Strategic Design & Common Patterns

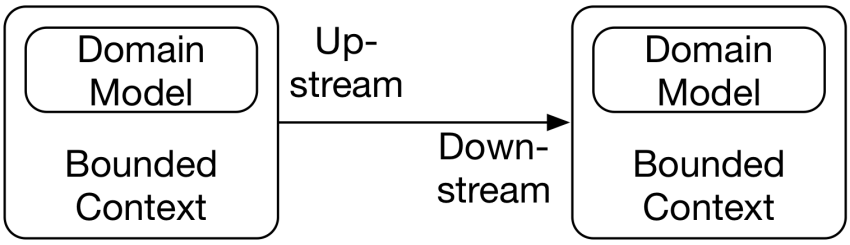
In this lesson, we'll get an introduction to strategic design and look at some important strategic design patterns.

We'll cover the following

- Strategic design
- The customer/supplier pattern
  - Example
- The conformist pattern
  - Example
- The anti-corruption layer
  - Example
- The separate ways pattern
  - Example
- The shared kernel pattern
  - Example
- The open host service pattern
- The published language model
  - Example
- Selecting patterns
  - Example
    - Tradeoffs to Consider

Strategic design

The division of the system into different bounded contexts is part of **strategic design**, which belongs to the practices of domain-driven design (DDD). The strategic design describes the *integration* of bounded contexts.



Fundamental Terms of Strategic Design

The drawing above shows the fundamental terms of strategic design.

- The **bounded context** is the context in which a specific **domain model** is valid.
- The bounded contexts depend on each other. Usually, each bounded context is implemented by one team.
- The **upstream** team can influence the success of the **downstream** team. However, the downstream team cannot influence the success of the upstream team.
    - For example, the success of the team responsible for payment depends on the order process team.
    - If data such as prices or credit card numbers are not part of the order, it is impossible to do the payment.
    - However, the order process does not depend on the payment to be successful.
    - Therefore, **order processing is upstream**. It can make payment fail. **Payment is downstream** since it cannot make the order process fail.

DDD describes in several patterns how exactly communication takes place. These patterns not only **describe the architecture**, but also the **cooperation *within* the organization**.

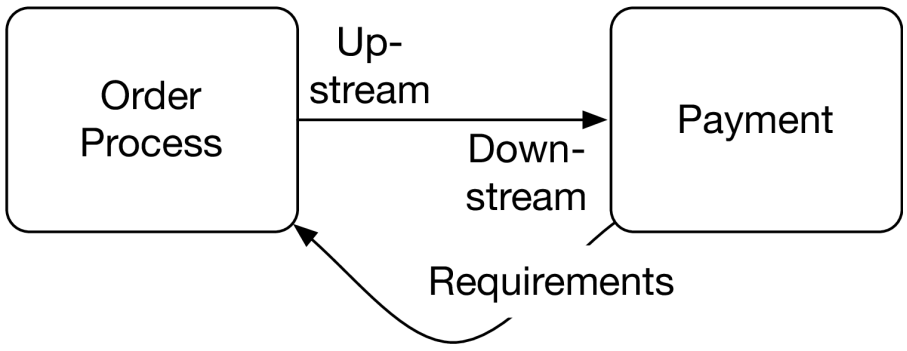
The customer/supplier pattern

With this *customer/supplier* pattern, the **supplier is upstream** and the **customer is downstream**. However, the customer can factor their priorities into the planning of the upstream project.

Example

In the drawing below, for example, payment uses the model of the order process. However, payment defines requirements for the order process. Payment can only be done successfully if the order process provides the required data.

So, payment can become a customer of the order process. That way the customer's requirements can be included in the planning of the order process.



