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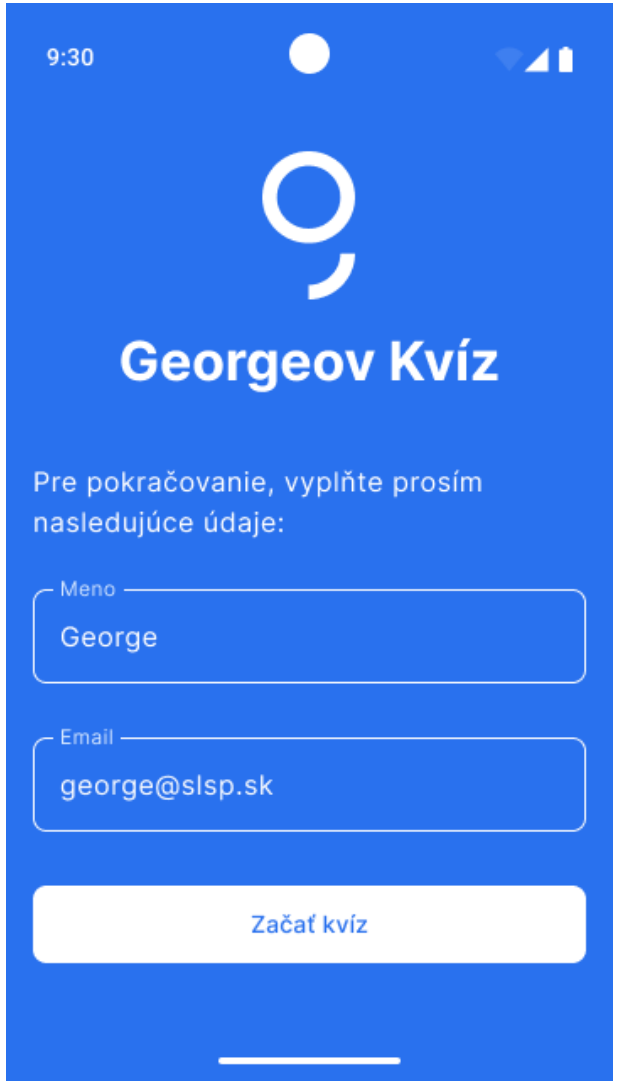
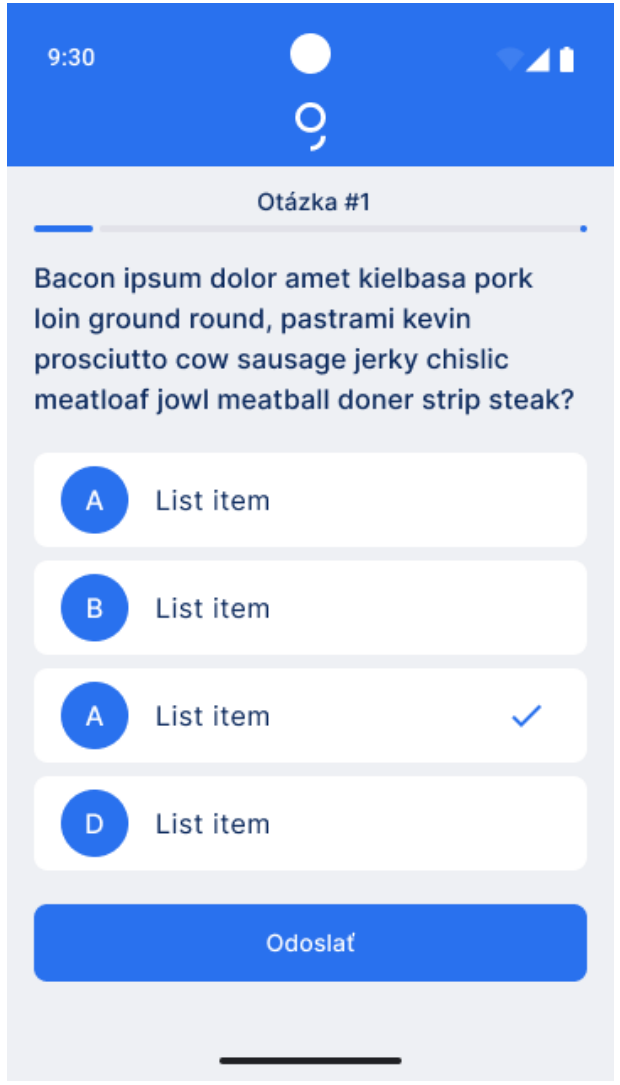
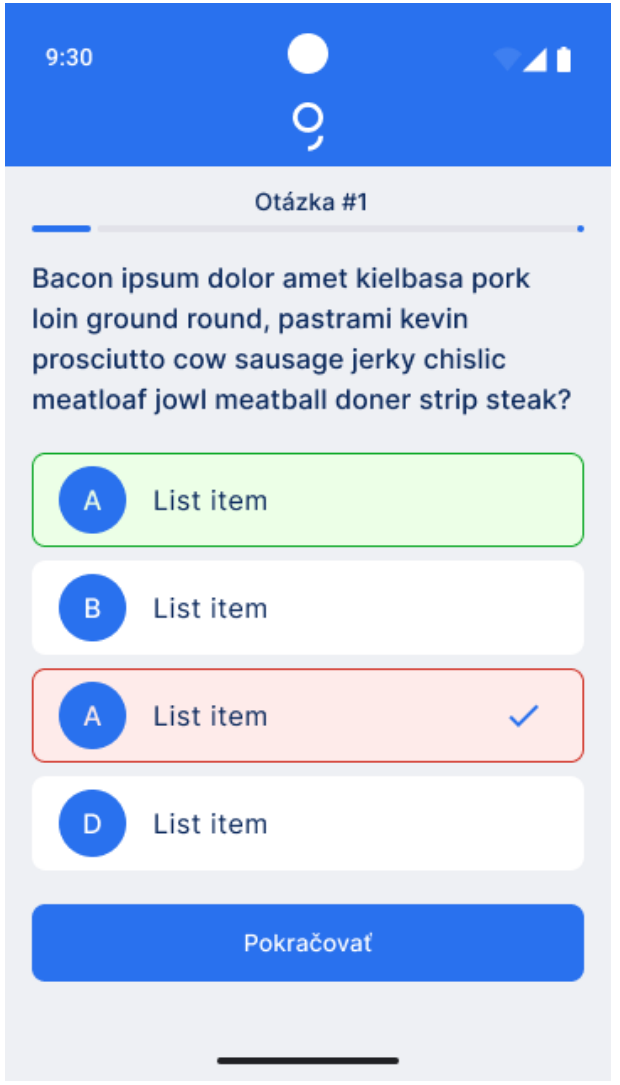
How IT in banking works

Tomáš, Martin, Martin
FEI STU, 20.3.2024

Demo application







DEMO APLIKÁCIA

Try it out!

