

# Designing a data access control concept for the Knowledge4Retail platform

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# Agenda

1. Motivation
2. Research Design
3. Results
4. Evaluation
5. Limitations
6. Conclusion

# Motivation

## Access control for the K4R platform



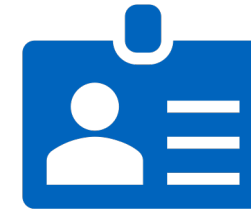
Optimizing product placements



Optimize retailer's internal product logistics



Handling traffic between various components controlled by a digital twin



Knowledge4Retail needs a data access control concept

### Foundations and Background

- Role-based access control
  - Assign roles to all entities about what it can access
- Data flows and involved organizations

### Semi-structured interviews

- Requirement analysis for roles and organizations
  - Understand the data flow
  - Define roles for the different components

### Data access control concept

- Incorporate results from
- Literature review
  - Requirement analysis

## RQ1

How to model data flows within the Knowledge4Retail platform for associated organizations and roles?

## RQ2

What are requirements of partner organizations for a Knowledge4Retail data access control concept?

## RQ3

How to design a data access control concept for the Knowledge4Retail platform?

# Expert Interviews

With experts from the different sectors of the project



## Interview Partners

- Six interviewees from various partners of the project
- Each expert in a different sector
  - From dm, DFKI, Uni Bremen, nagarro

