# Motivation for Loosely Coupled Software Systems

## Or (1): Life is just a bakery

## Or (2): This is what this course is about

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# Agenda

- *Scenario 1:* It works (somehow)
- *Scenario 2:* The Orchestrator Pattern
- *Scenario 3:*
  Loosely Coupled and Event-driven
- DDD as a software specification & development approach

# Scenario 1

It works (somehow)

1

I need a large birthday cake.
Cream, three stacks, with fruit.
Can you make it Thursday?

Yes, that works. **2**

3

Julia, we need a 3-stack with fruit for Mrs. Gulbins. Please prepare the cream and tell Alfred.

4

Mrs. Gulbins, any food intolerances?

5

Alfred, a 3-stack with fruit for Mrs. Gulbins. Here is the cream.

6

Mrs. Gulbins, a chocolate base layer is always nice in a 3-stack. You want that?

7 Yes please!

8

Julia, I need chocolade whipped cream, too.

9

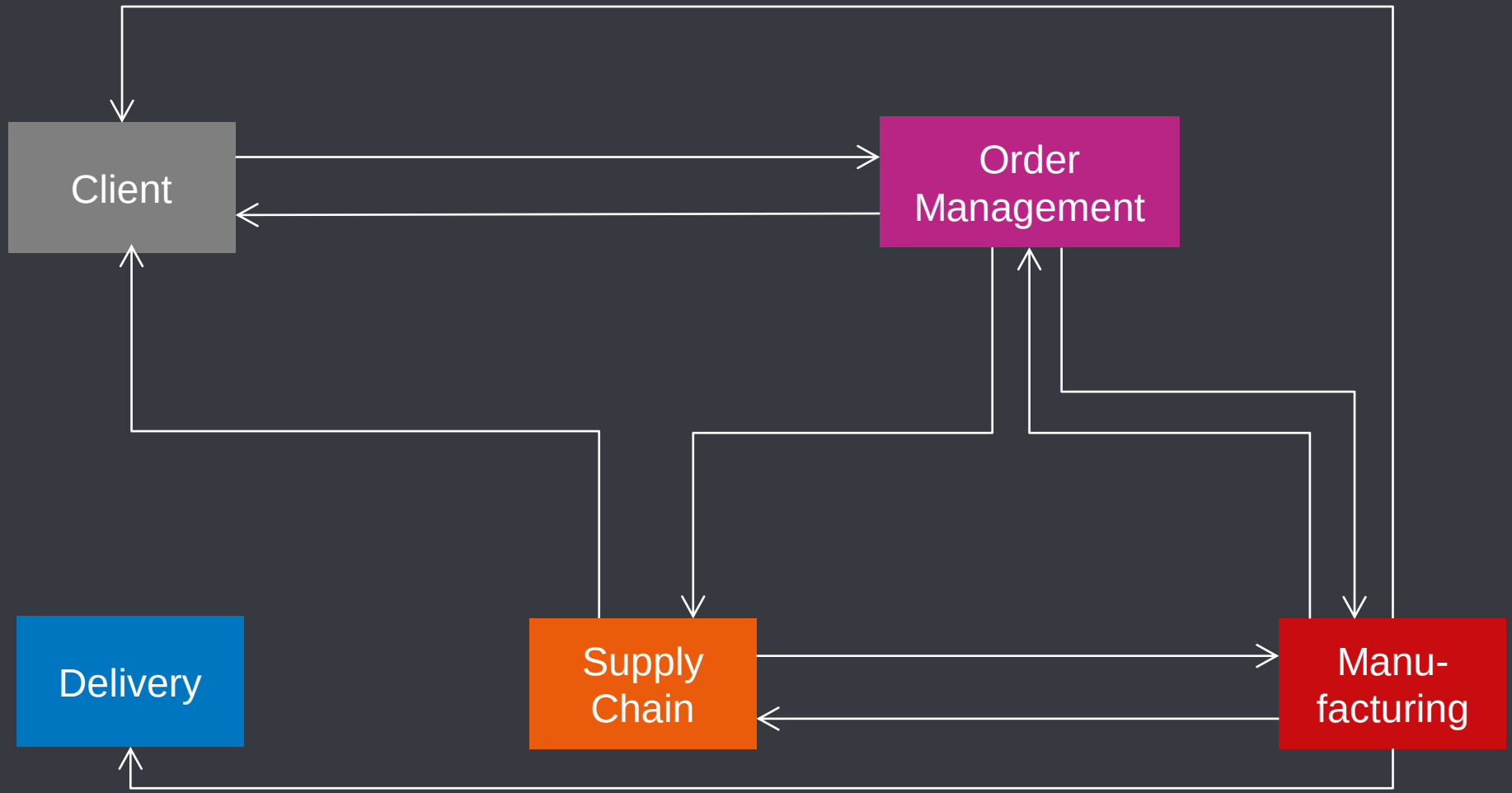
Martha, you need to add the chocolote base layer to the bill.