Business Analysis

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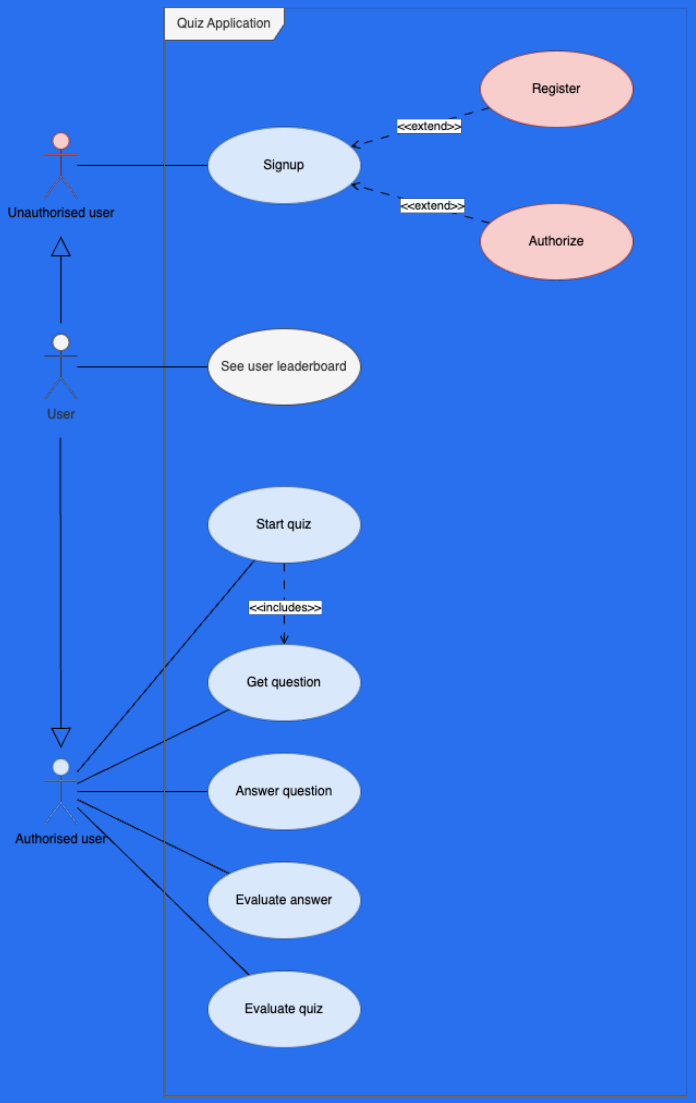
BA Drivers

- Company Strategy
- Group Strategy & Initiatives
- BA/PO Initiatives
- Inter-Team Dependencies
- Compliance & Regulations

Business Requirements

- Solve business problem
- Achieve business objectives
- Business Assignment = Proposal for the change
- Quiz Demo - BA



User Experience

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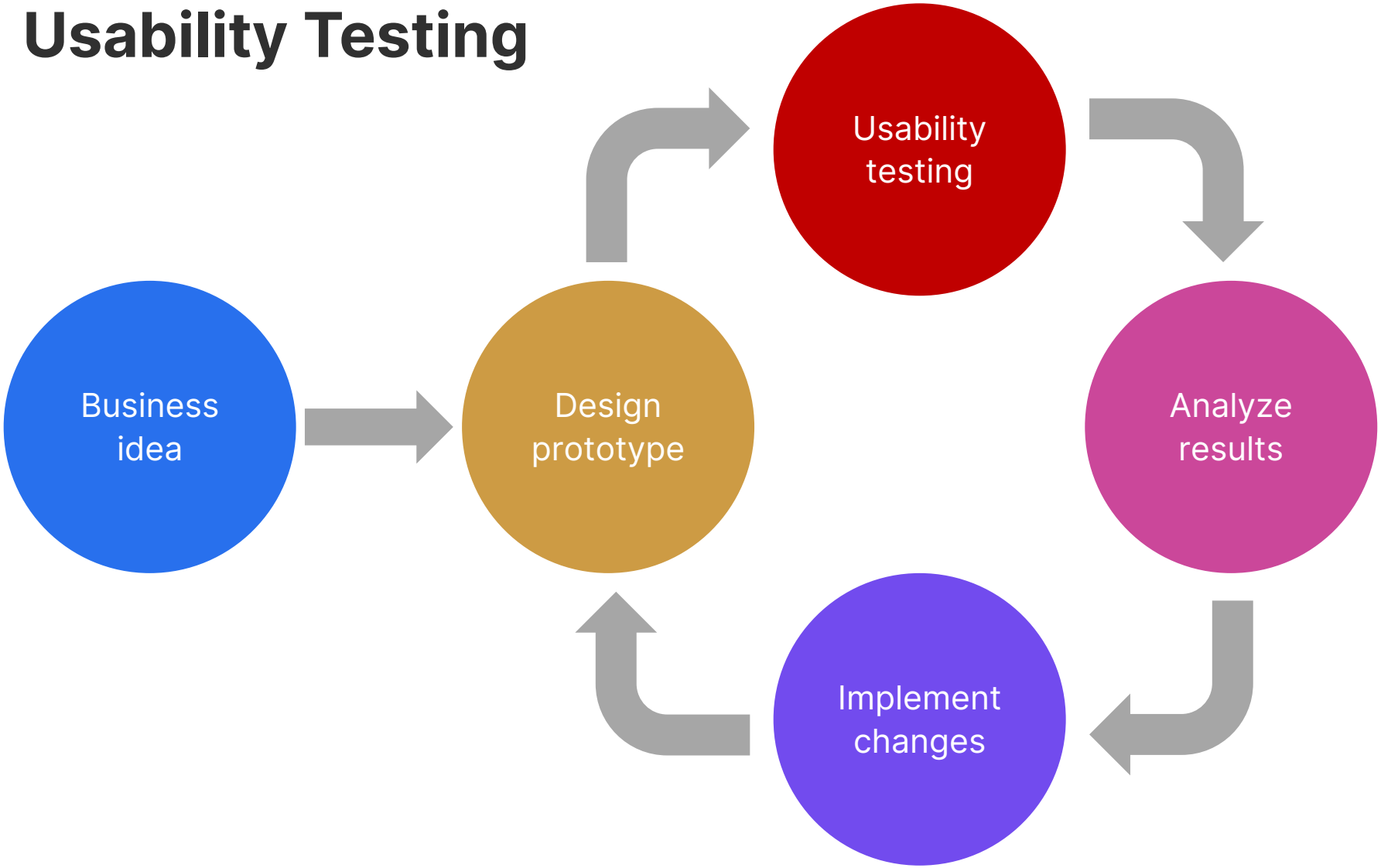
1. Data analysis

