Microservices in Higher Education
Migrating a Legacy Insurance Core Application

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Agenda

CC_ITM@HsH

University of Applied Sciences and Arts Hanover (HsH)

- ~ 10.000 enrolled students

- Five faculties

- Wide range of courses

Competence Center Information Technology & Management (CC_ITM)

- Institute at the HsH

- Members: Faculty staff, industry partners (practitioners) of different areas of businesses.

- Main objective: **Knowledge transfer between university and industry.**

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whoami

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Agenda

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1. Introduction

2. Educational Context

3. Core Application: Partner Management System

4. Microservice Architecture: Partner Management System

5. Evaluation of Outcomes

6. Conclusion

Educational Context

Goals of Teaching at the HsH

- Professional competence

- Methodical expertise

- Social skills and self-competence

Educational Context
Practical Project

Hochschule Hannover, Studiengang B.Sc. Angewandte Informatik (BIN)					
Credits / **Semester**					
1	2	3	4	5	6
Programmieren 1	Programmieren 2	Programmieren 3	Webtechnologien	Wahlpflichtfach Informatik 1	Wahlpflichtfach Informatik 2
Grundlagen der Informatik	Datenbanksysteme 1	Datenbanksysteme 2	Software Engineering 1	Software Engineering 2	Praxisprojekt 2
Mathematik 1	Mathematik 2	Mathematik 3	Computergrafik 1	Computergrafik 2	Bachelor-Arbeit und Kolloquium
Theoretische Informatik	Statistik	Betriebssysteme und Netze 1	Betriebssysteme und Netze 2	Praxisprojekt 1	
Startprojekt	Algorithmen und Datenstrukturen	Programmierprojekt	Seminar		
Fachenglisch		Betriebswirtschaft	Erg. Fach BWL	Ergänzendes Fach 1	Ergänzendes Fach 2

Credits axis: 0, 5, 10, 15, 20, 25, 30

Educational Context
Educational Goals of the Practical Project

- Professional competence…

  → through independent elaboration and application of technical concepts with the supervision of experienced tutors.

- Methodical expertise…

  → through independent project management.

- Social skills and Self-competence…

  → through working in a larger autonomous team of students .

Educational Context
Practical Project

- Practical project as part of the bachelor's program (*"Potential and Challenges of Microservices in the Insurance Industry"*).

- Involved were:

  - 10 students (Applied Computer Science and Business Information Systems)

  - A postgraduate

  - Prof. Dr. Arne Koschel and Prof. Dr. Andreas Hausotter (co-authors)

  - Competence Center Information Technology and Management (CC_ITM)

  - Two local insurance companies

Goal was to work out the basics of microservices and to examine the suitability for the insurance industry.

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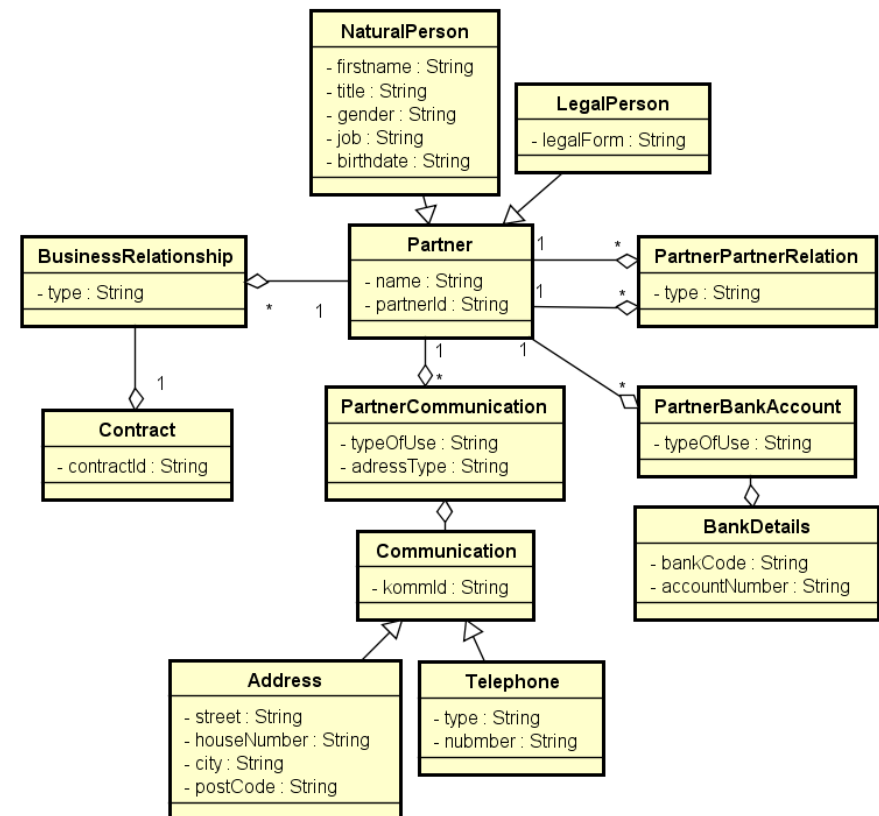
Core Application
Partner Management System