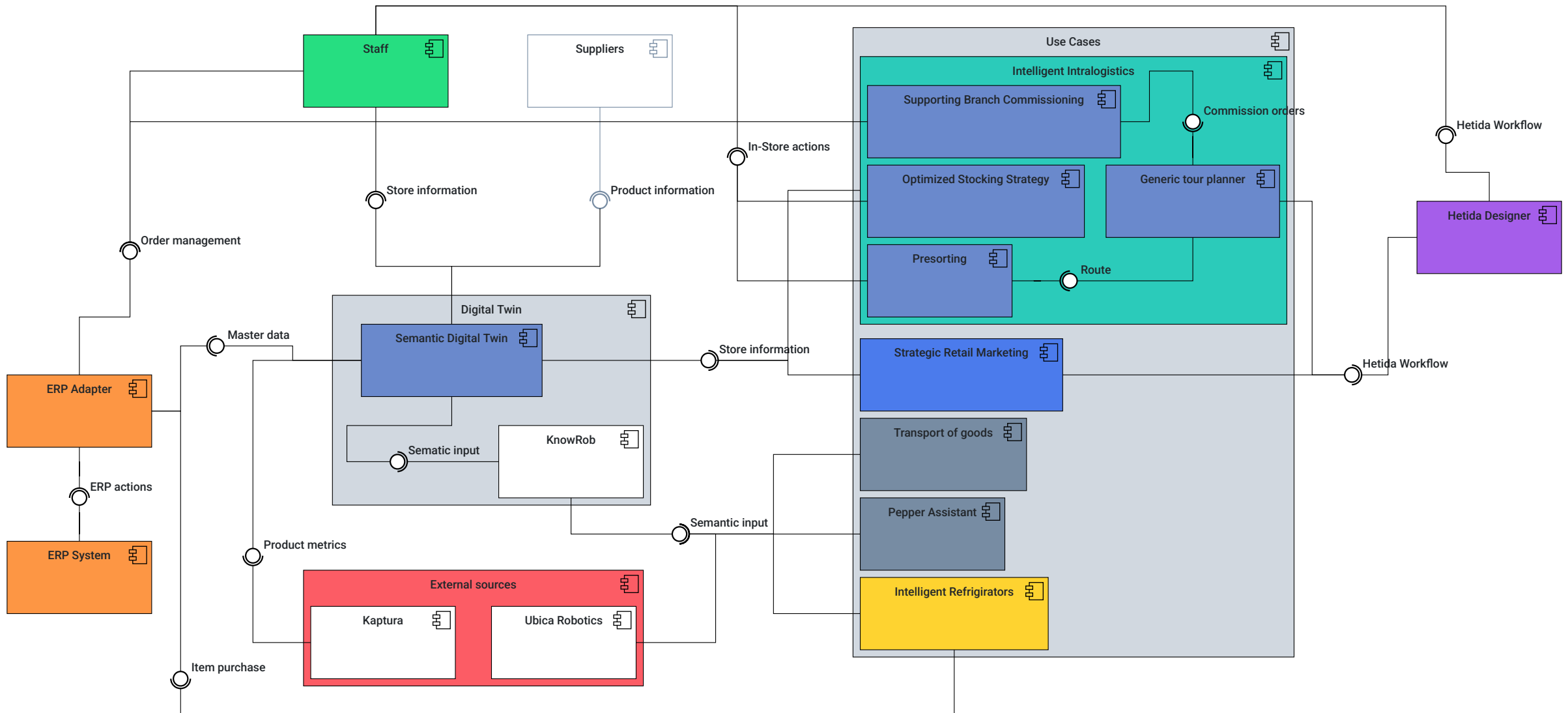


## Questioning

- Access roles
  - Components of the platform
  - Staff of supermarket chains
- On-Premise vs. Cloud

