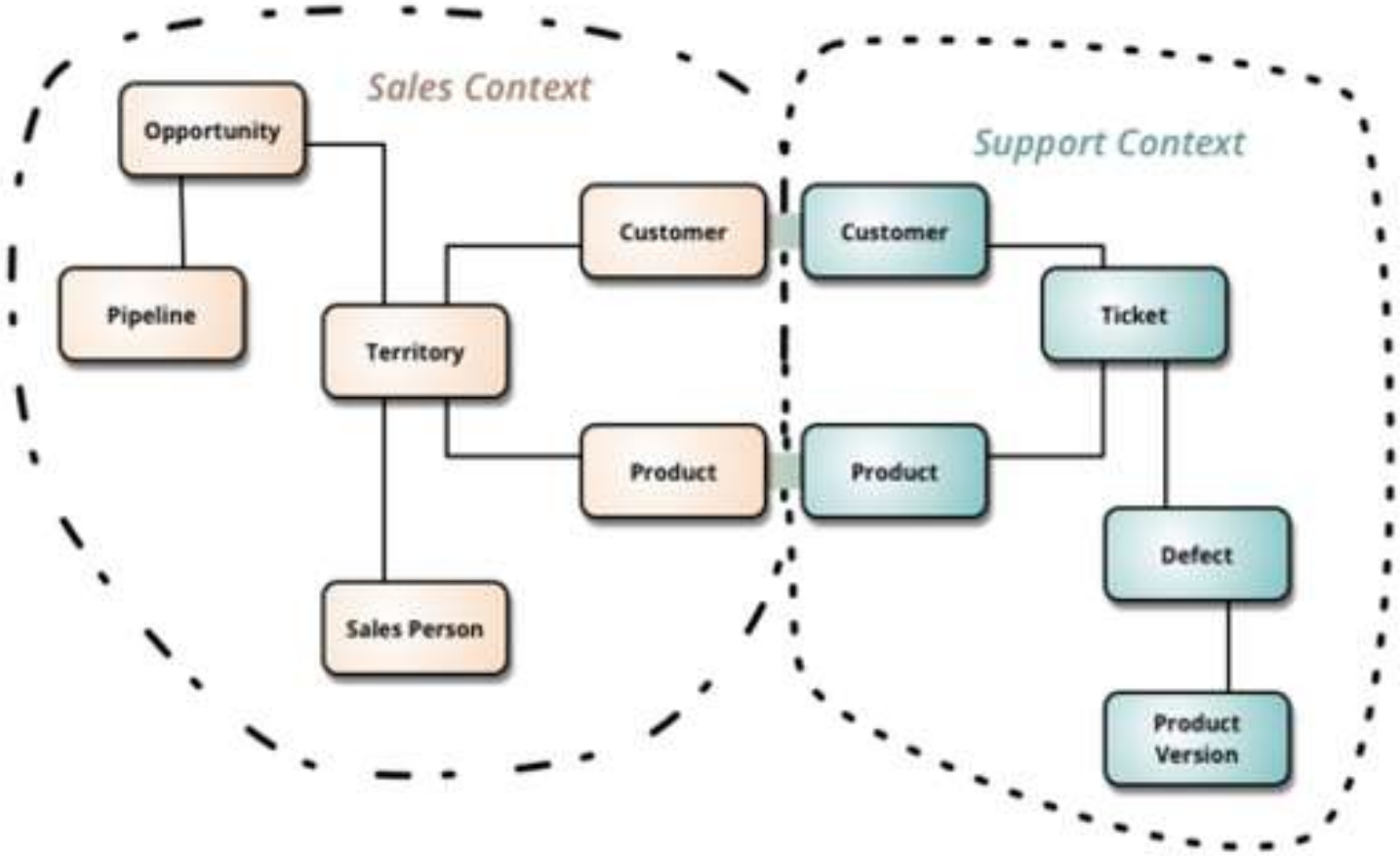
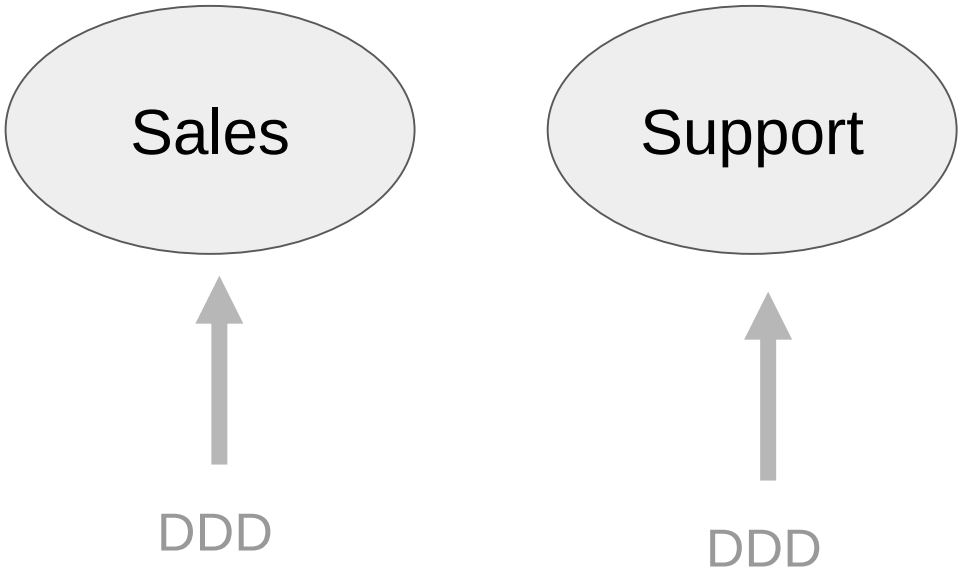

Sales Context
Opportunity
Pipeline
Territory
Customer
Product
Sales Person
Support Context
Customer
Ticket
Product
Defect
Product Version

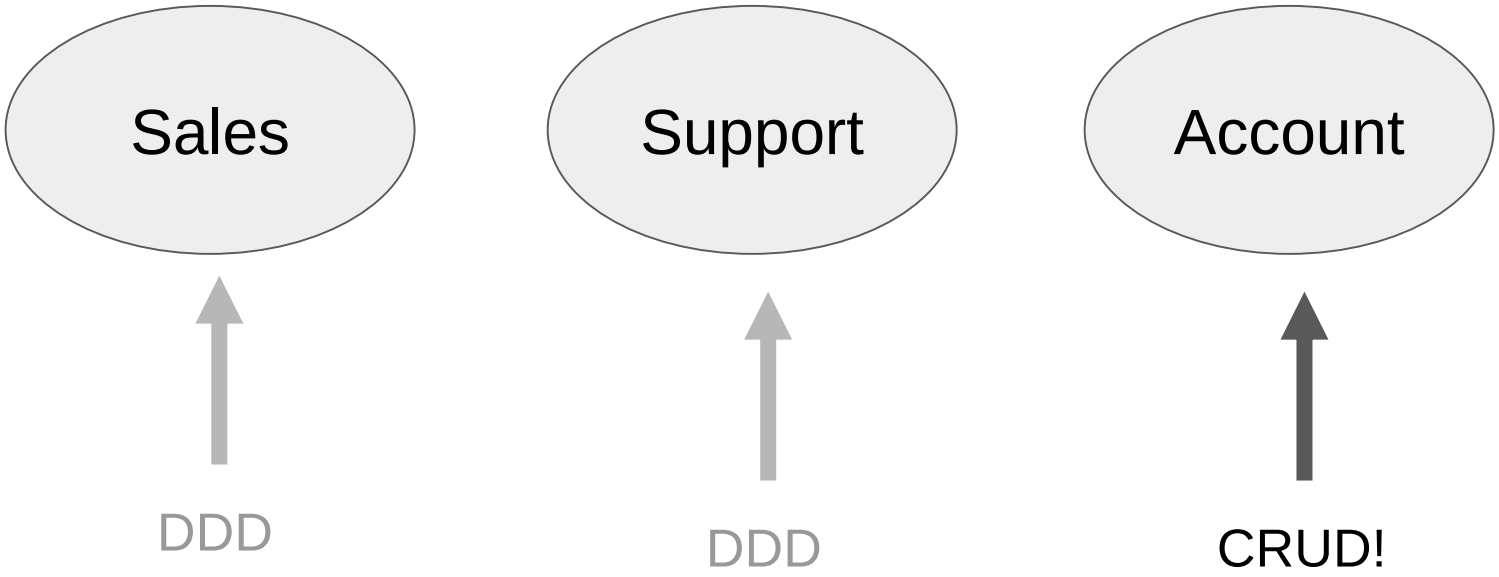
Contexts aren’t just folders or “packages”

Everything could be a context

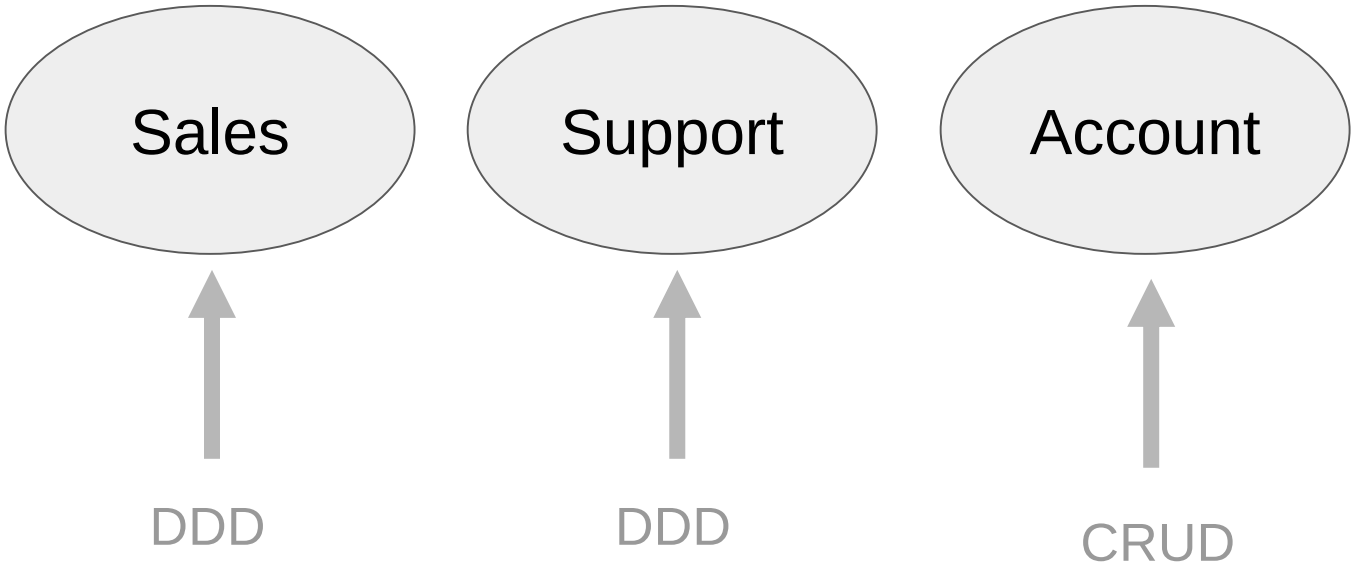
Even a microservice...


Sales
Support
DDD
DDD

Data-driven Context



Big Ball of Mud as a Context



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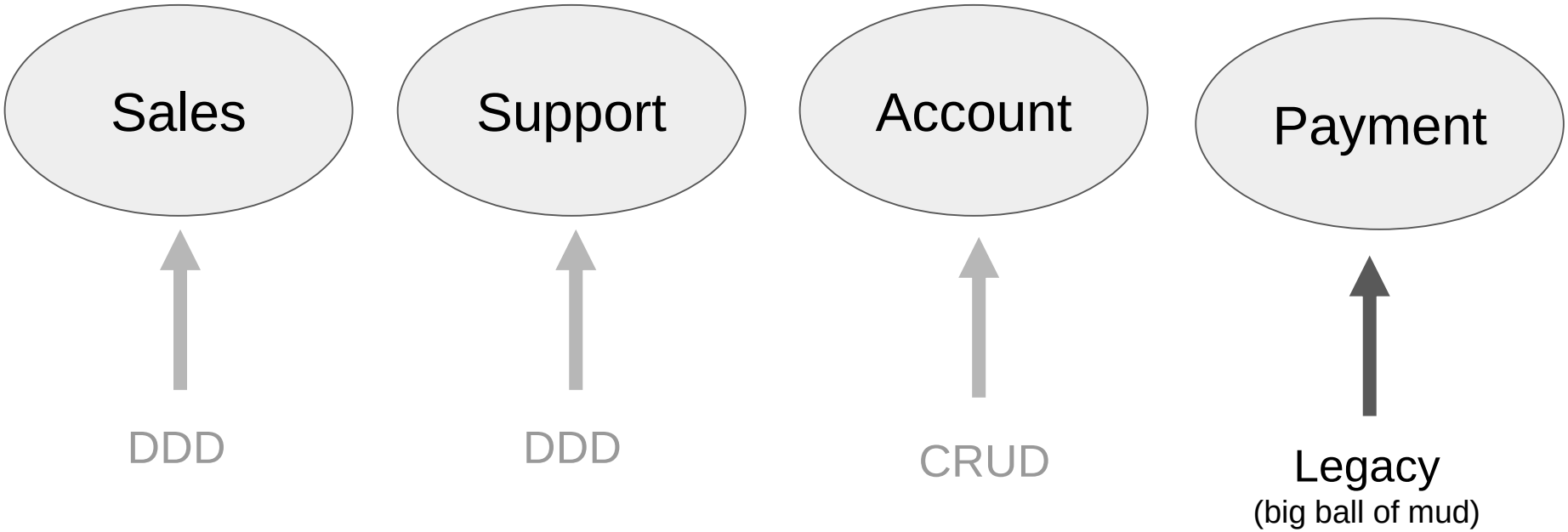
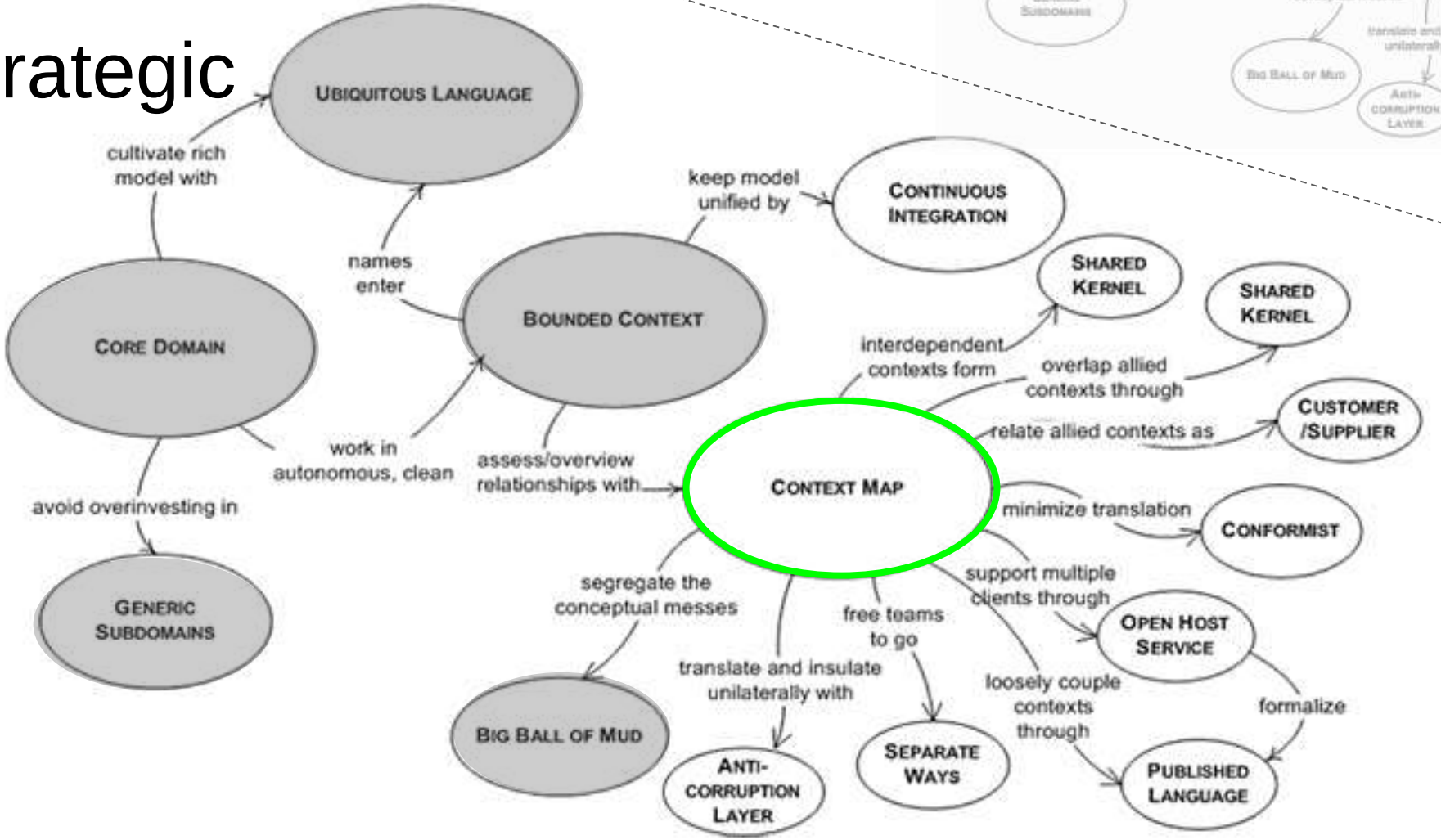


