



TACKLING THE COMPLEXITY IN THE MIDDLE OF THE PLATFORM

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Engineering Lead @ Zalando SE

16-05-2019





Our Vision:
Zalando.
The Starting Point
for Fashion

ZALANDO IN NUMBERS

> 5.4 billion EUR

2018

> 15,000

employees in
Europe

> 79%

of visits via
mobile devices

**> 250
million**

visits
per
month

**> 26
million**
active customers

> 300,000
product choices

~ 2,000
brands

17
countries

WE ARE CONSTANTLY INNOVATING TECHNOLOGY

**HOME-BREWED,
CUTTING-EDGE
& SCALABLE**

technology solutions

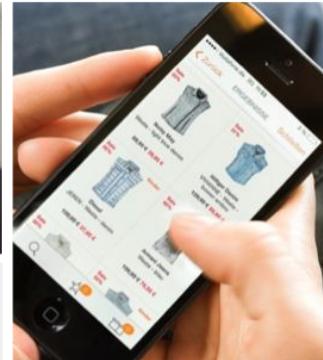


7 tech locations
(HQs in Berlin)



~ 1,900

employees from



77

nations



help our brand to
WIN ONLINE

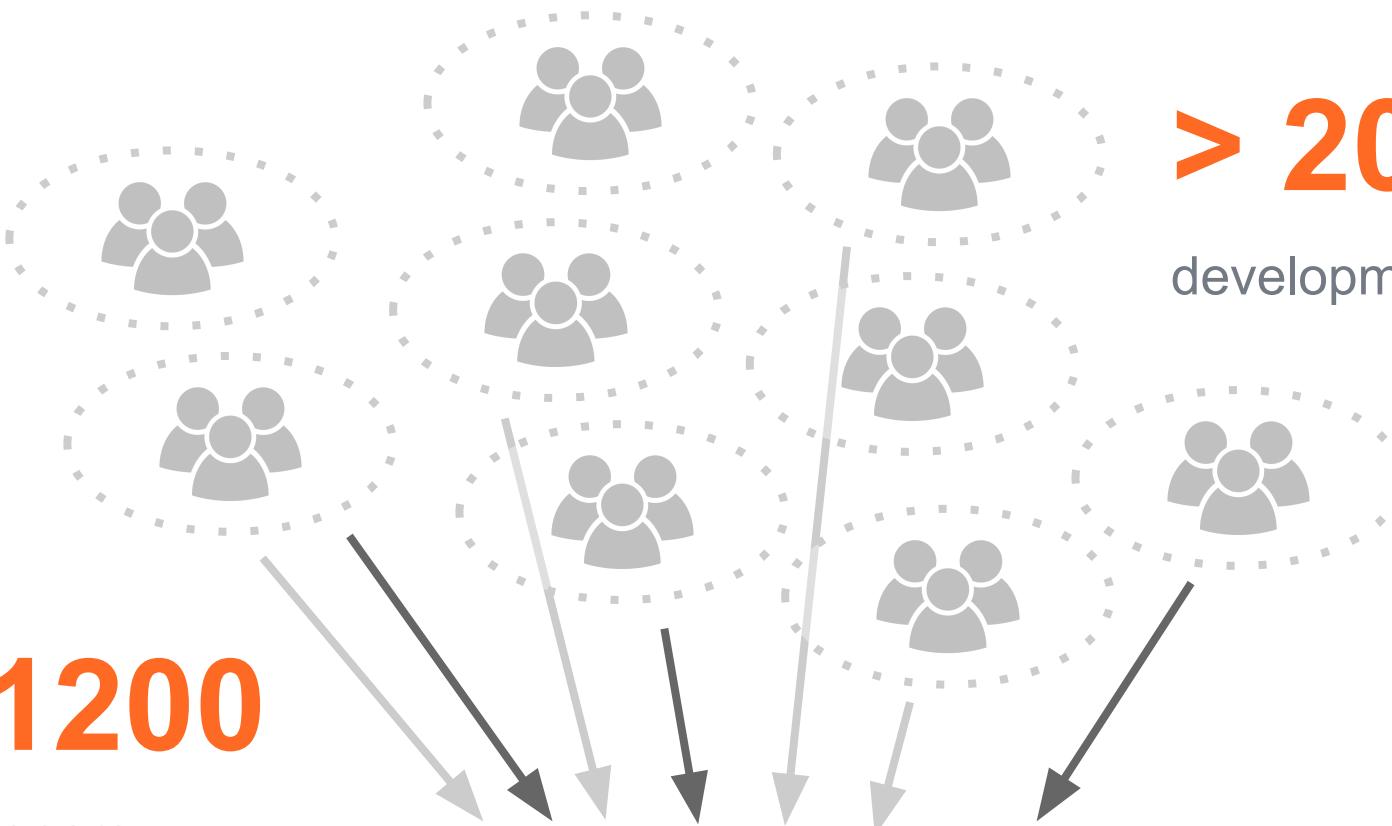
> 1200

developers

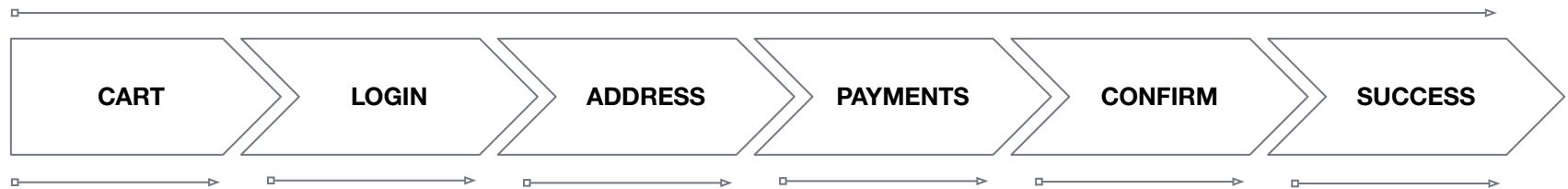
Platform

> 200

development teams



CHECKOUT FLOW



Where's the complexity?

The screenshot illustrates the Zalando checkout process, which consists of five sequential steps:

- Step 1: Login
- Step 2: Address
- Step 3: Payment
- Step 4: Confirm
- Step 5: Done

Below the steps, there is an "ORDER SUMMARY" section containing two items:

- DELIVERY OPTION**:
 - Zalando PLUS: Offers a 10% discount for Zalando Plus members.
 - EASTERPLUS: Offers free delivery until April 22, 2019.
 - Tomorrow, 19:00 - 21:30: Premium evening delivery, FREE with Zalando PLUS.
 - We, 24.04. – Fr, 26.04.: Premium delivery, FREE with Zalando PLUS.
 - Th, 25.04. – Sa, 27.04.: Standard delivery, free.
- ORDER**:
 - Shipment by Zalando Th, 25.04. – Sa, 27.04.
 - Product 1: Clinique for Men MAXIMUM HYDRATOR50ML - Face cream - . Colour: not defined Size: One Size 32,95 €
 - Product 2: Tommy Hilfiger PIMA GLOVES - Gloves - black Colour: black Size: One Size 29,95 € 25,45 €

On the right side of the summary, there is a large orange "PLACE YOUR ORDER" button.

