Analysis of Overhead in Dynamic Java Performance Monitoring

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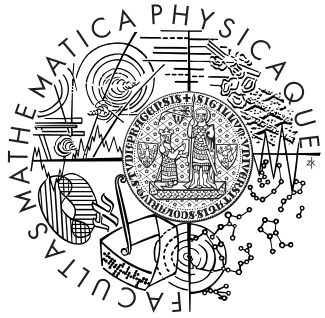
Department of Distributed and Dependable Systems



Context: Dynamic Monitoring of Production Systems

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Dynamic Monitoring of Production Systems

Measurement probes are active only when needed,

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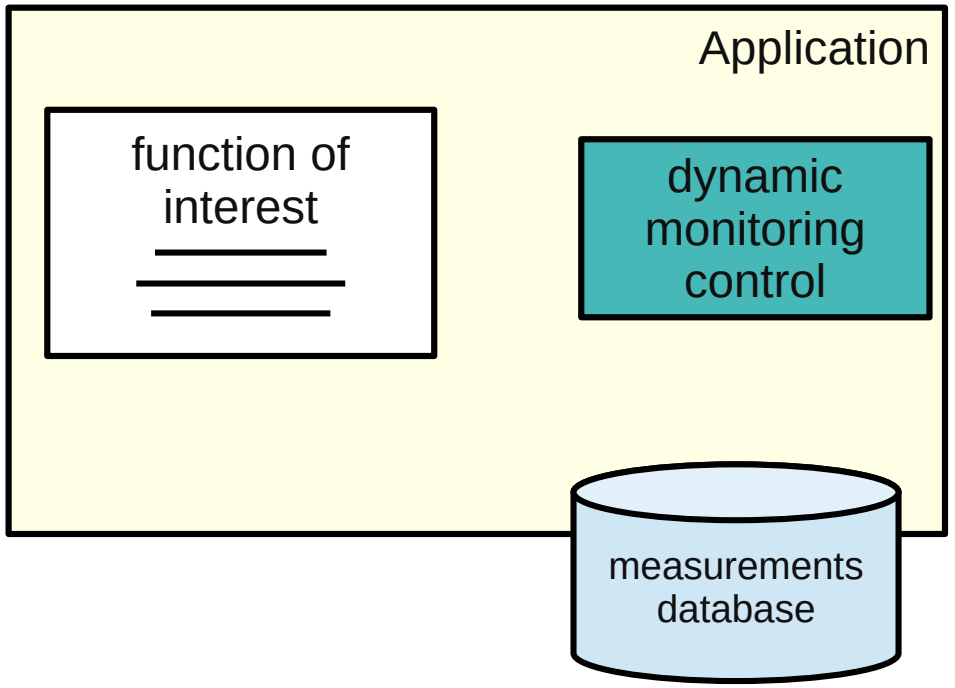

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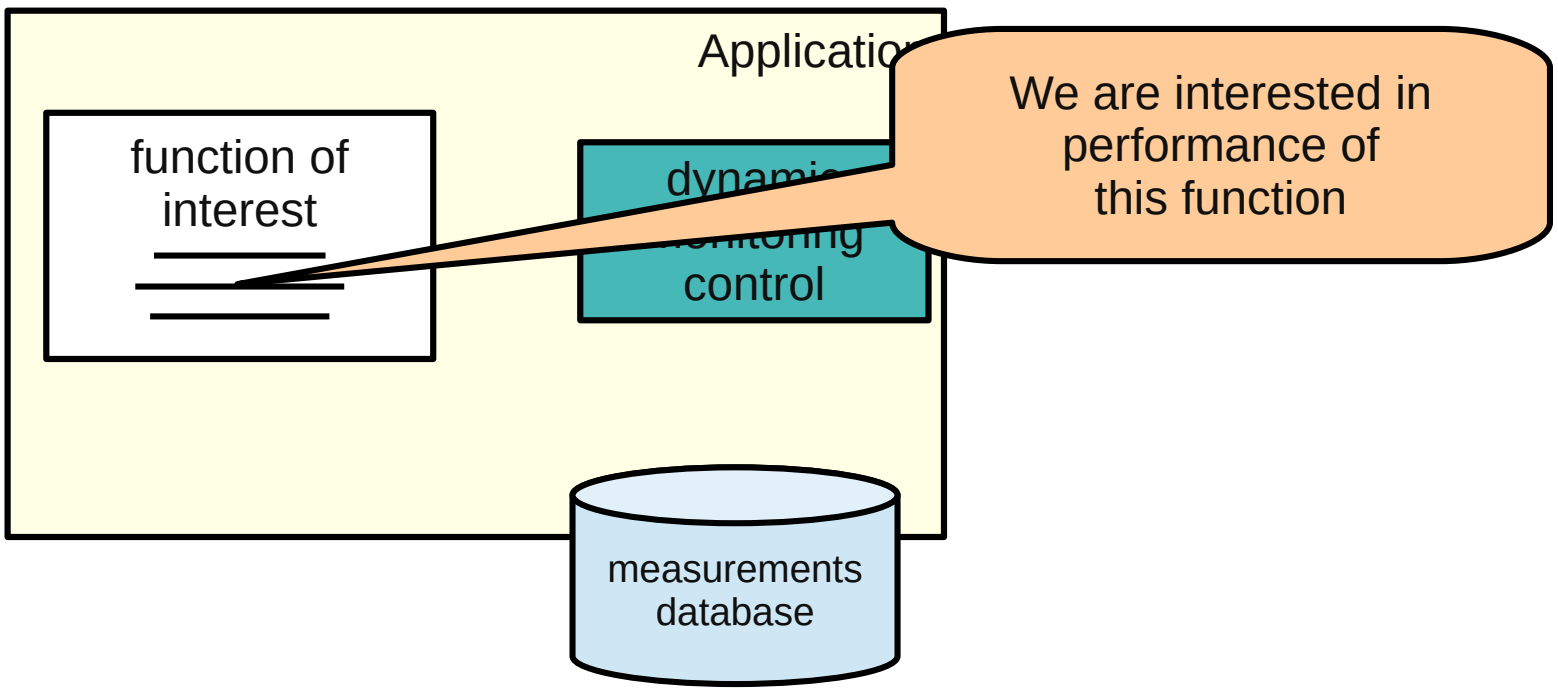

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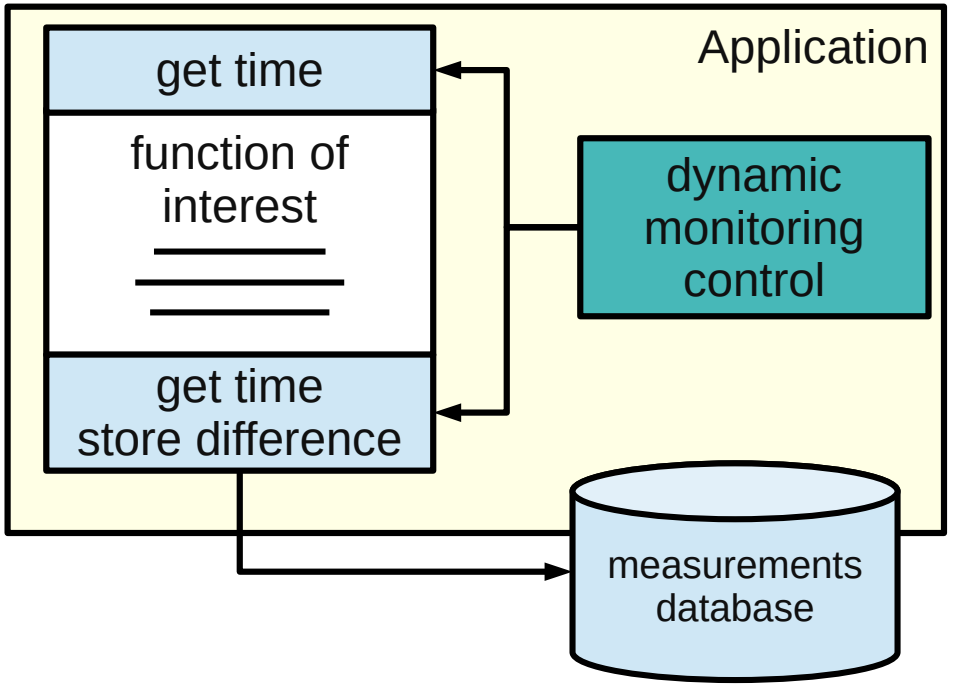