Squads

Bounded Contexts

Strategic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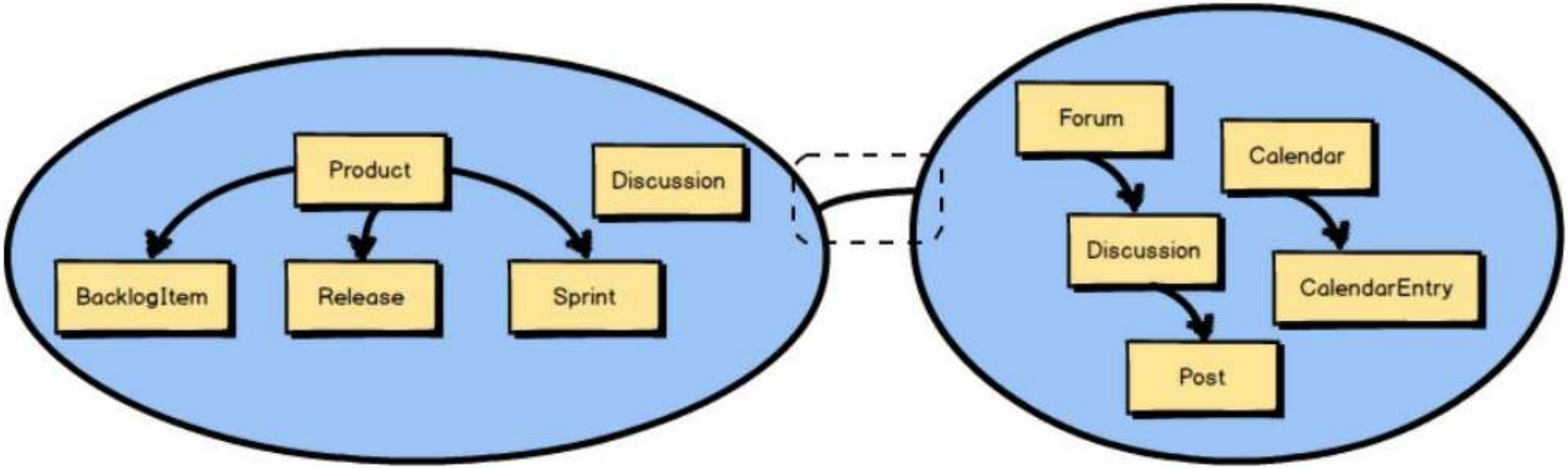
Contex Map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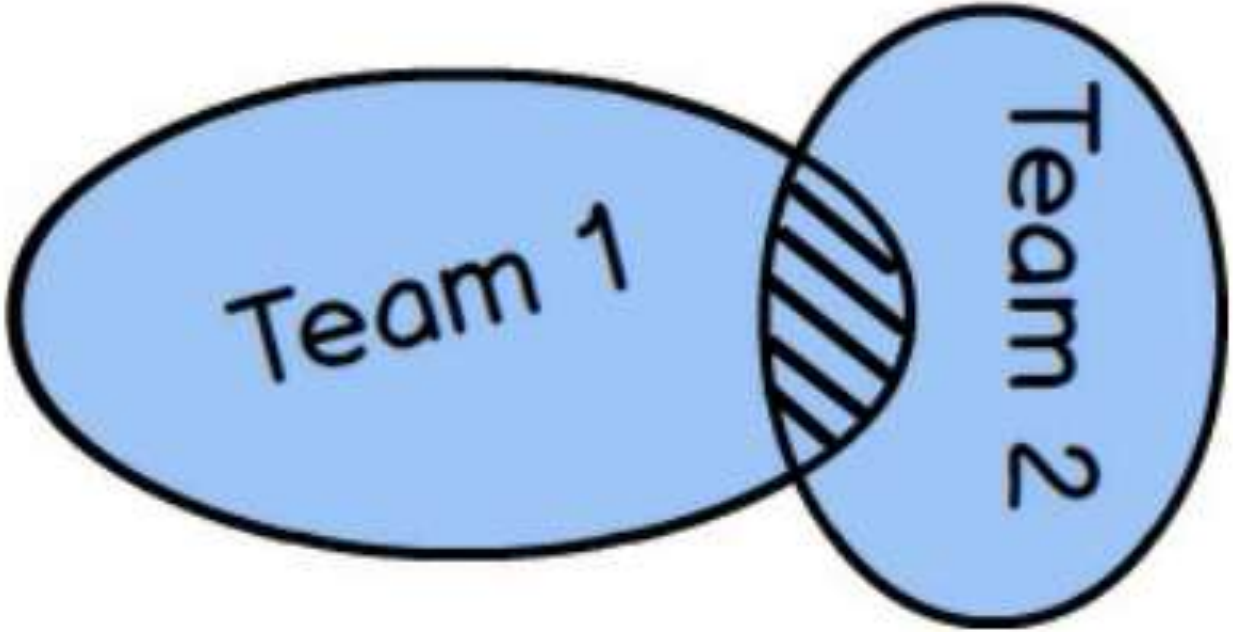
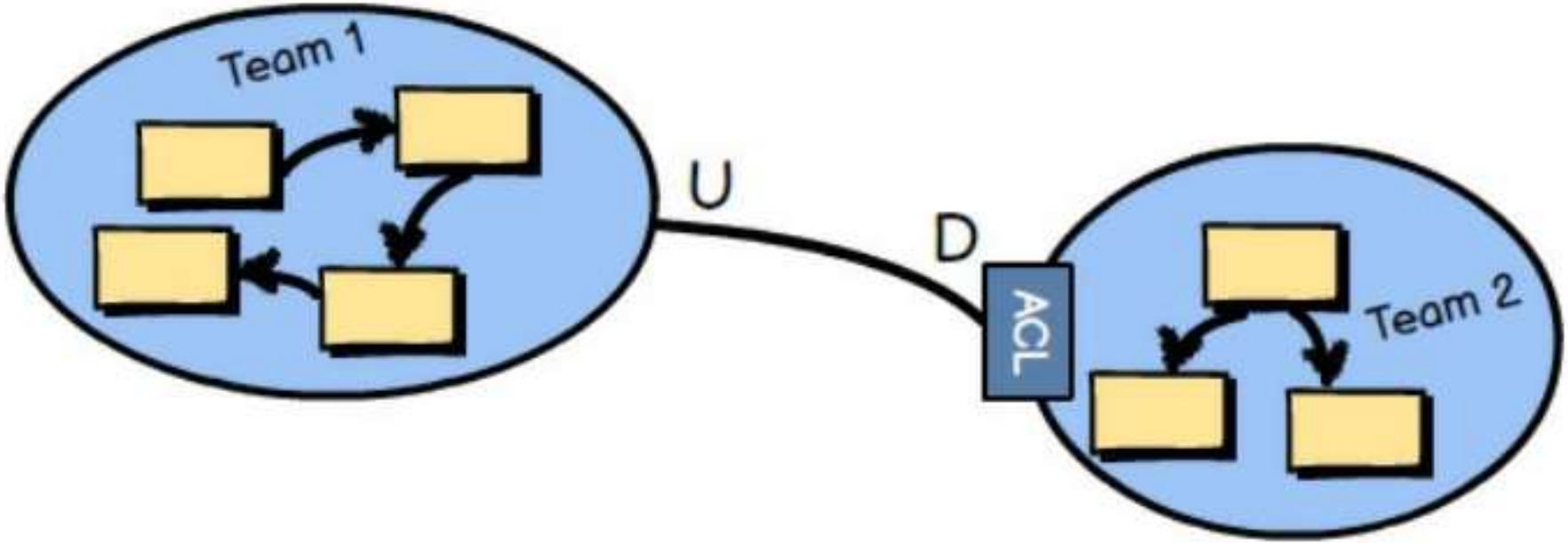
Post

Contex Map - Shared Kernel
Contex Map - Customer/Supplier
Contex Map - Conformist
Contex Map - Partner
Contex Map - Open Host Service
Contex Map - Published Language

