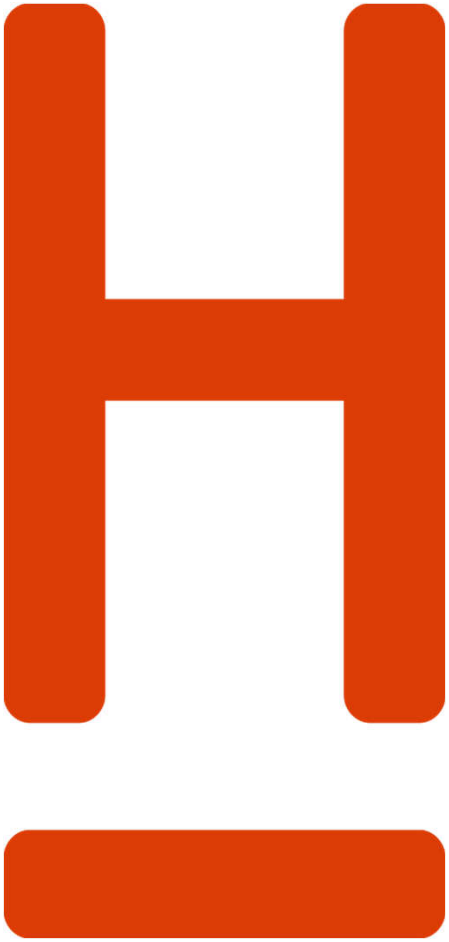
HOCHSCHULE
HANNOVER
UNIVERSITY OF
APPLIED SCIENCES
AND ARTS
–
Fakultät IV
Wirtschaft und
Informatik

Towards a Resiliency Decision Framework for Microservices



Authors: Johannes Busch, Arne Koschel, Andreas Hausotter

Presenter

Prof. Dr. Arne Koschel (IARIA fellow) is since 2005 a full professor for distributed systems at the Faculty of Business and Computer Science of the Hochschule Hannover, University of Applied Sciences and Arts Hannover, Germany. He has a long standing research and industry experience in distributed, smaller as well as large scale, information systems and middleware in general.

His current research interests include cloud computing, service based systems (microservices, SOA), distributed event processing and messaging, as well as middleware, and distributed applications in general. He has co-authored well over 100 peer-reviewed conference and journal articles as well as books on software architecture, distributed systems, and more.

