TECHNISCHE UNIVERSITÄT BERLIN

Efficiently Detecting Performance Changes in FaaS Application Releases

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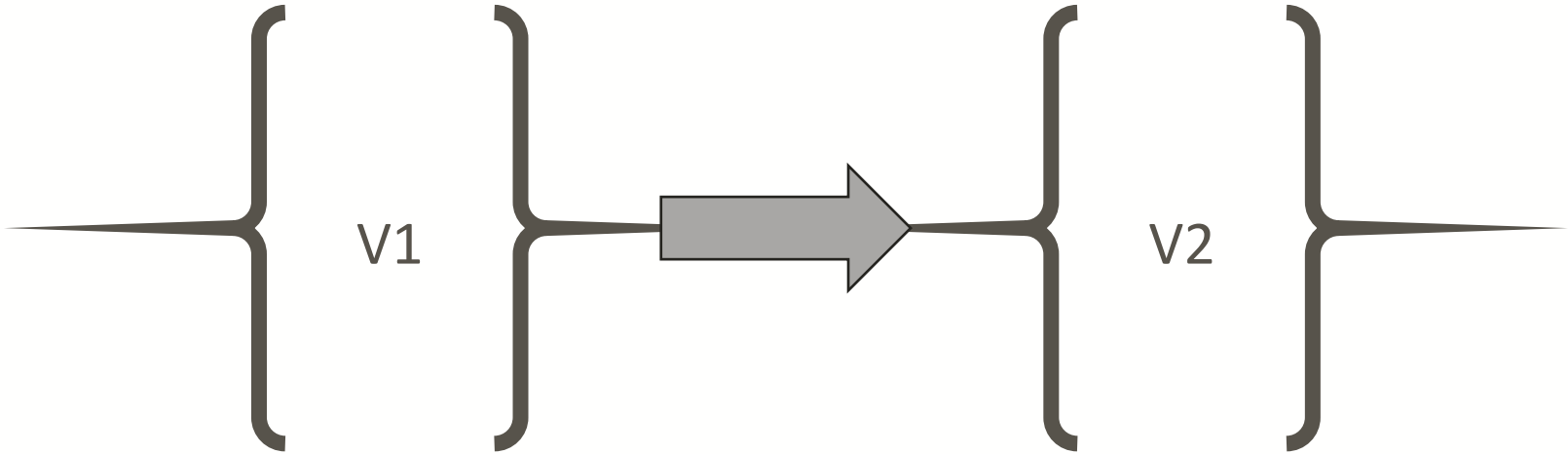
Mobile Cloud Computing

EINSTEIN CENTER Digital Future

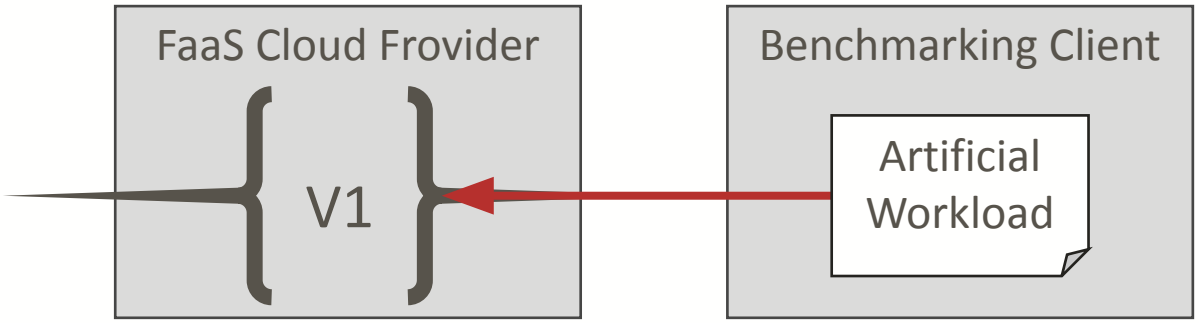
There are code changes

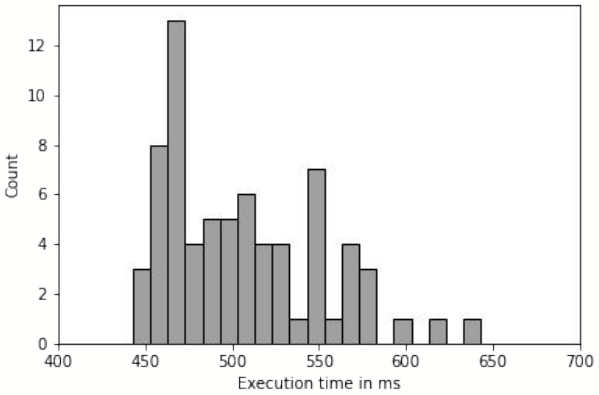
- Bug fixes
- New library versions
- New features
- …



How would you measure and quantify the performance change?