Contex Map - Shared Kernel

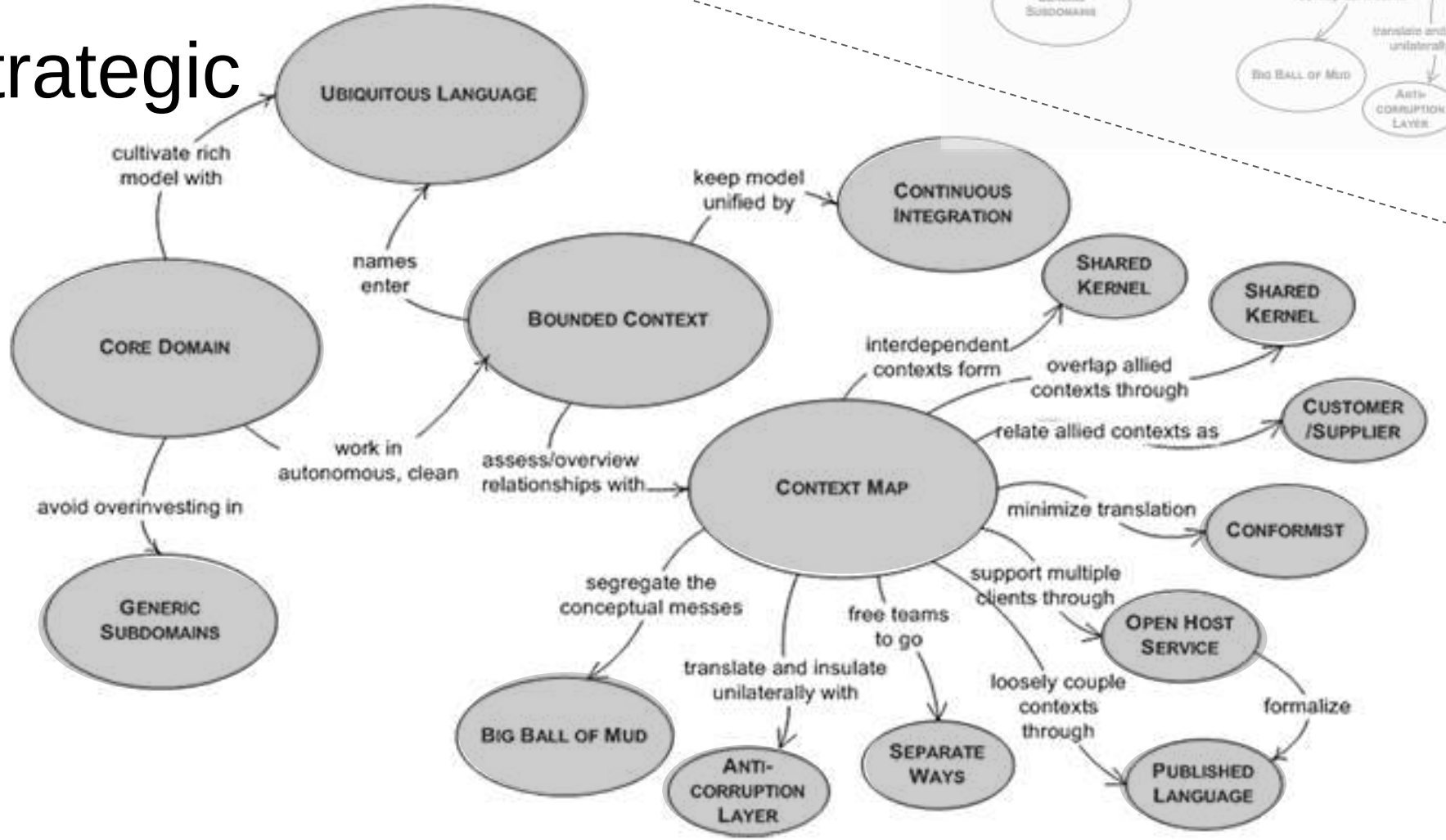


Contex Map - Anticorruption Layer



Integration Approaches

Strategic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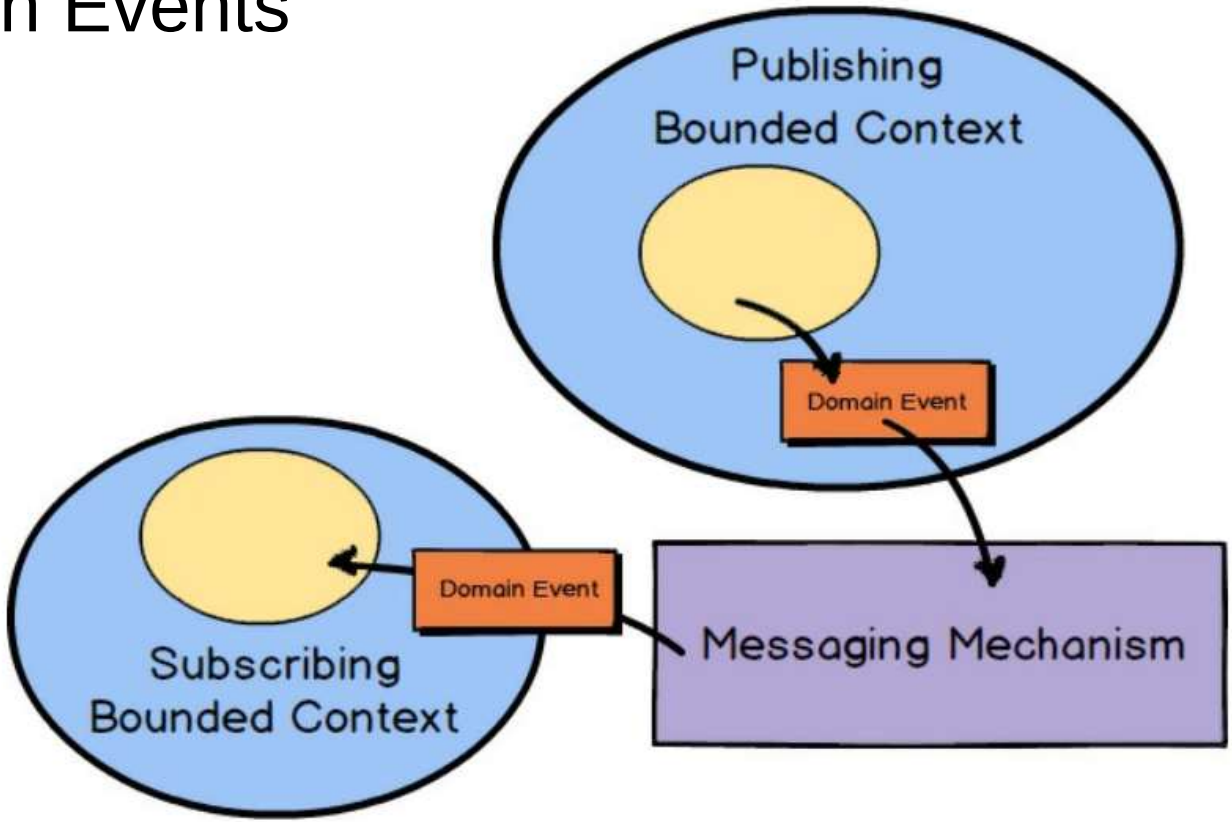
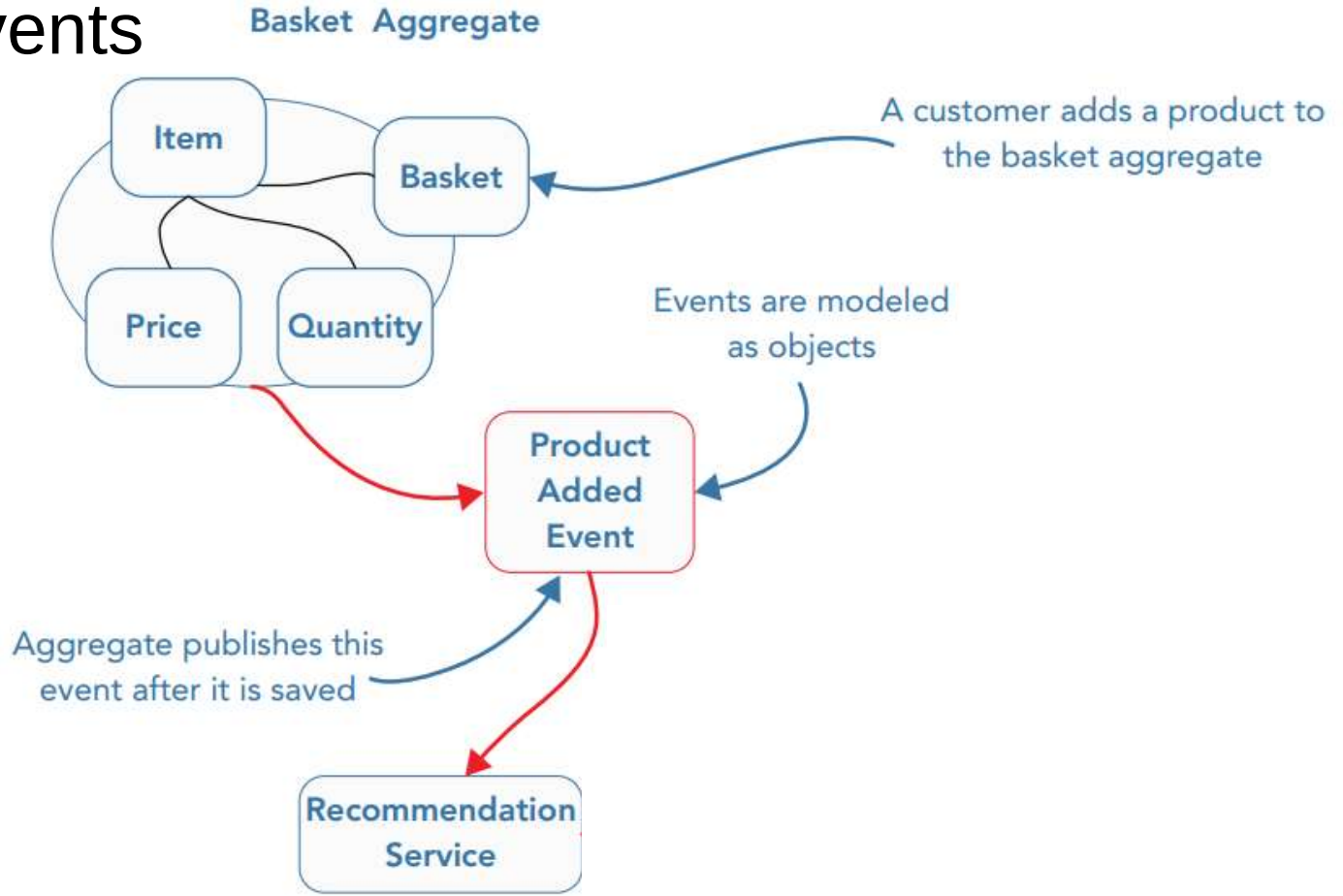
Integrating between bounded contexts using Domain Events

Domain Events



http://udidahan.com/2009/06/14/domain-events-salvation/

Domain Events



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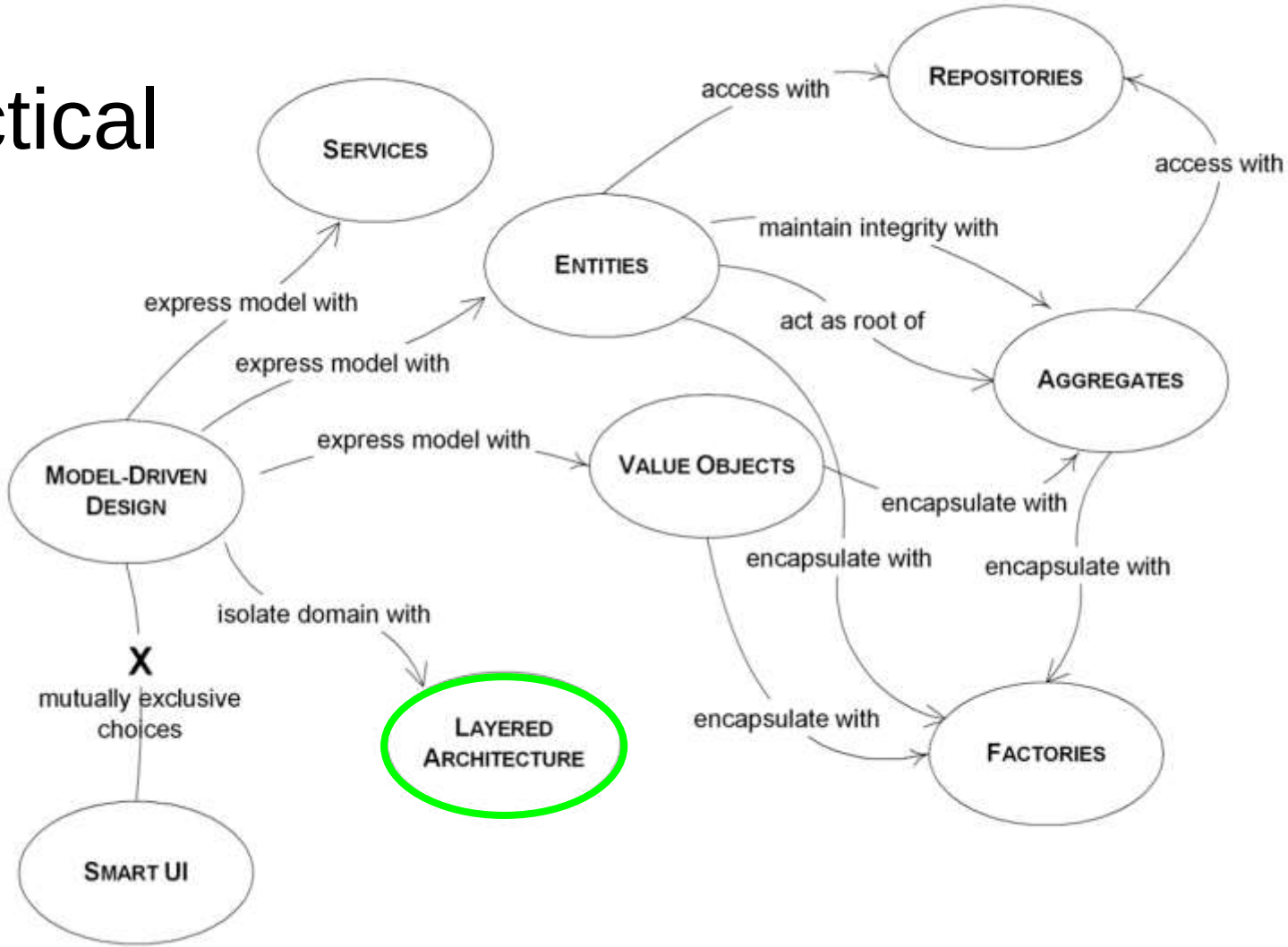
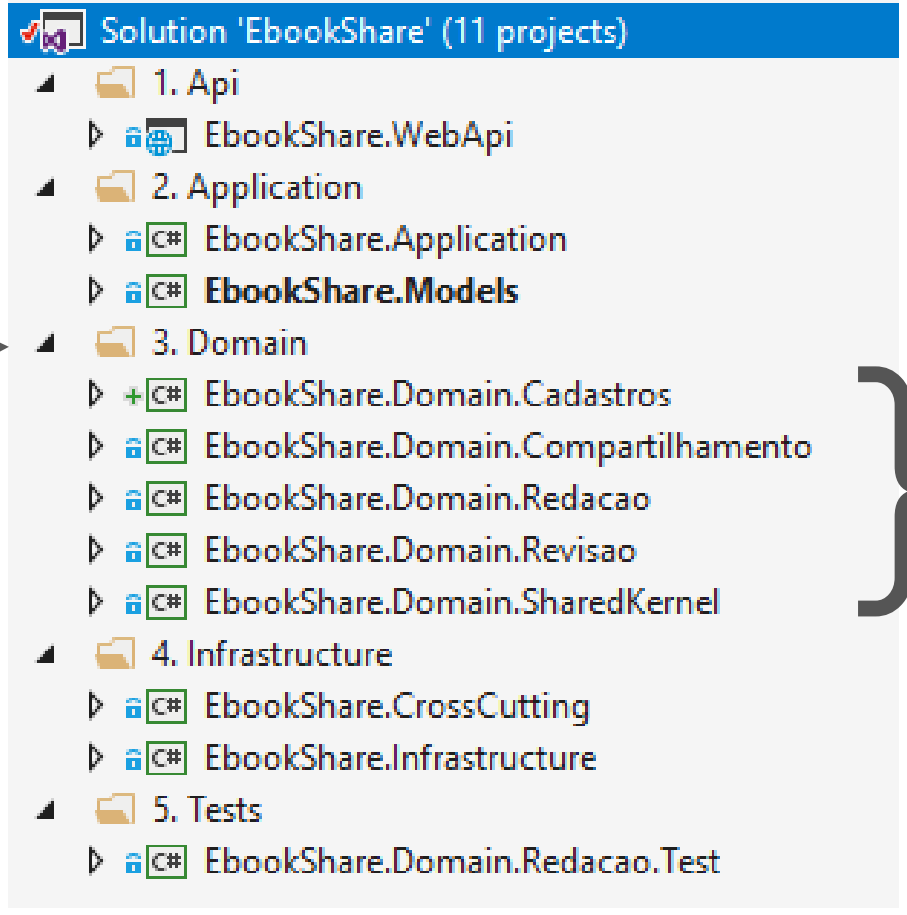
Tactical


SERVICES
access with
REPOSITORIES
access with
ENTITIES
maintain integrity with
express model with
act as root of
express model with
AGGREGATES
express model with
MODEL-DRIVEN DESIGN
VALUE OBJECTS
encapsulate with
encapsulate with
encapsulate with
isolate domain with
X
mutually exclusive choices
LAYERED ARCHITECTURE
encapsulate with
FACTORIES
SMART UI

