# Developing TypeScript APIs with confidence using  tRPC

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# Hi, I’m Boris.

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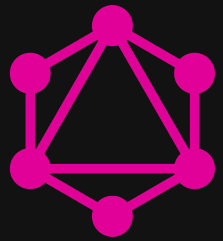
# Some questions for today

**What** even is tRPC and why do we want to use it?

**Where** to use it?

**How** to use it and improve our dev experience?

# What options do we have now?

GraphQL

{ REST }

# What even is tRPC and why do we want to use it?


gRPC

So now that we have established what tRPC isn’t...

# ...let's see what it is (and has)

- TS Library that lets us build fully typesafe API without need for schemas or code generation
- Allows for sharing types between client and server (or server to server)

# ...let’s see what it is (and has)

- A protocol to expose your backend code to your frontend
- Stripping down REST
- GET for queries (easy caching)
- POST for mutations

# Why would I even use this thing?

- Allows full E2E type safety
- Catching bugs as soon as possible (compile and build time)
- If you are using TypeScript everywhere already, it’s easy to plug in
- Autocompletion

# Where to use it?

# Where to use it?

- Any new or existing full-stack TypeScript project (e.g. Next.js or Node.js)
- In a monorepo or single project (type definitions come from the TS code itself)
- If you want faster and safer development

# Where not to use it?

- Projects with many microservices
- Projects that require some other language for the backend (C#, Go, Java…)
- Don’t use it to rewrite existing TS codebase - instead add to them

**How** to use it to improve our dev experience?

# For starters...

- Controller ---- Router
- Endpoint --- Procedure
- Uses Zod for validation
- React Query for data fetching

# The Example

- T3 stack - tRPC pre-configured with example
- npm create t3-app@latest
- kusur.martinovic.dev

# The Example


Povrat € nakon plaćanja u kn
Unesite iznos artikla u €
100,00
Iznos kojeg je kupac dao u €
90,00
Iznos kojeg je kupac dao u kn
100,00
Preostalo za vratiti kupcu: 3,27 €, tj. 24,65 kn

# Defining our router

```
export const appRouter = createTRPCRouter({
  calculation: calculationRouter,
});
```

# Defining our procedure

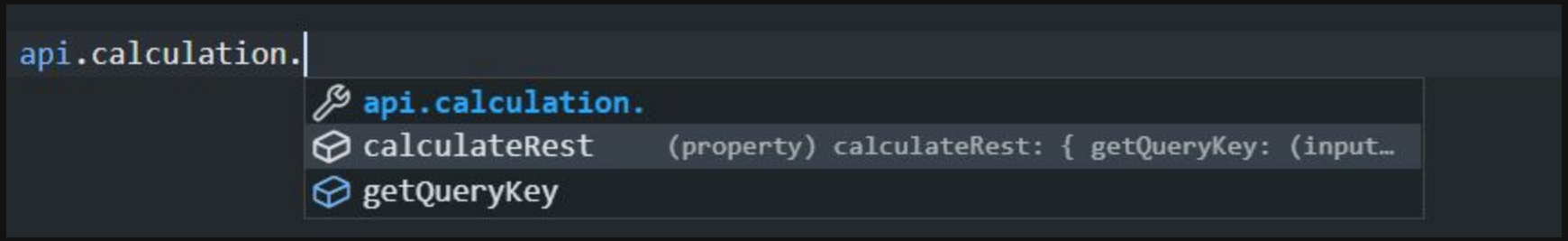
```
const rate = 7.5345;
//api/trpc/calculateRest
export const calculationRouter = createTRPCRouter({
  calculateRest: publicProcedure
    .input(
      z.object({
        priceEur: z.number().nonnegative(),
        givenEur: z.number().nonnegative(),
        givenKn: z.number().nonnegative(),
      })
    )
    .query(({ input }) => {
      //calculating sum and formatting
      return {
        resultText:
          returnSum <= 0
            ? `Preostalo za vratiti kupcu: ${returnSumEur} €, tj. ${returnSumKn} kn`
            : `Kupac duguje: ${returnSumEur} €, tj. ${returnSumKn} kn`,
      };
    }),
});
```

# Calling our procedure

```
const calcRest = api.calculation.calculateRest.useQuery({
  priceEur: priceEur ?? 0,
  givenEur: givenEur ?? 0,
  givenKn: givenKn ?? 0,
});
```

# Ok… but where’s the safety part?

# Autocomplete



# Wrong property name?

Argument of type '{ price: number; givenEur: number; givenKn: number; }' is not assignable to parameter of type '{ priceEur: number; givenEur: number; givenKn: number; }'.