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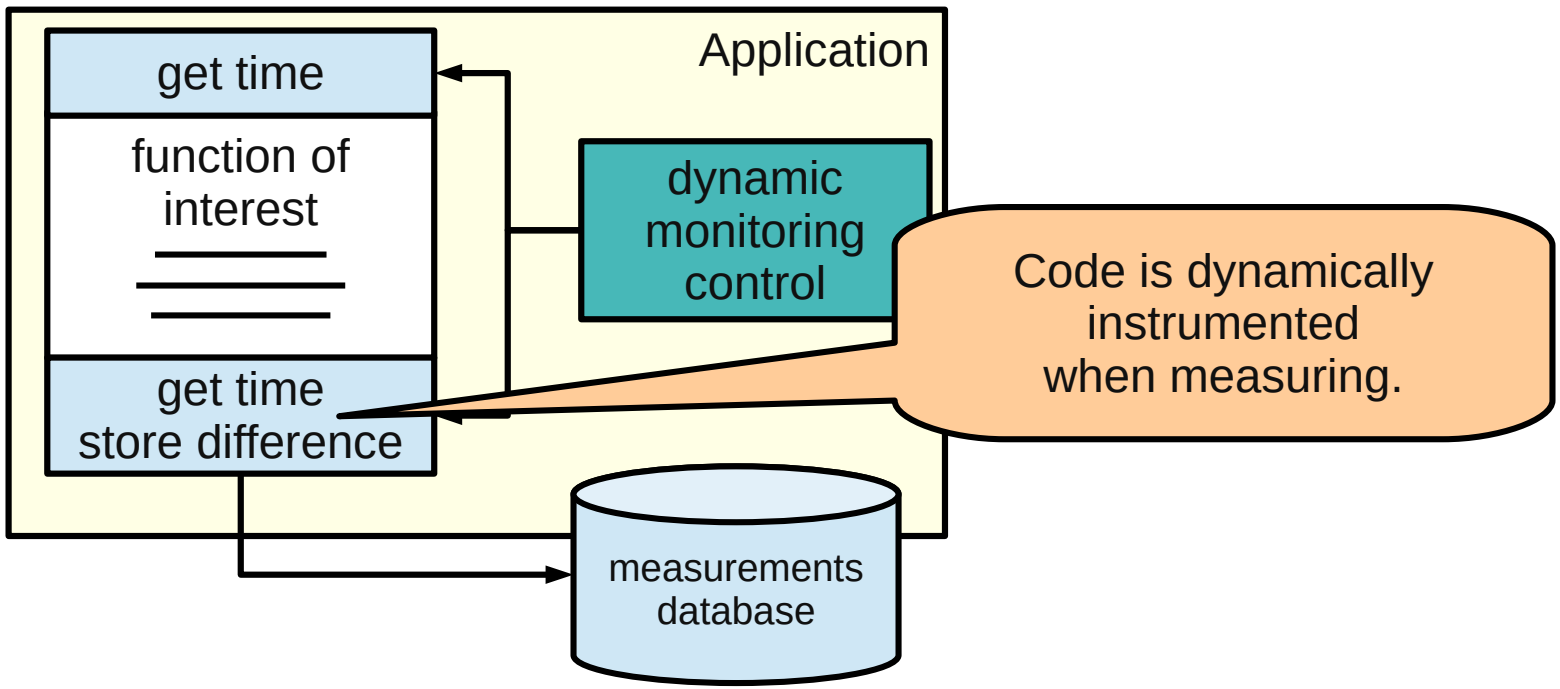

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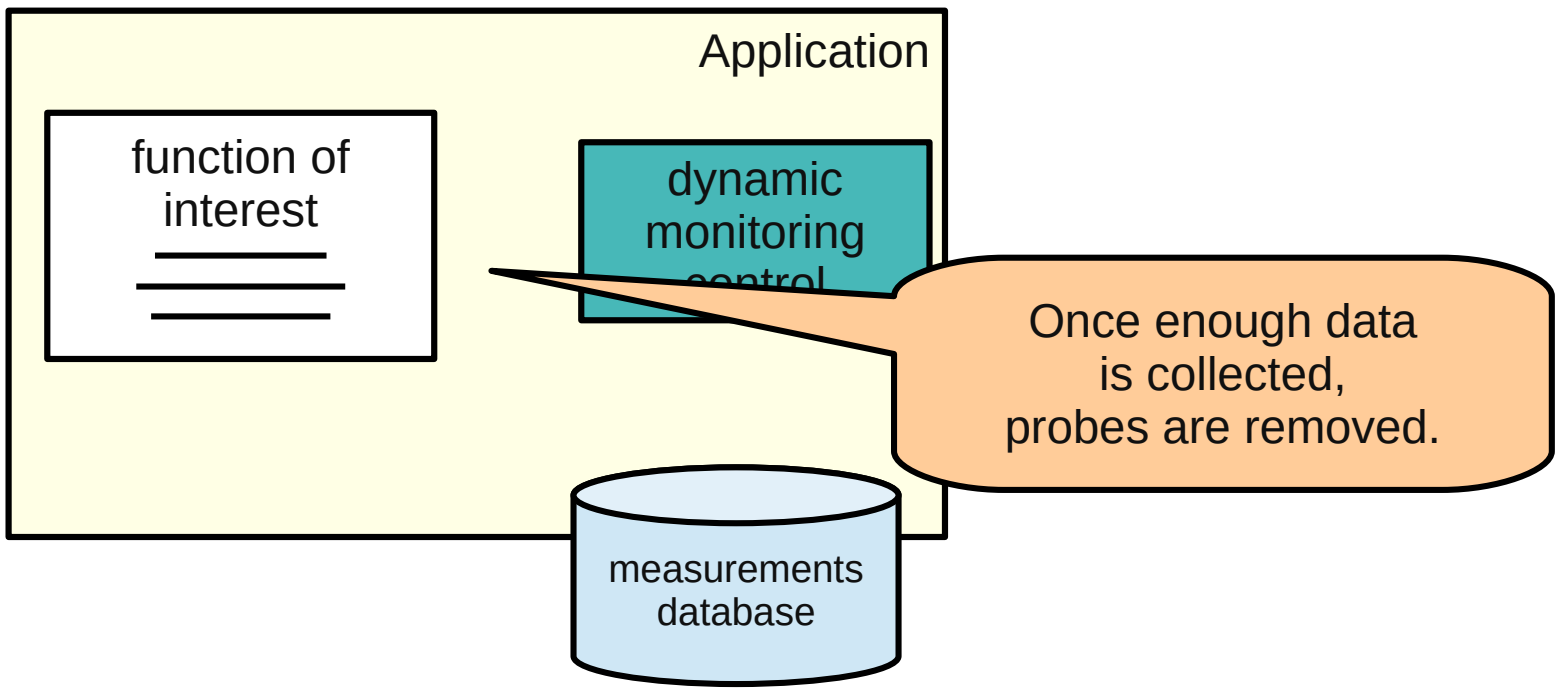

Issues of Dynamic Monitoring

In managed environments, code is compiled at run-time;
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Interesting Questions

How do the code manipulations affect the application?