Below the summary, there are sections for **DELIVERY ADDRESS** and **BILLING ADDRESS**, both of which are filled with the same address: Jovan Vidic Street Berlin Germany.

Further down, there is a **PAYMENT METHOD** section with a dropdown menu showing a card ending in XXXX.

Finally, there is a **VOUCHER / GIFT CARD (Optional)** section with a placeholder for entering a code.

At the bottom right, there is a summary of the order details:

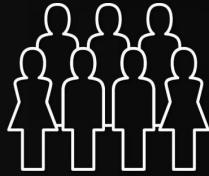
Delivery	free
TOTAL (VAT included)	58,40 €

Below this summary is another "PLACE YOUR ORDER" button.

A note at the bottom states: "By placing an order at [en.zalando.de](#), you're agreeing to our [Privacy Policy](#), [Terms and Conditions](#) and [Cancellation policy](#). We may occasionally email you product recommendations. Don't worry, you can unsubscribe at any time by simply clicking the link in our emails."

Scalability

Black Friday 2018



> 220,000

new customers



≈ 2,000,000
orders

black
sneakers

Bestseller



> 4,200
orders
per minute



Black Friday 2017

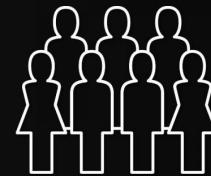


"The very good performance seen this Black Friday illustrates the strong relationship Zalando has built with its customers. This happened over time, through a relentless effort to meet specific local needs in each individual market."

Delphine Mousseau, Vice Presidents Markets at Zalando



Black Friday 2018



> **220,000** new customers



≈ **2,000,000** orders



> **4,200** orders per minute





Data Centre ▶ Cloud

Capacity shortage hits AWS UK micro instances

Elastic cloud snaps back

By [Gavin Clarke](#) 24 Mar 2017 at 17:29

19 SHARE ▼

Amazon's brand-new UK T2 micro instances reached saturation point on Friday, with users being told the AWS service had run out of local capacity.

Customers were informed that T2 micro instances were running short of rack space in the EU West 2a availability zone in the morning.

The AWS zone is in London and opened in December – AWS operates two more EU zones, in Ireland and Frankfurt.

Amazon is unwilling to detail its UK setup but *The Register* understands the UK zones have been floated using the data centres of two partner service providers rather than AWS break ground and build its own infrastructure.

Most read



Oh dear. Secret Huawei enterprise router snoop 'backdoor' was Telnet service, sighs Vodafone



Self-taught Belgian bloke cracks crypto conundrum that was supposed to be uncrackable until 2034



Chinese dev jailed and fined for posting DJI's private keys on Github



Huawei, Huawei. Huawei, Huawei. Feeling hot, hot, hot: US threatens to cut UK from intel sharing over Chinese tech giant



America's anti-hacking

Reliability

What's absolutely needed to enter checkout?

My Bag (2 items)

 Clinique for Men MAXIMUM HYDRATOR50ML - Face cream - Colour: not defined Size: One Size	<input type="button" value="1"/> ▼	<input type="button" value="Remove"/> <input type="button" value="Move to wish list"/>	€32.95
 Tommy Hilfiger PIMA GLOVES - Gloves - black Colour: black Size: One Size	<input type="button" value="1"/> ▼ (2 left!)	<input type="button" value="Remove"/> <input type="button" value="On the wish list"/>	€29.95 €25.45 You save 15%

ⓘ Items placed in this bag are not reserved.
ⓘ Wenn Du die Darstellung in deutscher Sprache bevorzugst, wähle bitte die deutsche Sprachoption ("DE") oben in der Navigation.