Agenda

Introduction

- Motivation & Application Scenario

Resiliency Decision Framework

- Metamodel
- Suggestion Procedure
- Application
- Example

Conclusion and Future Work

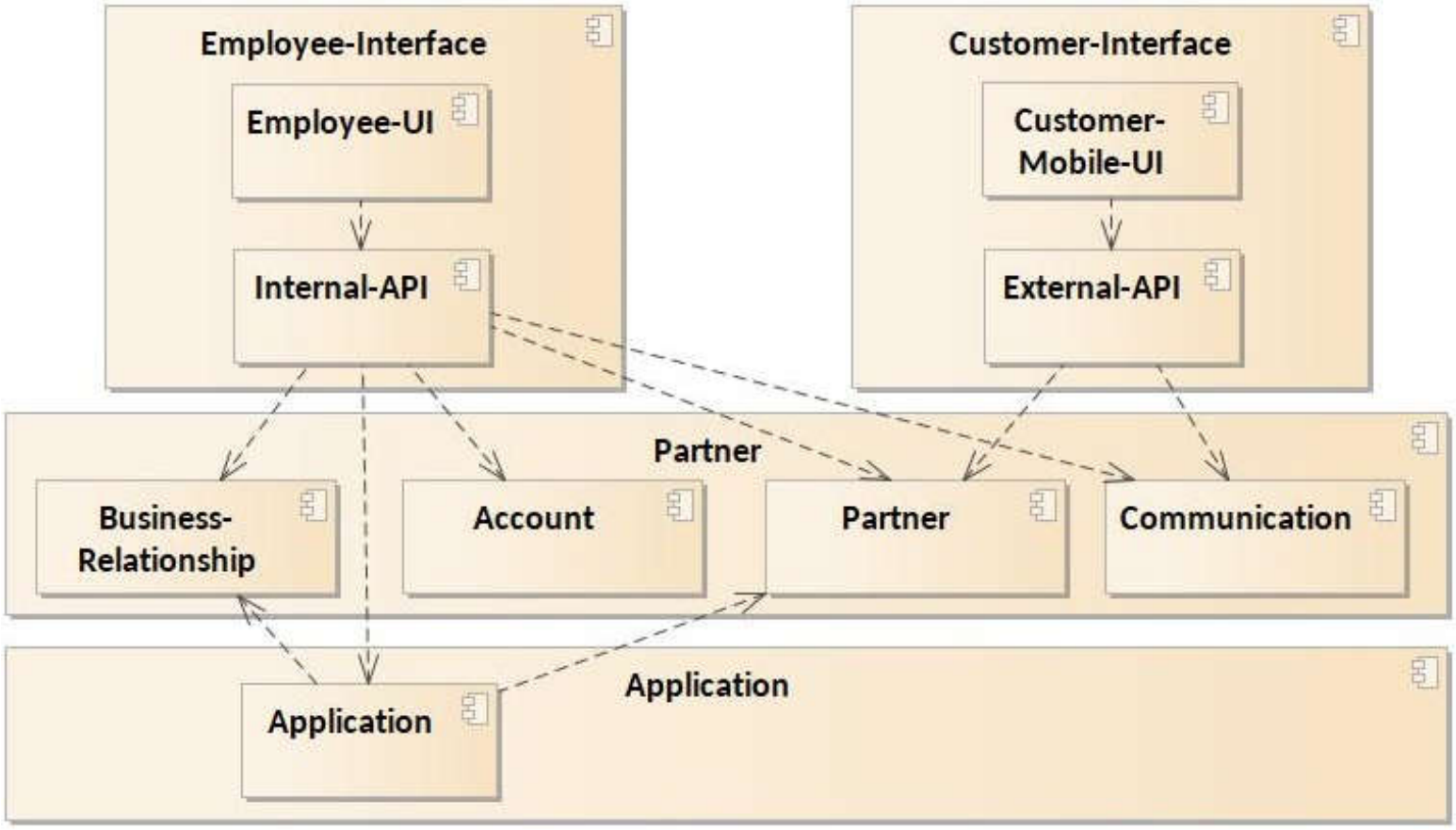
Introduction

Motivation

- Microservices offer strong **Benefits**:
  - Independency
  - Flexibility
- … but strong **Challenges**:
  - Distributed system
  - Many moving parts
  - Example: AWS Kinesis -> AWS Cognito -> AWS Service Dashboard

- **Resiliency** is important!
  - Service failures can’t be prevented
  - .. but many concepts & pattern are known

Application Scenario



- **Challenge:** Which resiliency concepts are best suited?