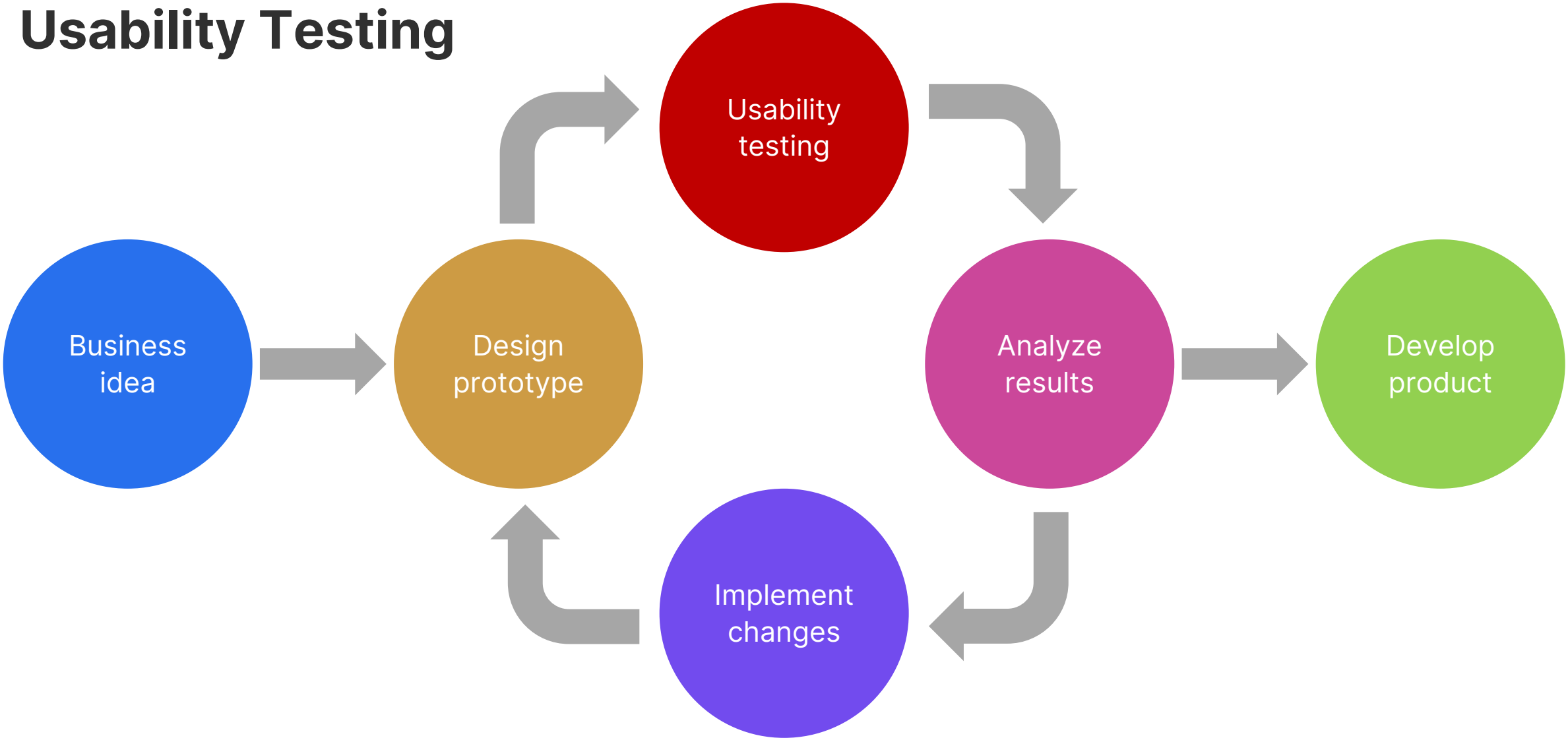
2. Quantitative research

3. Qualitative research

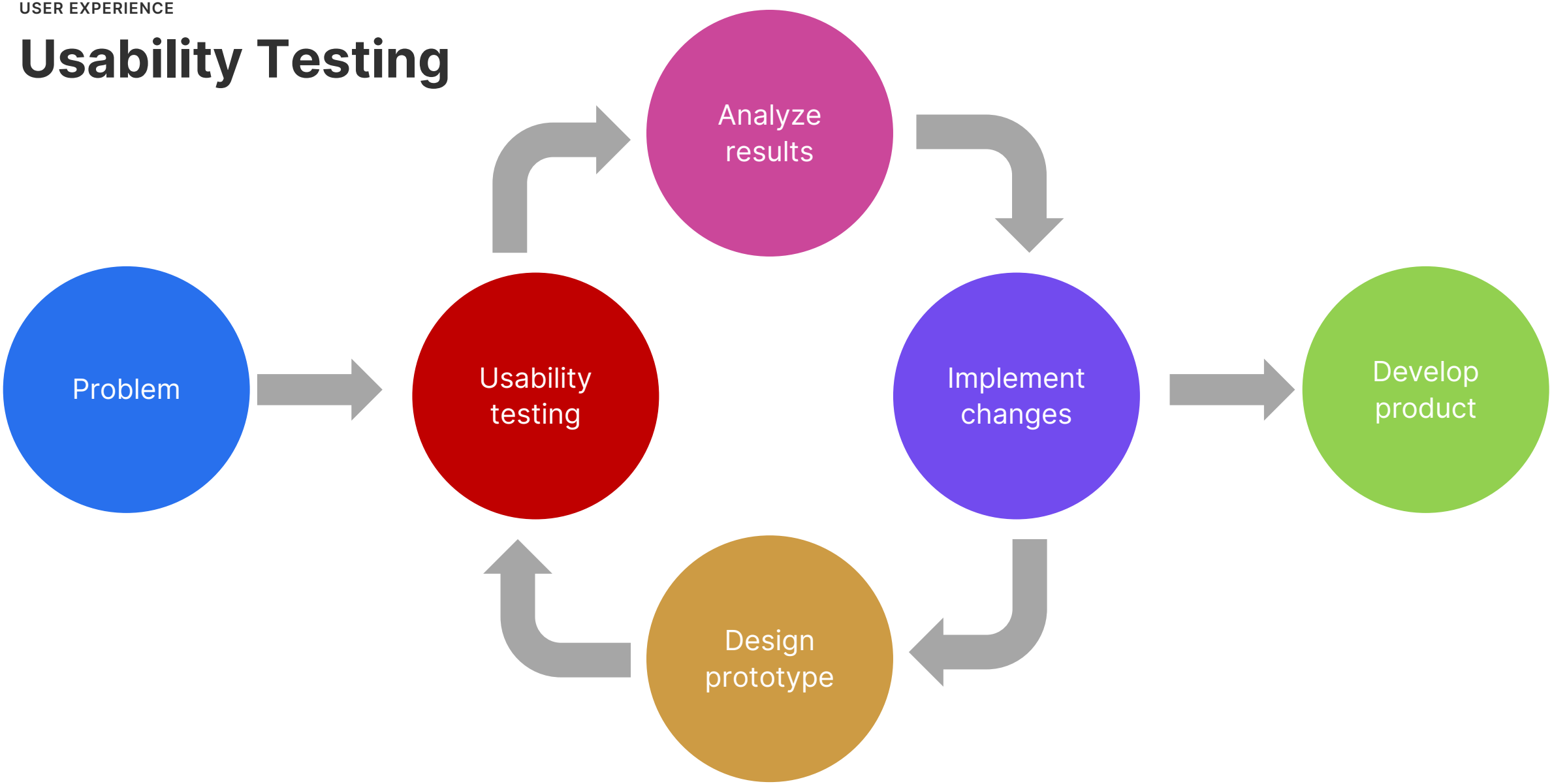
Usability Testing



Usability Testing



Usability Testing



Solutions Architecture

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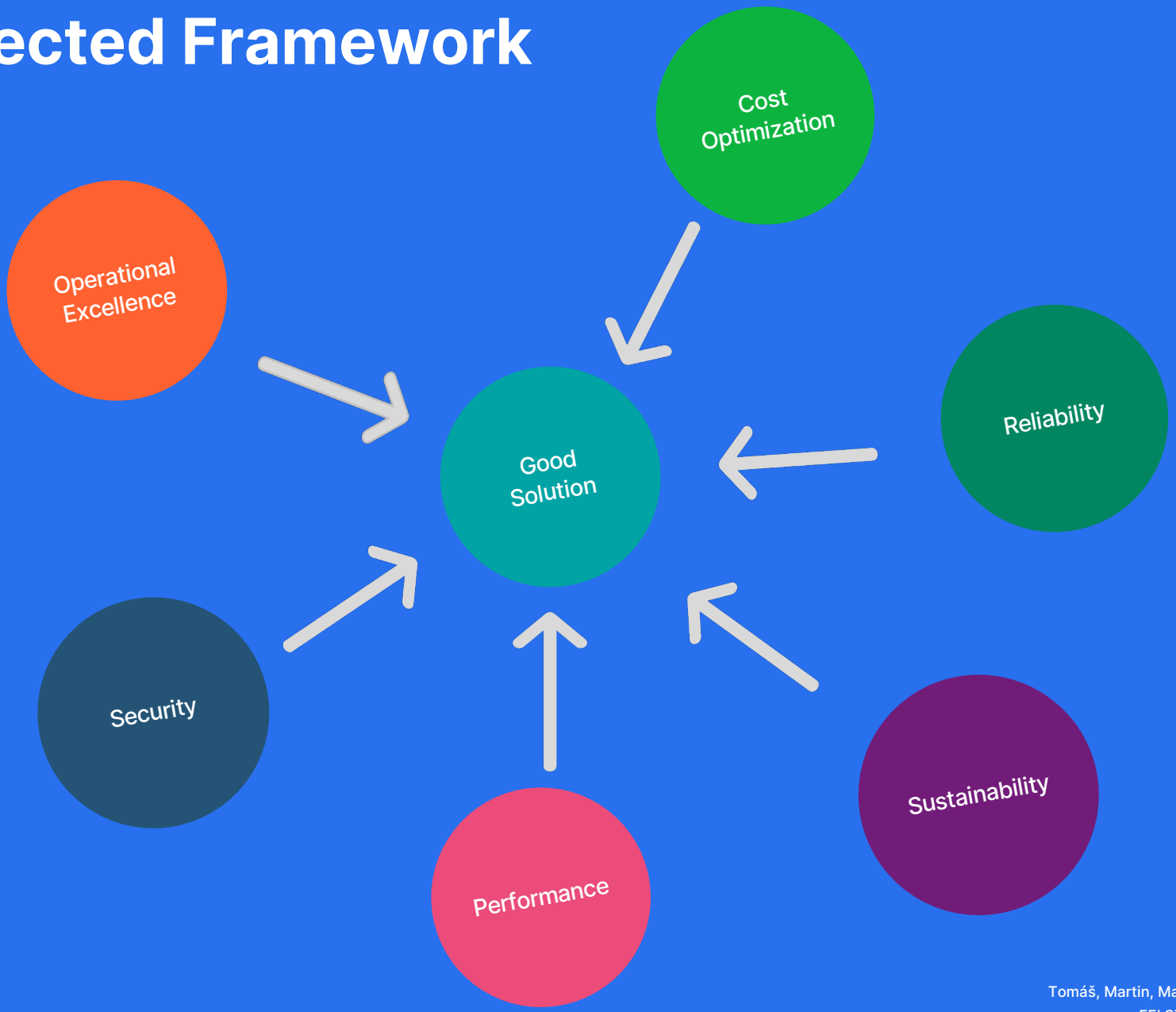
From Goal to Solution Design

- Understand Business Requirement
- Well-architected Framework – 5 (6?) Pillars
- Bottlenecks and Alternatives
- Describe and Draw Everything
- Repeat First Step Until the Solution is Done :-)