Total

Subtotal	€58.40
Delivery	free
Total (VAT included)	€58.40

GO TO CHECKOUT

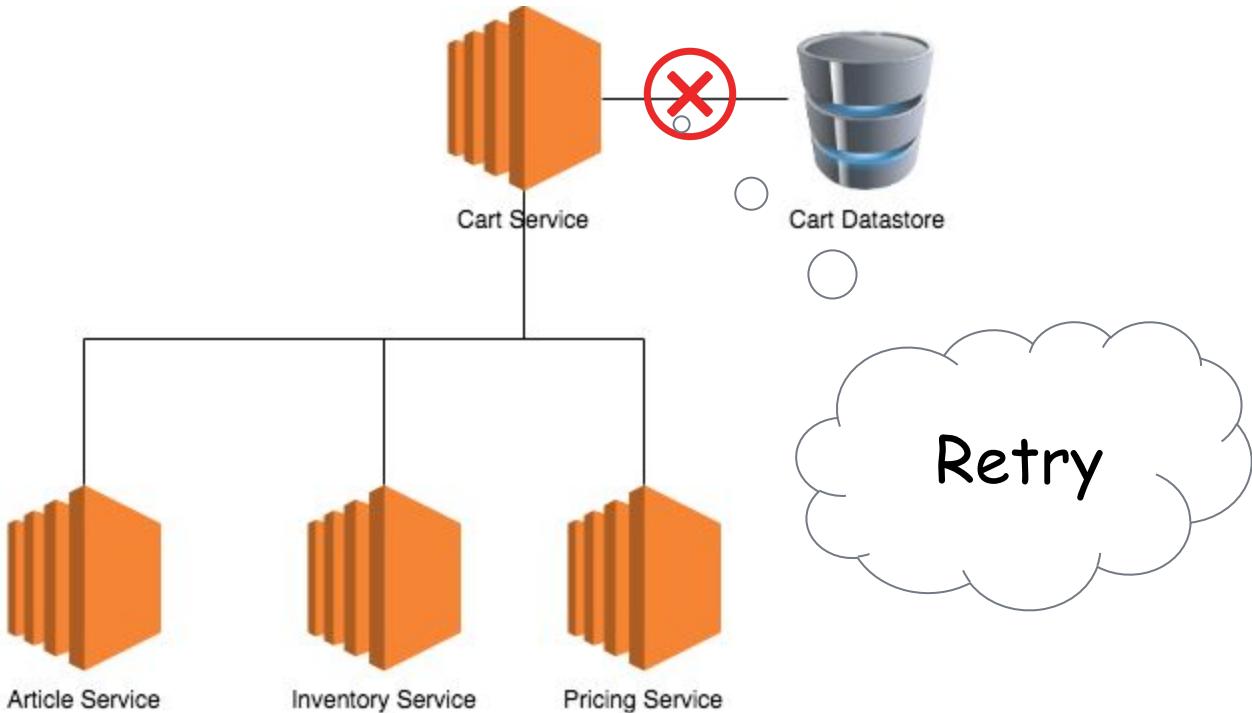
Add a voucher (Optional) ▾

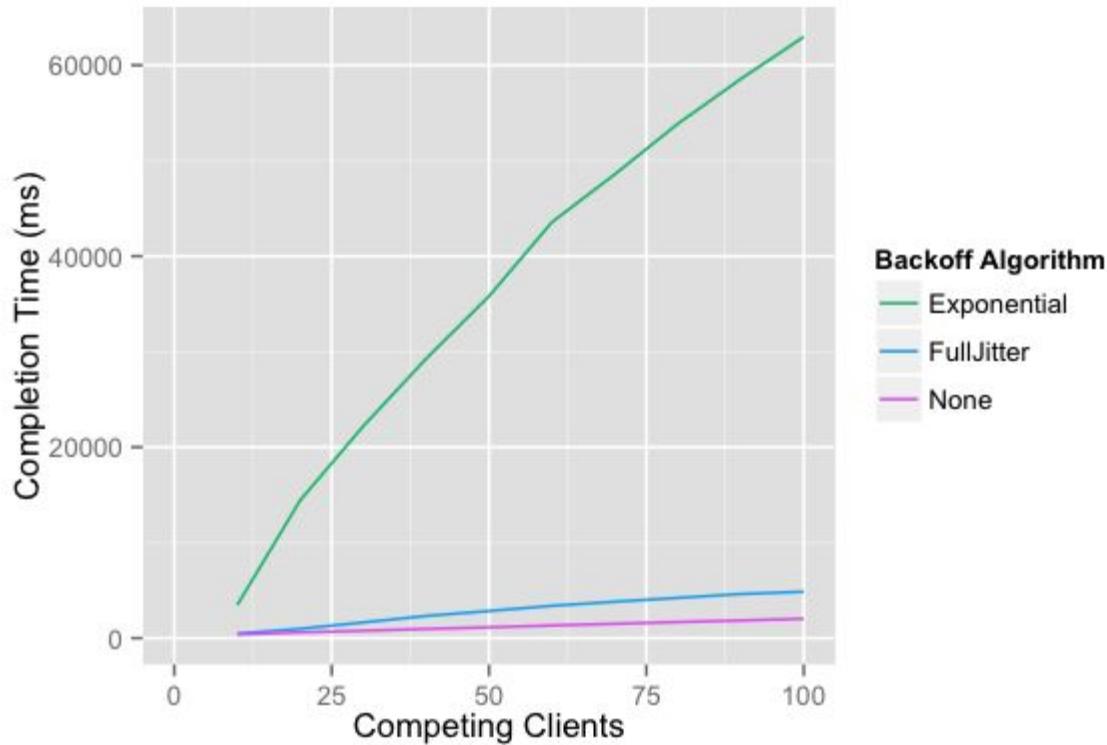
Out of stock

ⓘ Sorry! The following items are no longer available in your chosen size.

 adidas Originals CAMPUS - Trainers - dark blue/white/chalk white Colour: dark blue Size: 47 1/3 (This article is not available anymore)	<input type="button" value="Remove"/> <input type="button" value="On the wish list"/>
---	---

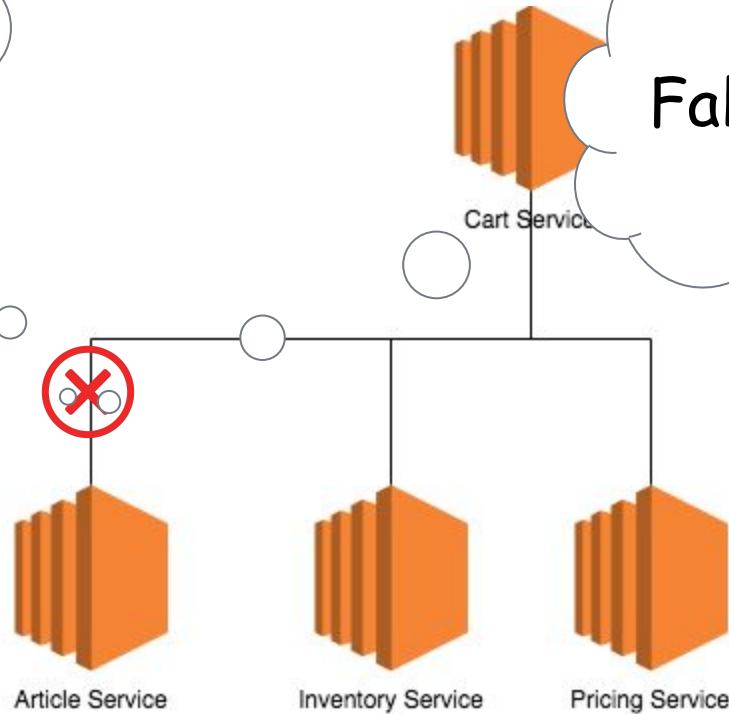
ⓘ Wenn Du die Darstellung in deutscher Sprache bevorzugst, wähle bitte die deutsche Sprachoption ("DE") oben in der Navigation.