Resiliency Decision Framework

Resiliency Decision Framework (RDF) - Basics

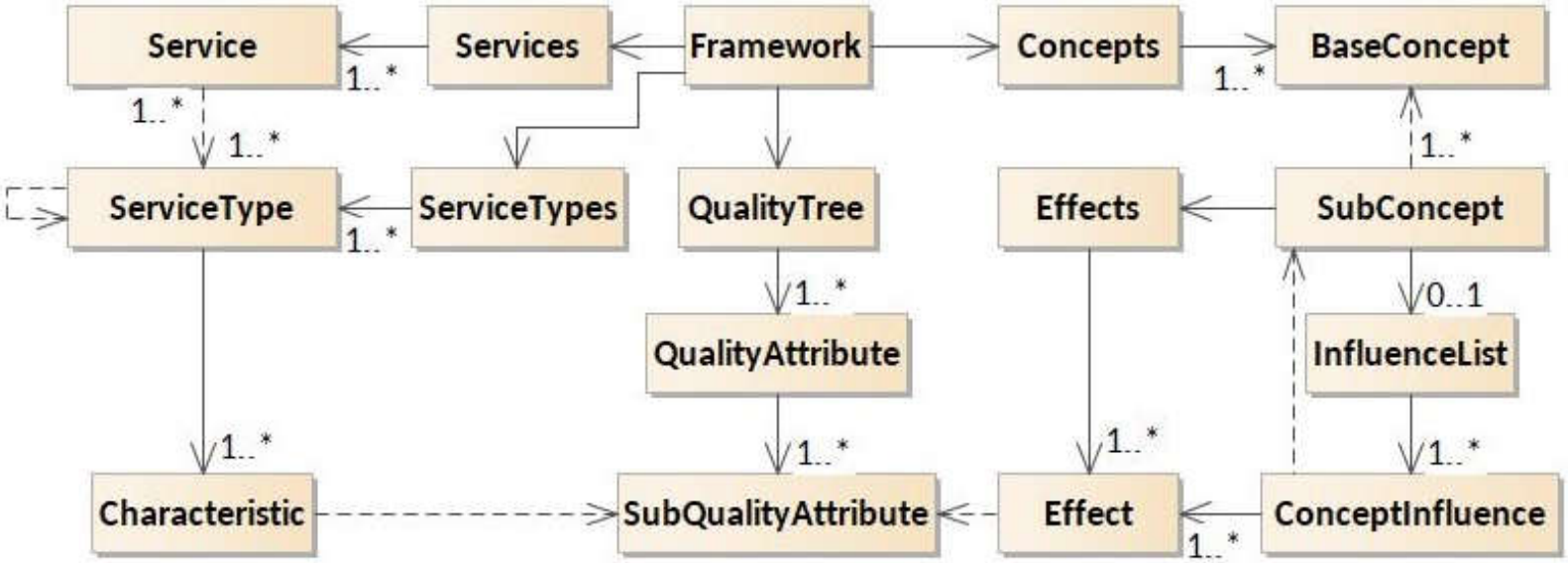
- **Analyzes**:
  - Service requirements
  - Resiliency pattern effects

- **Goal:**
  - **Sorted list of resiliency pattern**

- **General requirements:**
  - Technology independent
  - Flexible and universal

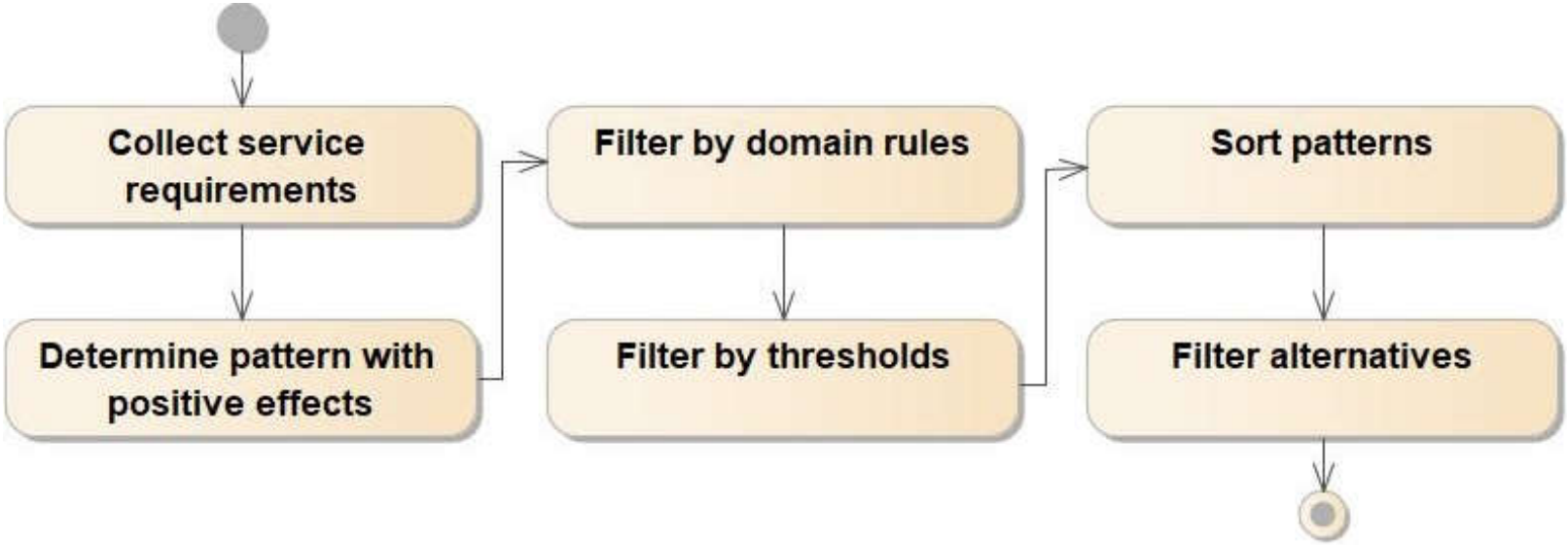
- *Out of Scope:*
  - Evaluation of specific QoS attributes (e.g. QoS Measurement Model)