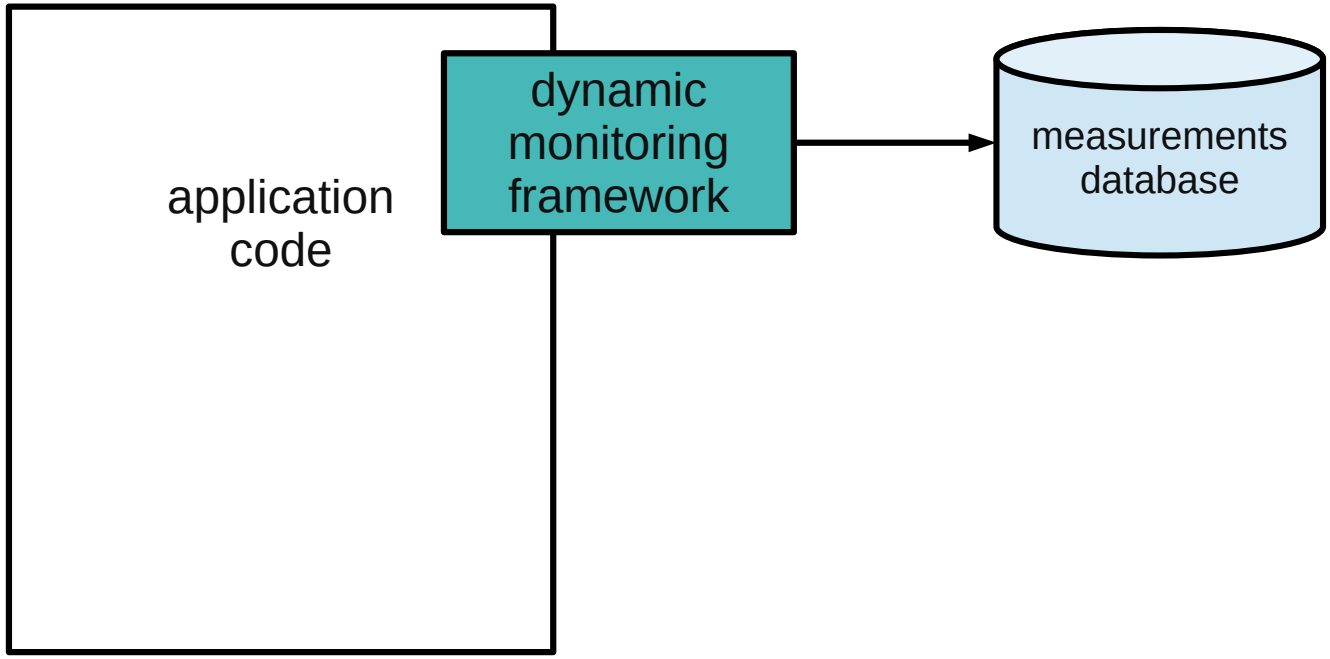
What is the overhead of such probe?

Is the observed performance representative?

Is there zero overhead once the probe is removed?

Experiment Setup

Experiment Coordination



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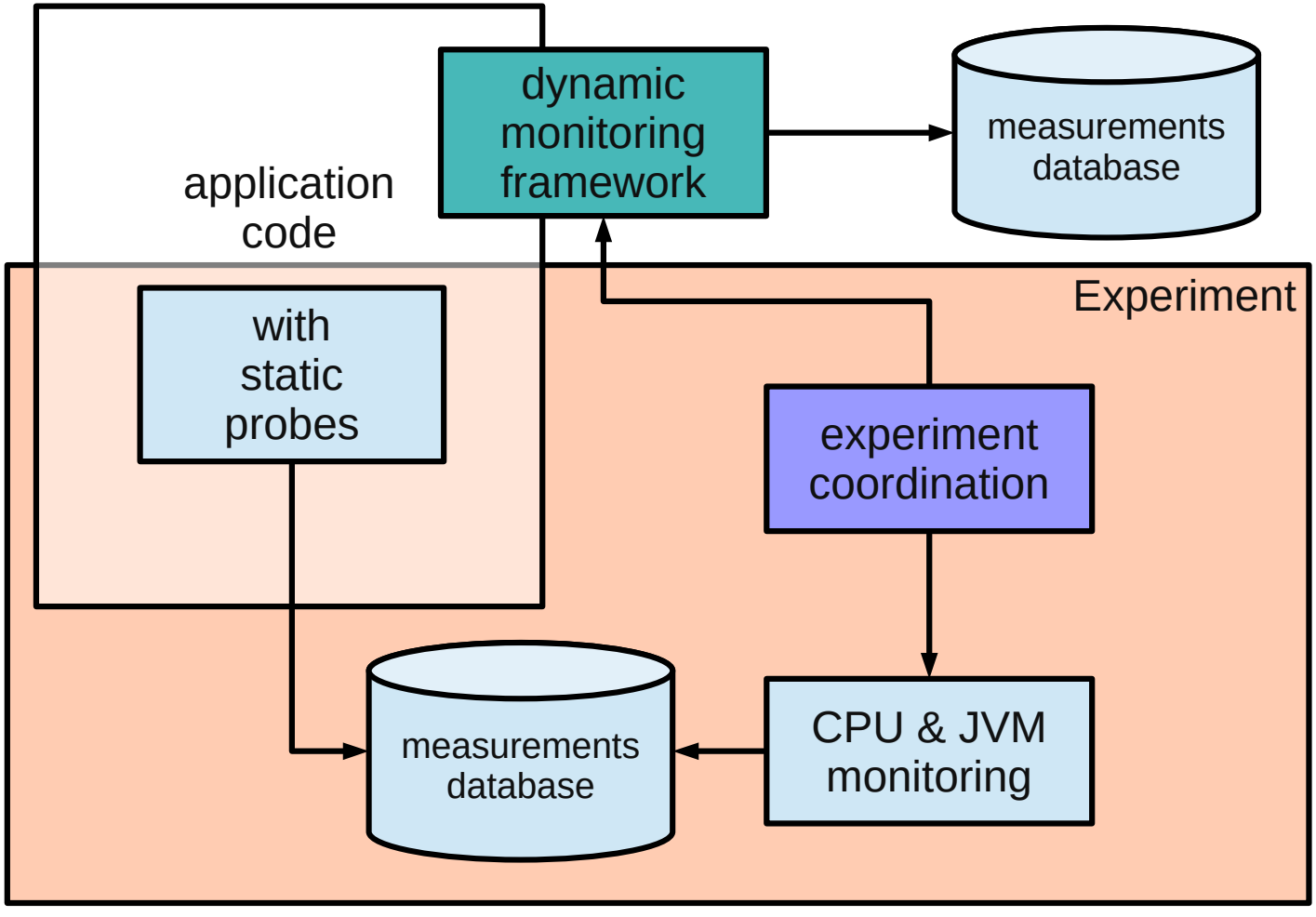

