Coding Challenge

A *CSMS* (charging station management system) such as be.ENERGISED is used to manage *charging stations*, *charging processes* and customers (so-called eDrivers) amongst other things.

One of the most important functionalities of such a CSMS is to calculate a price to a particular charging process so that the eDriver can be invoiced for the consumed services. Establishing a price for a charging process is usually done by applying a *rate* to the *CDR* (charge detail record) of the corresponding charging process.

Charging Process

During a charging process two important events are sent by the charging station to the CSMS:

- StartTransaction - constitutes the begin of a charging process
- StopTransaction - instructs the CSMS that the charging process has ended

Every charging station has an electricity meter that is counting the overall delivered energy (in Wh) and an internal clock. On both events a *meter value* retrieved from the electricity meter along with a timestamp are sent by the charging station to the CSMS.

Event	Parameter	Description
StartTransaction	meterStart	meter value of the electricity meter when the charging process was started
	timestamp	timestamp (according to ISO 8601) when the charging process was started
StopTransaction	meterStop	meter value of the electricity meter when the charging process was stopped
	timestamp	timestamp (according to ISO 8601) when the charging process was stopped

A minimal CDR is built by combining these values

Parameter	Example
meterStart	1204307
timestampStart	2021-04-05T10:04:00Z
meterStop	1215230

has-to-be gmbh
Salzburger Straße 26
A-5550 Radstadt
Reg. Council: Salzburg, Reg.-No. FN 399512 v
VAT: ATU68066335
Managing Director: Martin Klässner
Bank accounts: has-to-be.com/banks

Parameter	Example
timestampStop	2021-04-05T11:27:00Z

In our example above the car consumed roughly 11kWh (10923 Wh) within 1 hour and 23 minutes.

Charging Process Rating

Rating is the process of applying a rate to a CDR.

A rate can have the following components

- energy - rate the charging process based on the energy consumed
- time - rate the charging process based on its duration
- transaction - fees per charging process

Lets assume we apply the following rate to our example CDR:

Component	Conditions	Price
energy	0.30€ per kWh	€3.277
time	2€ per hour	€2.767
transaction	1€ service fee	€1
		€7.04

Note: While the component prices are calculated with a precision of 3 decimal places the resulting overall amount needs to be rounded to 2 decimal places.

Challenge 1

Implement a small RESTful API that will expose the following endpoint

POST /rate

Will apply the given rate to the corresponding CDR.

Input

```
{
  "rate": { "energy": 0.3, "time": 2, "transaction": 1 },
  "cdr": { "meterStart": 1204307, "timestampStart": "2021-04-05T10:04:00Z", "meterStop": 1215230, "timestampStop":
"2021-04-05T11:27:00Z" }
}
```


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Output

```
{
  "overall": 7.04
  "components": { "energy": 3.277, "time": 2.767, "transaction": 1 }
}
```

Notes

- You are free to choose your favorite tech stack
- Any form of submission is valid (Github, GitLab, .zip Archive)
- Supply instructions on how to run your application (and testsuite)
- Goal of the exercise it to get a feeling for how you work
    - feel free to submit any supporting material (notes, UI to test, ...) as well

Challenge 2

Suggest improvements to the API design

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