On Benchmarking for Concurrent Runtime Verification

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Introduction

“Do we really need another benchmarking tool?”

Deciding what to measure

CRV 2014: first step towards standardising RV benchmarks

Concurrent RV: do we measure in the same way?

Four sensible metrics for benchmarking concurrent RV

- Mean execution slowdown (s)
- Mean memory consumption (MB)
- Mean scheduler (or CPU) usage (%)
- Mean system response time (ms)

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The nice-to-haves (or should we say, essential?)

Essential features for concurrent RV benchmarking

- Accurate metrics
- Different load profiles
- Growing and shrinking
- High loads
- Parametrisability of model
- Repeatability of results

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..And of course.. **adequate realism** in benchmarks

One way of doing things

Industry tradition

1. Deploy the system to be tested on a staging server
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Bad:

- Depend on features offered
- Involved to set up
- Hard to reproduce

The middle way

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Bad:

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Good:

- Packages moving parts
- Engineered for nice-to-haves

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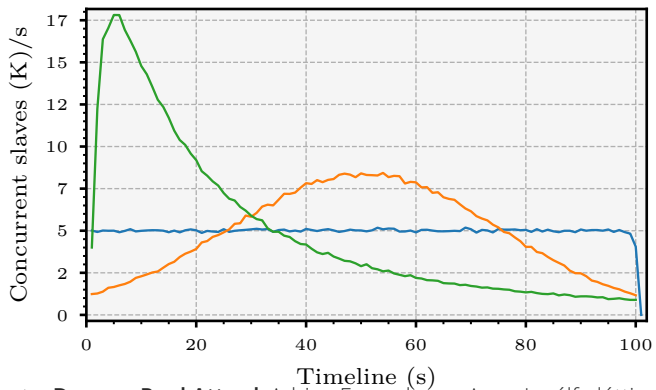

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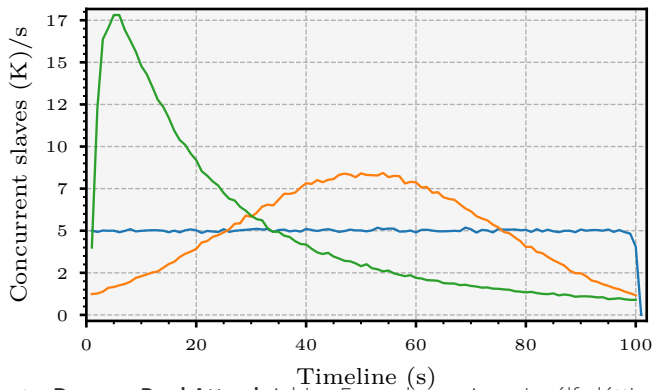

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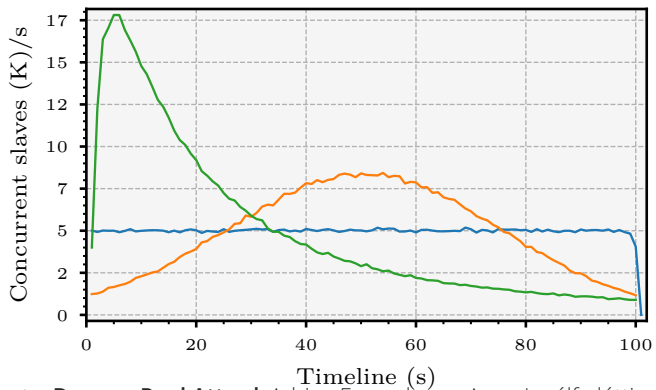

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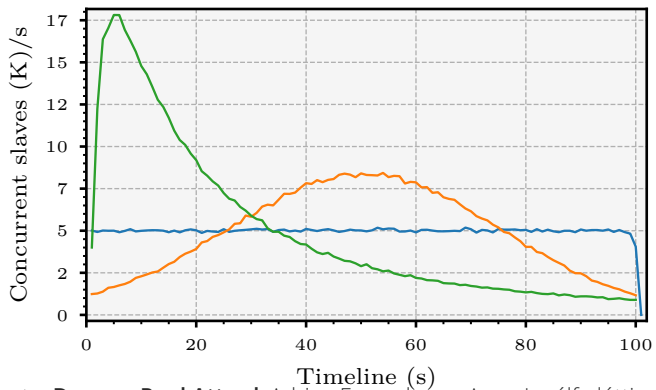