10

Julia, Alfred, what is your status with Mrs. Gulbins cake?

11 Done. You can send the the bill. I‘ll tell Juan.

12 Juan, can you please deliver this cake to Mrs. Gulbins?


Client
Order Management
Delivery
Supply Chain
Manu-facturing

# Observation

- Each subsystem manages its own business logic
- **BUT:** Process knowledge distributed
  - Many subsystems know more then they they should
- (Wildly) cyclic dependencies

# Scenario 2

# The Orchestrator Pattern

1

I need a large birthday cake.
Cream, three stacks, with fruit.
Can you make it Thursday?

Yes, that works.

Food intolerances?
Chocolate base layer?
…?

2

3

Julia, we need whipped cream.

4

Alfred, start with three layers.

5

Julia, now also
chololate cream.

6

Alfred, please a chocolate base layer.

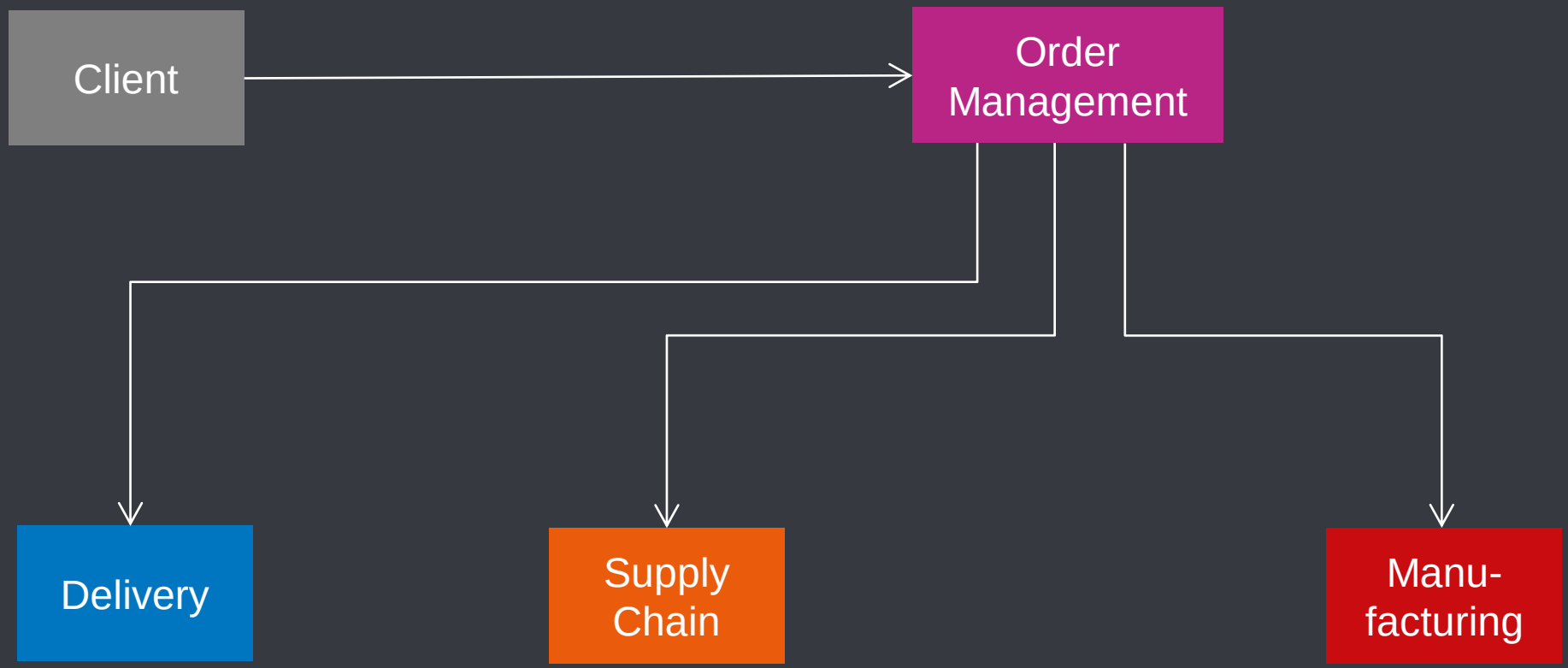
7

And now some fruit as decoration.

8 When ready, bring me the cake.

9

Juan, please deliver this cake to Mrs. Gulbins.


Client
Order Management
Delivery
Supply Chain
Manu-facturing

# Observation

- Process knowledge nicely centralized
- No cycles
- **BUT:** Subsystems become anemic
  - (not the master of their own business logic)
- Orchestrator (Order Management) prone to become a „God System“
  - VERY hard to maintain

# Scenario 3

Loosely Coupled and Event-driven

1

I need a large birthday cake.
Cream, three stacks, with fruit.
Can you make it Thursday?

Yes, that works.