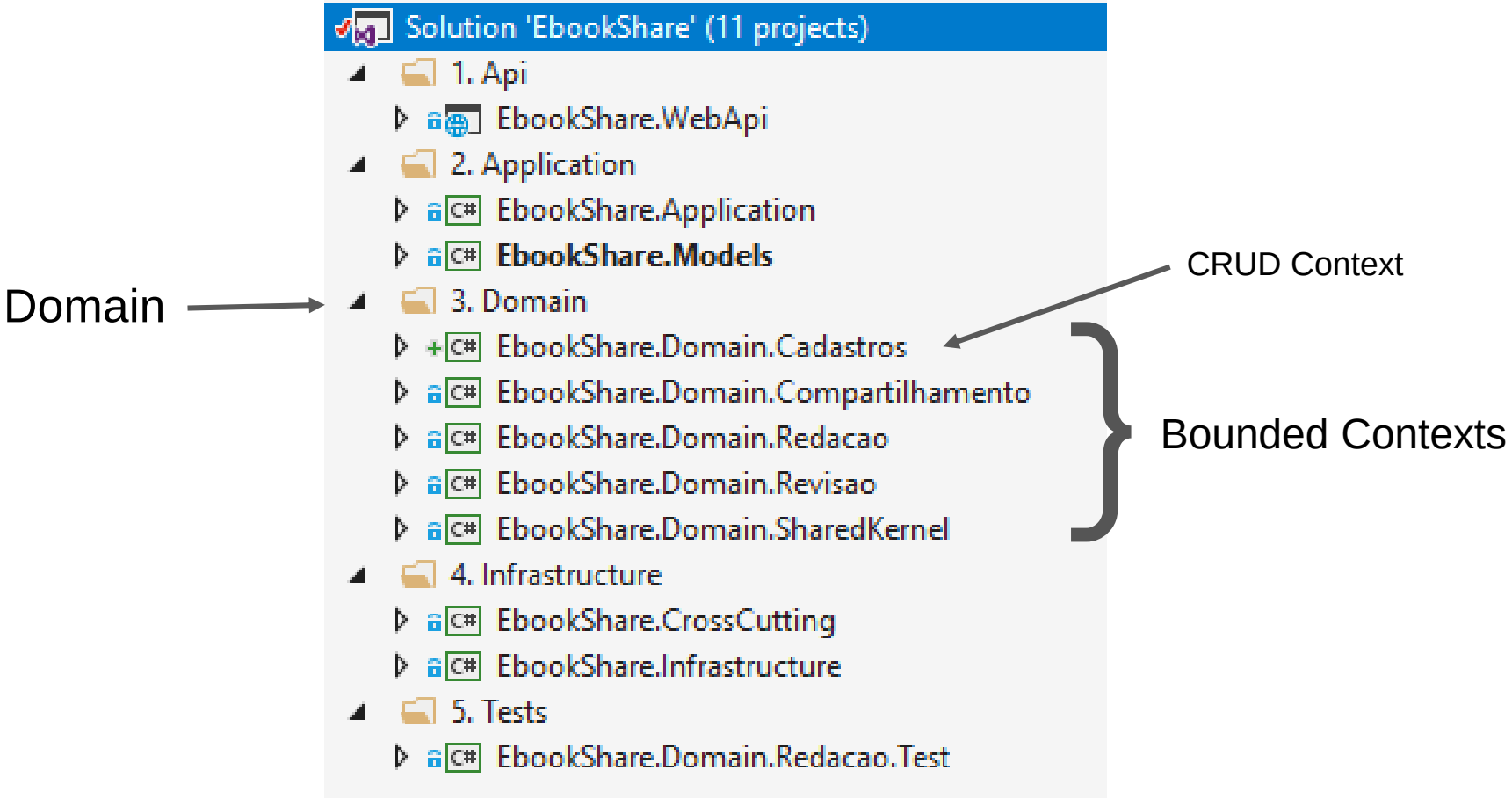
Layered Architecture

Domain

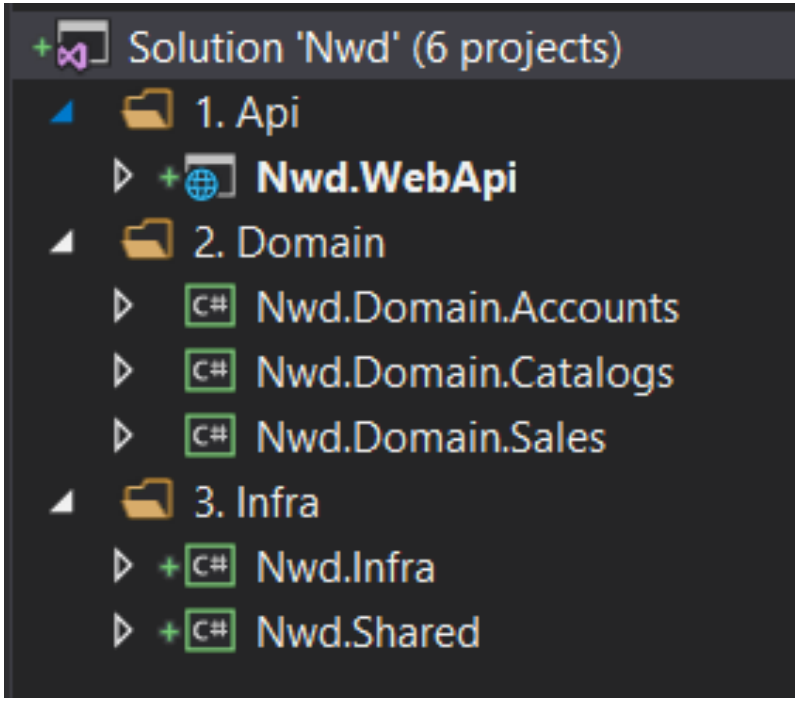


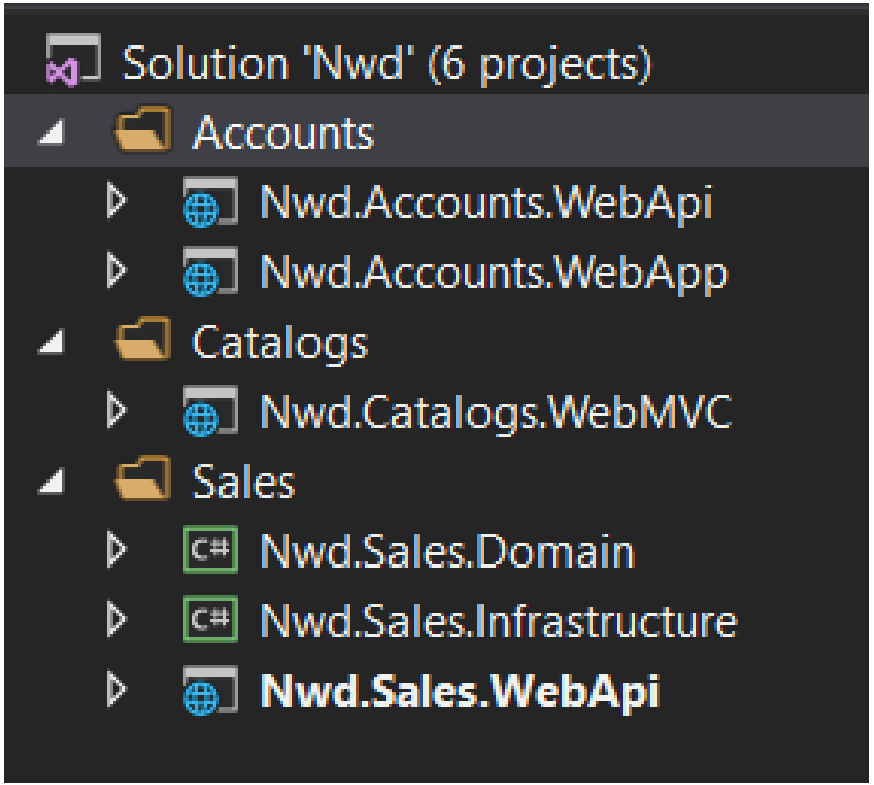
Bounded Contexts

Layered Architecture

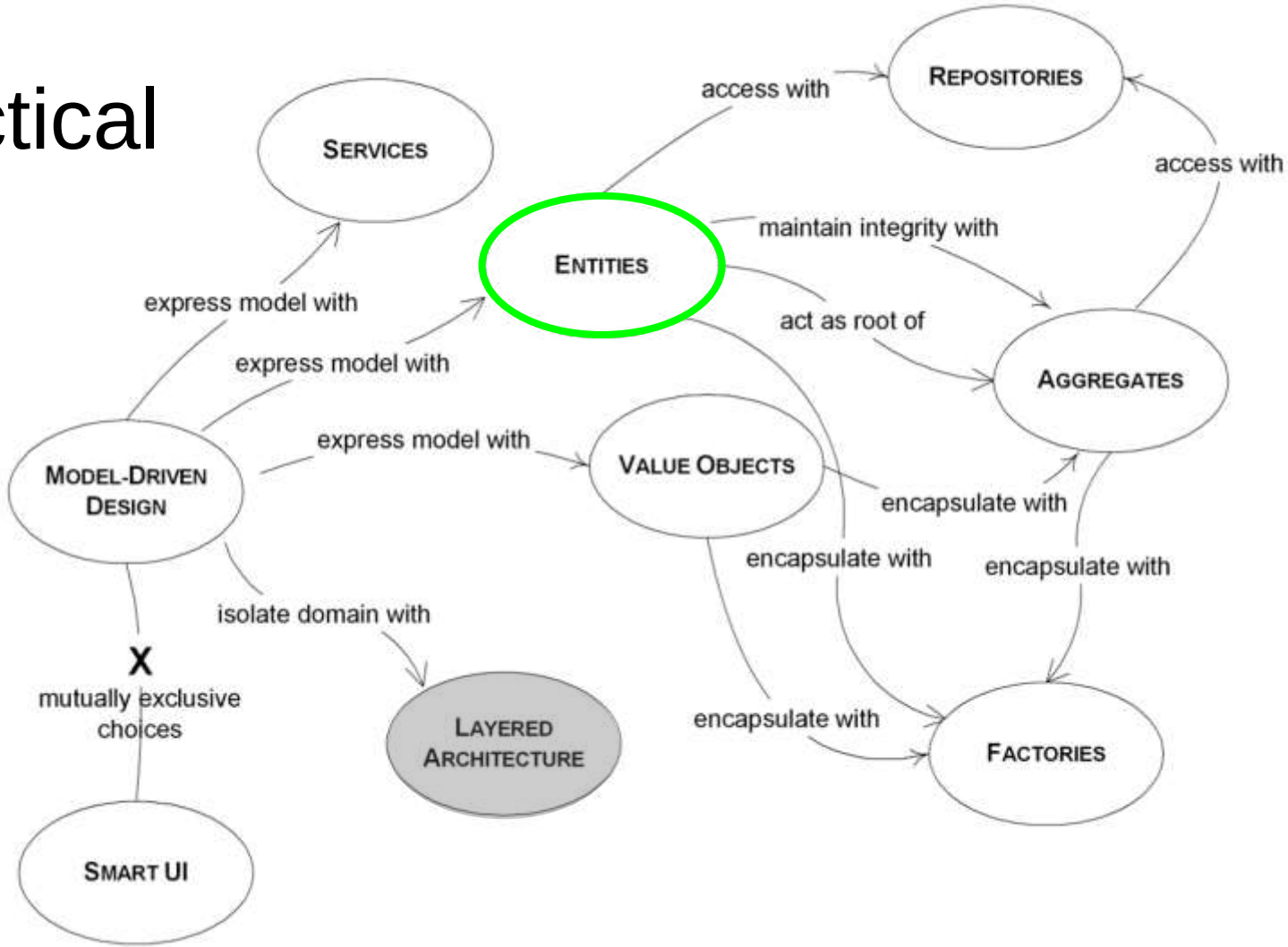


Layered Architecture

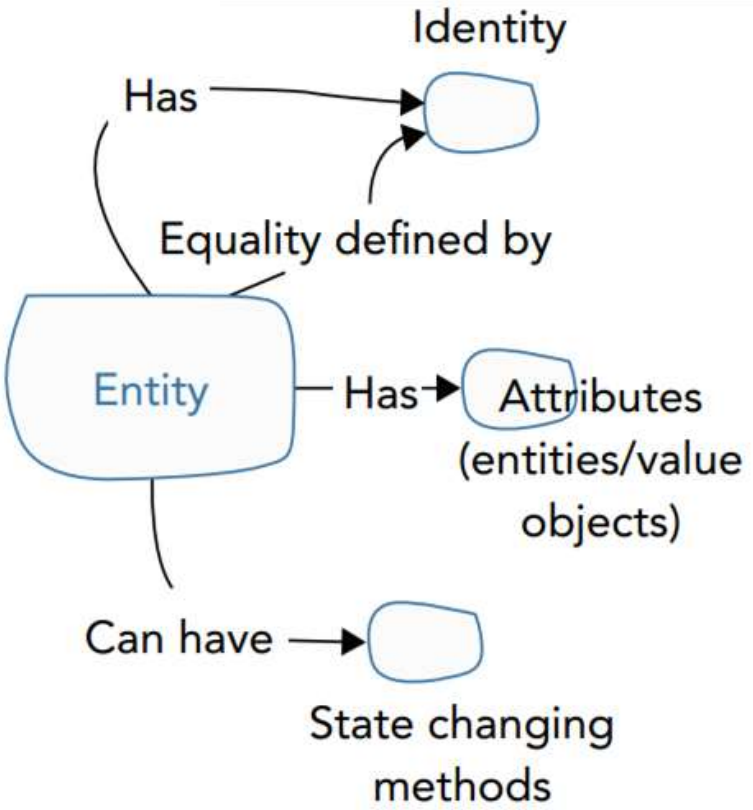




Tactical

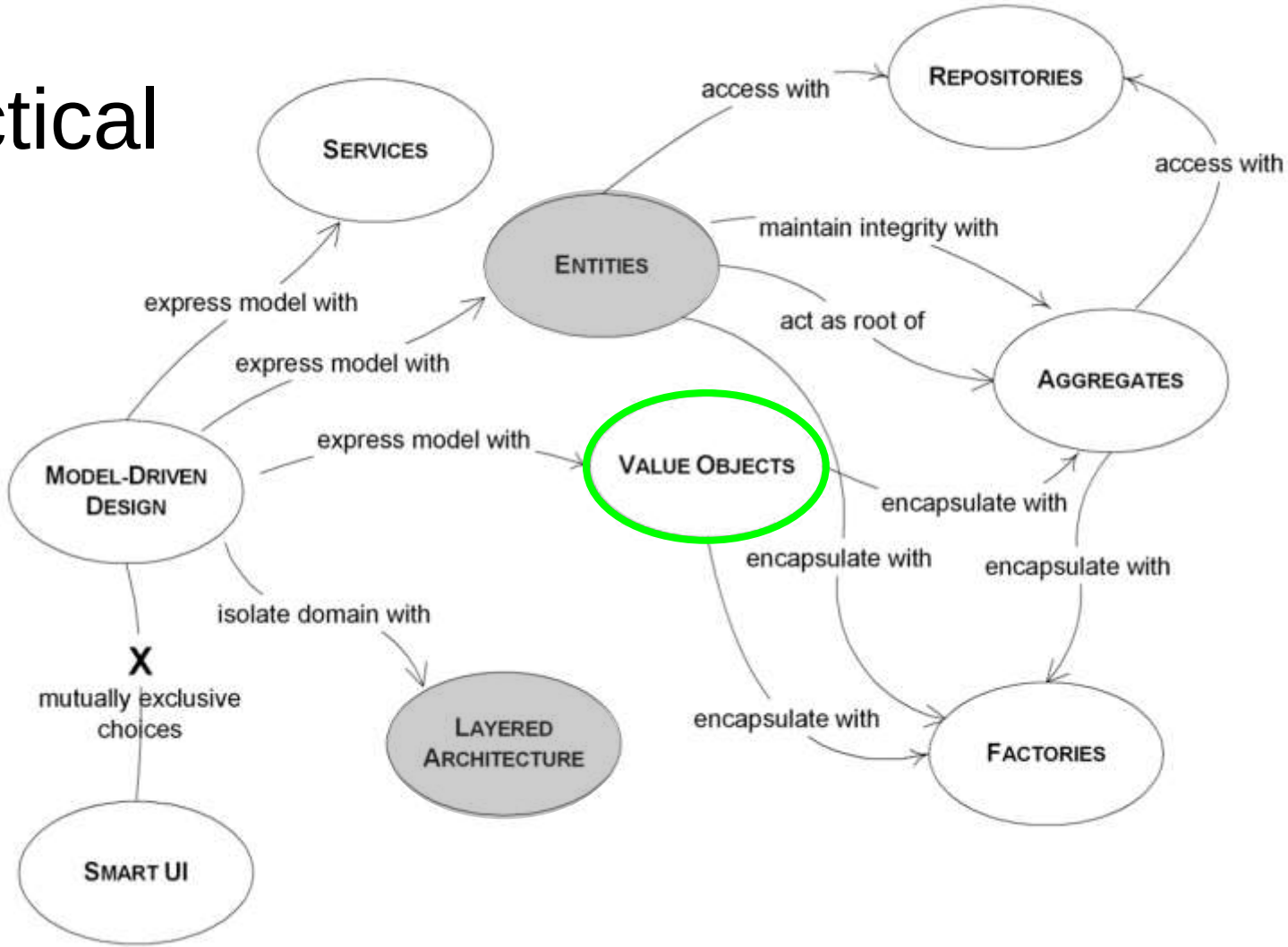

SERVICES
access with
REPOSITORIES
access with
ENTITIES
maintain integrity with
express model with
act as root of
express model with
AGGREGATES
express model with
MODEL-DRIVEN DESIGN
VALUE OBJECTS
encapsulate with
encapsulate with
encapsulate with
isolate domain with
X
mutually exclusive choices
LAYERED ARCHITECTURE
encapsulate with
FACTORIES
SMART UI

Entities


Identity
Has
Equality defined by
Entity
Has
Attributes
(entities/value
objects)
Can have
State changing
methods

```ruby
class Item < Infra::Models::ApplicationRecord
  after_initialize :validate

  belongs_to :product

  attribute :quantity, :integer

  def validate
    validate_quantity!
    validate_product_presence!
  end

  def change_quantity(quantity)
    validate_quantity!
    self.quantity = quantity
  end

  private

  def validate_quantity!
    raise Exceptions::BusinessException.new('Product must be greater than zero')  unless self.quantity.
  end

  def validate_product_presence!
    raise Exceptions::BusinessException.new('Product must be informed')  unless self.product.present?
  end
```