**Translation**: I was expecting `{ priceEur: number; givenEur: number; givenKn: number; }`, but you passed `{ price: number; givenEur: number; givenKn: number; }`

See full translation

Object literal may only specify known properties, and 'price' does not exist in type '{ priceEur: number; givenEur: number; givenKn: number; }'.

**Translation**: You can't pass property `price` to object `{ priceEur: number; givenEur: number; givenKn: number; }`.

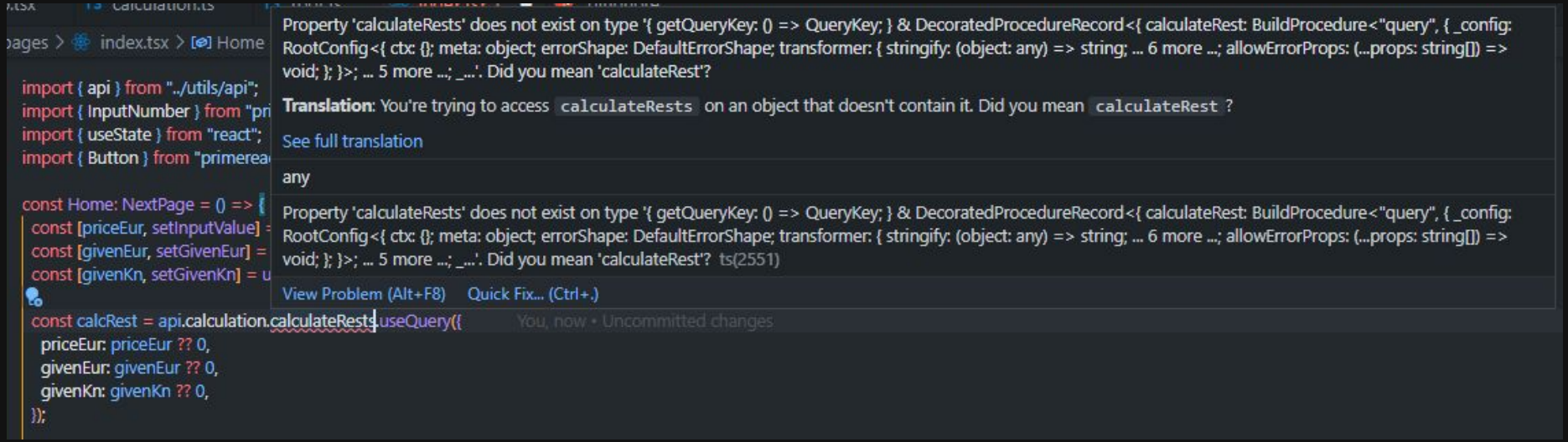
See full translation

(property) price: number

Argument of type '{ price: number; givenEur: number; givenKn: number; }' is not assignable to parameter of type '{ priceEur: number; givenEur: number; givenKn: number; }'.

```
price: priceEur ?? 0,
givenEur: givenEur ?? 0,
givenKn: givenKn ?? 0,
});
```

# Wrong procedure name?



# Added a new property? No problem!

```
export const calculationRouter = createTRPCRouter({
  calculateRest: publicProcedure
    .input(
      z.object({
        priceEur: z.number().nonnegative(),
        givenEur: z.number().nonnegative(),
        givenKn: z.number().nonnegative(),
        note: z.string(),
      })
    )
```

Argument of type '{ priceEur: number; givenEur: number; givenKn: number; }' is not assignable to parameter of type '{ priceEur: number; givenEur: number; givenKn: number; note: string; }'.