Two Measurement Infrastructures

Self-measurement	Dynamic monitoring

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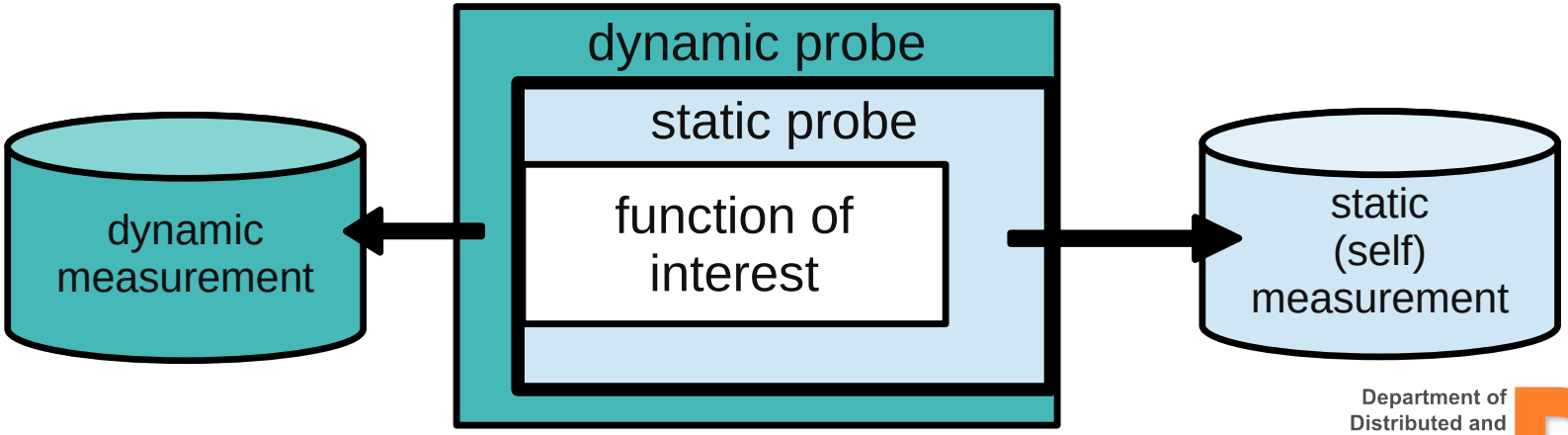

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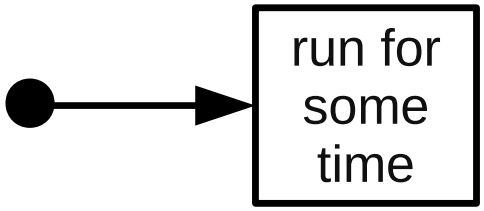

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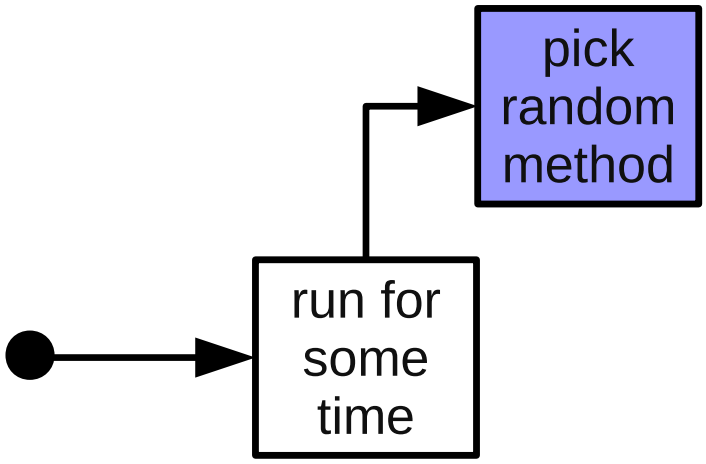

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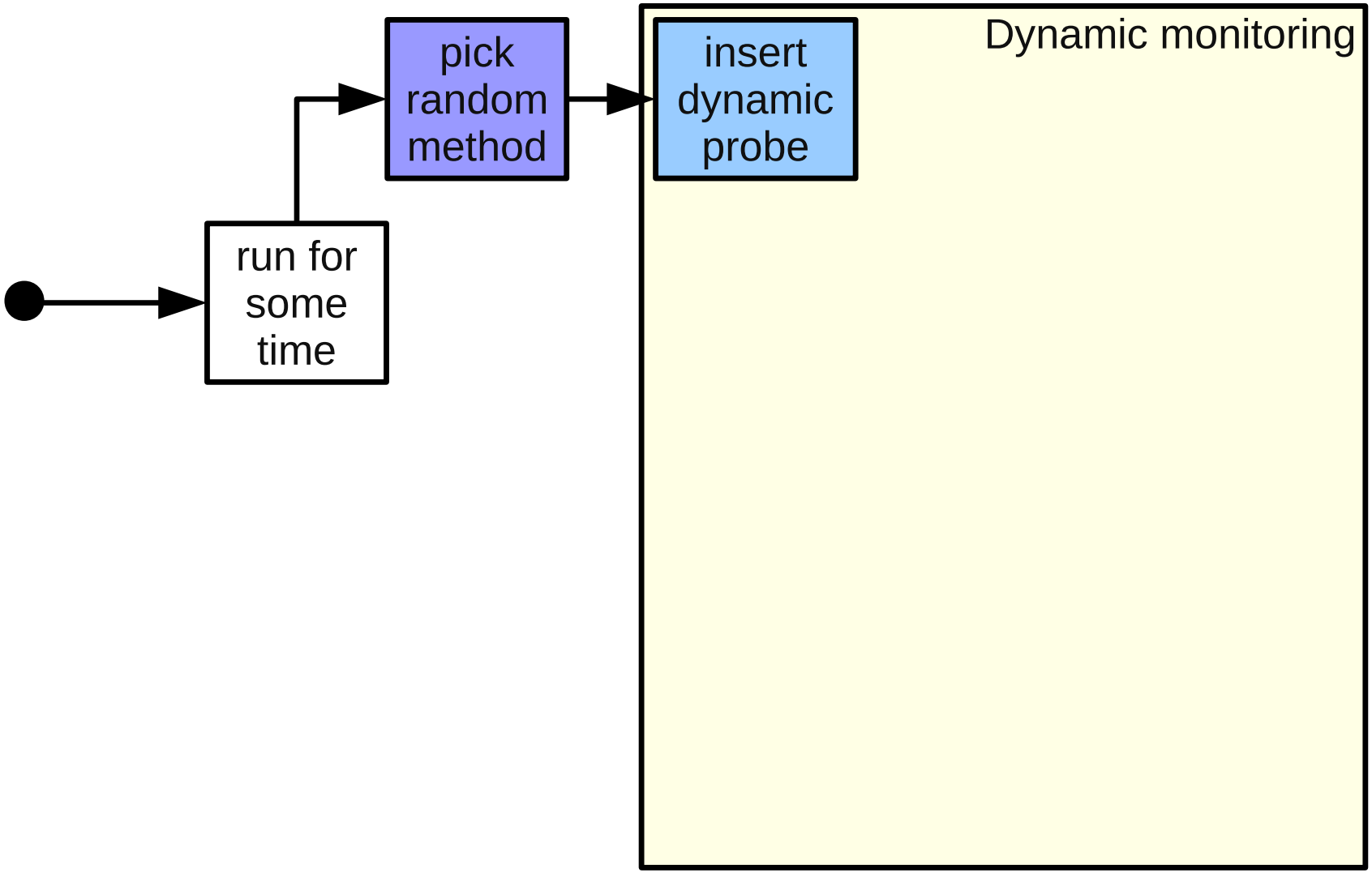