Tactical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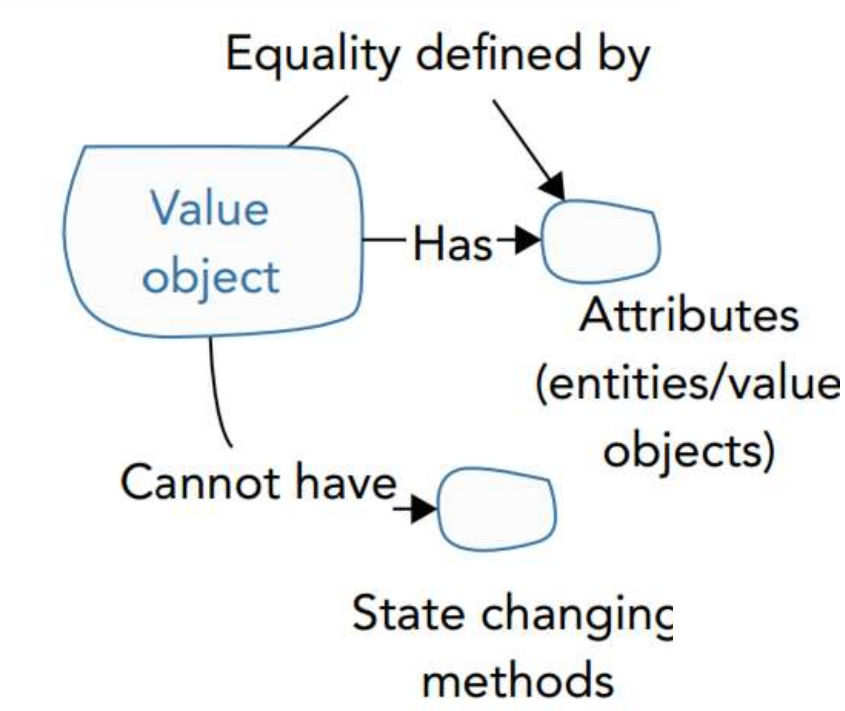
Value Objects

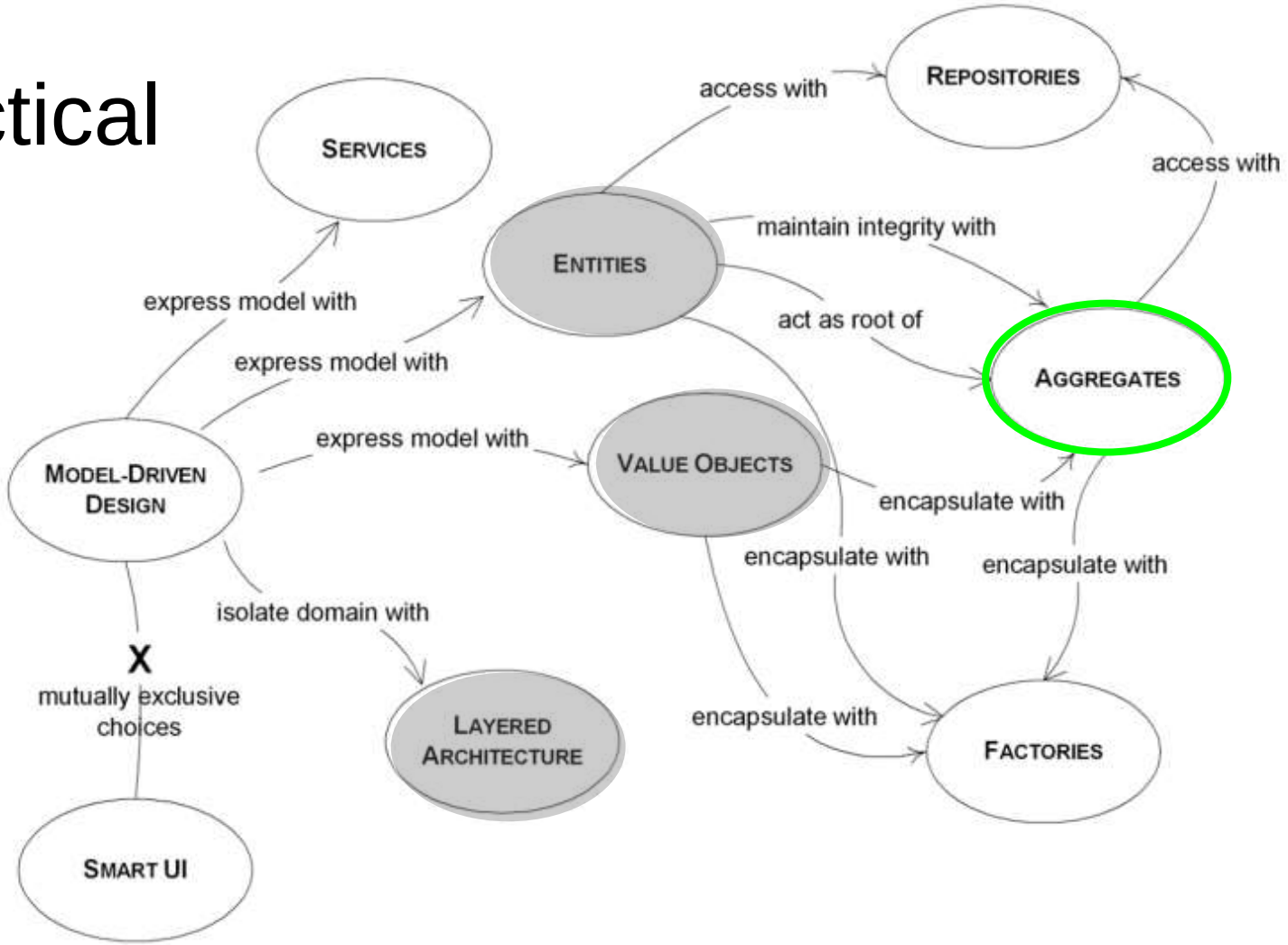


Mostrar money object… bem melhor pra mostrar vo

```
public class Endereco : ValueObject<Endereco>
{
    public Endereco(string logradouro, string cidade, string estado, Cep cep)
    {
        Logradouro = logradouro;
        Cidade = cidade;
        Estado = estado;
        Cep = cep;
    }

    public string Logradouro { get; private set; }
    public string Cidade { get; private set; }
    public string Estado { get; private set; }
    public Cep Cep { get; private set; }
}
```

Tactical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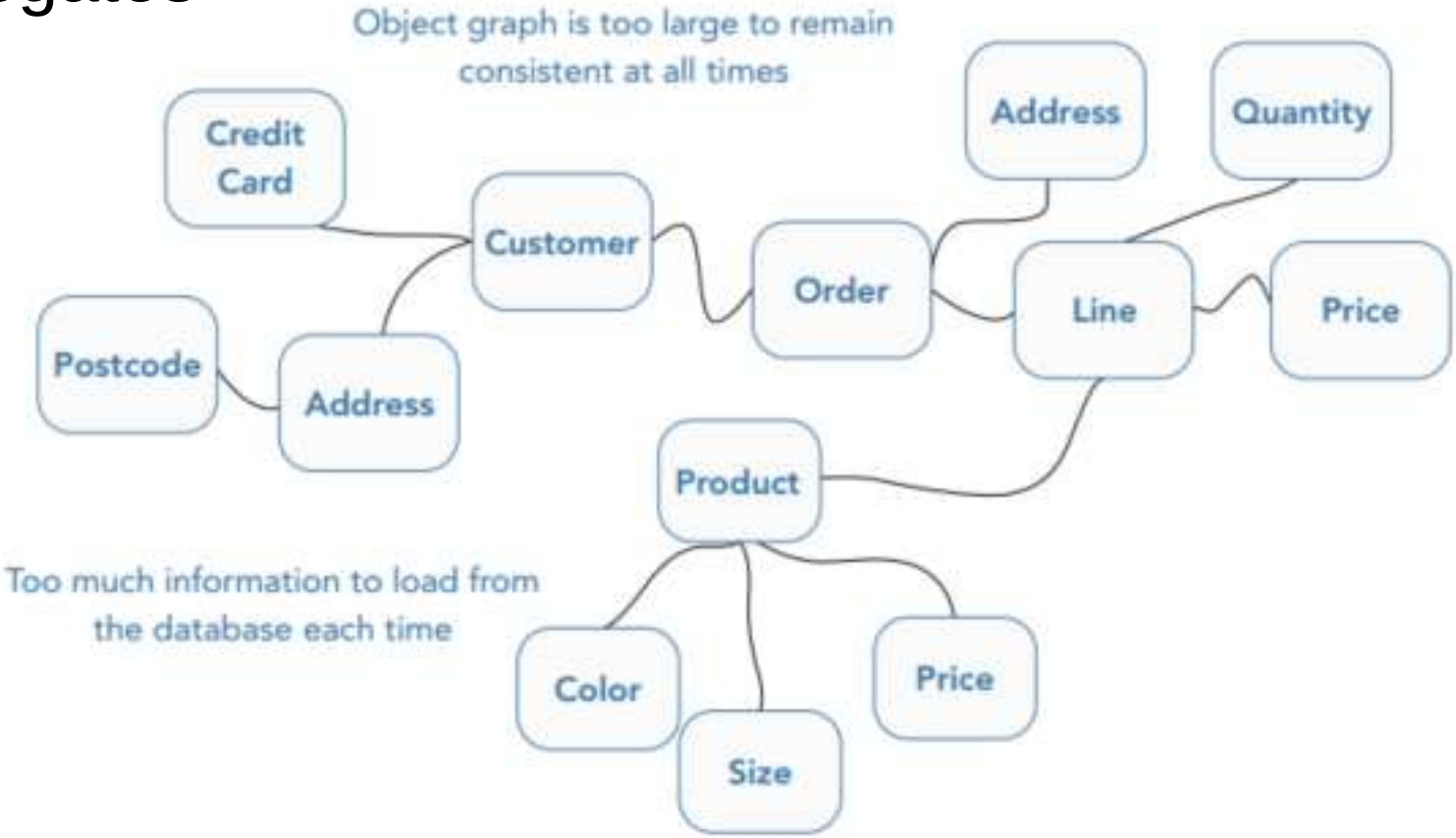
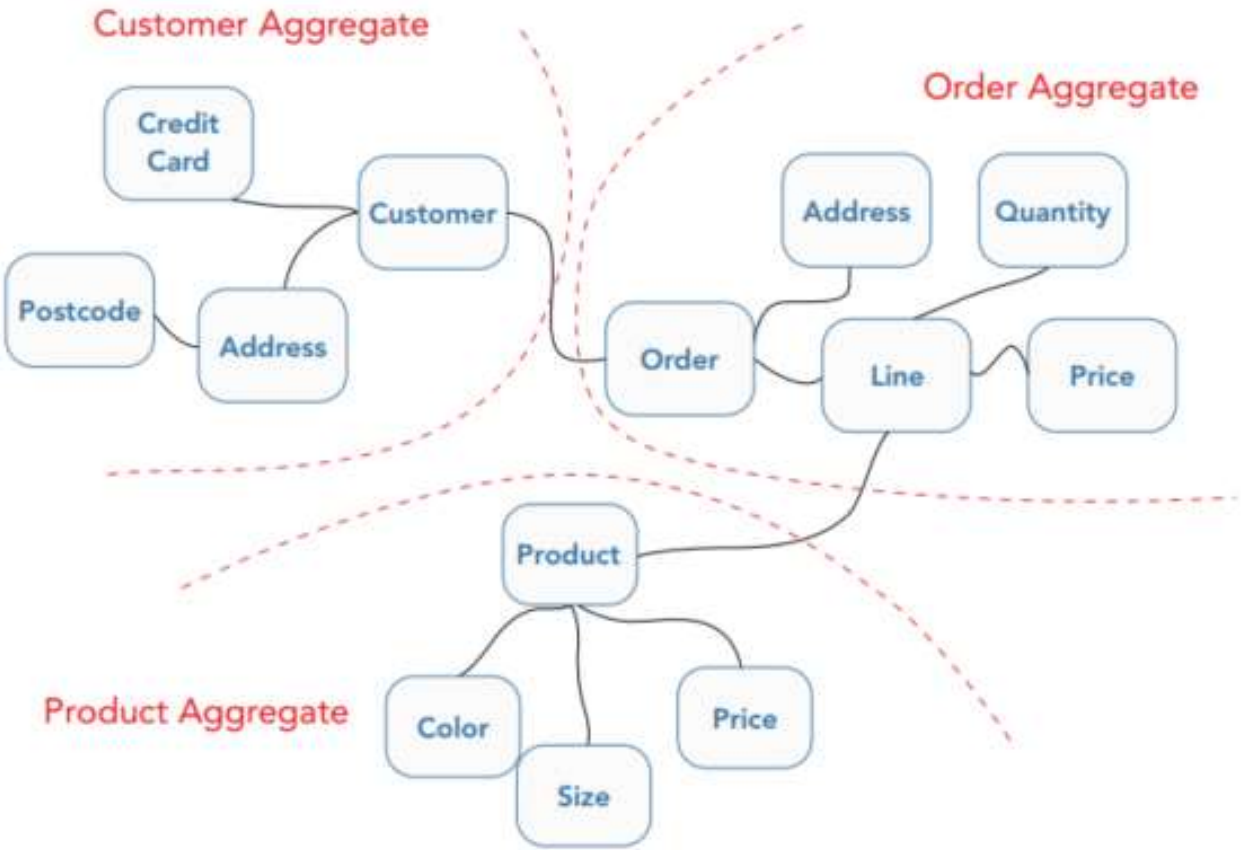
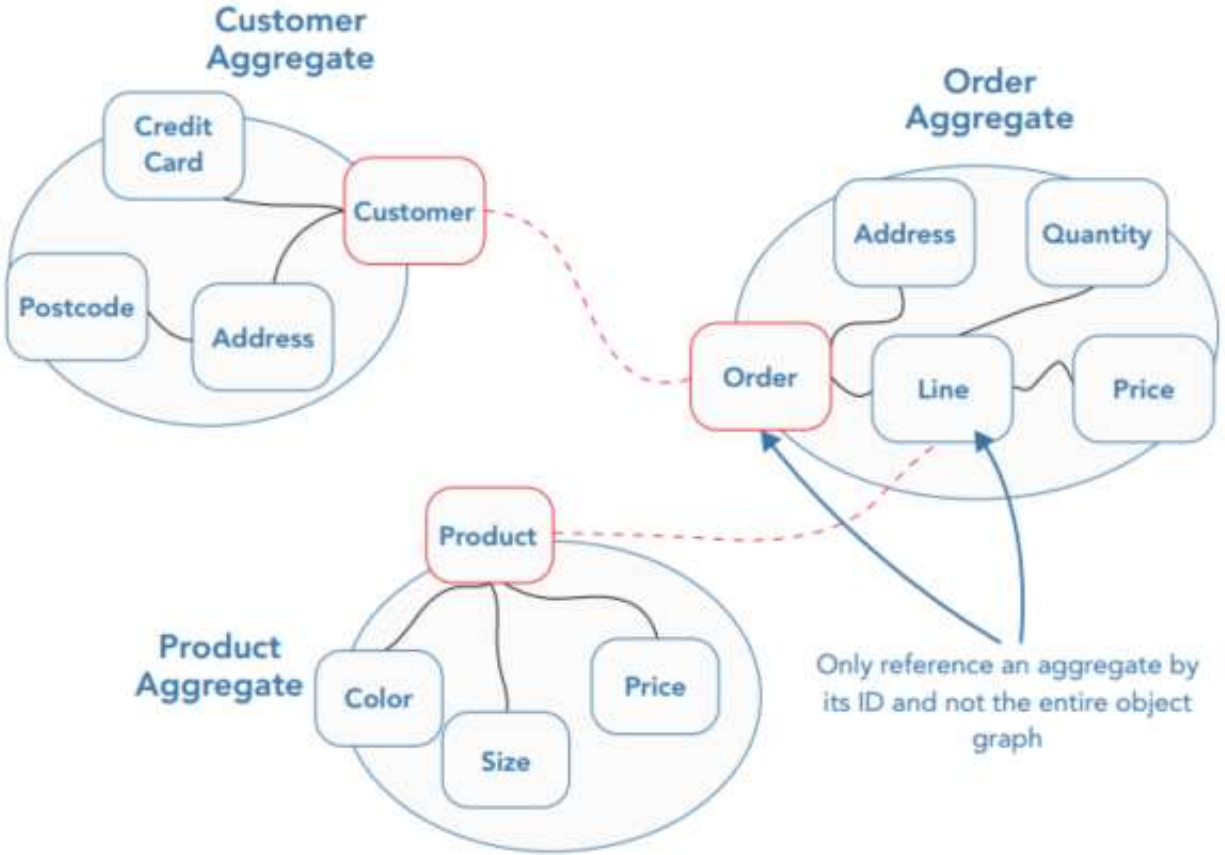
Aggregates


