Speeding up Jackson

3x speedup

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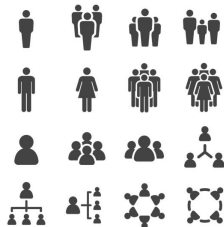TietoEvry

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Background - Norwegian Population Registry

Folkeregistert - Skatt

- 11 million people (JSONS)
- $\approx$ 6m active people
- Periodically $> 60\,000$ JSONs pr hour

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- Distributor for $\approx 1\,000$ customers
- ≈ 100 full copies
- GDPR - separate customer data
- $> 6\,000\,000$ JSONs pr hour.

Core Idea

OpenAPI-generator

OpenAPI generates Kotlin classes.

Reflection

Jackson uses reflection to create objects.
Reflection is slow.

Generate deserializer

Specification contains info needed to generate deserialize.
Generating the deserializer.

Jackson: 3 levels of parsing

JsonTokenizer

- Reads JSON as a stream, and divides into tokens
- FIELD, VALUE, START_OBJECT, …

JsonNode

- Generic tree structure
- Primitives, List<JsonNode>, Map<String, JsonNode>

Custom Kotlin / Java Objects (Value)

- Primitives, MyObj, List<MyObj>, Map<String, MyObj>
- Uses reflection to map to Kotlin objects
- Reflection is slow

- Include Deserializer data_class.mustache
- Deserializer jackson_deserializer.mustache
- Value deserializer deserialize_value.mustache

Generate Code

```
1   # Delete old code
2   rm -rf ./src/main/kotlin/im/kny/jacksonspeedup/offentligmedhjemmel
3
4   # Generate code
5   java -jar openapi-generator-cli.jar generate \
6       -g kotlin \
7       --global-property models,modelDocs=false \
8       -c openapi-generator-config.yaml \
9       --template-dir ./openapi-templates \
10      -i src/main/resources/openapi/freg-api-offentlig-med-hjemmel.json \
11      --package-name im.kny.jacksonspeedup.offentligmedhjemmel
12
13  # Compile the project
14  mvn clean
15  mvn test
```

Requirement

Reflection and generated deserializers should produce the same mapping.

Performance testing

Speedup

$2.7 \leq \text{speedup} \leq 3.2$

Startup time

- Reflection $0.8 - 1.4$ ms
- Deserializers $0.25 - 0.35$ms

Important for unit-tests!

Example-code:
github.com/kny78/jackson-speedup/

OpenAPI-generator PR:
github.com/OpenAPITools/openapi-generator/pull/13267