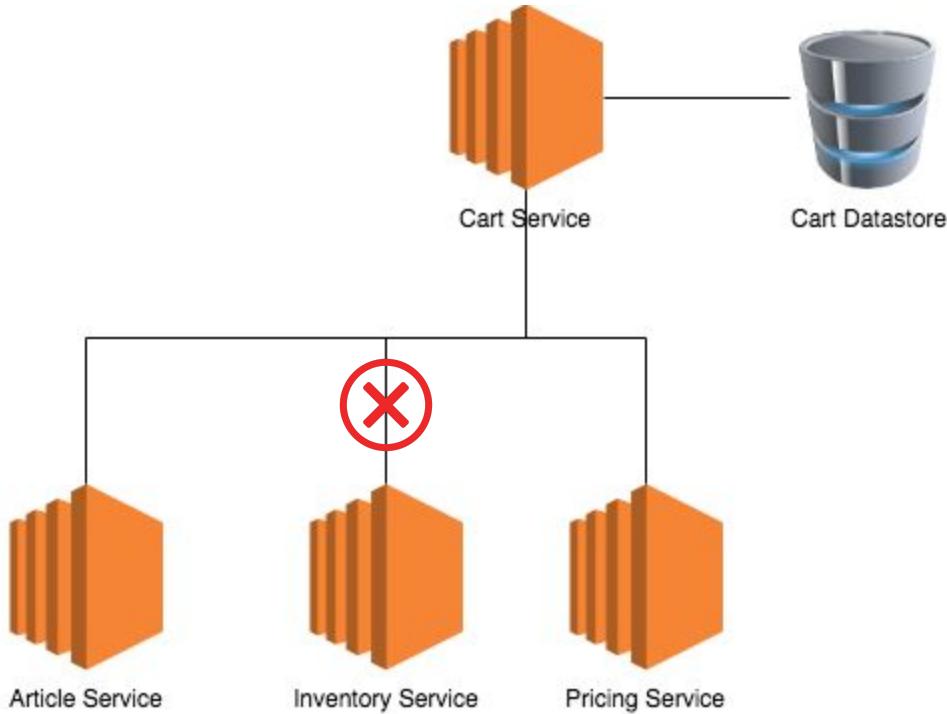


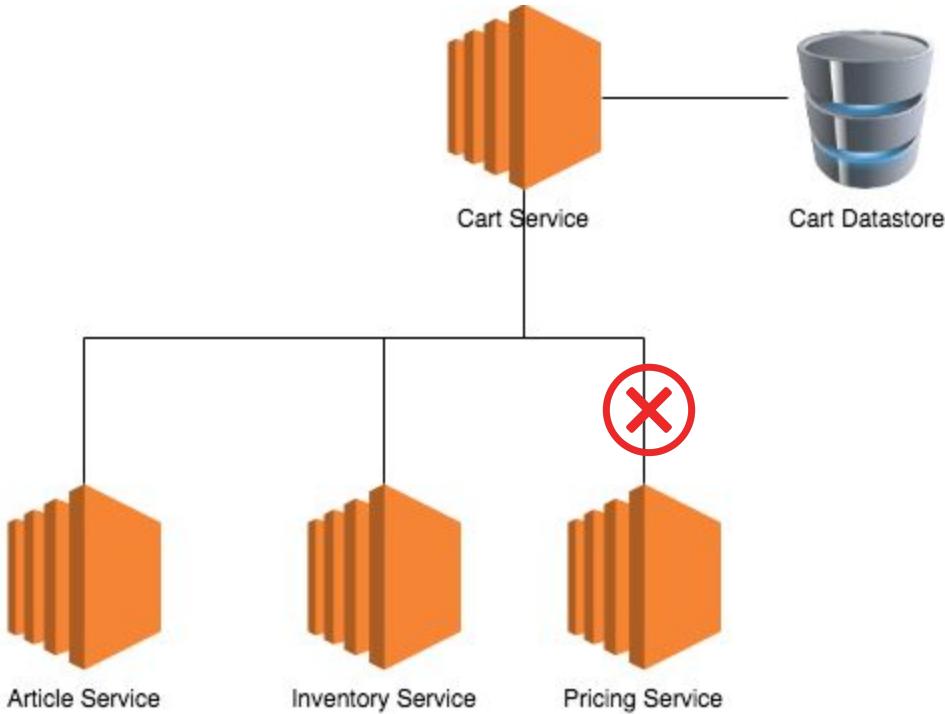


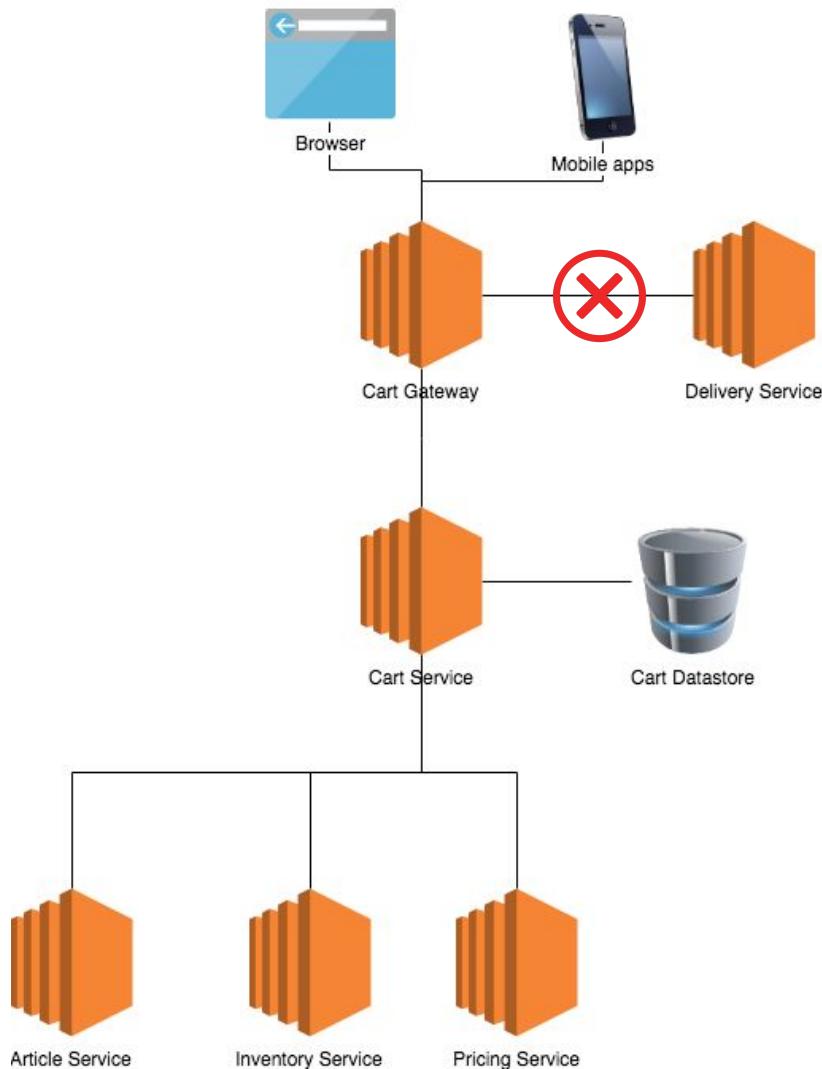
Open
Circuit

Fallback









Make a decision

ⓘ Items placed in this bag are not reserved.
 ⓘ Wenn Du die Darstellung in deutscher Sprache bevorzugst, wähle bitte die deutsche Sprachoption ("DE") oben in der Navigation.

Out of stock

ⓘ Sorry! The following items are no longer available in your chosen size.



adidas Originals
CAMPUS - Trainers - dark blue/white/chalk white
Colour: dark blue
Size: 47 1/3 (This article is not available anymore)

Remove | On the wish list



Tommy Hilfiger
PIMA GLOVES - Gloves - black
Colour: black
Size: One Size (This article is not available anymore)

Remove | On the wish list

ⓘ Wenn Du die Darstellung in deutscher Sprache bevorzugst, wähle bitte die deutsche Sprachoption ("DE") oben in der Navigation.

Total

Subtotal €32.95

Delivery free

Total (VAT included) €32.95

GO TO CHECKOUT

Add a voucher (Optional) ▾

Estimated delivery

Mo, 06.05. – Th, 09.05.