# Data flows of the platform

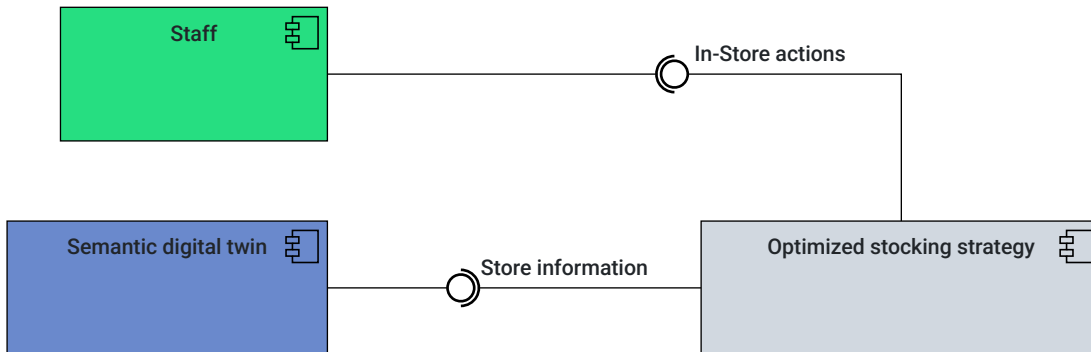
## Overview





# Data flows of the platform

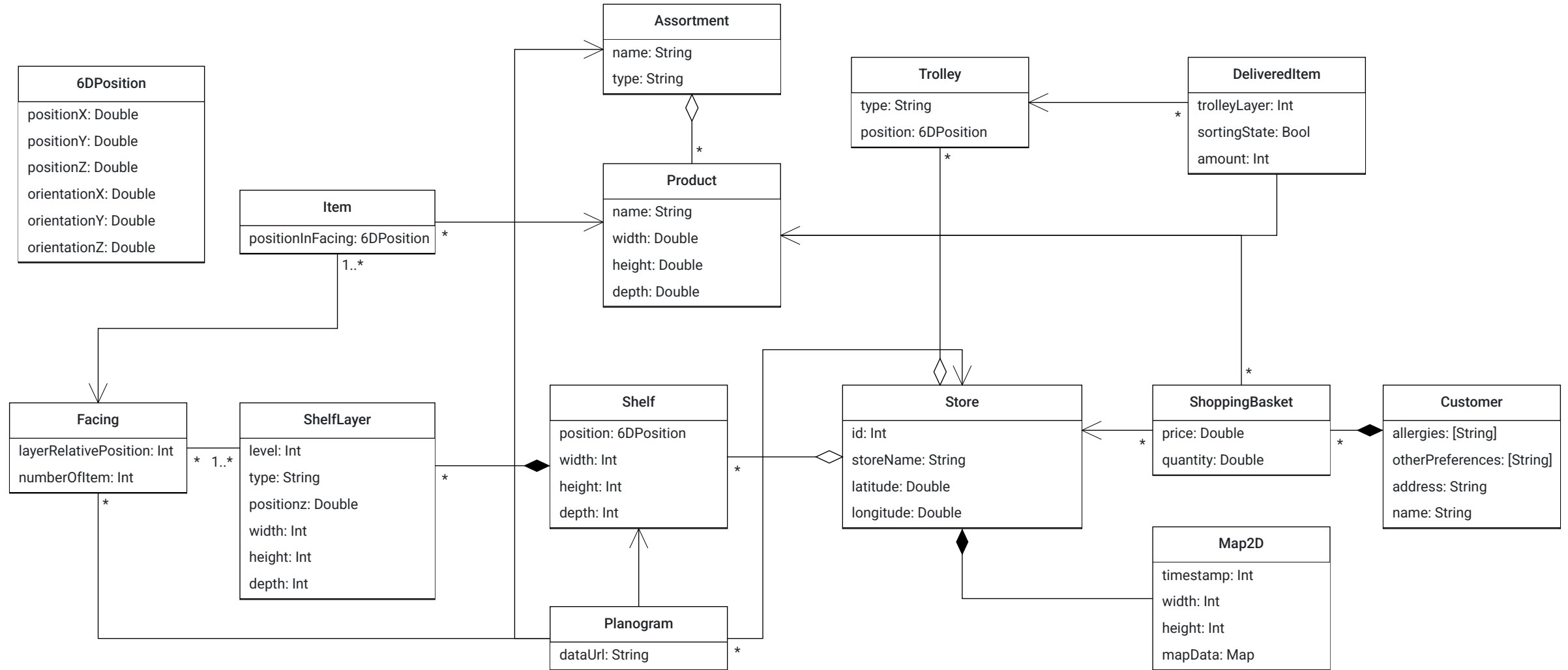
The example of the optimized stocking strategy