**Translation**: I was expecting `{ priceEur: number; givenEur: number; givenKn: number; note: string; }`, but you passed `{ priceEur: number; givenEur: number; givenKn: number; }`

See full translation

Property 'note' is missing in type '{ priceEur: number; givenEur: number; givenKn: number; }' but required in type '{ priceEur: number; givenEur: number; givenKn: number; note: string; }'.

**Translation**: You haven't passed all the required properties to `{ priceEur: number; givenEur: number; givenKn: number; note: string; }` - `{ priceEur: number; givenEur: number; givenKn: number; }` is missing the `note` property

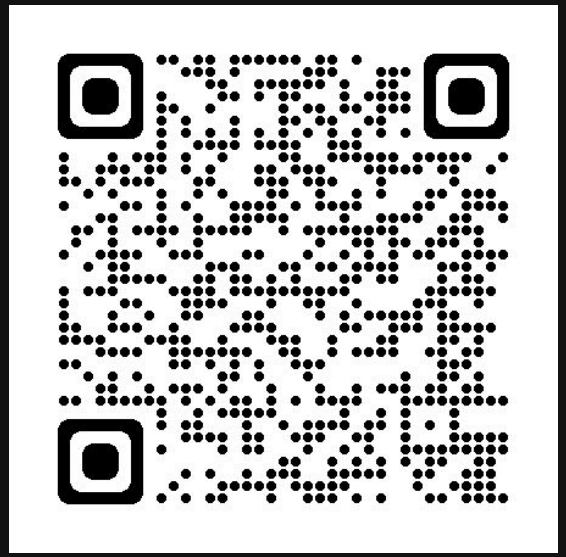
See full translation

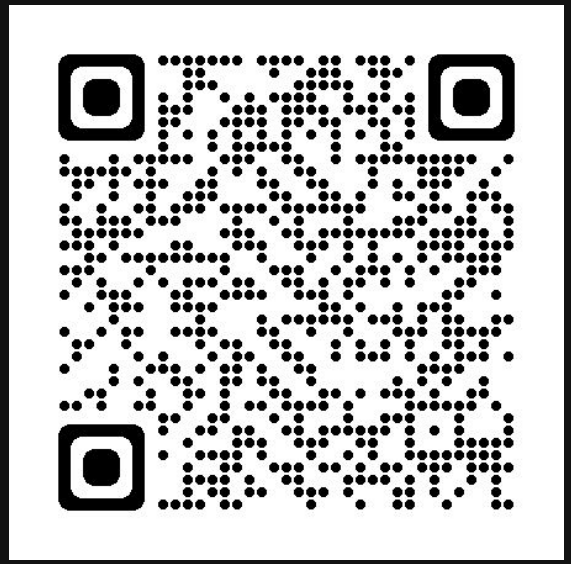
```
const givenKn: number | null
  givenKn: givenKn ?? 0,        You, last month • Index + calculation ...
});
```

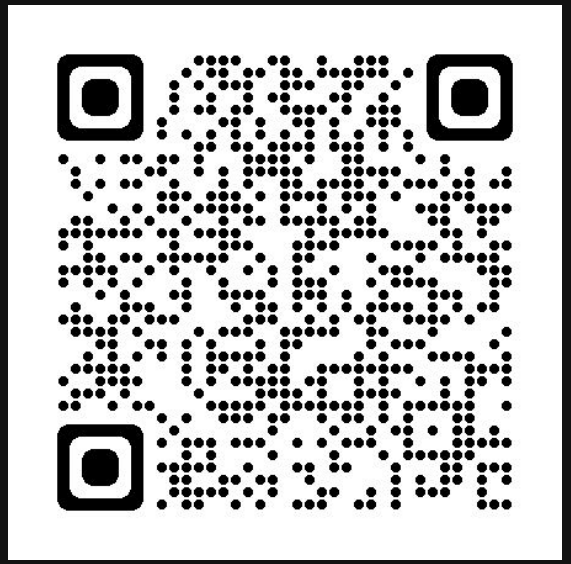
# Let’s sum it up

- tRPC is best learned by doing
- Excellent tool for fast-moving individuals and teams
- Full autocompletion, type safety and ease of use make it a great tool

# Thank you!







# The example