The traditional benchmarking approach





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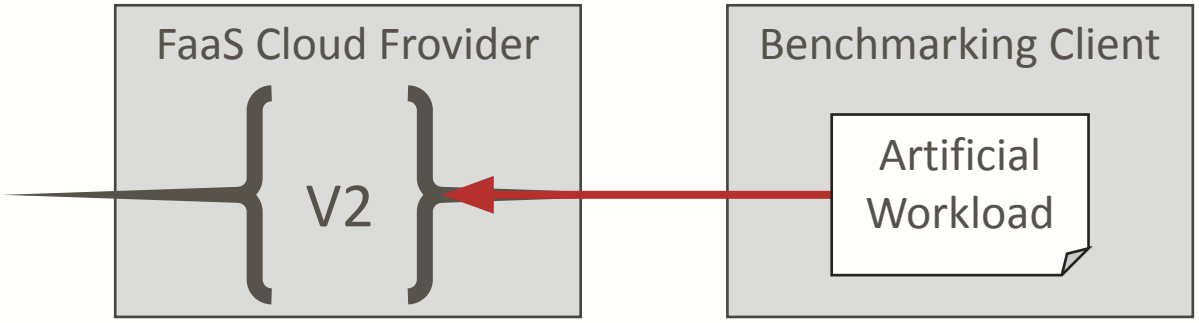
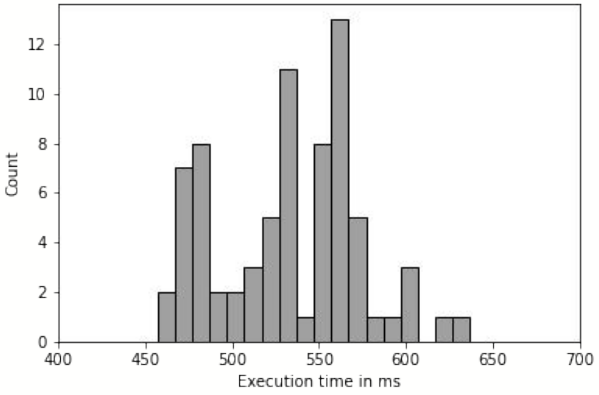