- A system for managing partners of an insurance company

- Based on the reference architecture for German insurance companies (VAA)

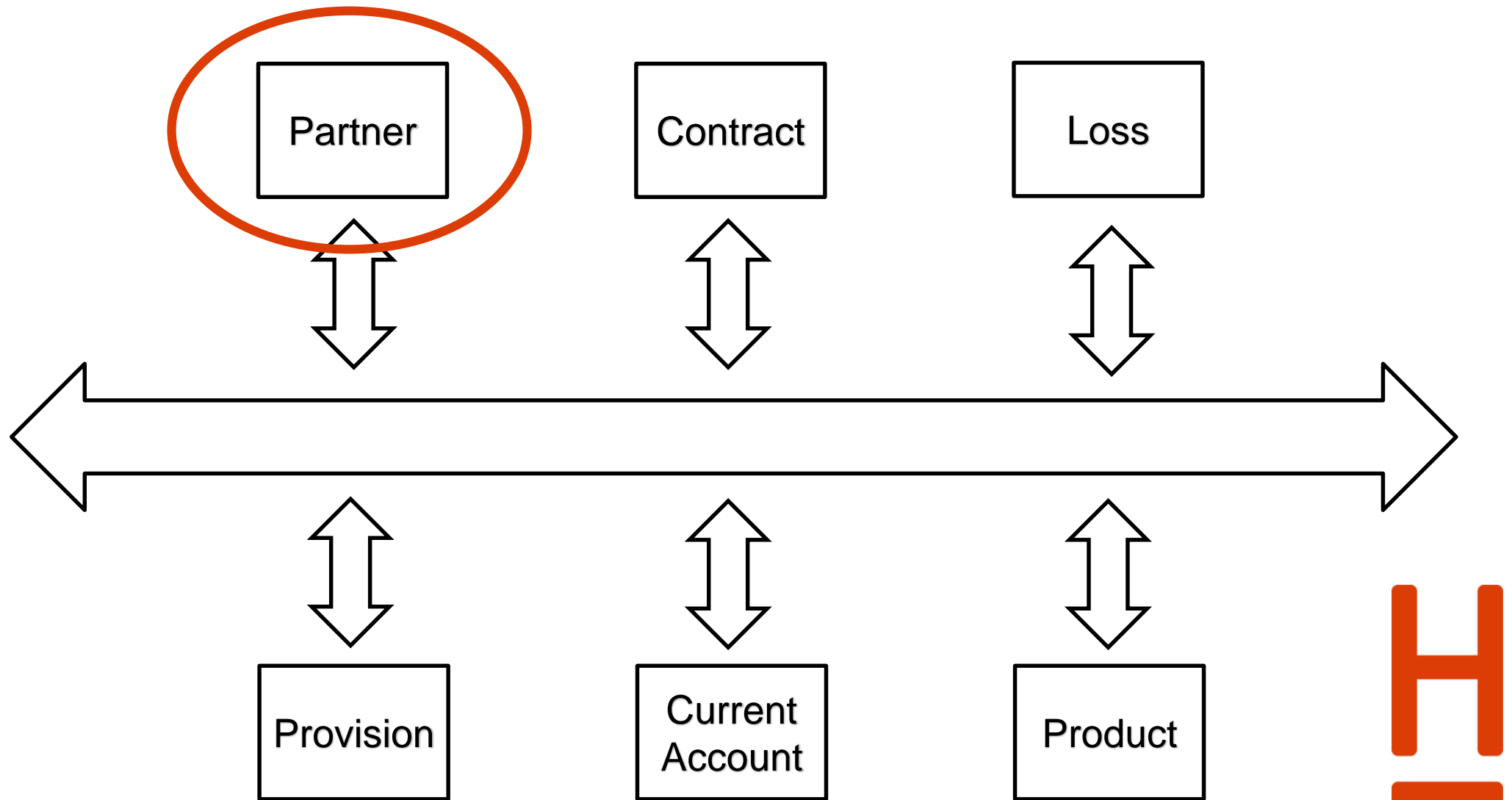→ Basically a CRUD application

Motivation:

- Currently implemented as a single deployment unit

- Heavily changing load distribution

- Poor flexibility, scalability and fault tolerance

→ Microservices approach

Core Application
Domains of VAA

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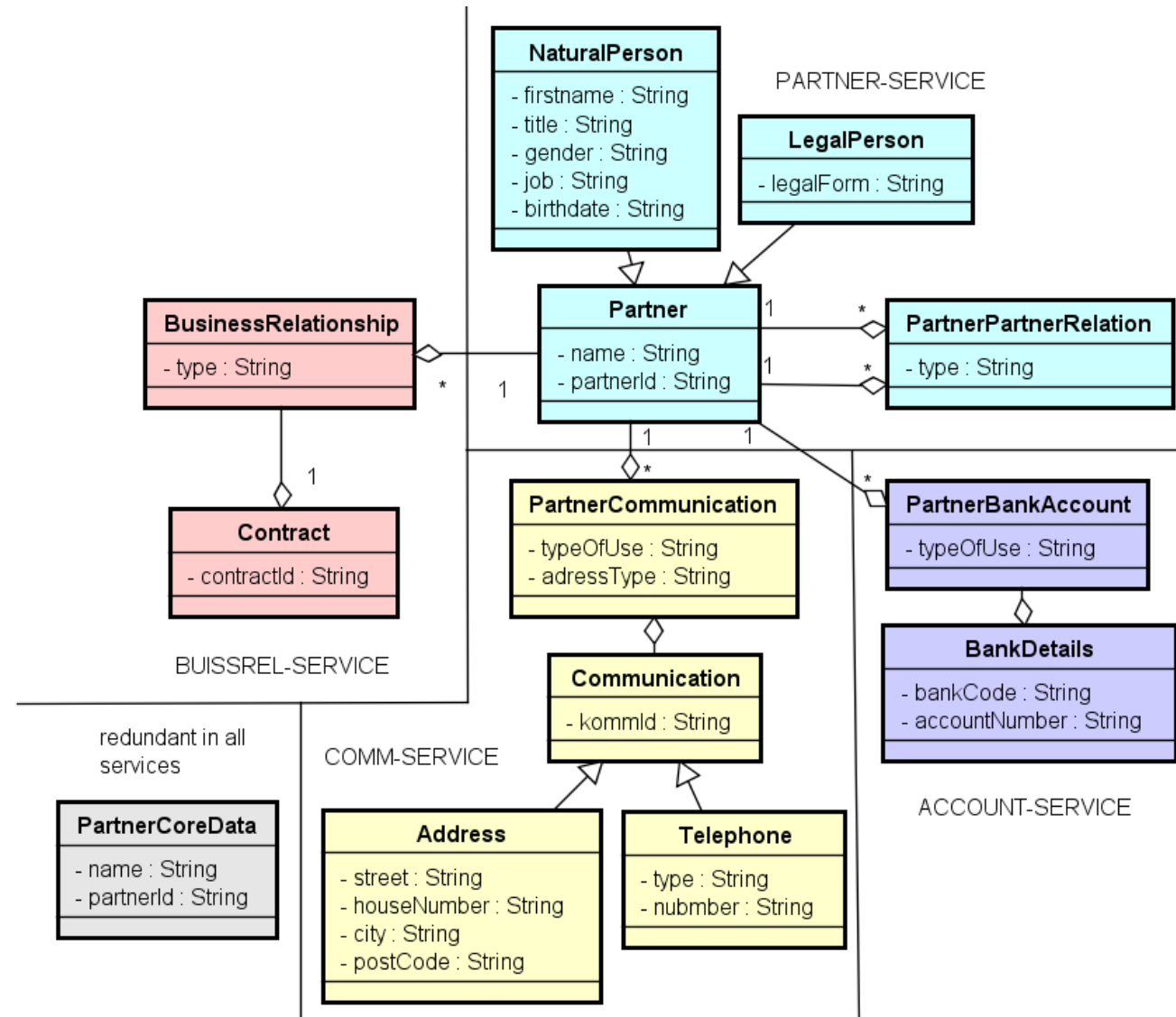5. Evaluation of Outcomes