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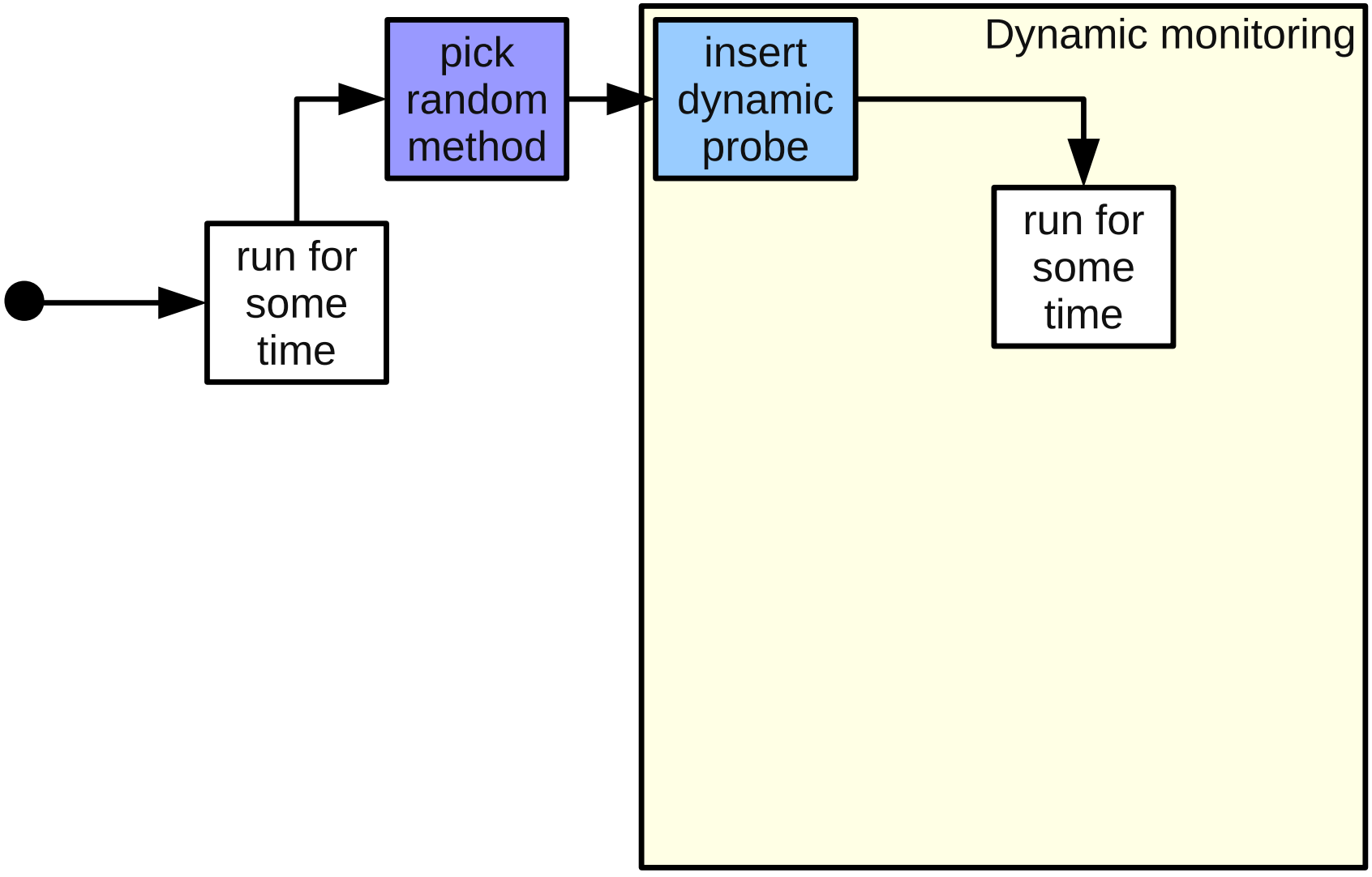

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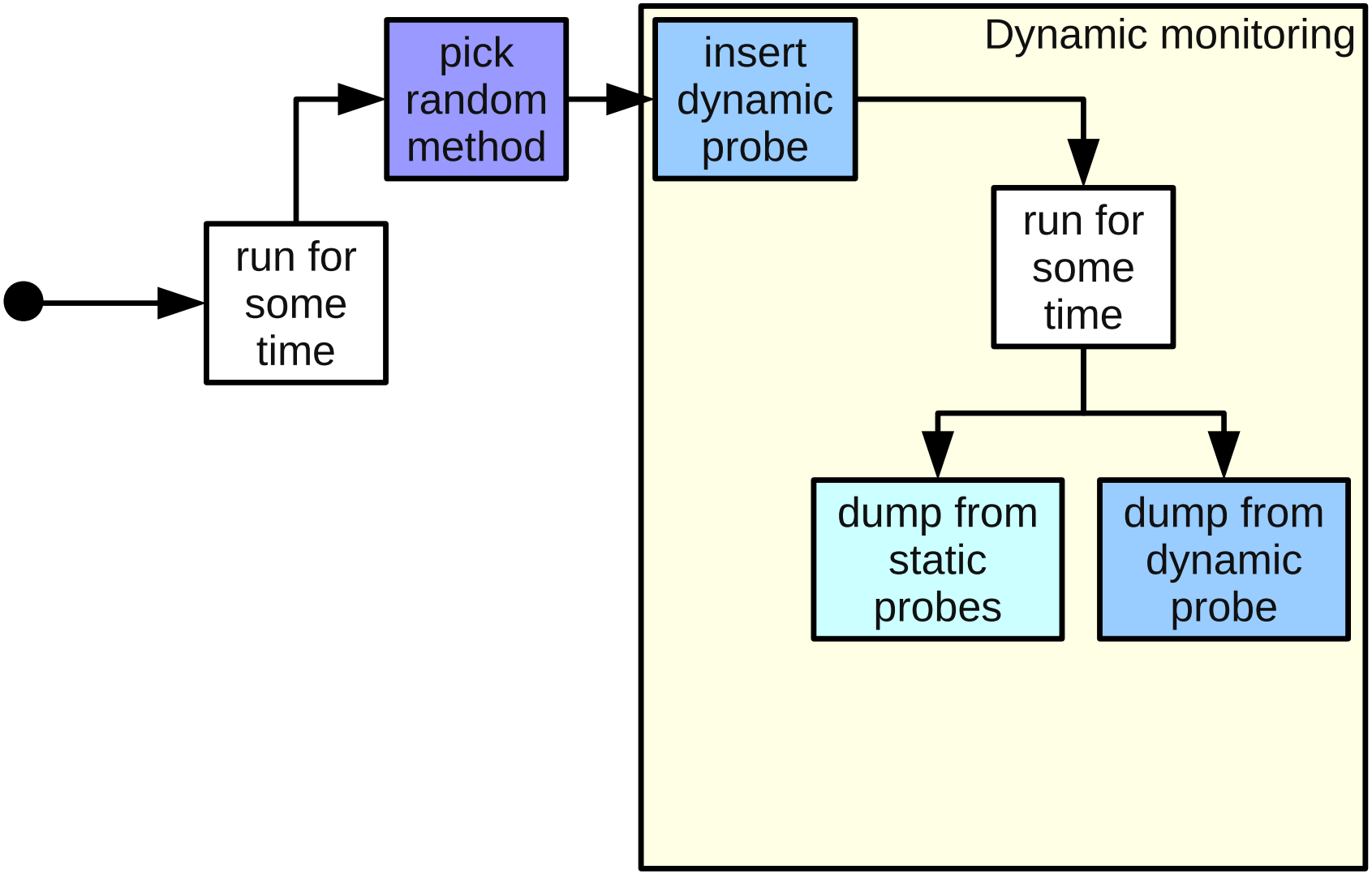