SLOs

*It's impossible to manage a service correctly, let alone well, without understanding which behaviors really matter for that service and how to measure and evaluate those behaviors. To this end, we would like to define and deliver a given **level of service** to our users, whether they use an internal API or a public product.*

- [Google SRE Book](#)

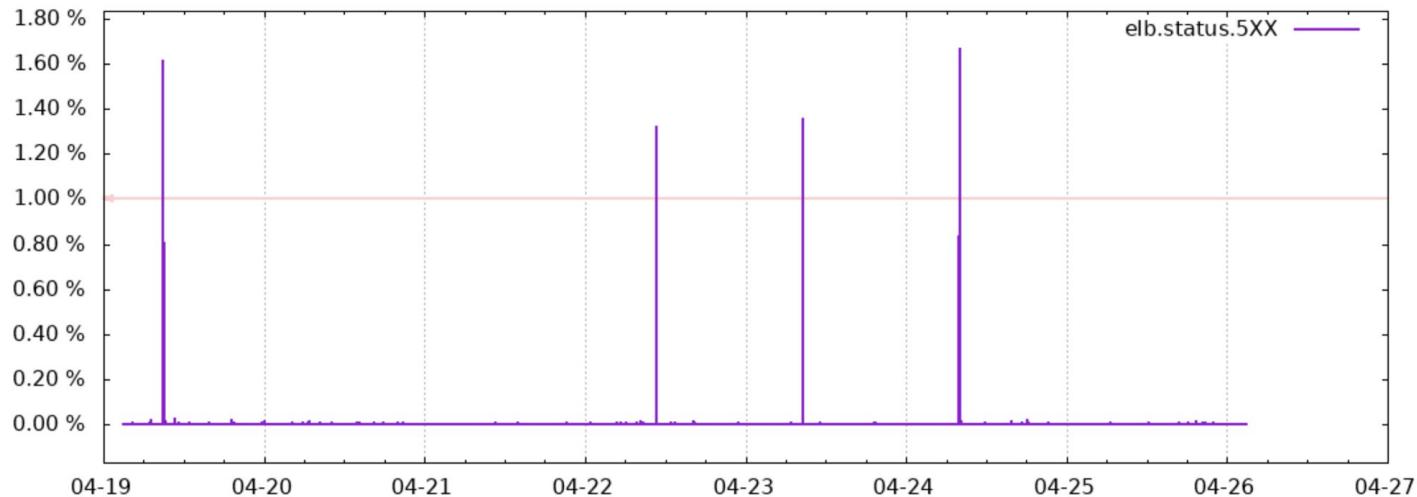
Service Level Reporting

Product Groups Products Reports

SLI	Fri 04-19	Sat 04-20	Sun 04-21	Mon 04-22	Tue 04-23	Wed 04-24	Thu 04-25	Fri 04-26
Elb Status 5XX	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %

At least one data point failed to meet the SLO

The weighted average for the period failed to meet the SLO



Post Mortem

Zalando confidential
[Post-mortem SLOs](#)

Page 1 of 2



Post-Mortem Document

Domain modeling

How would you model shopping cart?

HELP & CONTACT FREE DELIVERY & RETURNS 100 DAYS RETURN POLICY

WOMEN | MEN KIDS zalando DE EN My Account Wish List My Bag

Get the Look New Clothing Shoes Sport Accessories Care Premium Brands Sale % Search

My Bag (2 items)

Clinique for Men MAXIMUM HYDRATOR50ML - Face cream --
Colour: not defined
Size: One Size

Remove Move to wish list **€32.95**

Sold by: Massimo Dutti

Massimo Dutti MIT ZOPFMUSTER - Jumper - grey
Colour: grey
Size: M

Remove Move to wish list **€49.95**

Items placed in this bag are not reserved.
 Wenn Du die Darstellung in deutscher Sprache bevorzugst, wähle bitte die deutsche Sprachoption ("DE") oben in der Navigation.

Total

Subtotal	€82.90
Delivery	free
Total (VAT included)	€82.90

GO TO CHECKOUT

Add a voucher (Optional)

Out of stock

Sorry! The following items are no longer available in your chosen size.

adidas Originals CAMPUS - Trainers - dark blue/white/chalk white
Colour: dark blue
Size: 47 1/3 (This article is not available anymore)

Remove On the wish list

Tommy Hilfiger PIMA GLOVES - Gloves - black
Colour: black
Size: One Size (This article is not available anymore)

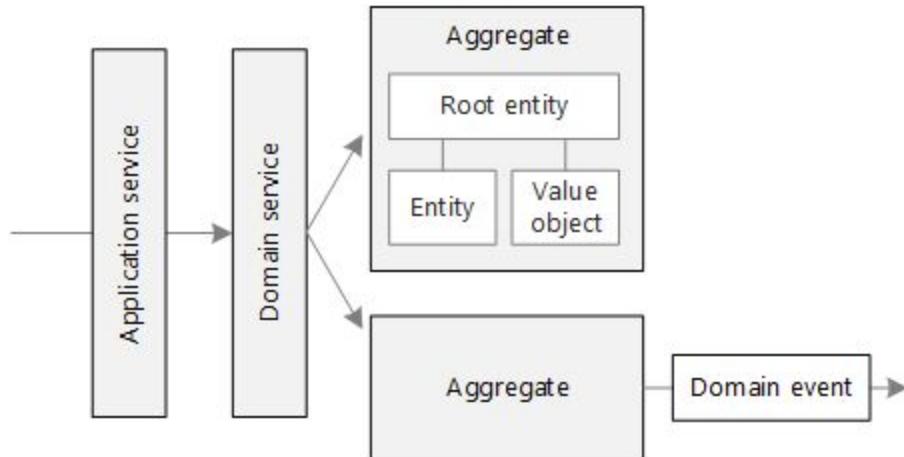
Remove On the wish list

Wenn Du die Darstellung in deutscher Sprache bevorzugst, wähle bitte die deutsche Sprachoption ("DE") oben in der Navigation.

Estimated delivery

Zalando: Mo, 06.05. – Th, 09.05.
Massimo Dutti: Sa, 04.05. – Tu, 07.05.

Using tactical DDD to design microservices



```
package de.zalando.cart;

import java.math.BigDecimal;
import java.util.List;

public class Cart {

    private List<CartItem> items;
    private BigDecimal deliveryFee;
    private BigDecimal total;

    public List<CartItem> getItems() {
        return items;
    }

    public void setItems(List<CartItem> items) {
        this.items = items;
    }

    public BigDecimal getDeliveryFee() {
        return deliveryFee;
    }

    public void setDeliveryFee(BigDecimal deliveryFee) {
        this.deliveryFee = deliveryFee;
    }

    public BigDecimal getTotal() {
        return total;
    }

    public void setTotal(BigDecimal total) {
        this.total = total;
    }
}

package de.zalando.cart;

import java.math.BigDecimal;
import java.util.List;
import java.util.stream.Stream;
import static java.math.BigDecimal.ZERO;
import static java.math.BigDecimal.ONE;

public class CartService {

    public CartRepository cartRepository;

    public Cart fetchCart(long cartId) {
        Cart cart = cartRepository.loadCartById(cartId);

        BigDecimal cartTotal = cart.getItems().stream()
            .map(CartItem::getArticlePrice)
            .reduce(BigDecimal.ZERO, BigDecimal::add)
            .add(cart.getDeliveryFee());

        cart.setTotal(cartTotal);

        return cart;
    }
}
```

```
package de.zalando.cart;

import java.math.BigDecimal;
import java.util.List;

public class Cart {

    private List<CartItem> items;
    private BigDecimal deliveryFee;

    public BigDecimal calculateTotal() {
        return items
            .stream()
            .map(CartItem::getArticlePrice)
            .reduce(BigDecimal.ZERO, BigDecimal::add)
            .add(deliveryFee);
    }
}
```

```
package de.zalando.cart;

public class CartService {

    public CartRepository cartRepository;

    public Cart fetchCart(long cartId) {
        return cartRepository.loadCartById(cartId);
    }
}
```

Article

sellable

```
private List<CartItem> items;  
  
private BigDecimal deliveryFee;  
  
public BigDecimal calculateTotal() {  
    return items.stream() Stream<CartItem>  
        .map(CartItem::getArticle) Stream<Article>  
        .reduce(BigDecimal.ZERO, BigDecimal::add) BigDecimal  
        .add(deliveryFee);  
}  
  
public List<CartItem> itemsWithInventory() {  
    return items.stream()  
        .filter(CartItem::hasInventory)  
        .collect(Collectors.toList());  
}
```

What is shopping cart?