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Microservice Architecture
Subdomains / Service Design
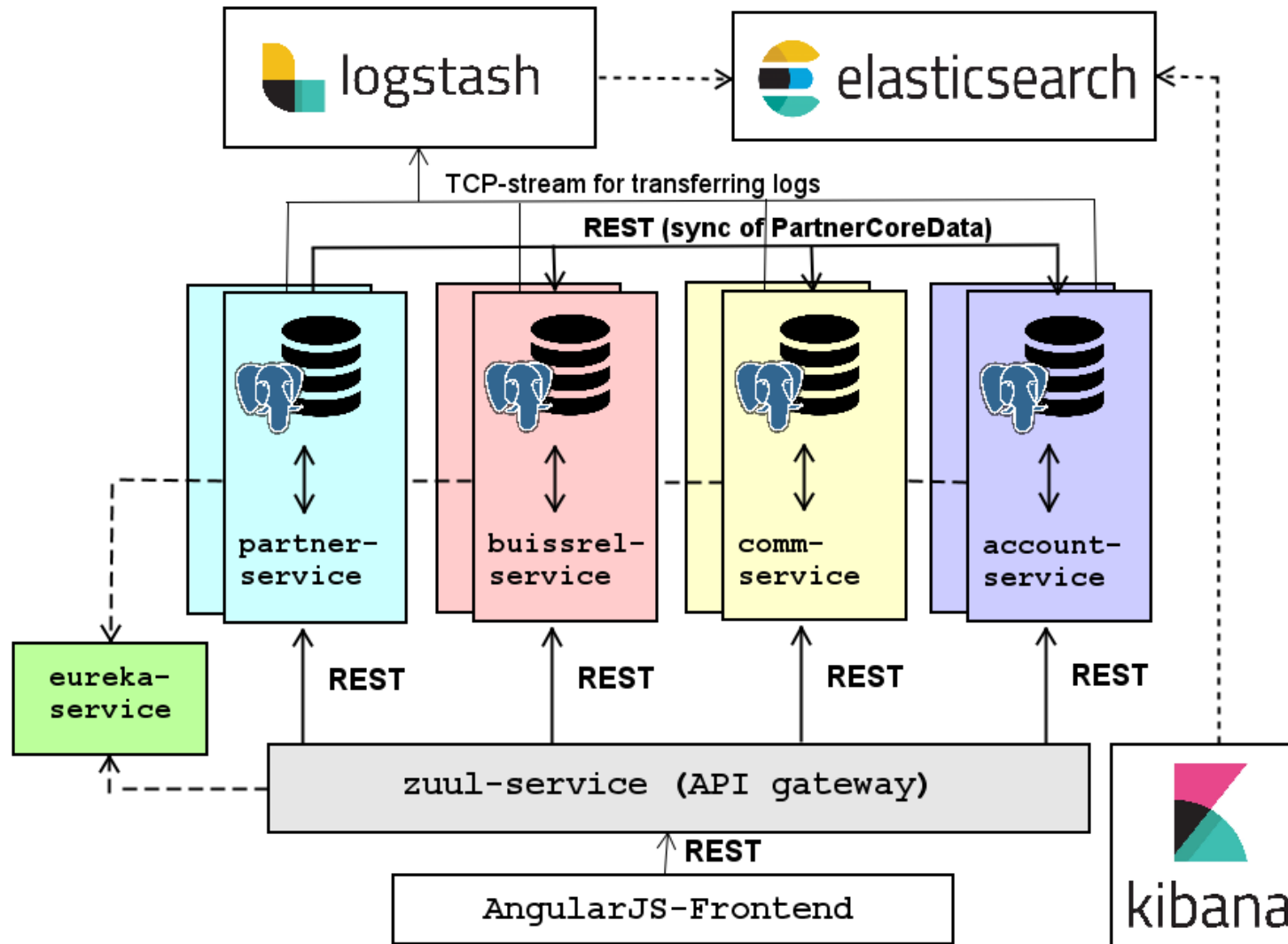
Determination of subdomains:

1. Definition of a common **ubiquitous language** for domain experts and project participants.

2. Analysis of the domain together with the domain experts.

3. Joint development of minimal useful subdomains and use cases.

→ Strongly inspired by DDD

Microservice Architecture
Partner Management System

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Evaluation of Outcomes

Business and technical

- The developed microservice architecture can guarantee the required scalability and fault tolerance.

- In parallel to the project, a development team at the insurance company came to a very similar result independently.

→ **Project results can be considered a success.**

BUT due to time constraints, consistency was <u>not</u> deepened.

→ Further works deal with this topic.

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Evaluation of Outcomes
Educational view

- Professional competence has been gained since…

  → the students became familiar with the microservices approach and successfully applied the newly acquired skills.

- Methodical expertise has been gained since…

  → the students independently selected and successfully applied the Scrum Framework.

- Social skills and Self-competence has been gained since…

  → the adoption of agile principles and living the 'Scrum values' required a high level of discipline and close cooperation of all project participants.

→ **Goals of teaching were fully fulfilled (proved by the results).**

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Conclusion

- Students have worked with regional companies and real-world tasks.

- Students have successfully designed and implemented a microservice architecture.

- Students had an enormous increase of professional competence, methodical expertise, social skills, and self-competence.

- Also great advantages for the companies

In summary, the presented model of teaching can be highly recommended.

Thank you for your attention!

Sources

[1] University of Applied Sciences Department of Computer Science and Arts Hannover. Study Guide Faculty IV, Dept. of Computer Science. https://f4.hs-hannover.de/fileadmin/media/doc/f4/Studium/Bachelor_Studiengaenge/BIN/Study_Guide_Course_Catalogue_HsH_Computer_ Science_2014.pdf, 2014. Acc: 11.11.2018.

[2] Martin Fowler and James Lewis. Microservices a definition of this new architectural term. https: //martinfowler.com/articles/microservices.html, March 2014.

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