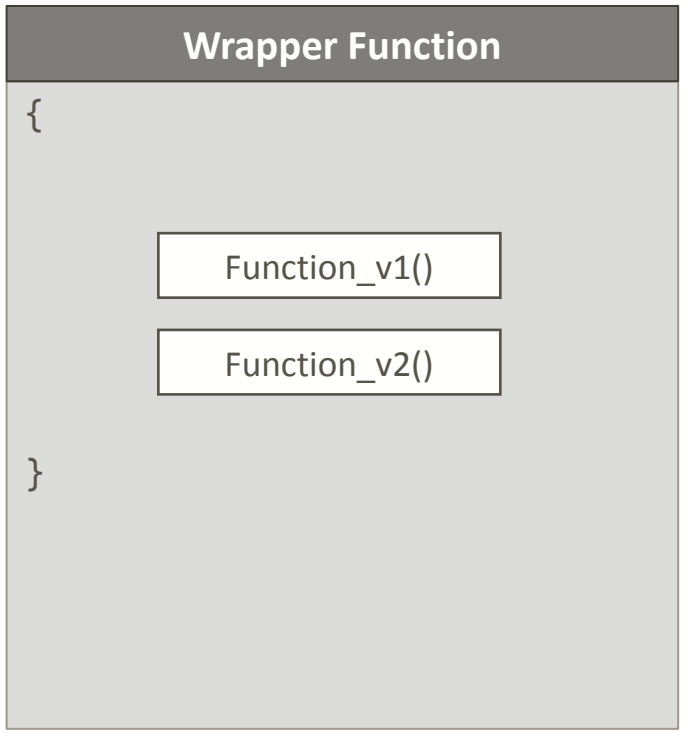


Idea: Run both function versions on the same instance

- Same compute unit
- Same environment
- Same random fluctuations
- …

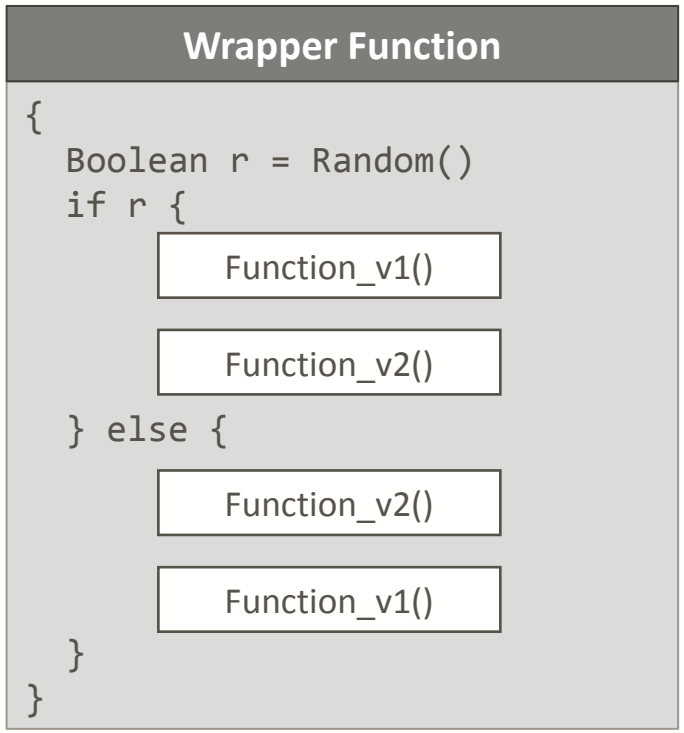
This should reduce the confidence interval width and lead to more accurate results!