Understand Business Requirement

- What client said:
  - I want to use a online quiz application to understand client needs
- What client means:
  - 24/7 availibility, simple and fast, configurable and reusable, reports on demand, more quizzes at once?, ...

Well-architected Framework

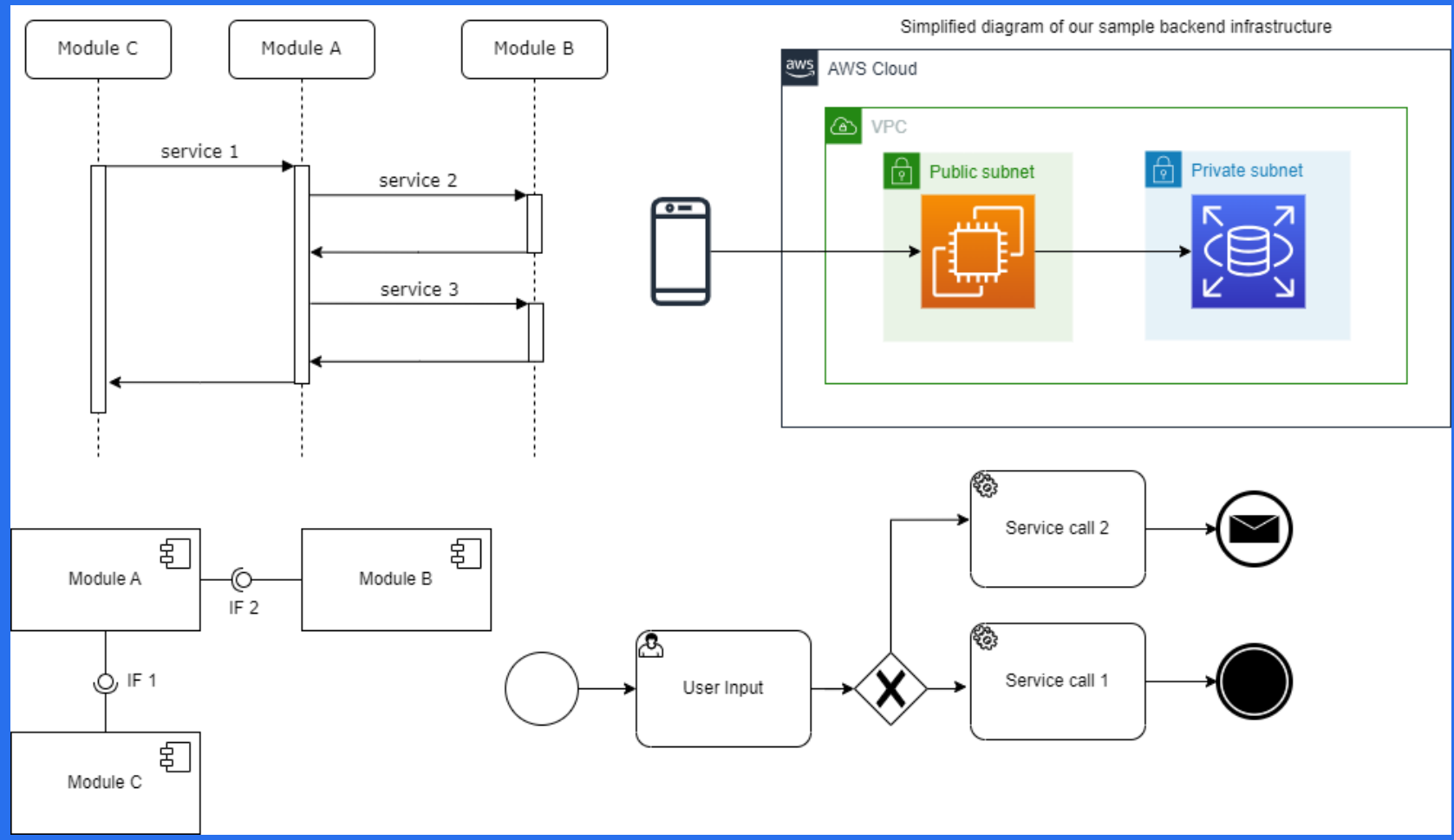


Bottlenecks and Alternatives

- Each requirement affects another requirements
  - Security vs. Performance
  - Robustness vs. Price
  - Reliability/Sustainability vs. Time to delivery
- Each solution has at least 2 more alternatives