Object graph is too large to remain consistent at all times
Credit Card
Customer
Address
Quantity
Order
Line
Price
Postcode
Address
Product
Too much information to load from the database each time
Color
Size
Price

Aggregates

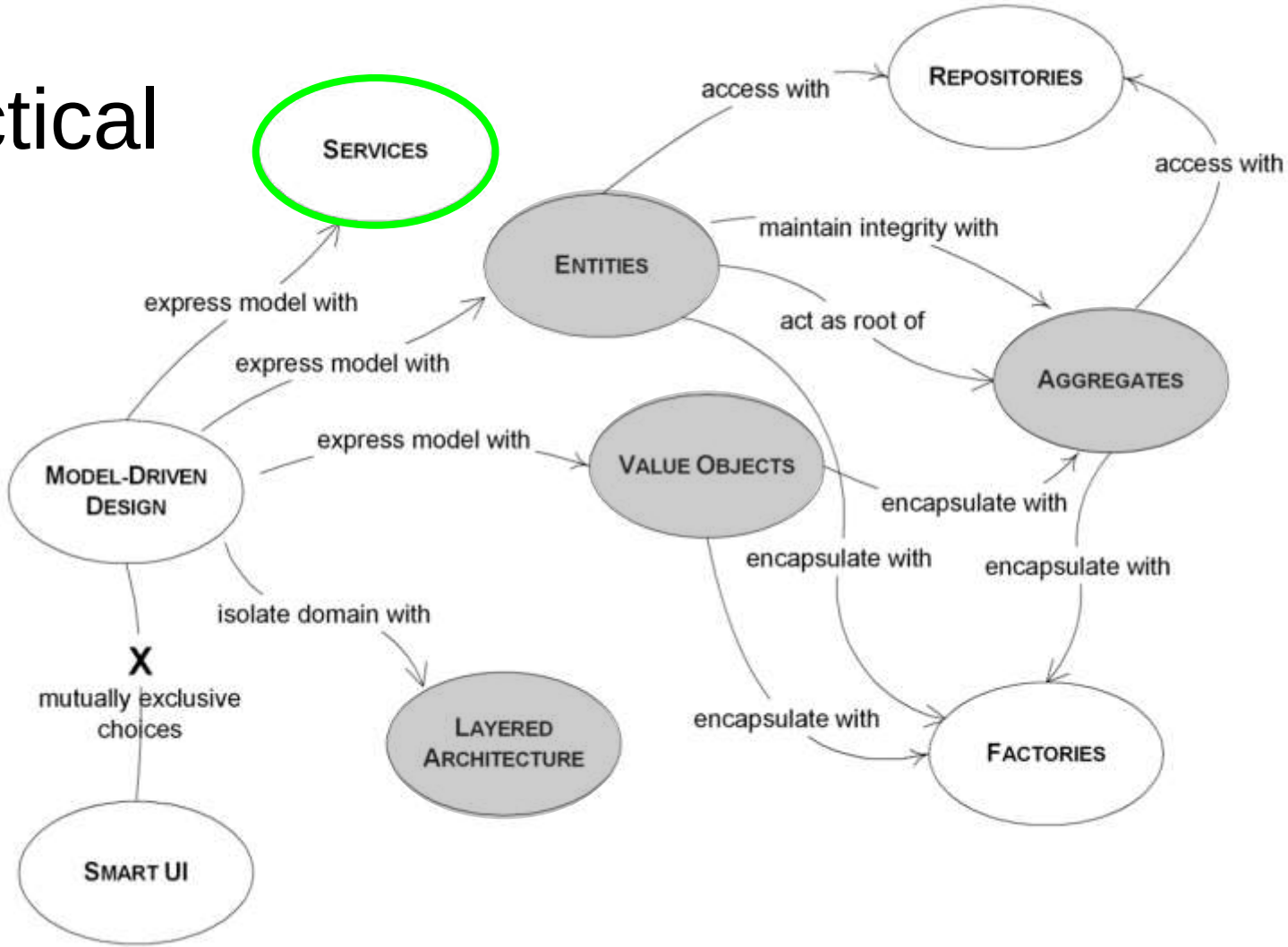

Customer Aggregate
Order Aggregate
Credit Card
Customer
Address
Quantity
Postcode
Address
Order
Line
Price
Product
Product Aggregate
Color
Price
Size

Aggregates


Customer Aggregate
Credit Card
Customer
Postcode
Address
Order Aggregate
Address
Quantity
Order
Line
Price
Product
Product Aggregate
Color
Price
Size
Only reference an aggregate by its ID and not the entire object graph

```ruby
class Order < Infra::Models::ApplicationRecord
  has_many :items, autosave: true
  attribute :customer, :string

  def add_product(product, quantity)
    raise Exceptions::BusinessException.new('Product already exists') if product_already_exists?(proc

    items << Item.new(quantity: quantity, product: product)
  end

  def change_product_quantity(product, quantity)
    validate_product_presence!(product)
    item = items.find { |i| i.product == product }
    item.change_quantity(quantity)
  end

  def remove_product(product)
    validate_product_presence!(product)
    items = self.items.reject { |item| item.product == product }
    self.items = items
  end

  private
  # ...
end
```

Tactical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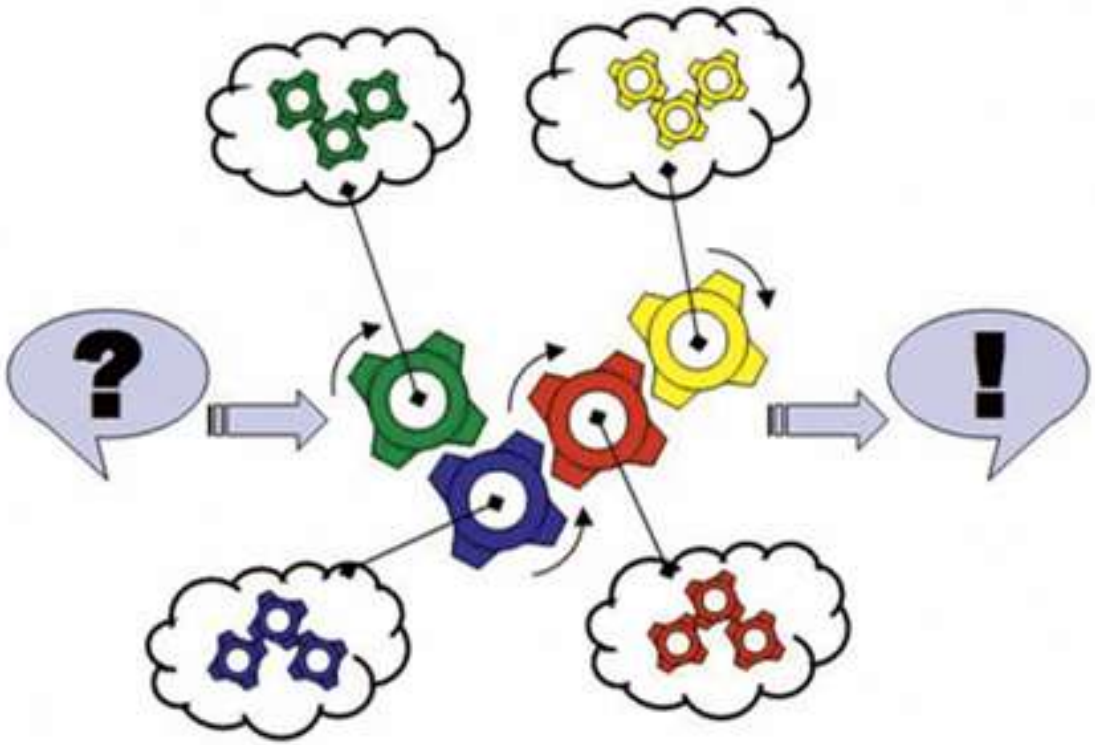
Domain Services

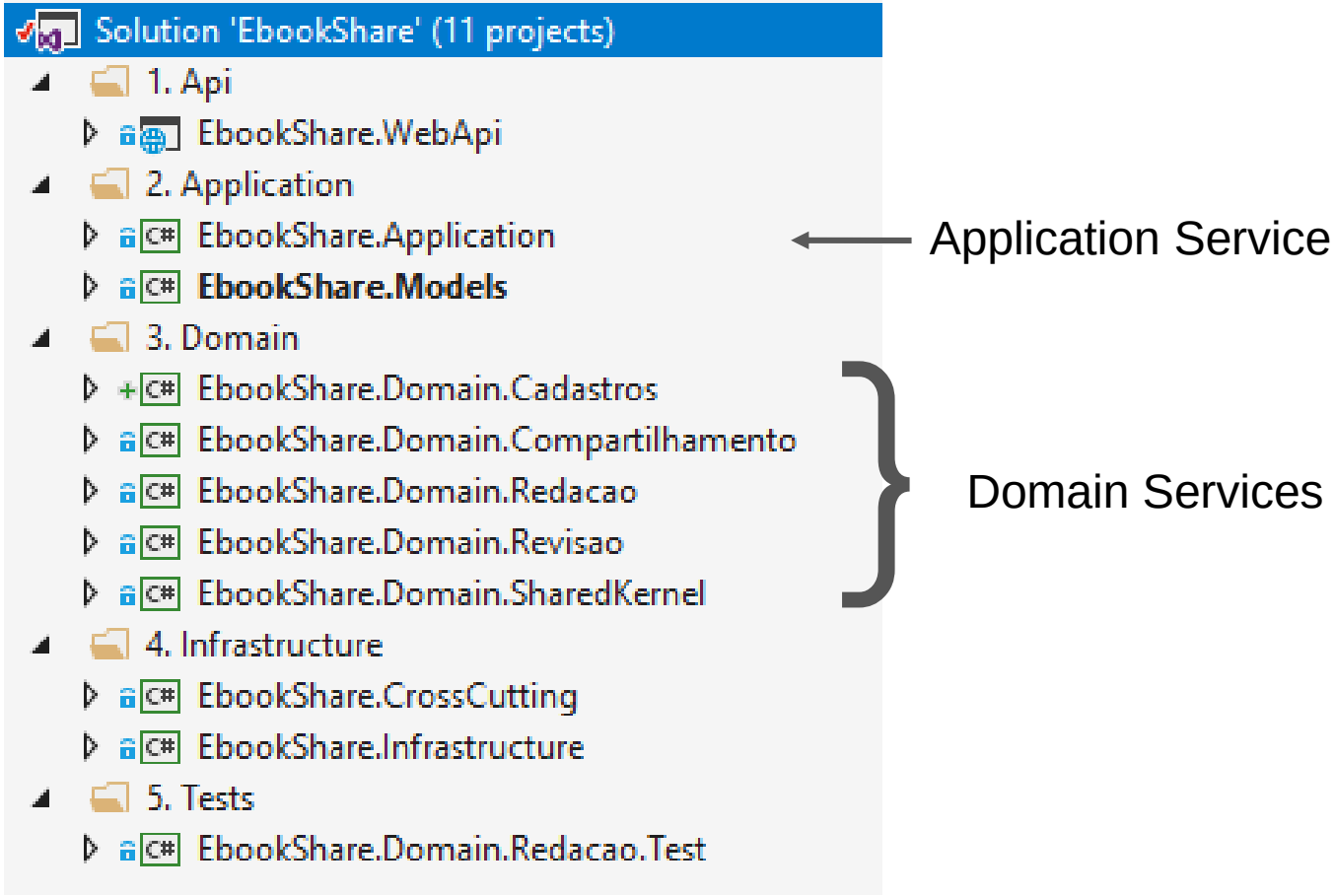


Domain Services

VS

Application Services

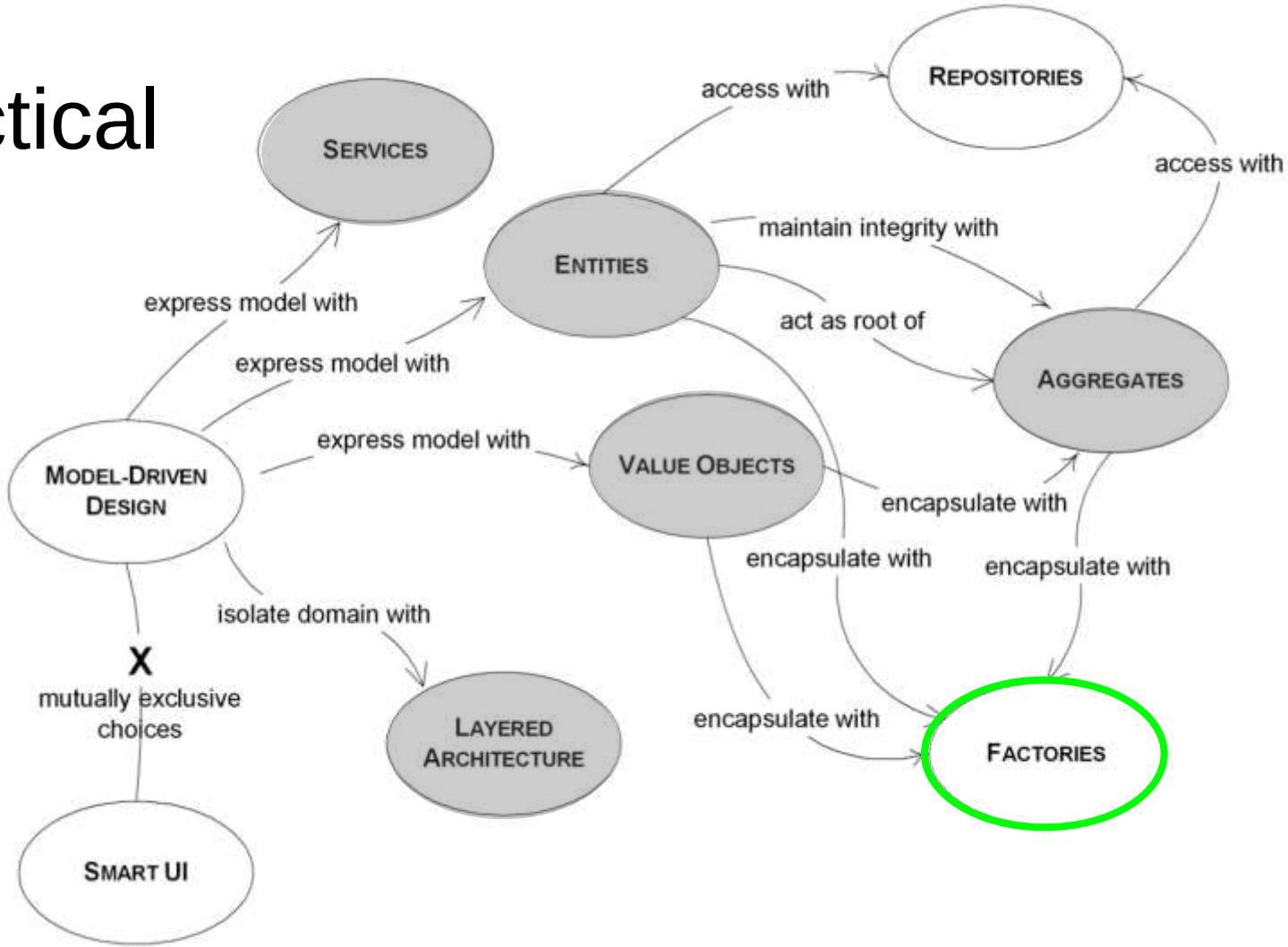
Domain Service vs Application Service



Application Service

```ruby
class OrderApplication
  def initialize(repositories = {})
    @order_repository = repositories.fetch(:order) { Infra::Repositories::OrderRepository.new }
    @product_repository = repositories.fetch(:product) { Infra::Repositories::ProductRepository.new }
  end

  def create_order(create_order_command)
    order = Domain::Order::Order.new(customer: create_order_command.customer)

    ActiveRecord::Base.transaction do
      @order_repository.save(order)

      order.id
    end
  end

  def add_product(add_product_command)
    order = @order_repository.find_by_id(add_product_command.order_id)
    product = @product_repository.find_by_id(add_product_command.product_id)

    ActiveRecord::Base.transaction do
      order.add_product(product, add_product_command.quantity)
```