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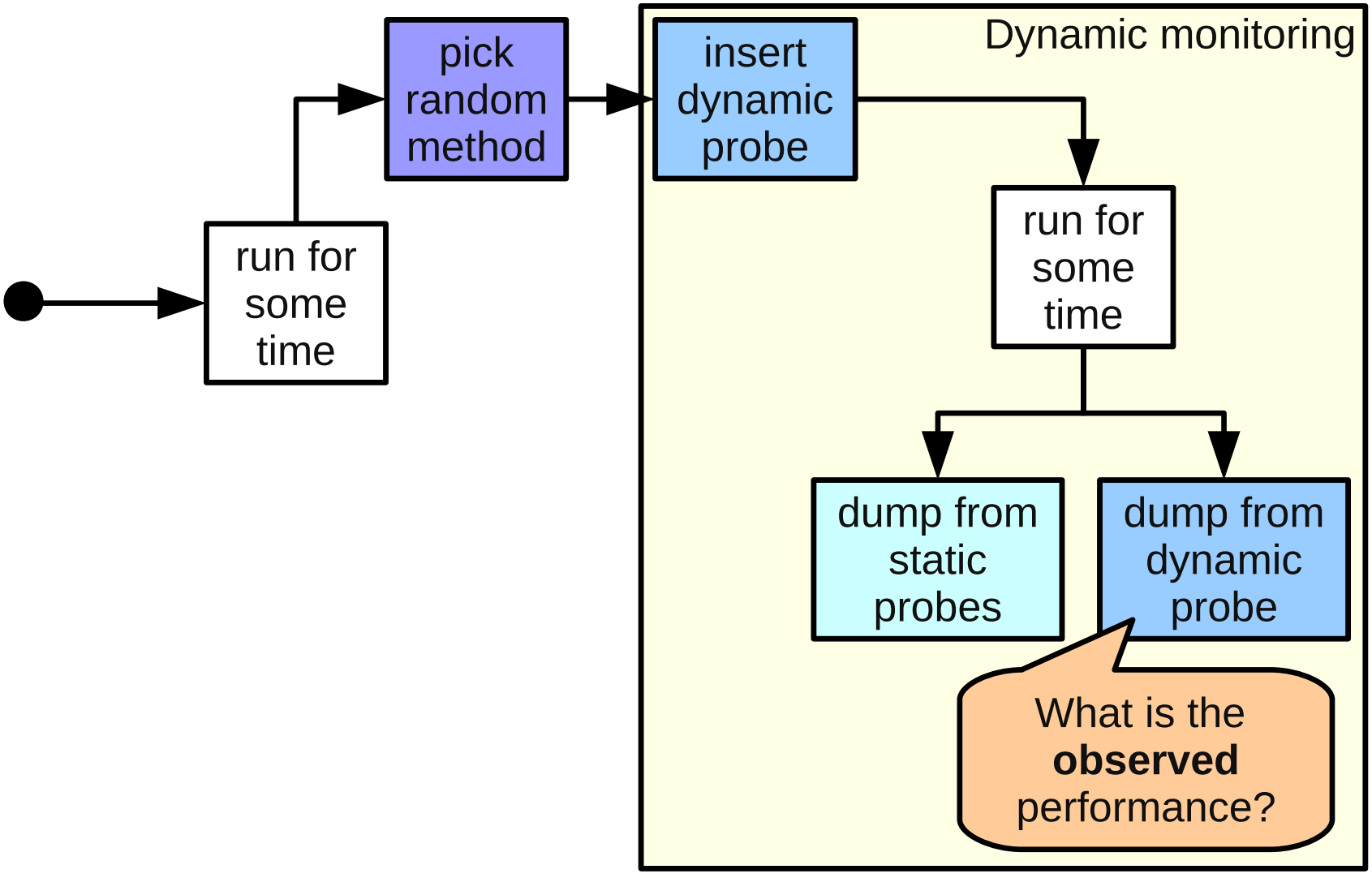

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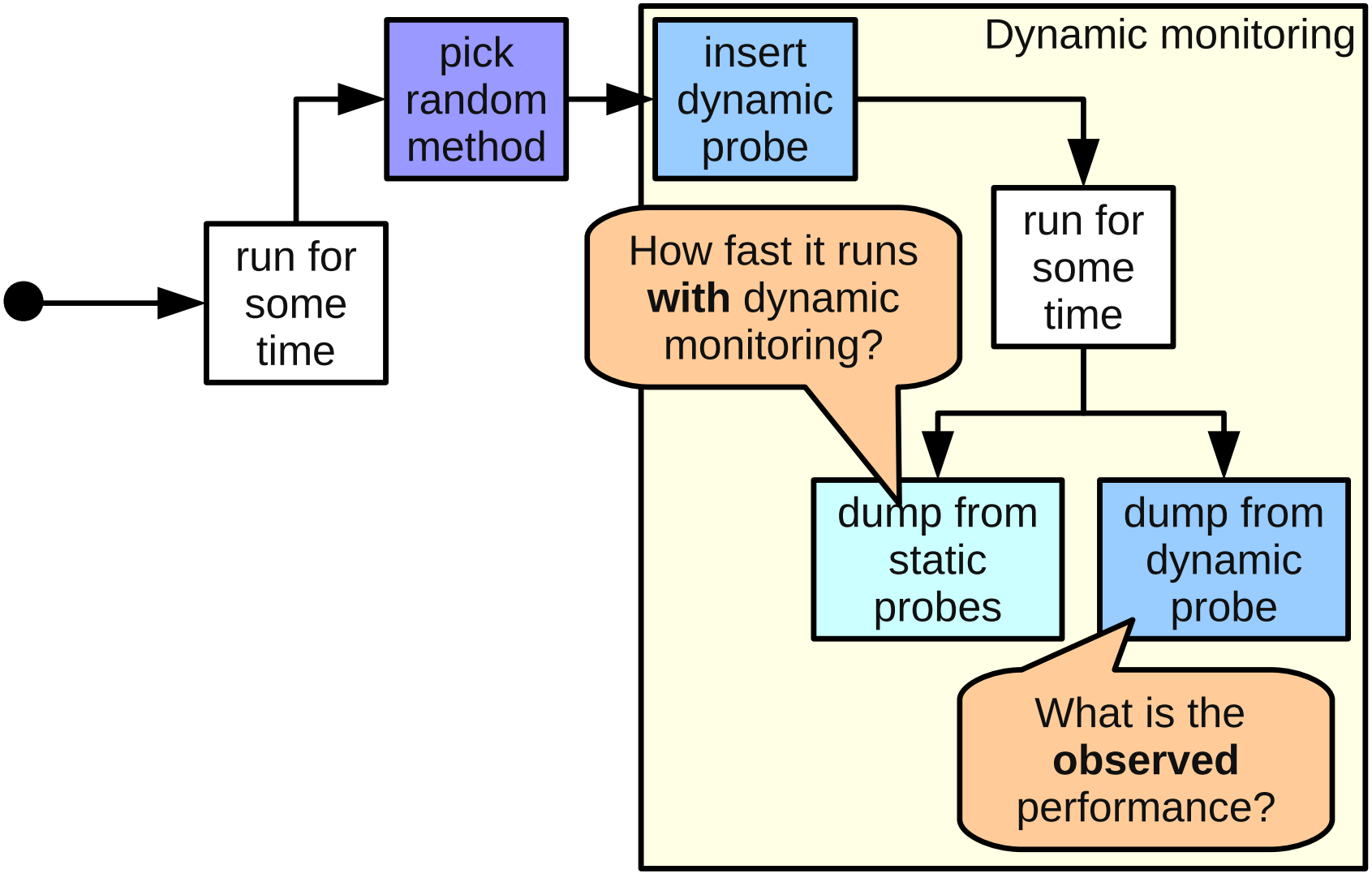