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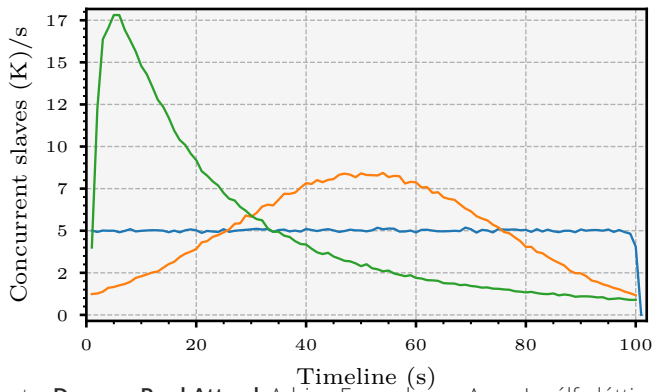
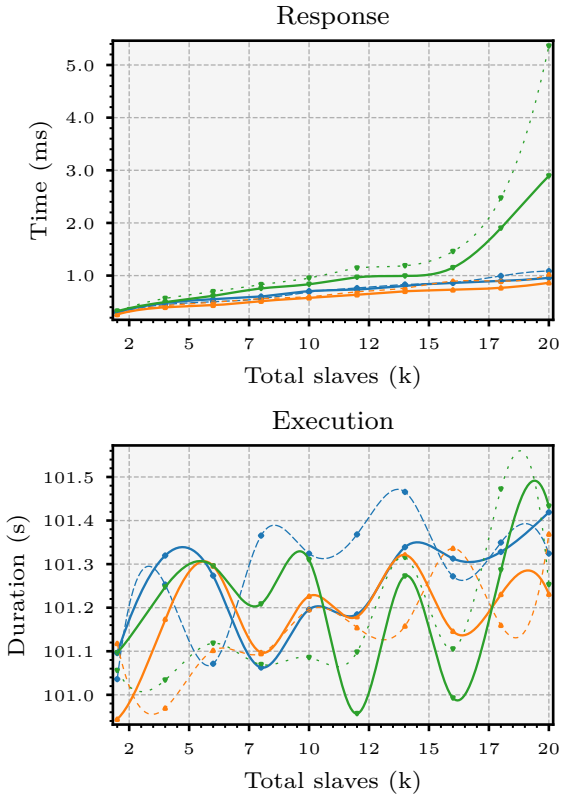


Concurent RV tool: Benchmark case study

Steady, Pulse, and Burst loads induce **different behaviour**.



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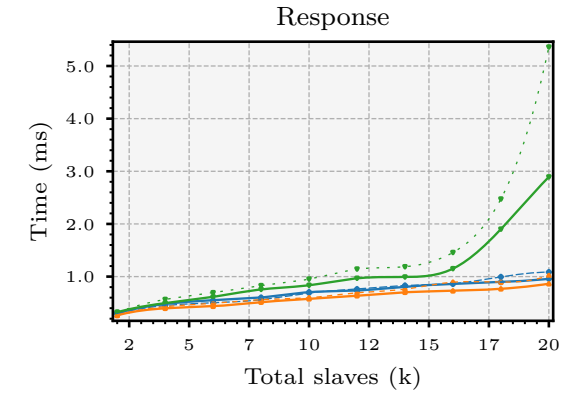
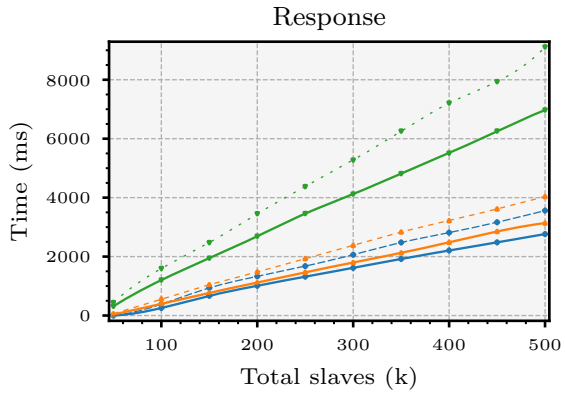
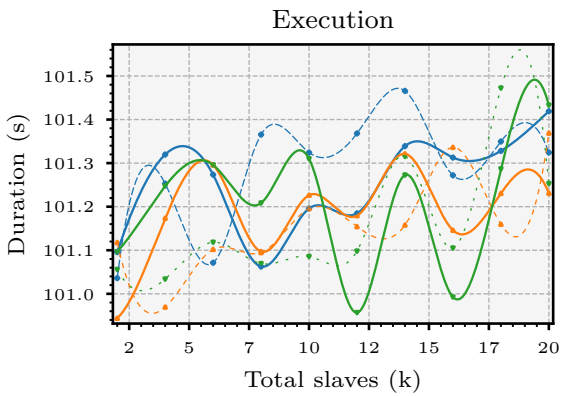
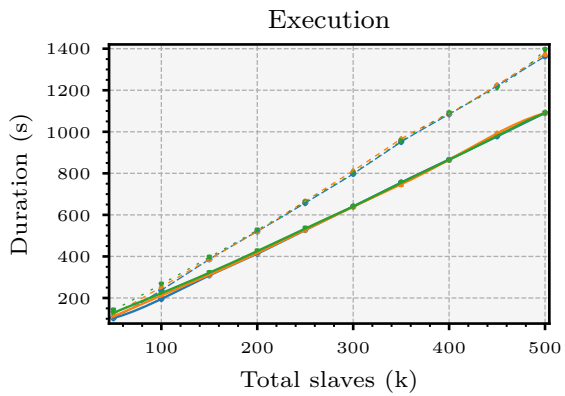