Tactical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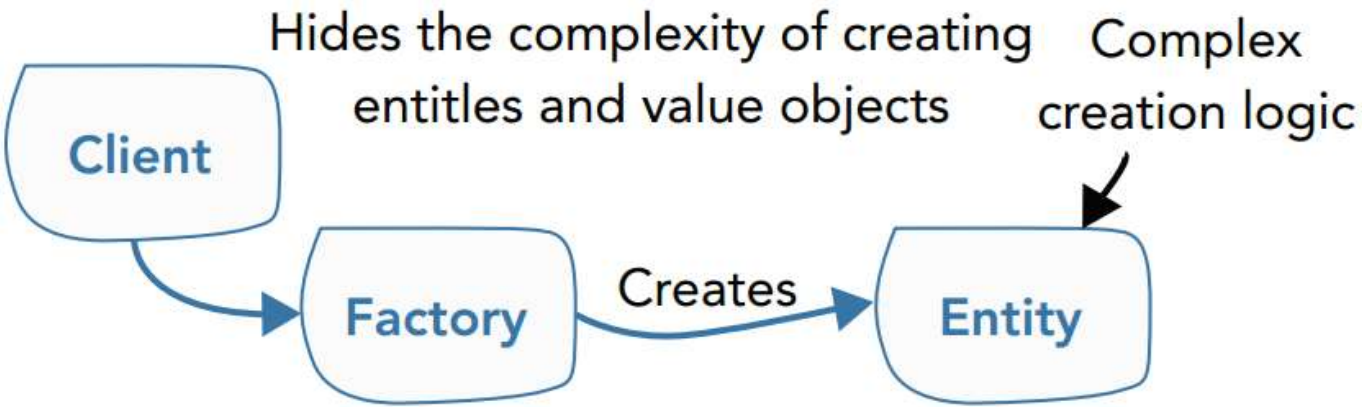
Factories


Hides the complexity of creating
entitles and value objects
Complex
creation logic
Client
Factory
Creates
Entity

Factory Method

```
public class Sexo
{
    private char sexo;

    private Sexo(char sexo)
    {
        this.sexo = char.ToUpper(sexo);
    }

    public static Sexo Masculino()
    {
        return new Sexo('M');
    }

    public static Sexo Feminino()
    {
        return new Sexo('F');
    }
}
```

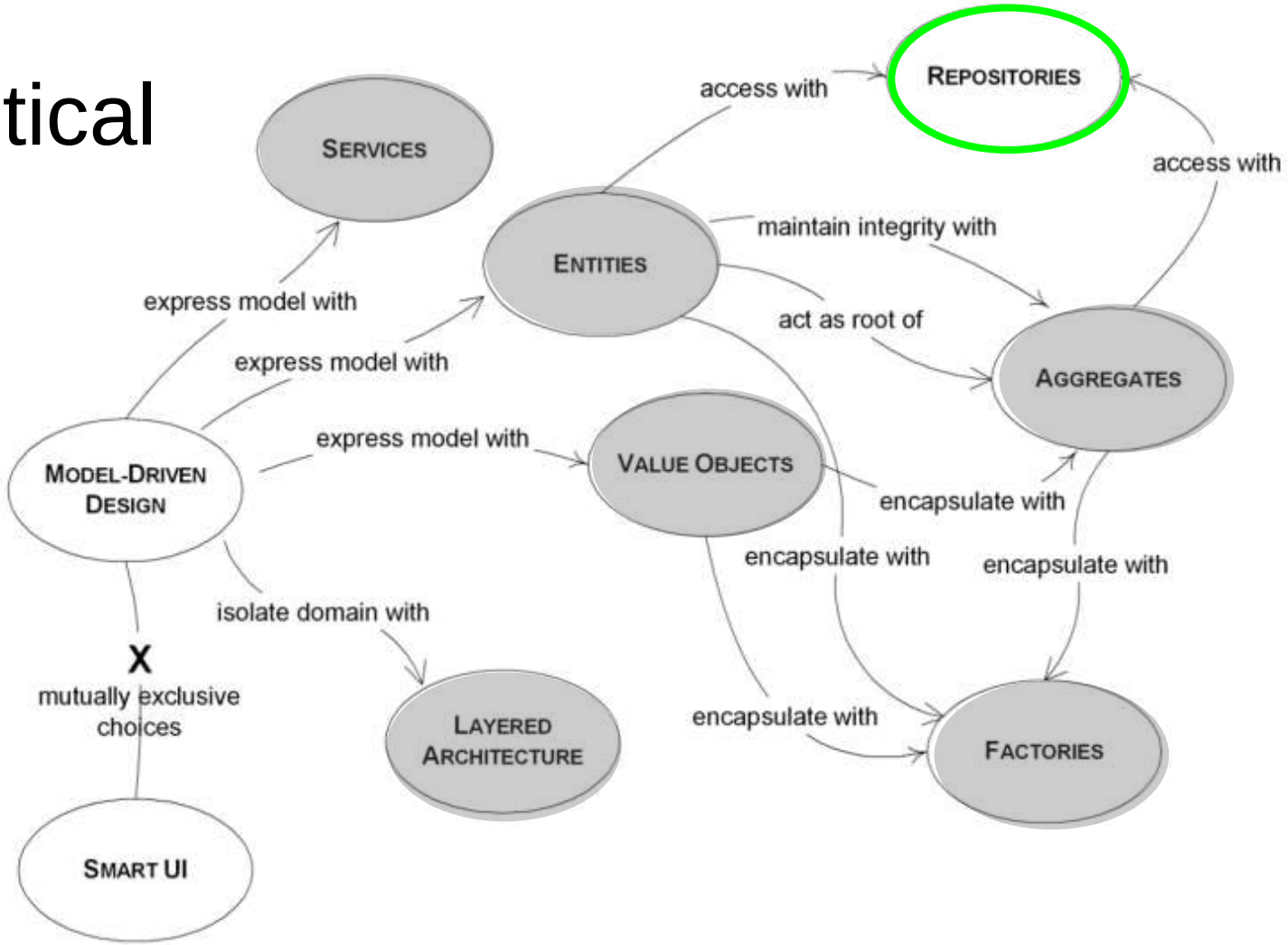
Factory Object

```
public class DocumentFactory
{
    public static Document CreateBibliography(string name, int age)...

    public static Document CreateResume(string name, int age, string profession)...

    public static Document CreateReport(string title)...
}
```

Tactical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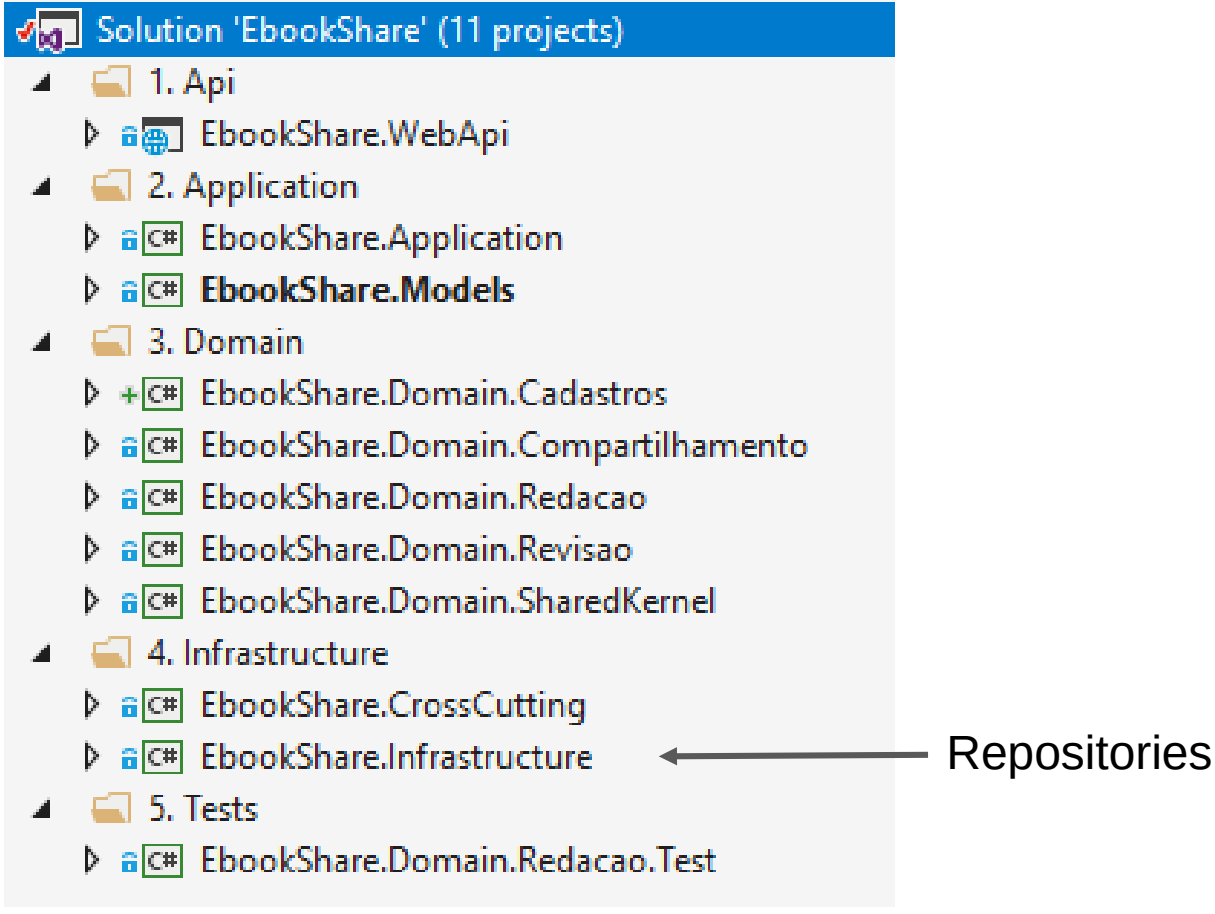
Repositories



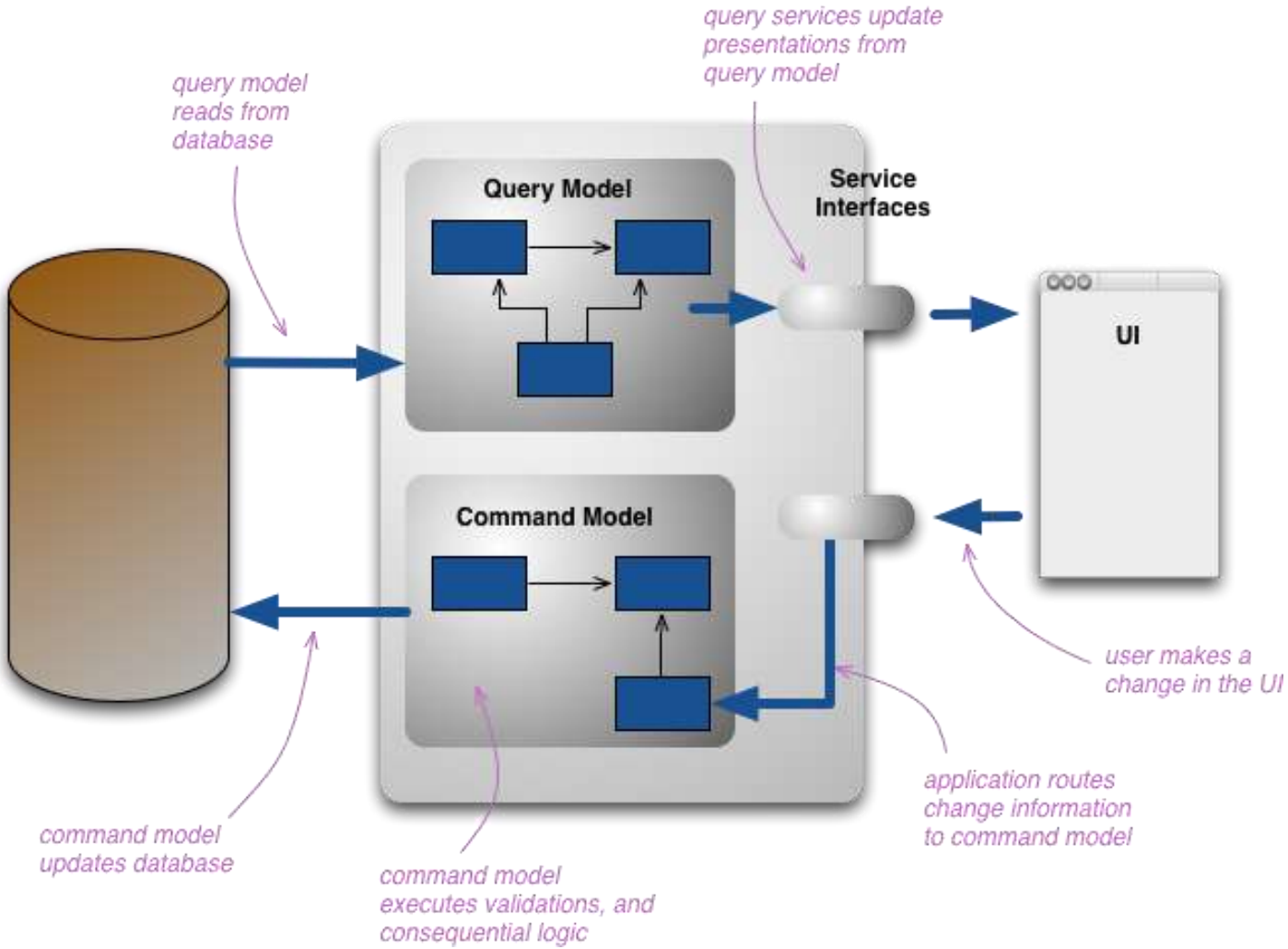
```ruby
module Infra
  module Repositories
    class OrderRepository < Domain::Order::OrderRepository
      def initialize(model = {})
        @order = model.fetch(:order) { Domain::Order::Order }
      end

      def save(order)
        order.save
      end

      def find_by_id(id)
        @order.find_by(id: id)
      end
    end
  end
end
```