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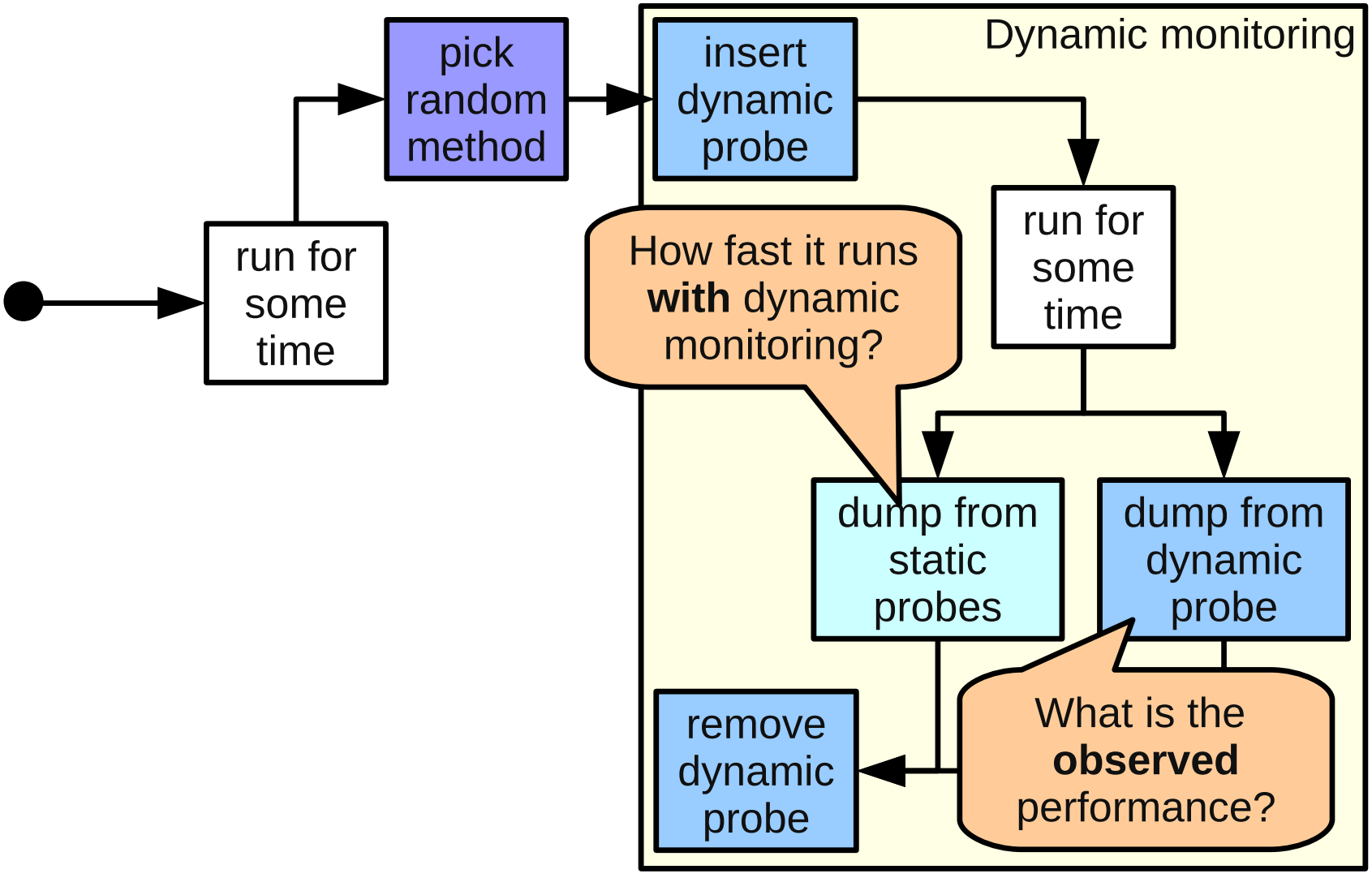

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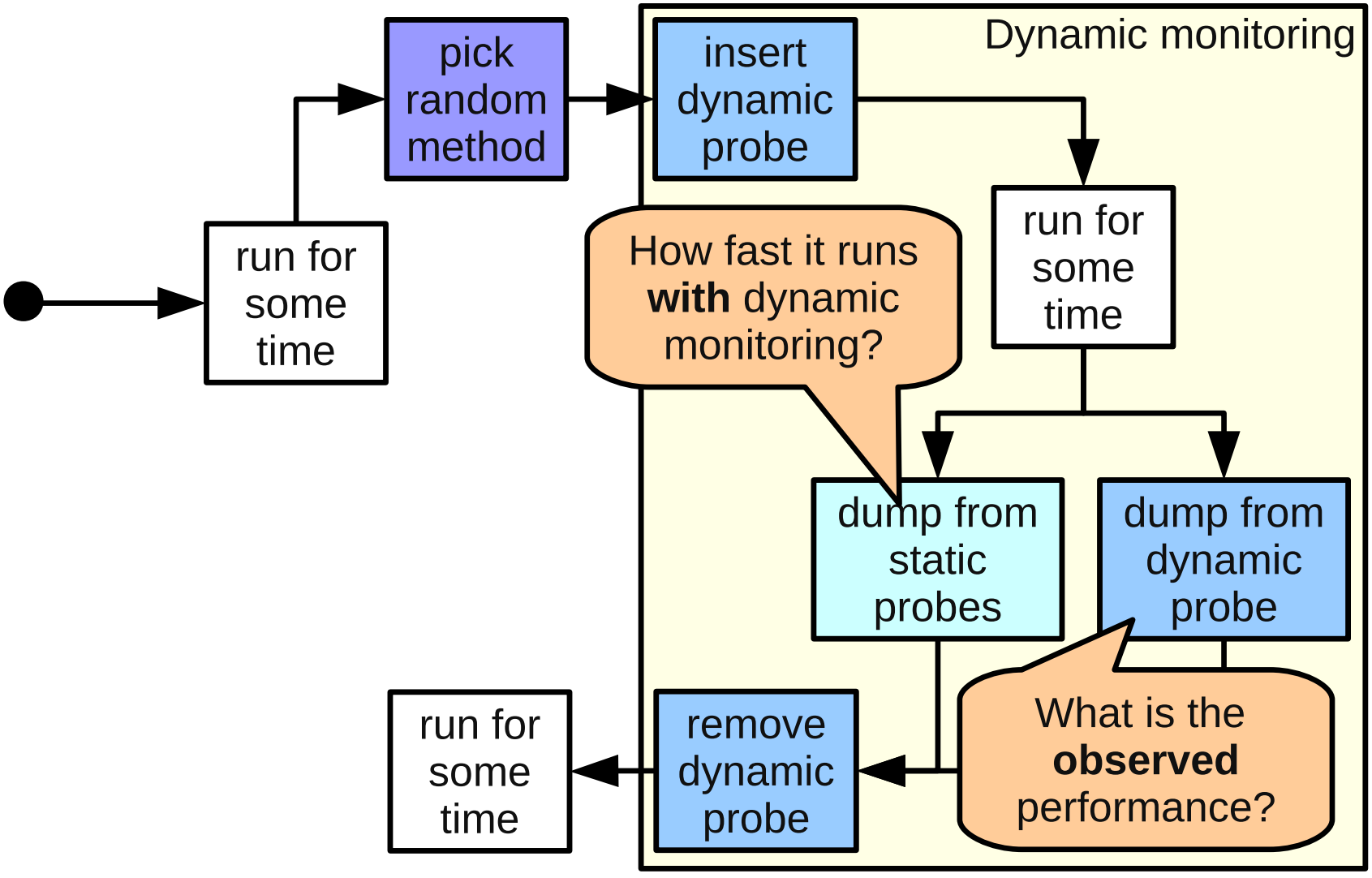