Resiliency Decision Framework - Metamodel



- **Well defined schema for RDF:**
  - Basis for suggestion procedure
  - Presents services, concepts and their relationships

Resiliency Decision Framework – Suggestion Procedure

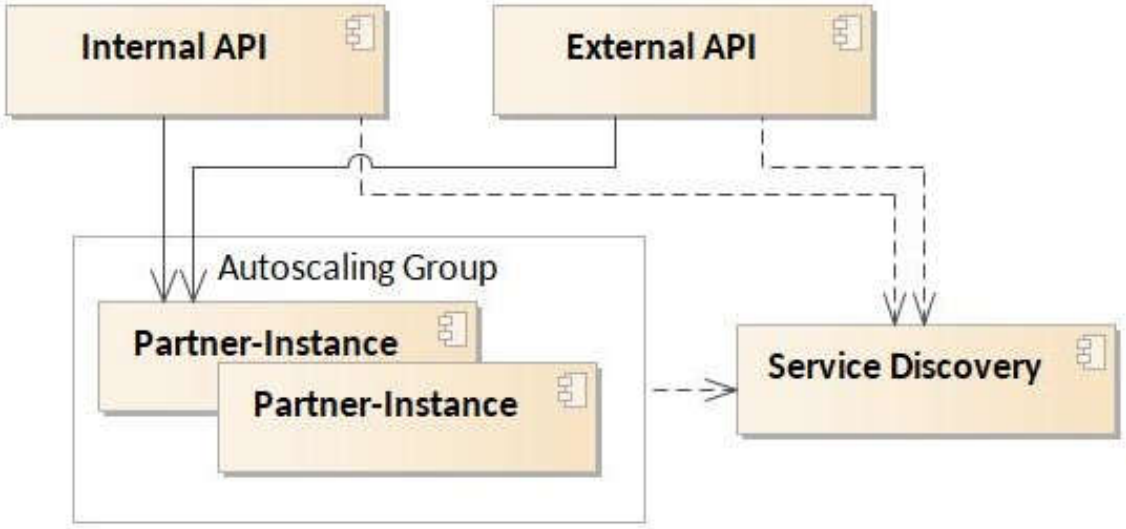


- **Determine positive patterns**
  - Through attribute matching
- **Filter by specific rules or attributes**
- **Sort** by evaluating each pattern against service requirements

Resiliency Decision Framework - Application

- **Develop catalogue:**
  - Focus on context and enhance pattern attributes
- **Define services:**
  - Based on requirements analysis
- **Application:**
  - Using the suggestion procedure
- **Implement patterns:**
  - Analyze technology specific implementations
- **Evaluate services:**
  - By analyzing QoS attributes

Resiliency Decision Framework - Example



- Partner Service **requirements:**
  - Central service -> high availability
  - Accessed by external customers -> offer minimal latencies

- Possible suggestions
  - Automatic scaling, escalation, monitoring

- … dependencies are analyzed e.g.
  - Automatic scaling needs load balancing
  - ➢ Minimal latency through service discovery

Conclusion and Future Work

Conclusion and Future Work

- **Conclusion**
  - Presented well defined Metamodel
  - Shown overview of suggestion procedure
  - Applied it minimal example

- **Future Work**
  - Development of quality tree for software resiliency
  - Development of resiliency pattern catalogue
  - Applying resiliency decision framework to application scenario

Thank You!