Idea: Merge source code into a wrapper function



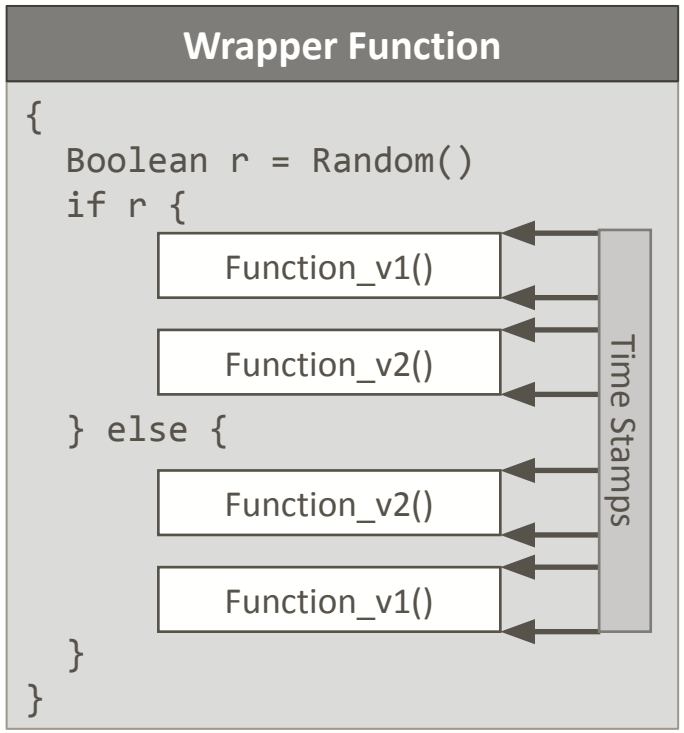
- Execute both functions successively

Idea: Merge source code into a wrapper function



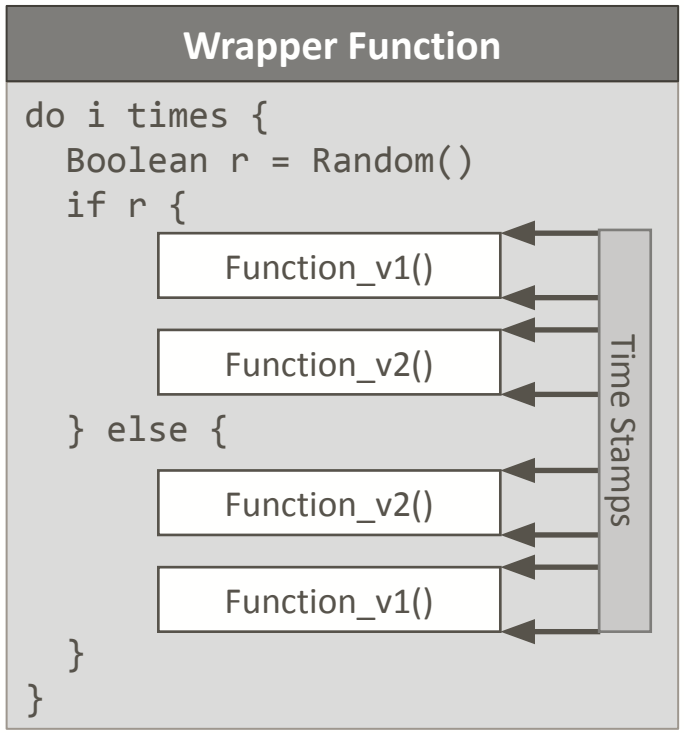
- Execute both functions successively
- Either version 1 or version 2 first

Idea: Merge source code into a wrapper function



- Execute both functions successively
- Either version 1 or version 2 first
- Track the time before and after each call

Idea: Merge source code into a wrapper function

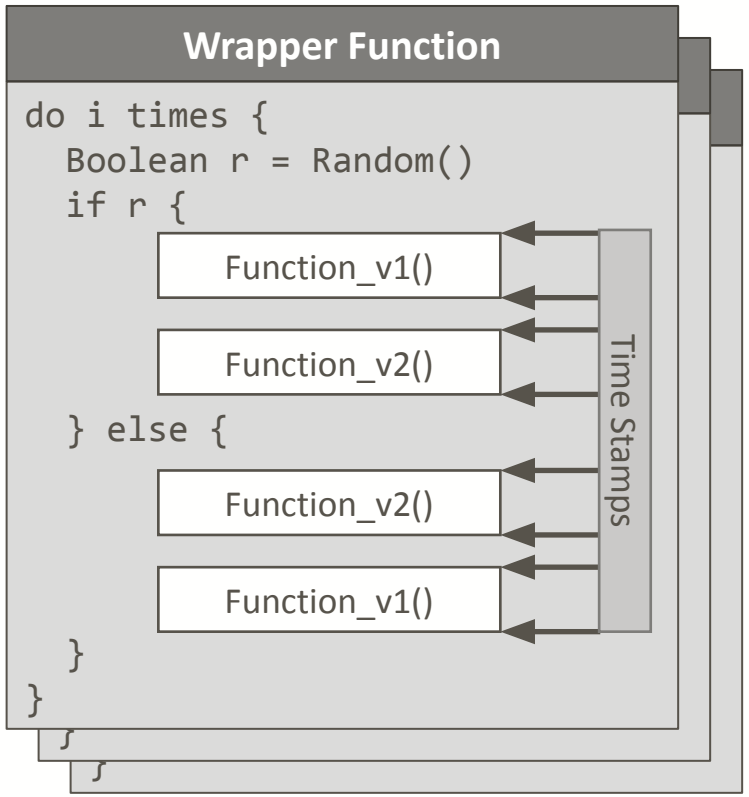


- Execute both functions successively
- Either version 1 or version 2 first
- Track the time before and after each call
- Repeat the calls several times

Randomized Multiple Interleaved Trials (RMIT) [1]

[1] - Ali Abedi and Tim Brecht. 2017. Conducting Repeatable Experiments in Highly Variable Cloud Computing Environments. In Proc. of ICPE '17. ACM.