Describe and Draw Everything

- UML and diagrams are the common language of every project participant



IT Analysis

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Finding the solution

- Business Requirements Analysis
- Solution Design

BA

ARCH

IT
ANA

PM

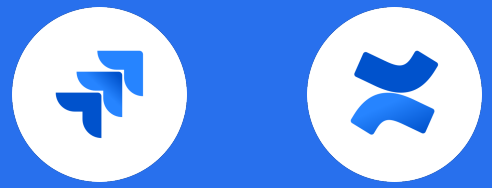
BE
DEV

FE
DEV

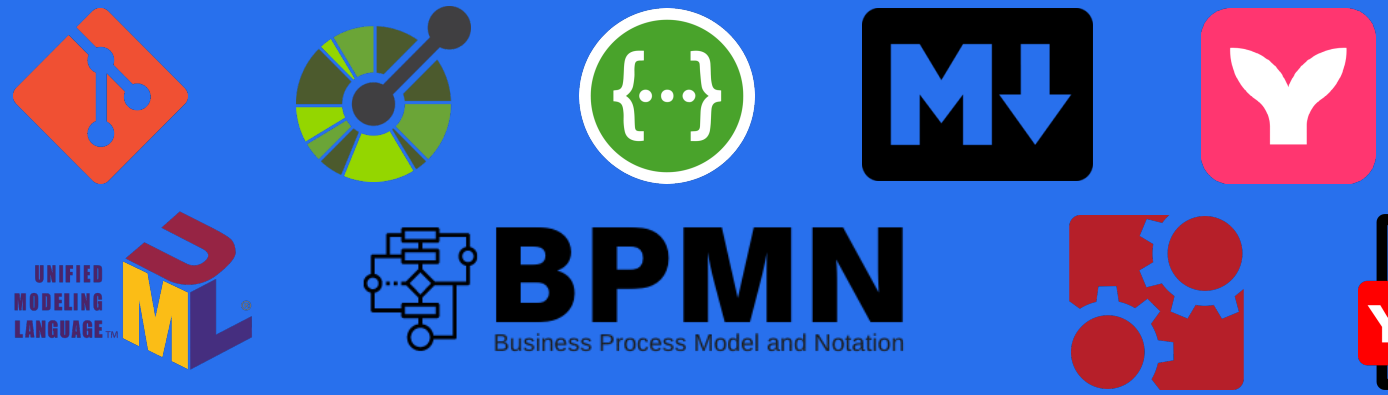
TEST

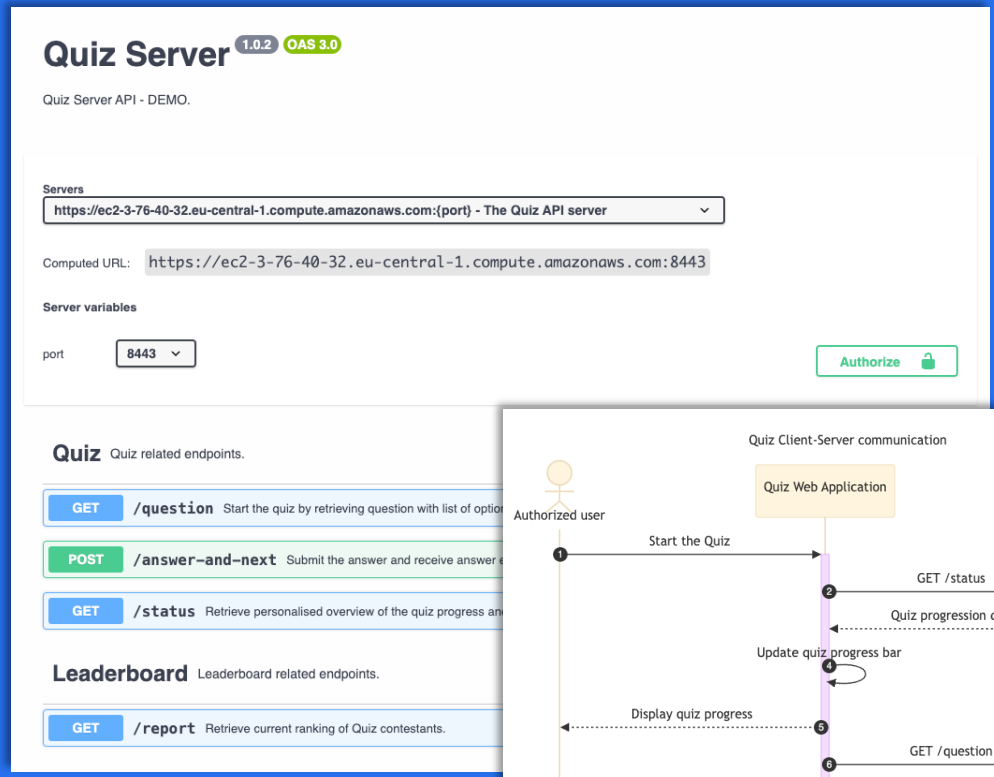
Artefacts

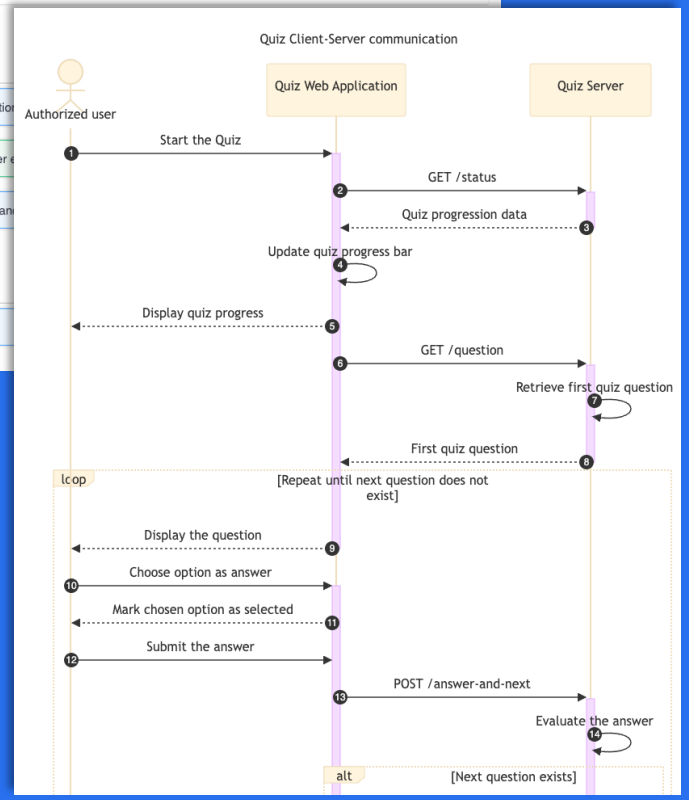
- Impact Analysis



- Functional Specifications







Frontend Development

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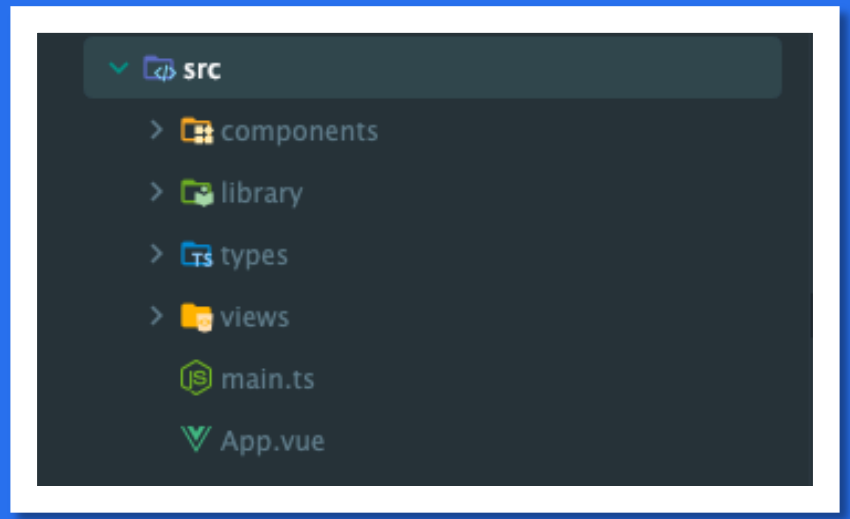
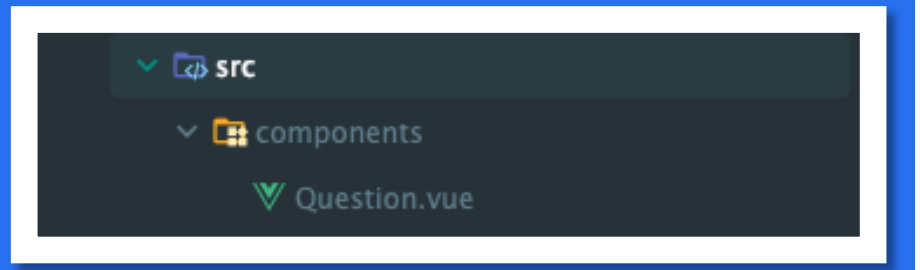
