



## Analysis of Java Methods for Performance Measurements

In the Big Data domain Java-based frameworks, such as Apache Hadoop, Flink or Spark, provide an approach to distribute the application workload for processing large-scale datasets.

For fast and resource-efficient execution of such applications, it is important to find and optimize program sections that limit the speed of the application's execution. For performance analysis, the code of an application is enhanced with measurement code for capturing timestamps of method entries and exits (instrumentation). A program trace or profile is automatically created when the application executes and can be later presented to the performance analyst. Since the instrumentation slows down the application, the methods to be instrumented need to be carefully selected. Manual selection of important methods for large applications with a complex structure is however tedious if not infeasible. Thus, (semi-) automatic selection needs to be investigated and applied. A selection based on the static analysis of a method's bytecode is one such candidate, but is expected to give only small improvements due to the missing runtime information.

In this **master or diploma** thesis, the potential influence of method selections on the runtime based on static method information should be investigated. Such static method information, e. g. the size of a method or existence of specific instructions, should be extracted from a method's bytecode. The information should then be used to select methods to instrument. The relevance of this selection for the analysis and the runtime overhead should be evaluated. A measurement infrastructure based on Score-P (see: [score-p.org](http://score-p.org)) with instrumentation and filtering possibilities is available.

### Envisioned Tasks:

1. Investigation of suitable method information
2. Investigation of relevance and overhead
3. Implementation of the proposed static analysis
4. Validation and analysis of the proposed solution
5. Documentation of implementation and results in written form

### Requirements:

- Knowledge of Java
- German or English language is possible

### Contact:

Jan Frenzel

Falkenbrunnen, Raum 252  
Chemnitzer Straße 46b  
01187 Dresden

[jan.frenzel@tu-dresden.de](mailto:jan.frenzel@tu-dresden.de)

Tel. +49 351 463-35569

#### Besucheradresse

Willers-Bau, Raum A 207  
Zellescher Weg 12  
01069 Dresden



Zufahrt  
für Rollstuhlfahrer zum EG über  
Parkplatz Richtung Zellescher Weg

#### Weitere Besucheradresse

Andreas-Pfitzmann-Bau, Raum 1044  
Nöthnitzer Straße 46  
01187 Dresden

Mitglied von:  
**DRESDEN**  
concept