Food intolerances?
Chocolate base layer?
…?

2

3

3-Stack, fruit,
no food intolerances,
chocolate base layer

*I'll prepare the bill. The team knows what to do ☺*

*OK, I need to prepare whipped cream and chocolate cream …*

*OK, I need to prepare the stacks …*

4

Whipped cream ready!

*OK, I can mount the stacks …*

5

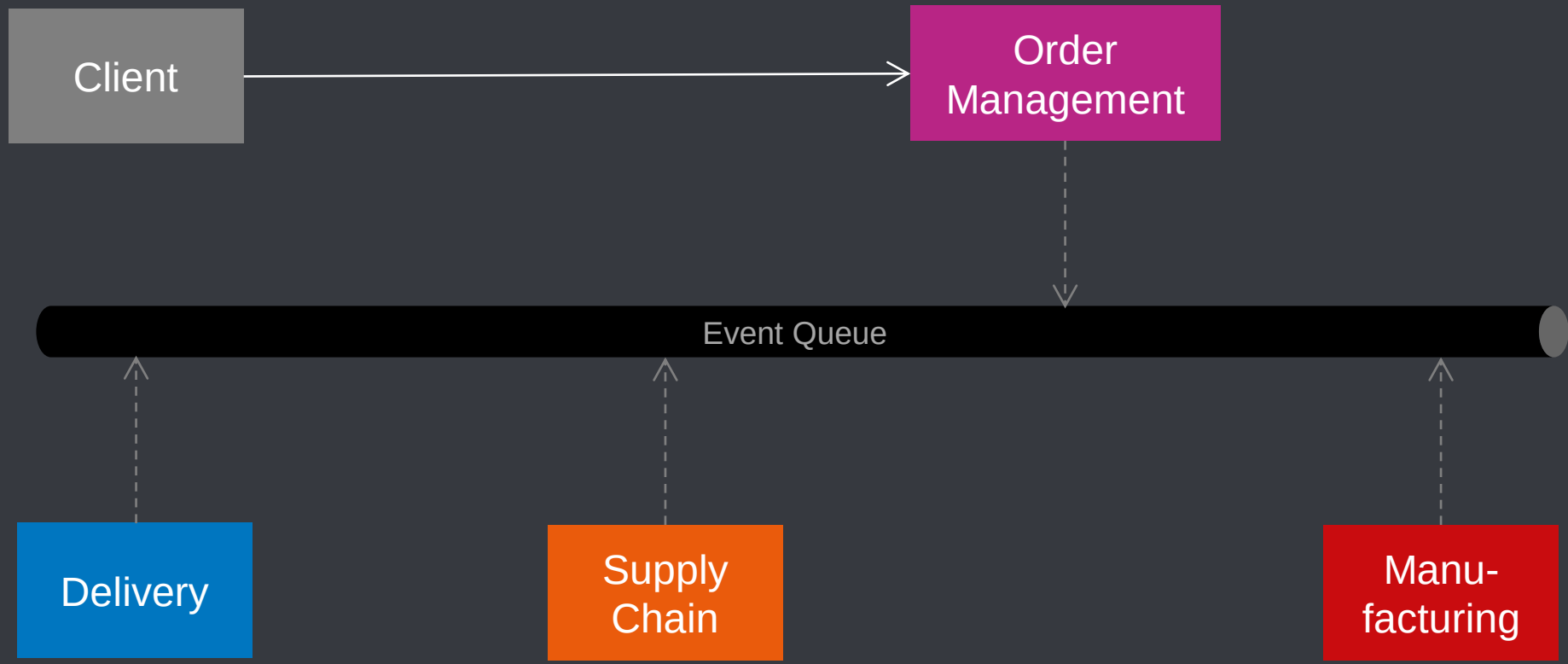
Cholcolate cream ready!

*… and now the base layer and the fruit …*

6

Cake for Mrs Gulbins is ready.

*OK, so I can deliver it.*


Client
Order Management
Event Queue
Delivery
Supply Chain
Manu-facturing

# Observation

- „Empowered“ yet loosely coupled subsystems - no cycles
- **BUT:** Harder to design
  - Thinking in events doesn‘t come natural
- More technical effort
  - No / very little synchronous calls
  - Asynchronous communication & data redundancy

# DDD as a software specification & development approach

# Requirements on Spec & Impl

1. Domain exploration focusing on …
   - clear boundaries between subdomains
   - business events as main source of domain knowledge
2. Modelling the message flow
   - in an expressive, yet not „overformalized“ way
3. Modelling high-level system structure
   - focusing on deployment and high-level dependencies
4. Implementation in a industry-standard language
   - with a framework that allows to explicitly express DDD building blocks

# **Solutions** *(in this course, but aligned with industry practice …)*

1. Event Storming

2. Domain-Driven Design Starter Modelling Process

3. C4 Model (level 1 + 2)

4. Spring Modulith + Java


# www.archi-lab.io