HELP & CONTACT FREE DELIVERY & RETURNS 100 DAYS RETURN POLICY

DE EN My Account Wish List My Bag

Get the Look New Clothing Shoes Sport Accessories Care Premium Brands Sale % Search Q

My Bag (2 Items)

Clinique for Men MAXIMUM HYDRATOR50ML - Face cream - - Colour: not defined Size: One Size
€32.95

Massimo Dutti MIT ZOPFMUSTER - Jumper - grey Colour: grey Size: M
€49.95

Items placed in this bag are not reserved.
Wenn Du die Darstellung in deutscher Sprache bevorzugst, wähle bitte die deutsche Sprachoption ("DE") oben in der Navigation.

Out of stock

Sorry! The following items are no longer available in your chosen size.

adidas Originals CAMPUS - Trainers - dark blue/white/chalk white Colour: dark blue Size: 47/ V3 (This article is not available anymore)
€ Remove | ❤ On the wish list

Tommy Hilfiger PIMA GLOVES - Gloves - black Colour: black Size: One Size (This article is not available anymore)
€ Remove | ❤ On the wish list

Wenn Du die Darstellung in deutscher Sprache bevorzugst, wähle bitte die deutsche Sprachoption ("DE") oben in der Navigation.

Estimated delivery

Zalando: Mo, 06.05. – Th, 09.05.
Massimo Dutti: Sa, 04.05. – Tu, 07.05.

Sa, 04.05. – Tu, 07.05. Standard delivery free

Your order will be delivered in separate packages

ORDER

Parcel 1 of 2 sold by Zalando
Mo, 06.05. – Th, 09.05.

Clinique for Men
MAXIMUM HYDRATOR50ML - Face cream - -
Colour: not defined
Size: One Size
32,95 €

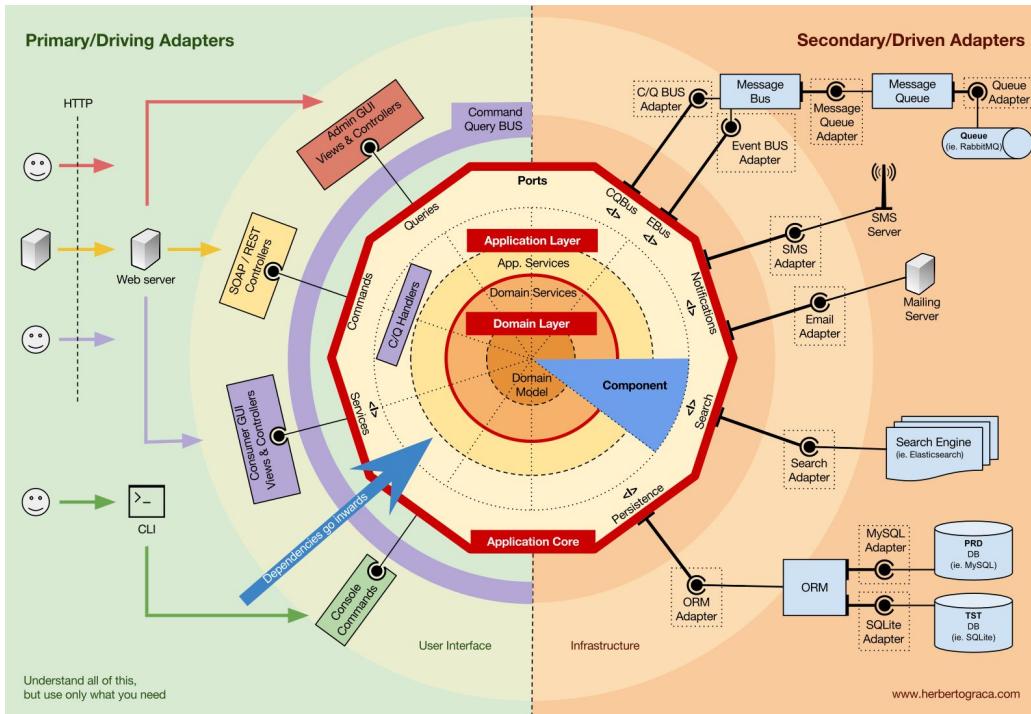
Parcel 2 of 2 sold by Massimo Dutti
Sa, 04.05. – Tu, 07.05.

Massimo Dutti
MIT ZOPFMUSTER - Jumper - grey
Colour: grey
Size: M
49,95 €

ZALANDO PARTNER

By placing an order at [en.zalando.de](#), you're agreeing to our [Privacy Policy](#), [Terms and Conditions](#) and [Cancellation policy](#). We may occasionally email you product recommendations. Don't worry, you can unsubscribe at any time by simply clicking the link in our email.

Hexagonal architecture



Delivery



QUICK GUIDE

12 Steps to Project Planning

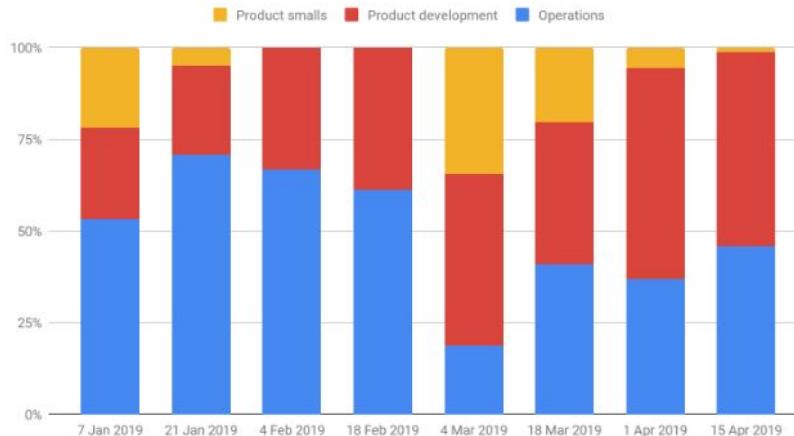


1. **DEFINE SCOPE**
Determine what tasks need to be completed.
2. **IDENTIFY SUPPORT**
Establish connection with key stakeholders.
3. **FIND AVAILABLE RESOURCES**
Determine in-house and outsourced teams.
4. **CHECK TIMELINE**
Assess realistic schedules and impacts.
5. **LIST BIG STEPS**
Capture big picture of your project.
6. **BREAKDOWN FURTHER**
Define deliverables.
7. **DEVELOP DRAFT PLAN**
Don't forget dependencies at this stage.
8. **CREATE BASELINE PLAN**
Gather feedback from your team.
9. **REFINE PLAN**
Check inputs based on reality.
10. **MONITOR PROGRESS**
Track your plan daily with the right tools.
11. **DOCUMENT EVERYTHING**
Capture changes in the project, too.
12. **KEEP EVERYONE LOOPED IN**
Don't leave communication to chance.