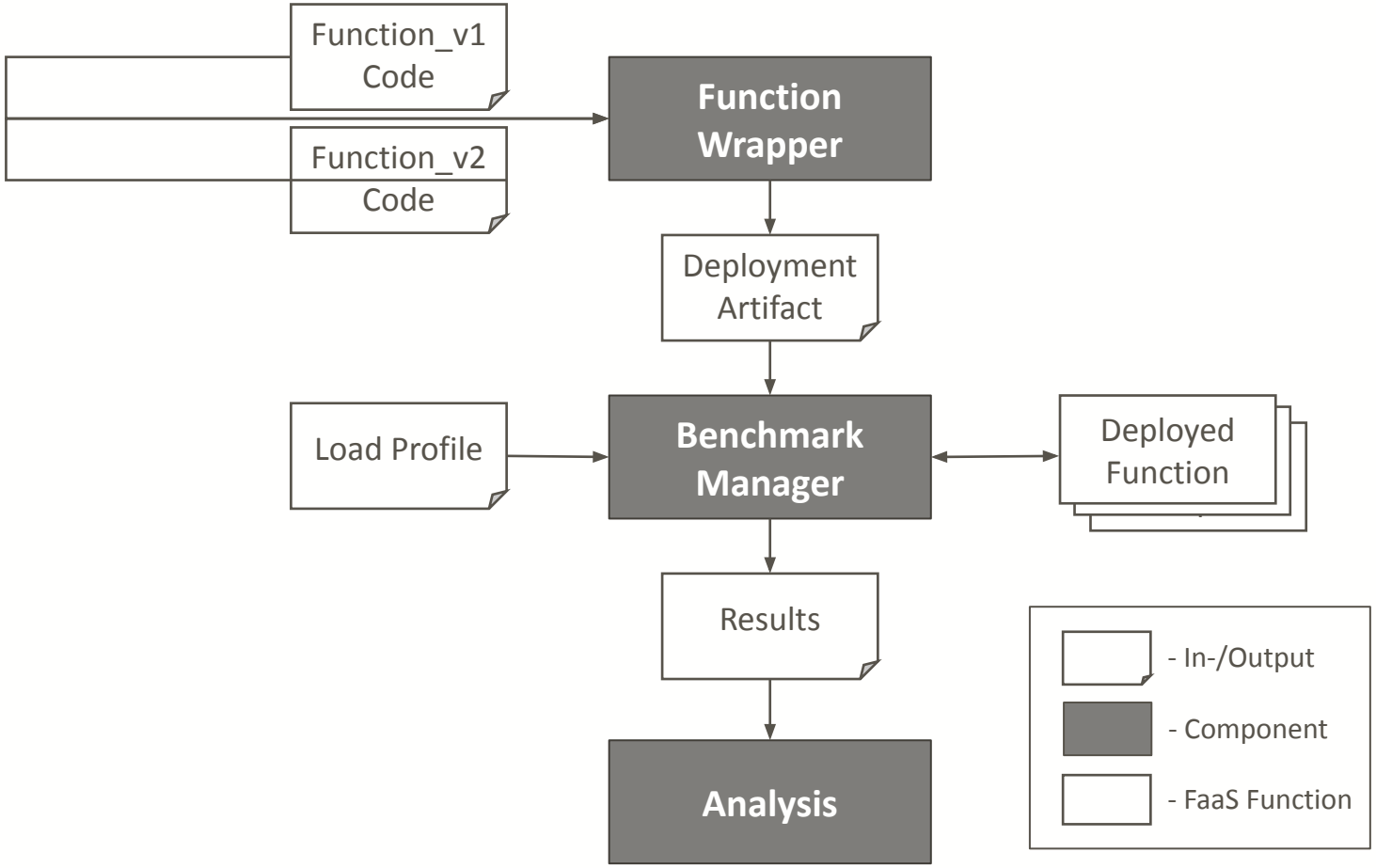
Idea: Merge source code into a wrapper function



- Execute both functions successively
- Either version 1 or version 2 first
- Track the time before and after each call
- Repeat the calls several times [1]
- Deploy Wrapper function several times

[1] - Ali Abedi and Tim Brecht. 2017. Conducting Repeatable Experiments in Highly Variable Cloud Computing Environments. In Proc. of ICPE '17. ACM.