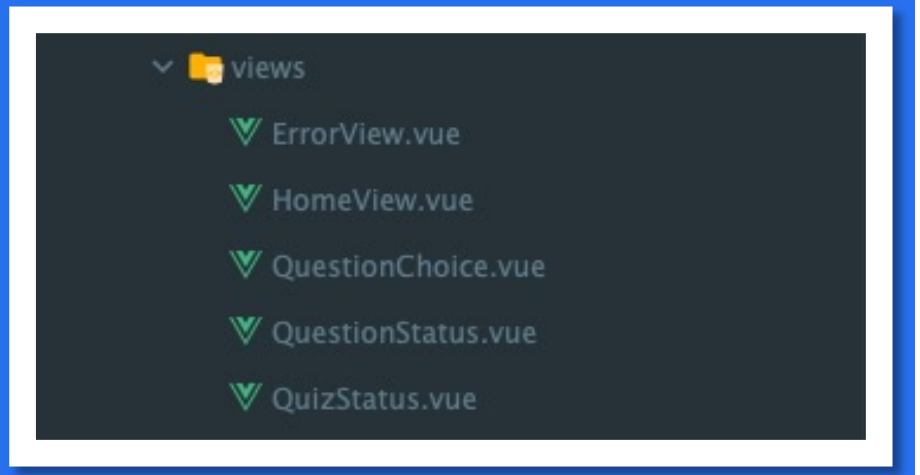
Idea behind our Frontends

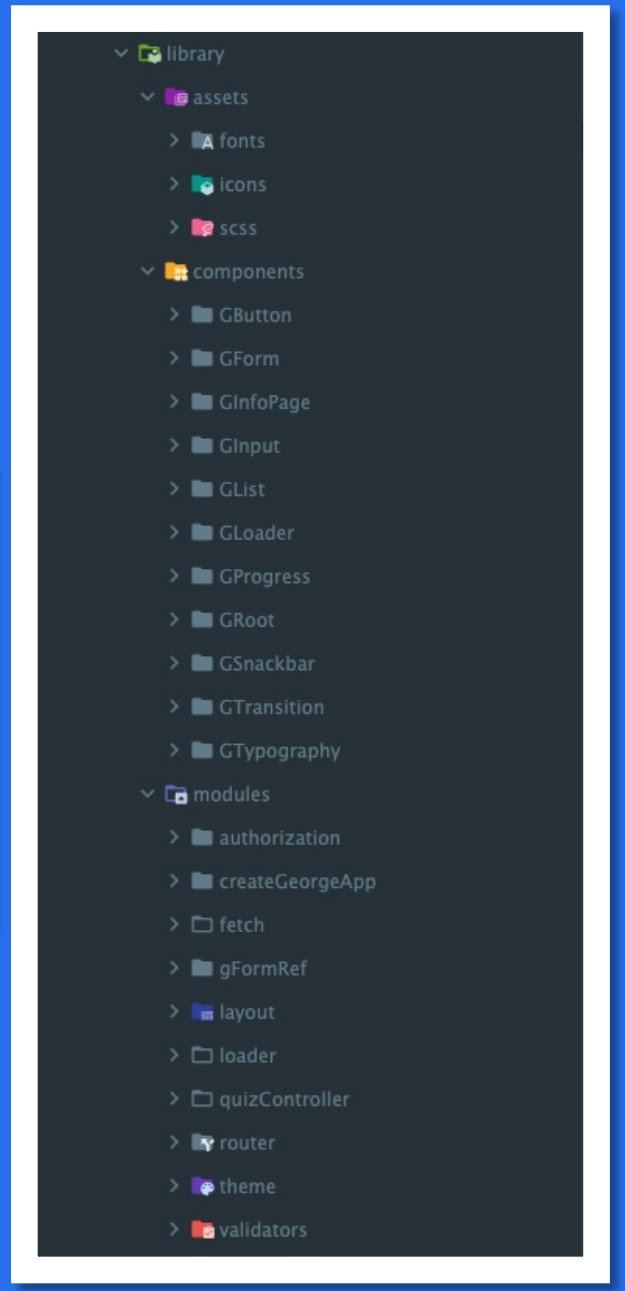
- Vue.js + Typescript
- Headless FE managed by BE
- Abstraction
- Modularization
- Composability

File structure









Abstraction

GInput.vue

```vue
<script setup lang="ts">
import { VTextField } from 'vuetify/components';
...
</script>

<template>
  <VTextField
    :label="props.label"
    color="text-inverted"
    flat
    variant="outlined"
    class="g-text-field--inverted"
    :rules="rules"
    :model-value="props.modelValue"
    @update:model-value="$emit( event: 'update:modelValue', $event)"
  />
</template>
```