PROJECTMANAGER.com

Cycle metrics - Trends

Cycle start	MEDIAN of LeadTime	STDEV of LeadTime	SUM of Blocked	COUNT of Ticket
15 Apr 2019	2	1.5	0.0	19.0
1 Apr 2019	3	3.7	4.0	12.0
18 Mar 2019	3	2.8	3.0	13.0
4 Mar 2019	3.5	3.4	0.0	10.0
18 Feb 2019	2.5	2.9	6.0	18.0

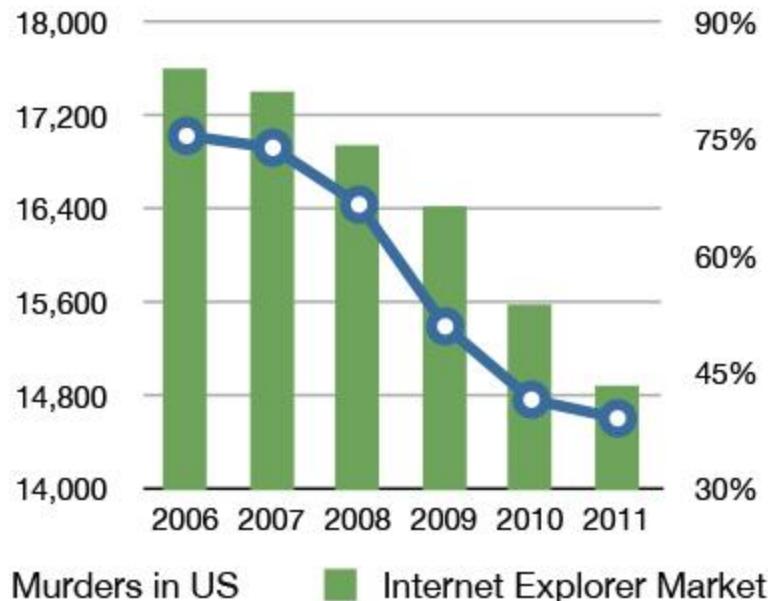


Type of work breakdown

*operational work is not fully reflected here. This includes only board items and not incidents, small investigations, ad-hoc questions or requests, clarification meetings, etc.

Correlation vs Causation

Internet Explorer vs Murder Rate



Flow



We do not need the perfect answer for the batch size

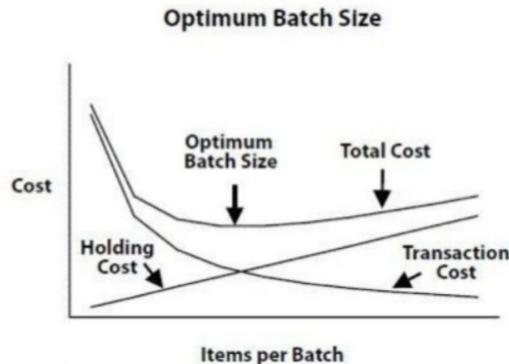


Figure 5-5 Optimum batch size is another U-curve optimization. Higher transaction costs shift optimum batch size higher. Higher holding costs shift it lower.

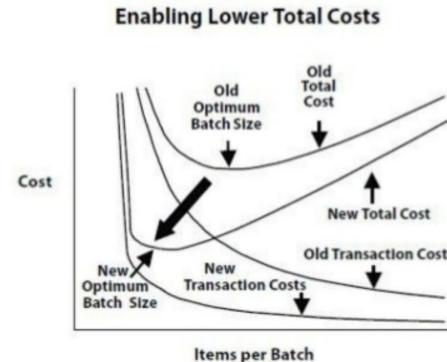
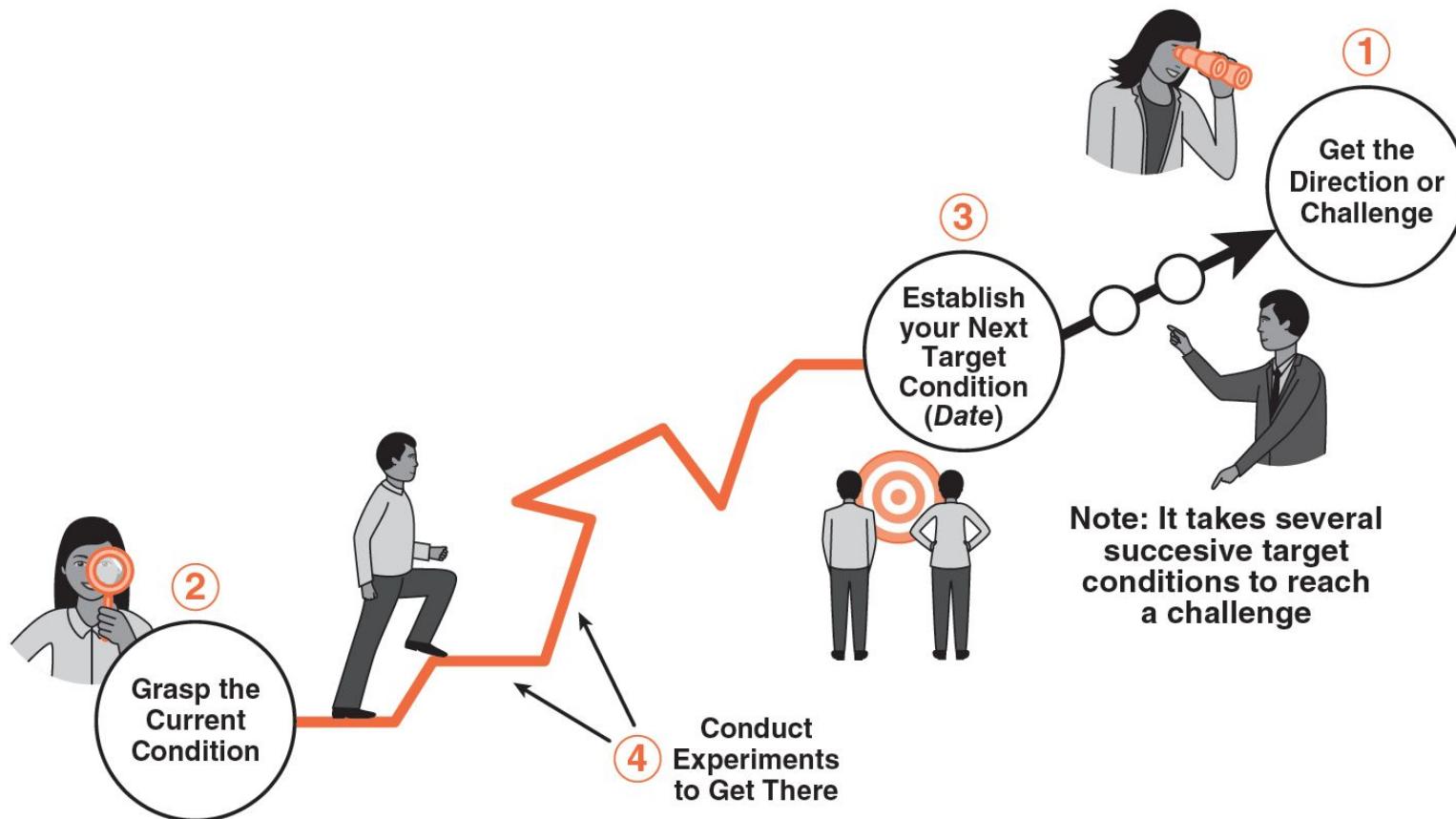


Figure 5-6 By lowering transaction costs, we create a lower optimum batch size. This also creates a new minimum process cost.