Open source prototype: faasterBench

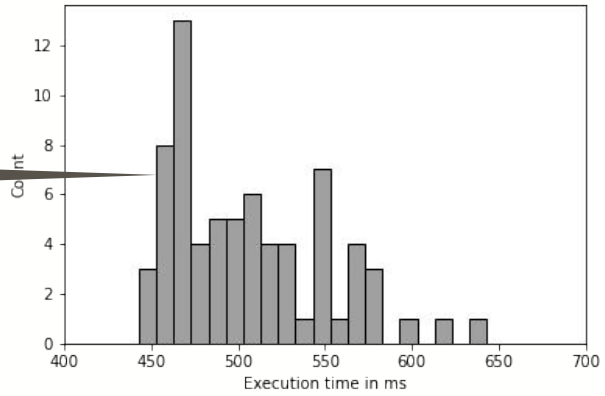


https://github.com/martingrambow/faasterBench

Experiments on AWS and GCP

Traditional

V1



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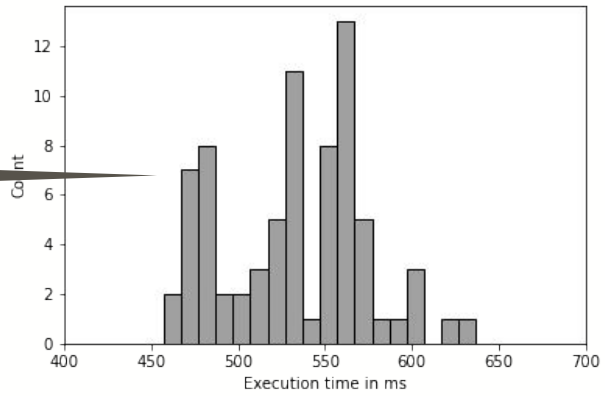
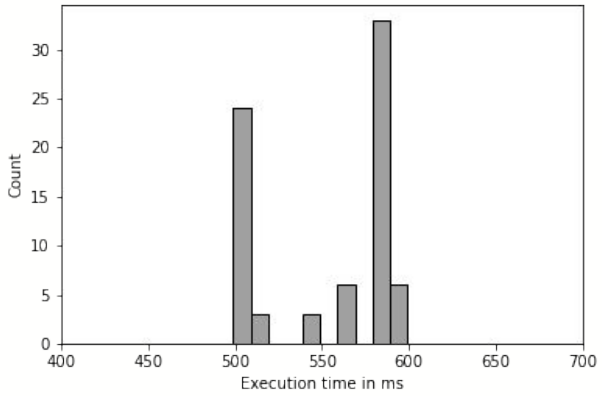
V2



faasterBench



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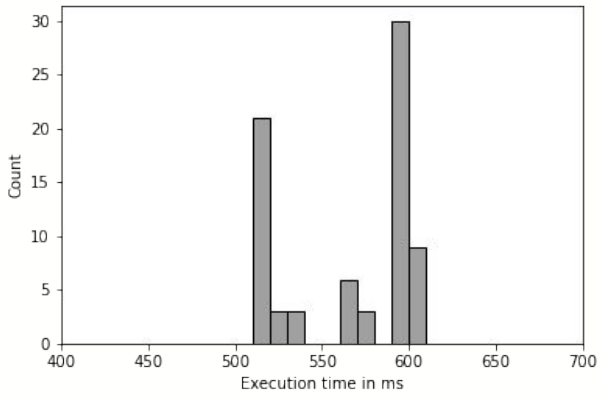
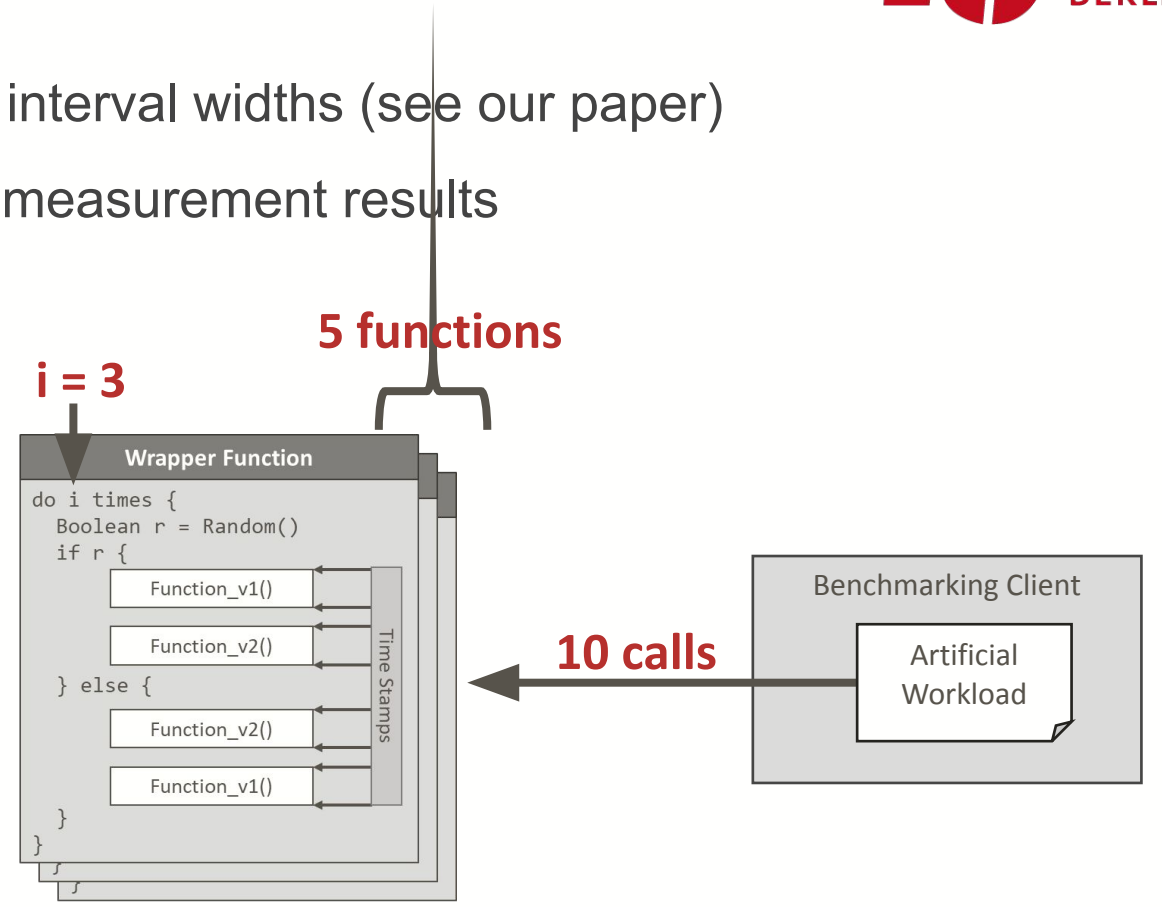