Customer / Supplier Pattern

The conformist pattern

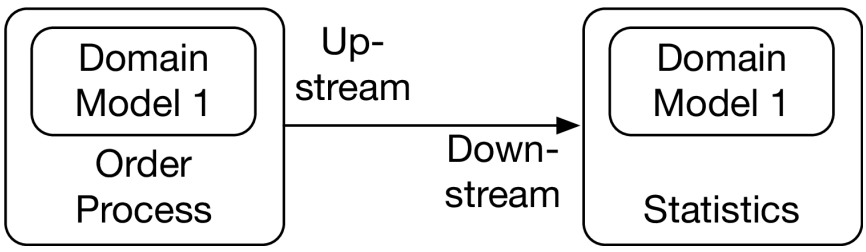
Conformist means that **a bounded context simply uses a domain model from another bounded context**.

Example

In the drawing below, the bounded contexts, **statistics**, and **order process**, both **use the same domain model**. The statistics are part of a data warehouse. They use the domain model of the order process bounded context and extract some information relevant to store in the data warehouse.

However, with the *conformist* pattern, the data warehouse team **does not have a say** in case of changes to the bounded context.

The data warehouse team could not demand additional information from the other bounded context. However, it is still possible that they would receive additional information out of altruism. Essentially, the data warehouse team is not deemed important enough to get a more powerful role.



Conformist: Domain Model Used in Other Bounded Context

The anti-corruption layer

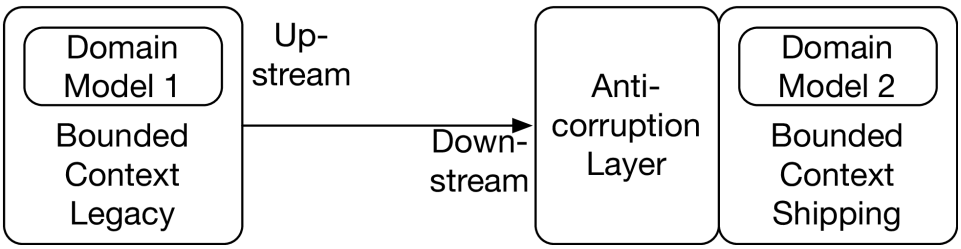
In the case of an **anti-corruption layer (ACL)** pattern, the bounded context does not directly use the domain model of the other bounded context, but it contains a layer for decoupling its own domain model from the model of the bounded context.

This is useful in conjunction with the *conformist* pattern to generate a separate model decoupled from the other model.

Example

The drawing below shows that the bounded context *shipping* uses an ACL at the interface to the bounded context *legacy* so that both bounded contexts have their own independent domain models.

This ensures that the model in the legacy system does not affect the bounded context *shipping*. *Shipping* can implement a clean model in its bounded context.



Anti-corruption Layer with Conformist

The separate ways pattern

With the **separate ways pattern**, the bounded contexts are **not related** at the software level although a relation would be conceivable.

Example

Let's assume that in the e-commerce scenario, a new bounded context, **purchasing**, for the purchase department is added. This bounded context could collect the data for listing products, but it is implemented differently.

With the *separate ways* pattern, the *purchasing* would be separate from the remaining system. When the goods are delivered, a user would use *another bounded context* like *listing* to enter the necessary data and list the products.

The purchasing causes the shipping, which in turn triggers the delivery, and thereby triggers the user to list the product with a different bounded context.

purchasing → shipping → delivery → list product

The shipping of the products is one event in the real world, however, in the software, the systems are separate.

Consequently, the systems are independent and can be evolved completely independently.

Separate Ways

The shared kernel pattern

The Shared Kernel Pattern describes a common core that is shared by multiple bounded contexts.