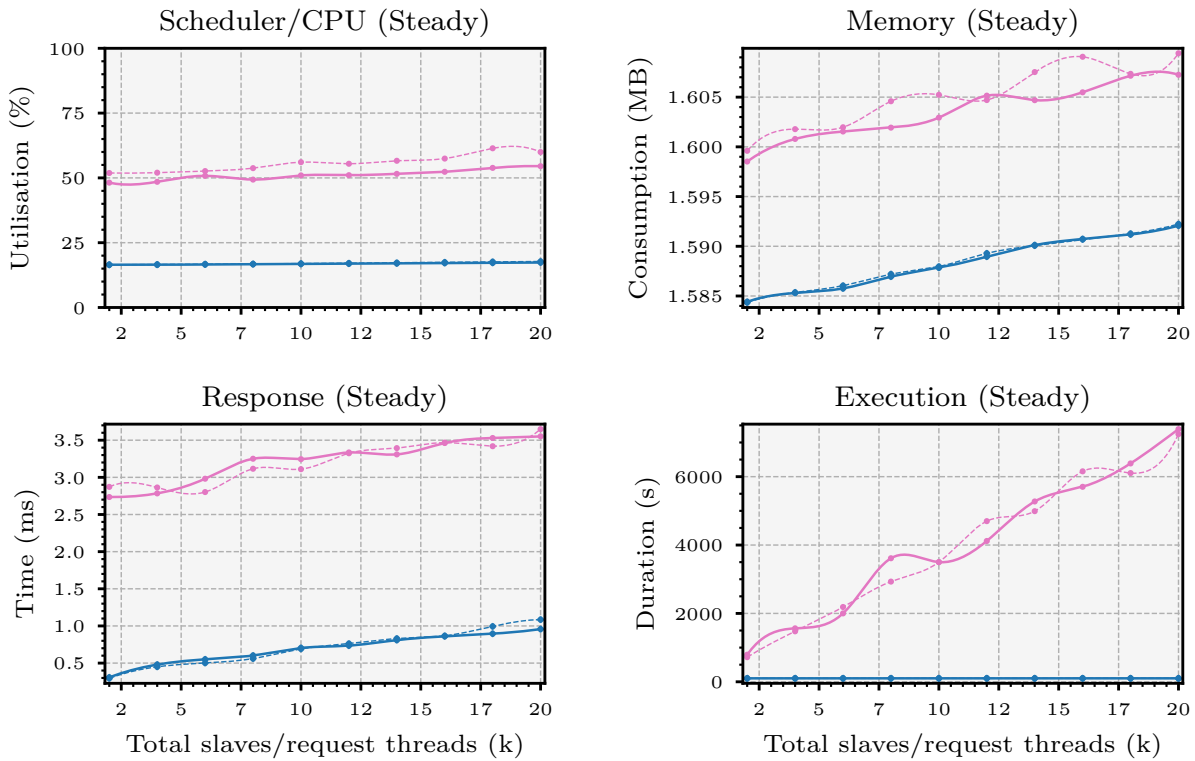




High loads (500k) enable us to confidently **extrapolate** results

Concurent RV tool: Synthetic vs. real system

Steady loads on synthetic and realistic set-ups for 20k



Different in measurements, but **corresponding** trends

Conclusion

“Do we really need another benchmarking tool?”

Multiple overhead metrics give a **comprehensive picture**

Different load profiles **increase coverage**

Scaling considerably to allow for **extrapolation**

Parametrisability enables **reproducibility of benchmarks**

Our tool captures the behaviour of **realistic** set-ups

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“Yep! And with these features..”

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Thank you