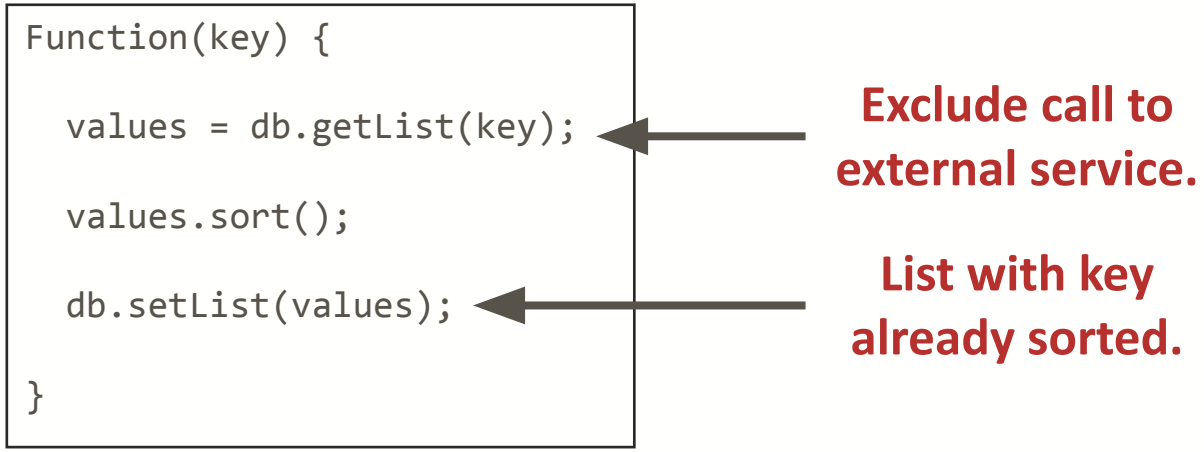
Findings and implications

- RMIT drastically reduces the confidence interval widths (see our paper)
- FaasterBench significantly improves the measurement results
- A good setup:
  - 3 iterations
  - 5 deployed wrapper functions
  - 10 calls per wrapper function
  - (150 measurement pairs in total)



Next steps

- Support more FaaS platforms
- Consider external calls
- Consider function parameters



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Any Questions?