No impact on APPs when changing 3rd party libraries

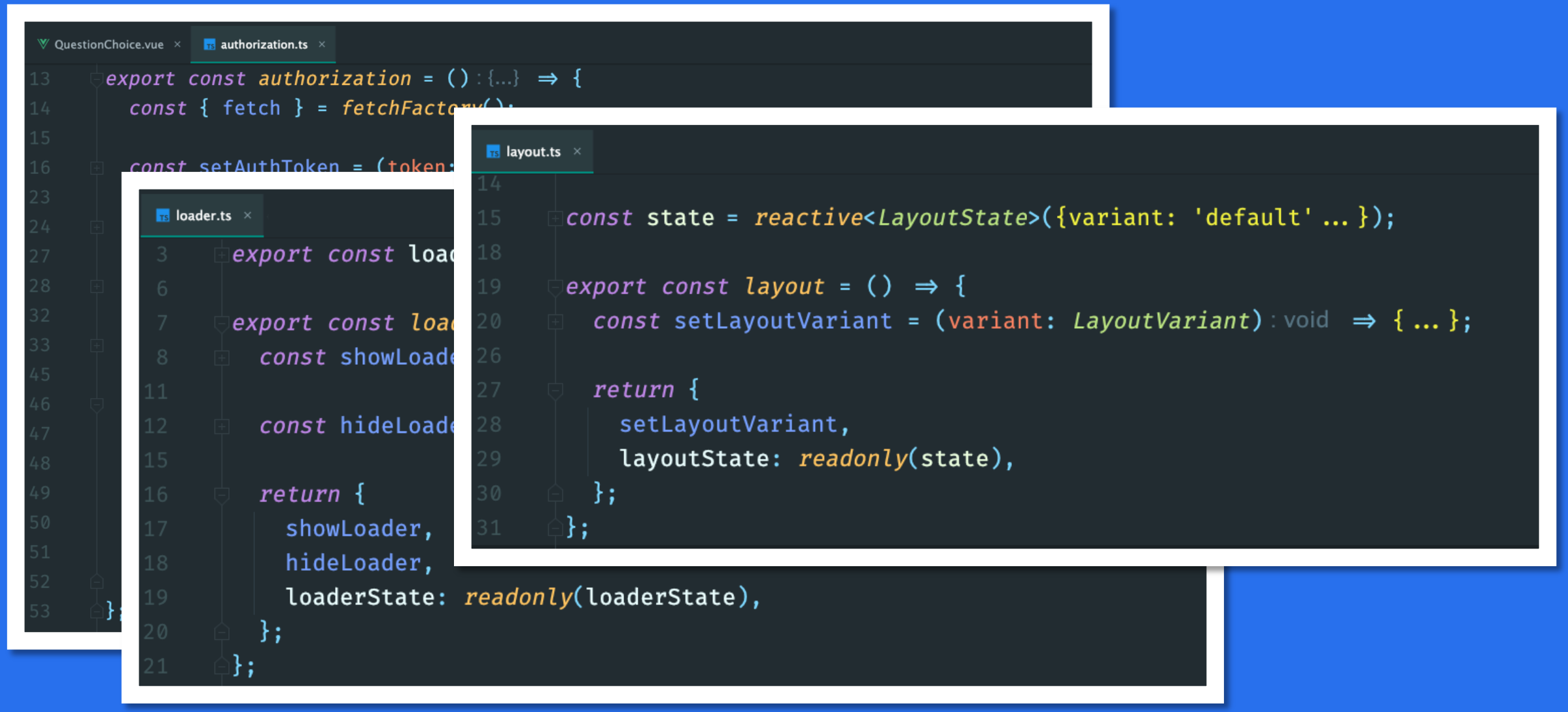
HomeView.vue

```
35  <template>
36    <GInfoPage title="Georgeov Kvíz">
37      <GText color="text-inverted" class="mb-6">
38        Pre pokračovanie, vyplňte prosím nasledujúce údaje:
39
40
41
42
43
44
45
46
47
```

QuestionChoice.vue

```
1   <script setup lang="ts">
2   import { quizController } from '@/library/modules/quizController/quizController';
6   const { quizState, answerQuestion } = quizController();
7   ...
22  const completeView = (newValue: string) => {
23    answerQuestion( {selectedOptionId}: { selectedOptionId: newValue });
24  };
25  </script>
```

Modularization



Composability

```
quizController.ts
45  export const quizController = (){...} => {
46    const { protectedFetch } = fetchFactory();
47    const { showLoader, hideLoader } = loader();
48    const { push } = router;
49
60    const starQuiz = async () => {
61      showLoader();
62
63      const response = await protectedFetch<QuizQ
64        url: '/question',
65        method: 'get',
66      });
67
68      await quizStatus();
69
70      state.questionData = response.data;
71      await push(Route.QuestionChoice);
72      hideLoader();
73    };
117   ...
124 };
```

🚫 Classes, ✅ Factory functions

```
function createCounter() : {delayedIncrement: function(): void, increment: function(): void}  {
  let count : number  = 0;

  function increment() : void  {
    count++;

  }

  function delayedIncrement() : void  {
    setTimeout( handler: () : void  => {
      increment();
    },  timeout: 1000);
  }

  return {
    increment,
    delayedIncrement
  };
}

const { delayedIncrement } = createCounter();
delayedIncrement();
```

Backend Development

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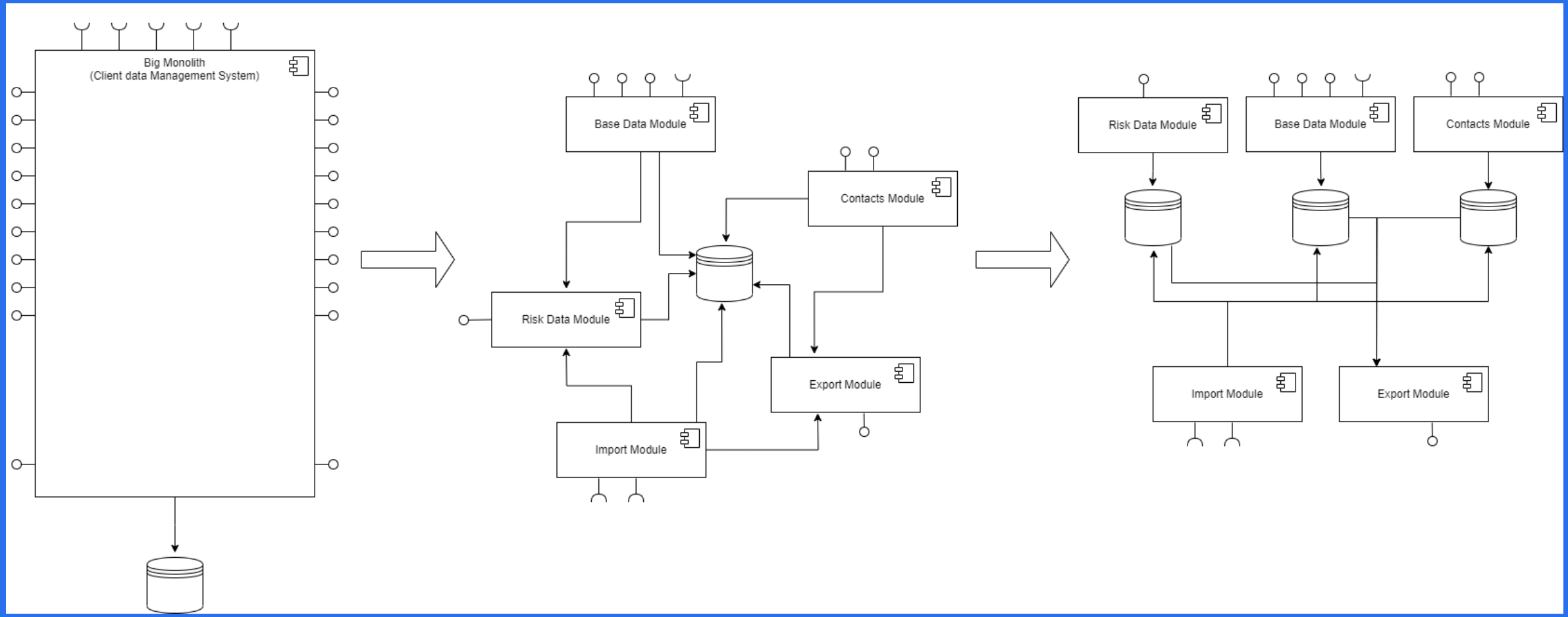
Tomáš, Martin, Martin (Sharkey)
FEI STU, 20.3.2024