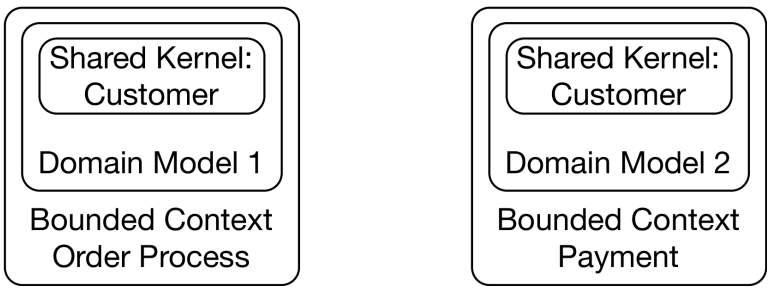
The data of a customer is an example of such a scenario.

However, the *shared kernel* comprises shared business logic and shared database schema and therefore **should not be used in a microservices environment**.

It is an anti-pattern for microservices systems. But because DDD can also be applied to deployment monoliths, there are still scenarios in which a shared kernel makes sense.

Example

In the drawing below the domain model order process and the payment possess a shared kernel.



Shared Kernel

Some patterns are primarily useful in cases where more than one bounded context has to be integrated.

The open host service pattern

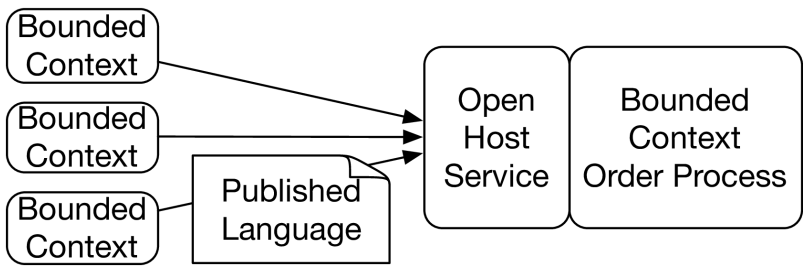
Open host service means that the bounded context offers a generic interface with several services. Other bounded contexts can implement their own integration with these services. This pattern is frequently found at public APIs on the Internet. However, it is also a possible alternative within an enterprise.

The published language model

Published language is a domain model accessible by all bounded contexts. For example, this can be a standard format such as EDIFACT for transactions between companies. But it is also possible to define a data structure that is only used inside a company and published, for example, in Wiki.

Example

These models can be used together. The *open host service* can use *published language* for communication. For example, the order process might accept orders from external clients. Providing a specific interface for each external client is a lot of effort, so there is a generic open host service and a published language for orders. Each external client can use this interface to submit orders to the bounded context order process.



Open Host Service and Published Language

Selecting patterns#

The choice of patterns has to be in line with:

1. The domain

2. The power structures
3. The communication relationships between the teams.

Example#

When the bounded context *payment* does not obtain the necessary data from the bounded context *order processing*, the products can be ordered but not paid for. Therefore, the **customer/supplier pattern** is an obvious choice.

However, this is not a fact found in the domain, but rather a **consequence of the power structure**, which in turn depends on the company business model.

Tradeoffs to Consider#

Of course, the selected patterns influence the effort necessary for coordination and therefore the degree of isolation between the teams. They set the rules by which the teams must work on the integration.

Thus, a pattern like *customer/supplier* is not desirable as it **requires a lot of coordination**. Still, it might be the right solution depending on domain aspects.

It makes little sense to use a different pattern between *payment* and the *order process* just to have less coordination. A different pattern might make it impossible for the business to succeed.

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Consider the following two teams as a part of a small social media app.

1. Image processing. They handle operations on images such as compression and storage.
2. Photo Albums. They handle the look of each user's 'photo albums'.

Which team is upstream and which is downstream in terms of strategic design?

A) The **image processing** team is **upstream** and the **photo albums** team is **downsteam**.

B) The **image processing** team is **downstream** and the **photo albums** team is **upstream**.

C) The **image processing** team is **downstrem** and the **photo albums** team is also **downsteam**.

Submit Answer

Question 1 of 4
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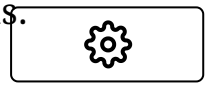
Reset Quiz

In the next lesson, we'll discuss architecture decisions.



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Architecture Decisions

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