# Digital Twin and its access objects

## Overview



# Access control list of the digital components

## Overview

Role	St <sup>a</sup>	Pr <sup>b</sup>	As <sup>c</sup>	It <sup>d</sup>	Sh <sup>e</sup>	Fa <sup>f</sup>	Tr <sup>g</sup>	DI <sup>h</sup>	Ma <sup>i</sup>	CS <sup>j</sup>	Pl <sup>k</sup>	ERP
Optimized stocking strategy	r	r		r	r	r	r	r			r	
Generic tour planner	r	r	r	r	r	r			r			
Presorting	r	r		rw	r	r	rw	rw				
Support branch commissioning	r											r*
Strategic retail marketing	r	r	r		rw	rw			r	r	rw	r**
Intelligent Refrigerator	r	r		r	rw*	rw*				rw		a
Robot	r	r	r						rw			
Autonomous transport of goods					r	r	r	r				
Ubica Robotics				rw		rw					rw	
Pepper Assistant				r	r	r				rw	r	
ERP Adapter	r	rw	rw					rw				
Kaptura		a										

# Access control list of the digital components



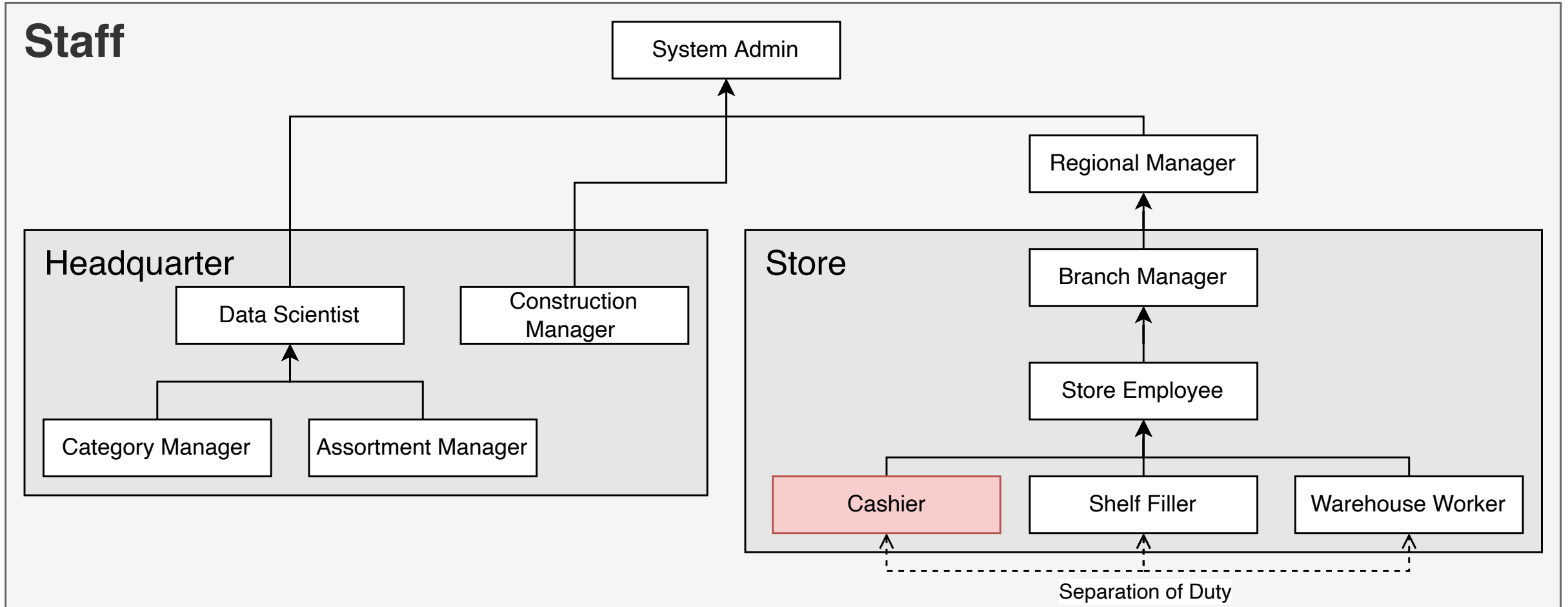
## Overview

Role	St <sup>a</sup>	Pr <sup>b</sup>	As <sup>c</sup>	It <sup>d</sup>	Sh <sup>e</sup>	Fa <sup>f</sup>	Tr <sup>g</sup>	DI <sup>h</sup>	Ma <sup>i</sup>	CS <sup>j</sup>	PI <sup>k</sup>	ERP
Optimized stocking strategy	r	r		r	r	r	r	r			r	
Generic tour planner	r	r	r	r	r	r	r		r			
Presorting	r	r		rw	r	r	rw	rw				
Support branch commissioning	r											r*
Strategic retail marketing	r	r	r		rw	rw			r	r	rw	r**
Intelligent Refrigerator	r	r		r	rw*	rw*				rw		a
Robot	r	r	r						rw			
Autonomous transport of goods					r	r	r	r				
Ubica Robotics				rw		rw					rw	
Pepper Assistant				r	r	r				rw	r	
ERP Adapter	r	rw	rw					rw				
Kaptura		a										

Role	Store	Product	Item	Shelf & Layer	Trolley	DeliveredItem	Planogram
<b>Optimized stocking strategy</b>	Read-only	Read-only	Read-only	Read-only	Read-only	Read-only	Read-only

# Role Hierarchy – Staff

A role has all rights of roles beneath





### Supermarket chains

- Company internal hosting
- Full control over system
- Possibility to enhance and change system to its needs



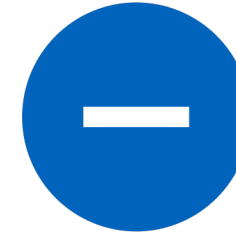
### Small retailers

- Cloud hosting through K4R
  - Less administration and setup

Two experts from implementation side and supermarket side



- General agreement with the chosen roles and data flows in the system
- Most chosen access rights were regarded as reasonable



- Implementation may differ from presented concept
- Minor suggestion for the chosen access rights





- Opinions on the functionality are not coordinated
  - Makes room for different interpretations
  - Concept serves as one possible solution



- Focus on dm as the only retail partner in the interviews

### Conclusion

- Created elements of a role-based access control concept for the K4R platform
  - All components and resources
  - Role hierarchies
  - Access rights
  - Hosting proposal

### Future Work

- Foundation for an access control concept of the platform
- Presentation of initial results for a hosting approach
- Providing an approach for conceptualizing an access control concept of an interdisciplinary project



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