Modern App in a Large Modern Bank

- From (Distributed) Monolith to Microservices
- Domain Driven Design & Hexagonal Architecture
- Technology Stack that Helps Us
- Modern App is Never Done

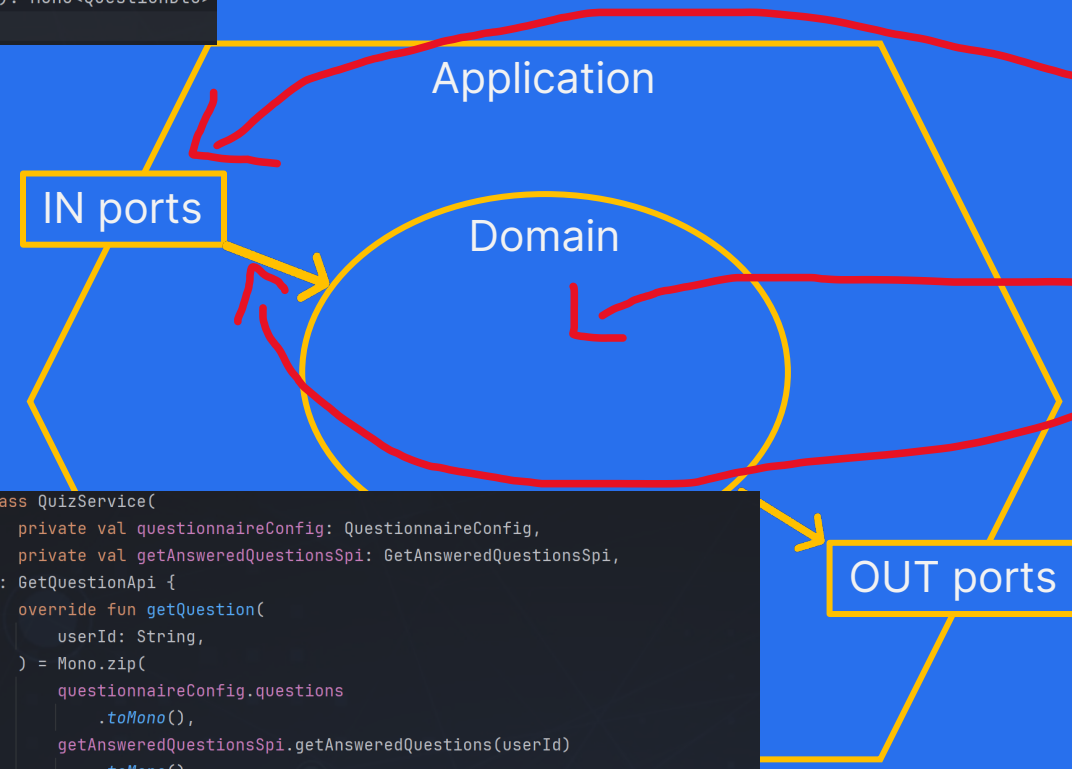
From (Distributed) Monolith to Microservices



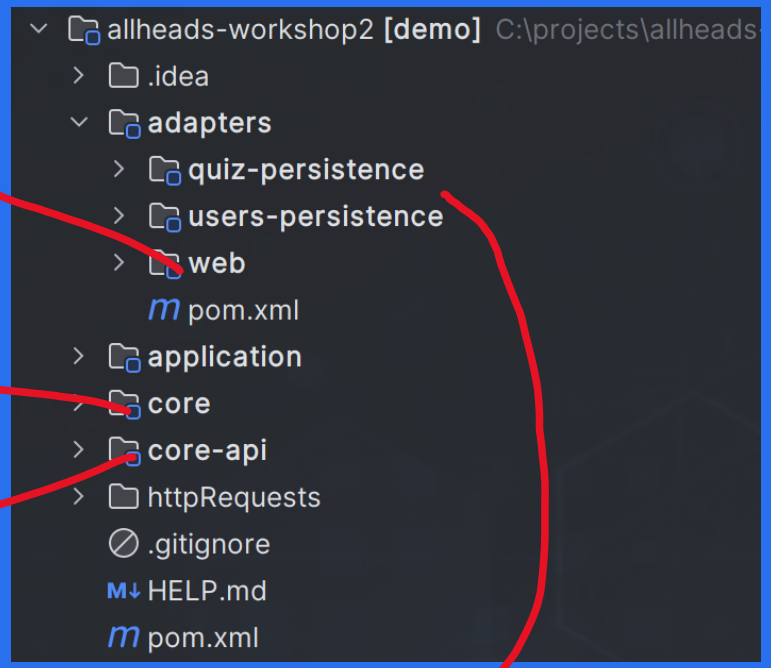
Domain Driven Design & Hexagonal Architecture

- Application domain is the bridge between code and business requirement
- Domain layer knows nothing about in/out ports

```
fun interface GetQuestionApi {
    fun getQuestion(userId: String): Mono<QuestionDto>
}
```




```
class QuizService(
    private val questionnaireConfig: QuestionnaireConfig,
    private val getAnsweredQuestionsSpi: GetAnsweredQuestionsSpi,
) : GetQuestionApi {
    override fun getQuestion(
        userId: String,
    ) = Mono.zip(
        questionnaireConfig.questions
            .toMono(),
        getAnsweredQuestionsSpi.getAnsweredQuestions(userId)
            .toMono()
    ).flatMap {  it: Tuple2<List<QuestionnaireConfig.Question>!, Map<String, AnsweredOptionDto>!>!
        it.toDto()
            .toMono()
    }
}
```



Technology Stack that Helps Us

- Java & Kotlin
- Spring boot
- Reactive programming
- BPMN engine when is needed
- Avoiding untrustworthy 3rd party libs and technologies

Modern App is Never Done

- DevOps engineers are developers best friends
  - Continuous improvements and upgrades
  - Automatization and continuous delivery
- Development is not just writing code
  - Monitoring
  - Observability
  - Reporting, Audit, ...

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Thank you!

Tomáš, Martin, Martin (Sharkey)