- **Ready for development**
 - UX interactions are defined
 - Error scenarios are defined (based from BDD scenarios)
 - Zatras are created (also for error messages)
 - The decision when to have 6 eyes principle is defined per ticket in iteration planning
 - Implementation is started after technical planning
- **Implementation**
 - Code is implemented by taking into consideration [good resilience practices](#)
 - Code is refactored and reviews are performed¹
 - The ticket is developed and tested by accountable engineers according to specification and code quality standards
 - A minor version of libraries are reviewed and updated
 - Testing is done/implemented/executed according to checkout testing strategy
 - The developed code is GDPR compliant
 - Open Tracing conventions are implemented and reviewed according to [the standard](#)
 - Logging is implemented according to logging strategy/rules
 - Security rules are implemented in a compliant way according to rules of Play²
 - Testing coverage didn't decrease Review automated way of measuring.
 - External dependencies are reviewed and adjusted as needed³
 - The user-facing implementation is reviewed against accessibility standards
- **Testing**
 - At least one reviewer manually tested feature. Define how to control/remind
- **Operational**
 - Alerts⁴, checks, and playbooks are implemented and reviewed according to guidelines
 - Playbook must be created/updated as a post mortem action for every PM in which checkout is impacted (specific for Incidents)
 - Capacity planning⁵ (K8s and AWS) is updated according to the identified needs (for new API or services or features that can affect traffic load for example)



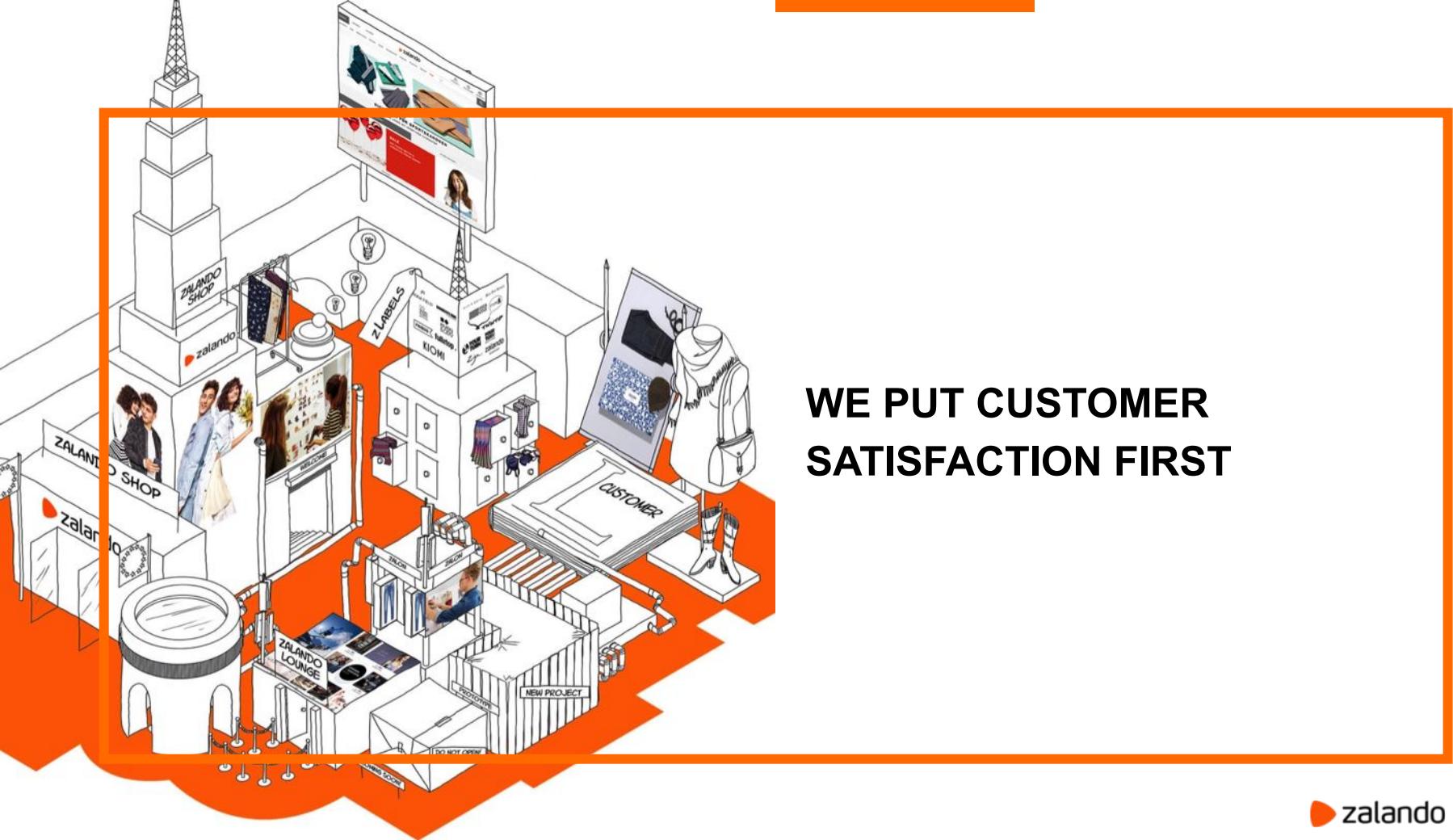
Here's one way to envision the four steps of the Improvement Kata pattern.

DOD

Legend

We are doing it right now
Desired ideal state (north star)

- Ready for development
 - UX interactions are defined
 - Error scenarios are defined (based from BDD scenarios)
 - Zatras are created (also for error messages)
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- Implementation
 - Code is implemented by taking into consideration good resilience practices
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- Testing
 - At least one reviewer manually tested feature. Define how to control/remind
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**WE PUT CUSTOMER
SATISFACTION FIRST**

Thank you

QUESTIONS?

Don't miss talks from my colleague Luis Mineiro
“Alerting, Monitoring and All that Jazz”
"Are we all on the same page? Let's fix that"

We're Hiring!
<https://jobs.zalando.com>