Schedule

- ~~Basic Concepts~~
- ~~Ubiquitous Language~~
- ~~Domain Expert~~
- ~~Domain Model~~
- ~~Architectures types~~
  - ~~DDD~~,
  - ~~Smart UI~~,
  - ~~...~~
- ~~**Strategic Design**~~
  - ~~Bounded Context~~
  - ~~Context Maps~~
  - ~~Domain Events~~
  - ~~Event Storming~~
- ~~**Tactical Design** (building blocks~~)
  - ~~Layered Architecture~~
  - ~~Entities~~
  - ~~Value Objects~~
  - ~~Aggregates~~
  - ~~Domain Services~~
  - ~~Factories~~
  - ~~Repositories~~
- CQRS
- SOA
  - Event Driven Architecture
- Event Sourcing
- Final Thoughts

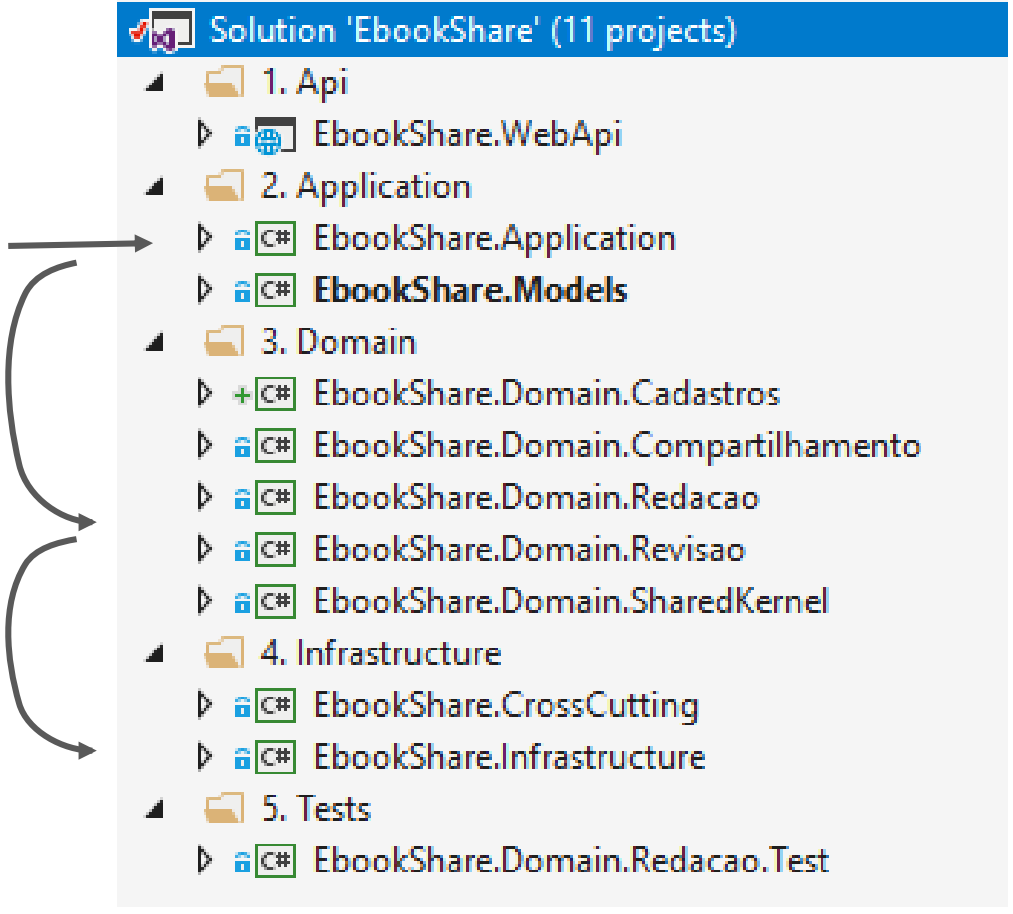
CAMADINHAS

CQRS


query services update presentations from query model
query model reads from database
Query Model
Service Interfaces
UI
Command Model
user makes a change in the UI
application routes change information to command model
command model updates database
command model executes validations, and consequential logic

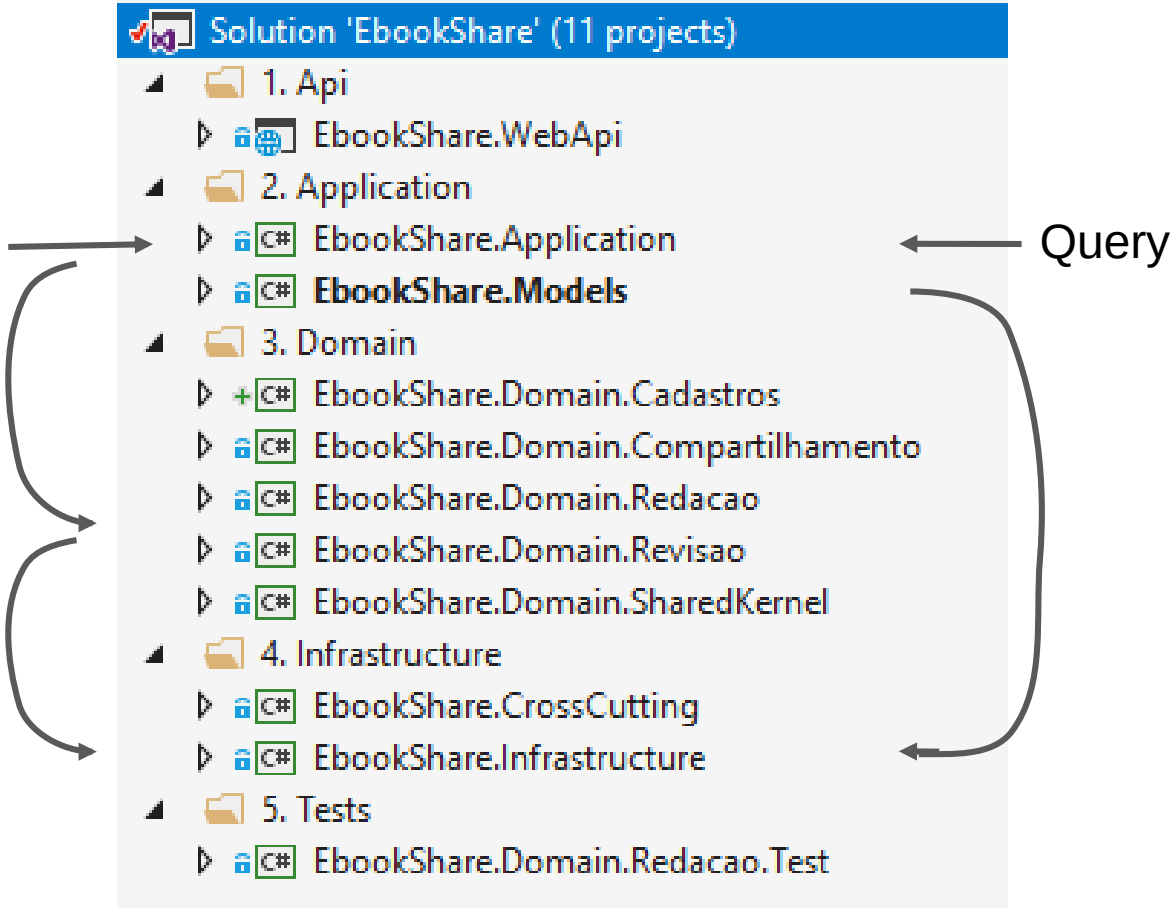
CQRS

Command



CQRS

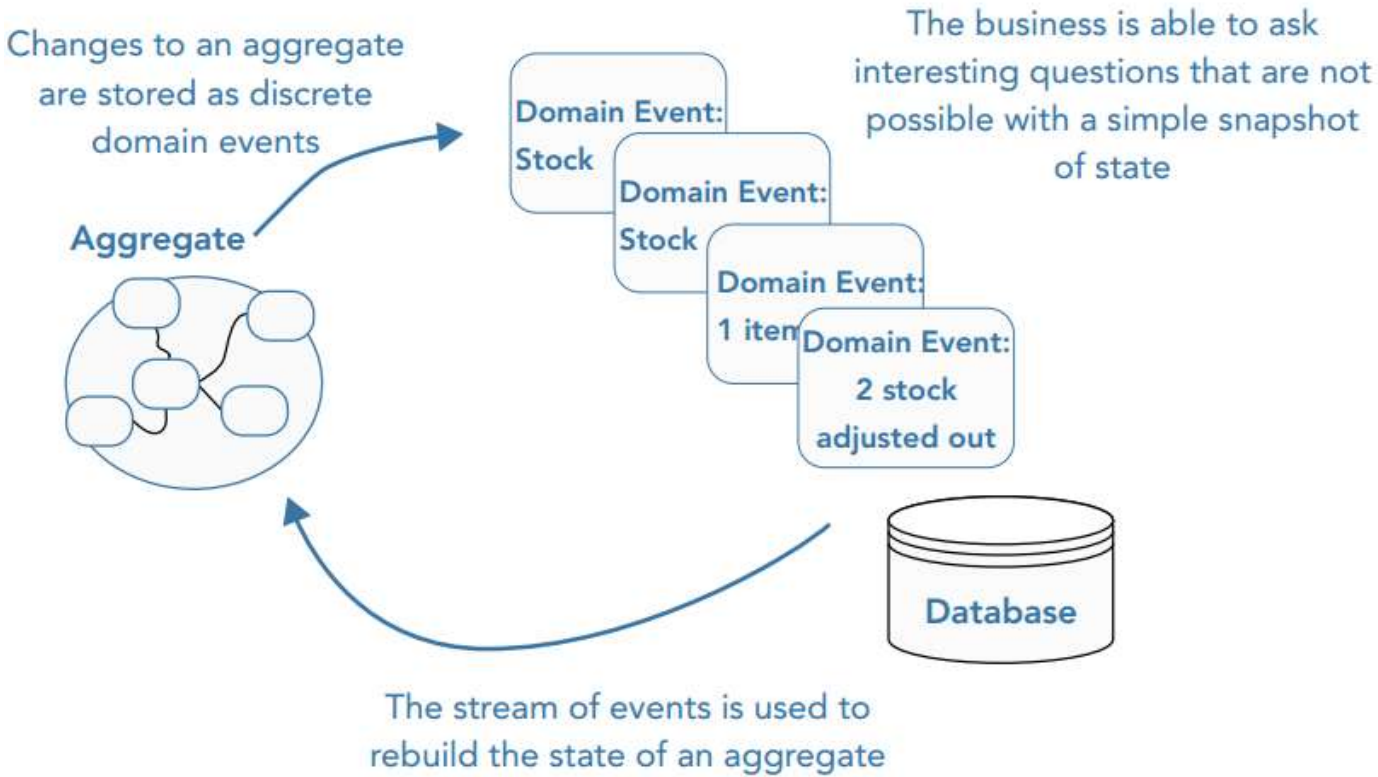
Command



Query

Integrating
between
external contexts

EVENT SOURCING



Schedule

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- ~~Domain Model~~
- ~~Architectures types~~
  - ~~DDD~~,
  - ~~Smart UI~~,
  - ~~...~~
- ~~**Strategic Design**~~
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  - ~~Domain Events~~
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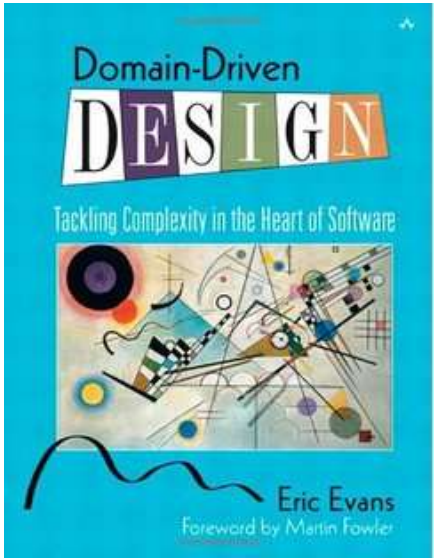
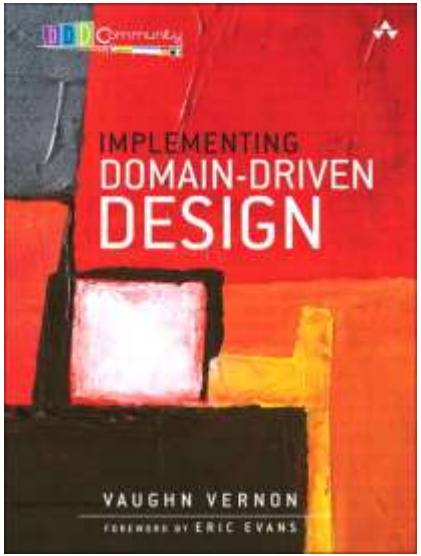
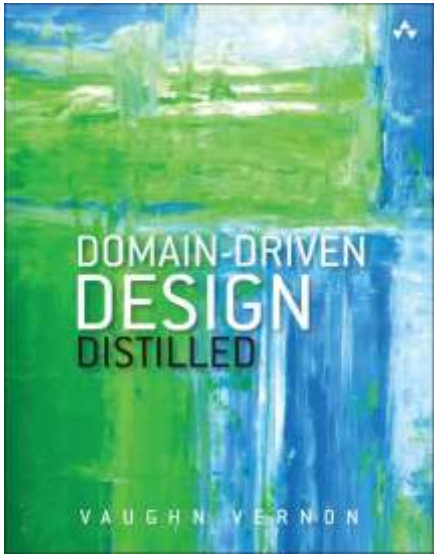
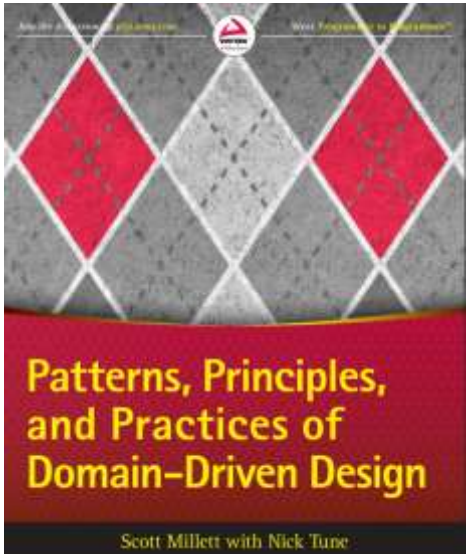
- ~~SOA~~
  - ~~Event Driven Architecture~~
- ~~Event Sourcing~~
- ~~Final Thoughts~~

Referências









https://github.com/VaughnVernon/IDDD_Samples_NET
https://github.com/heynickc/awesome-ddd

Obrigado!

fabriciorissetto@gmail.com

fabriciorissetto