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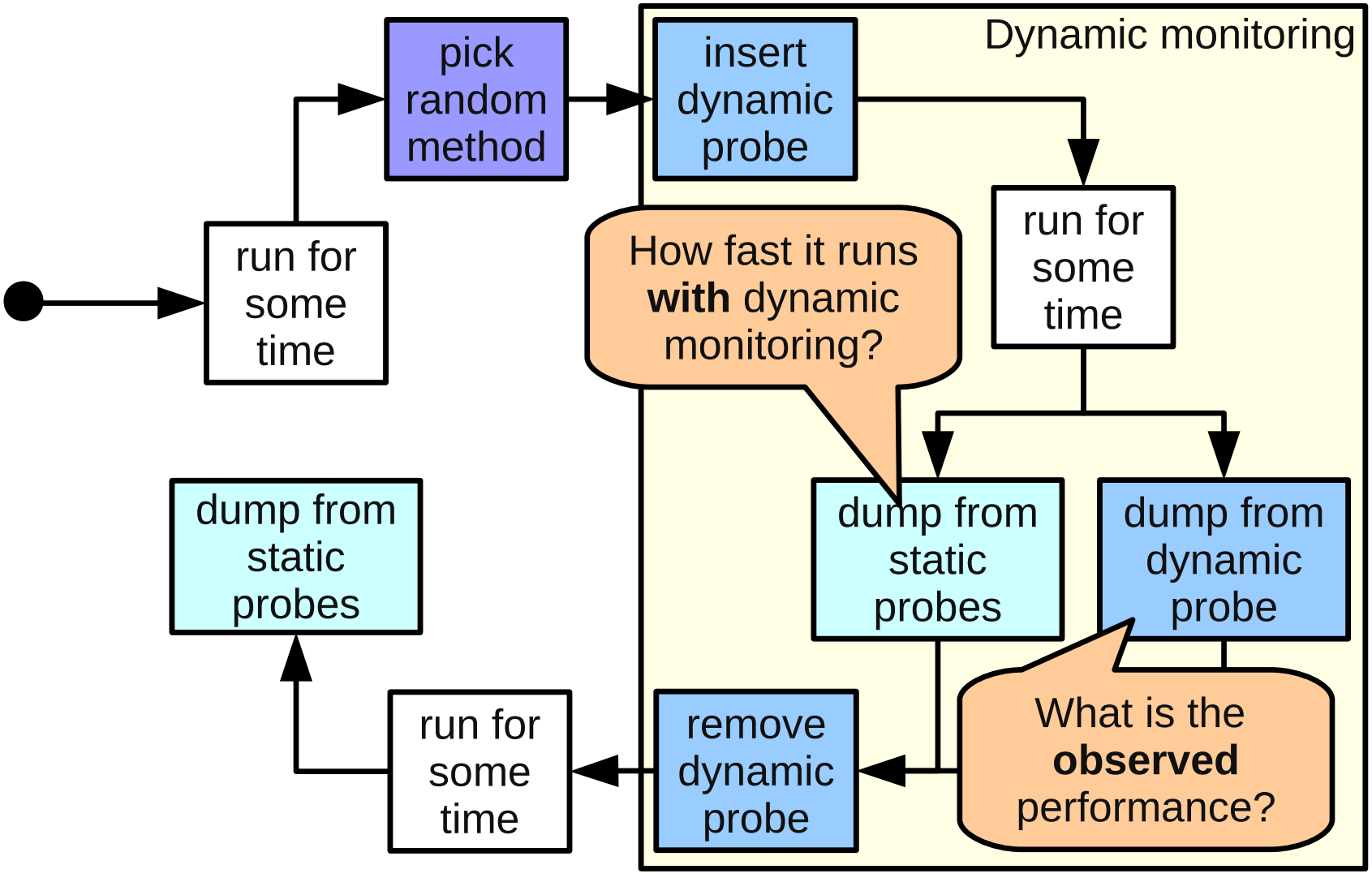

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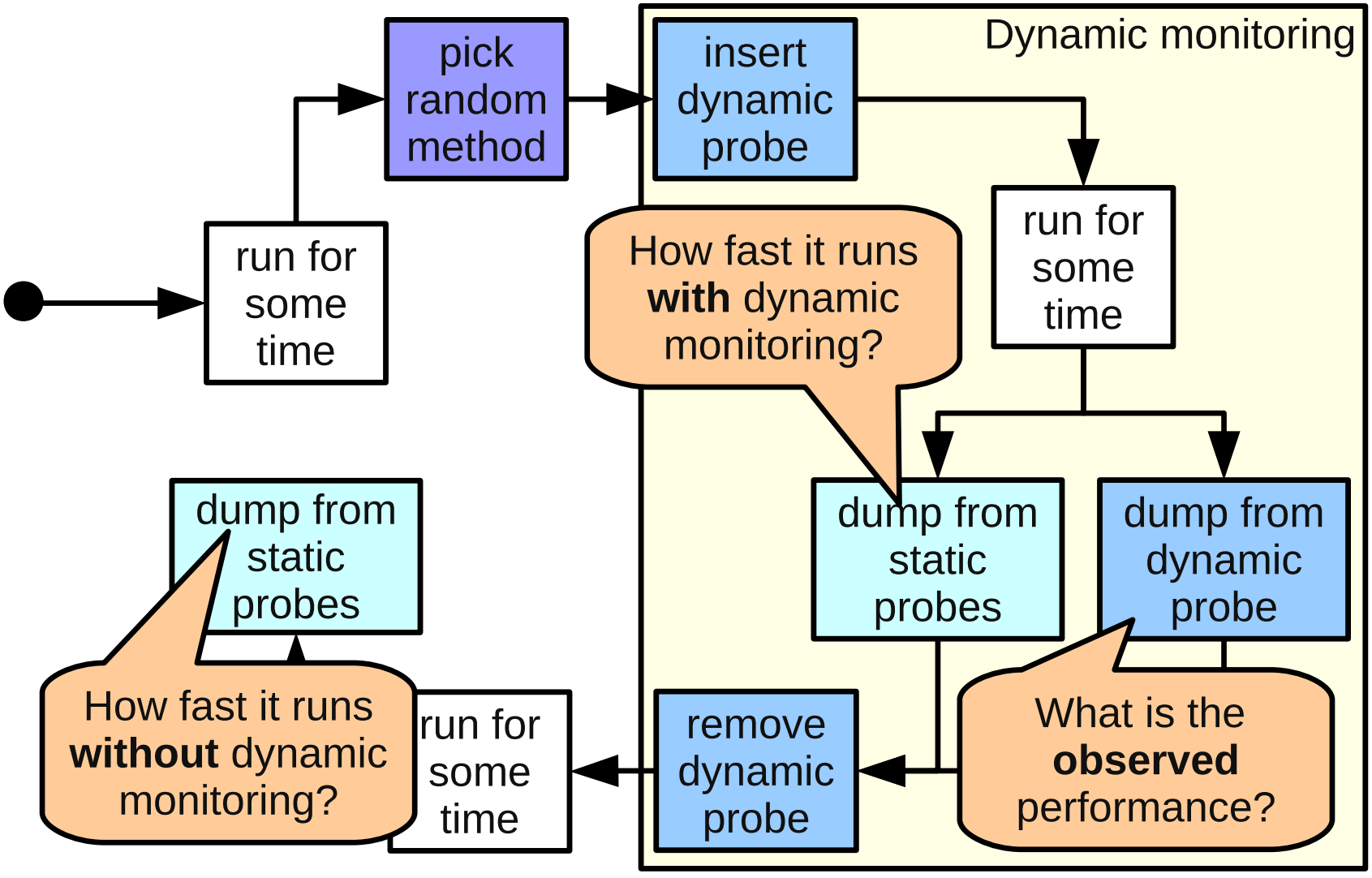

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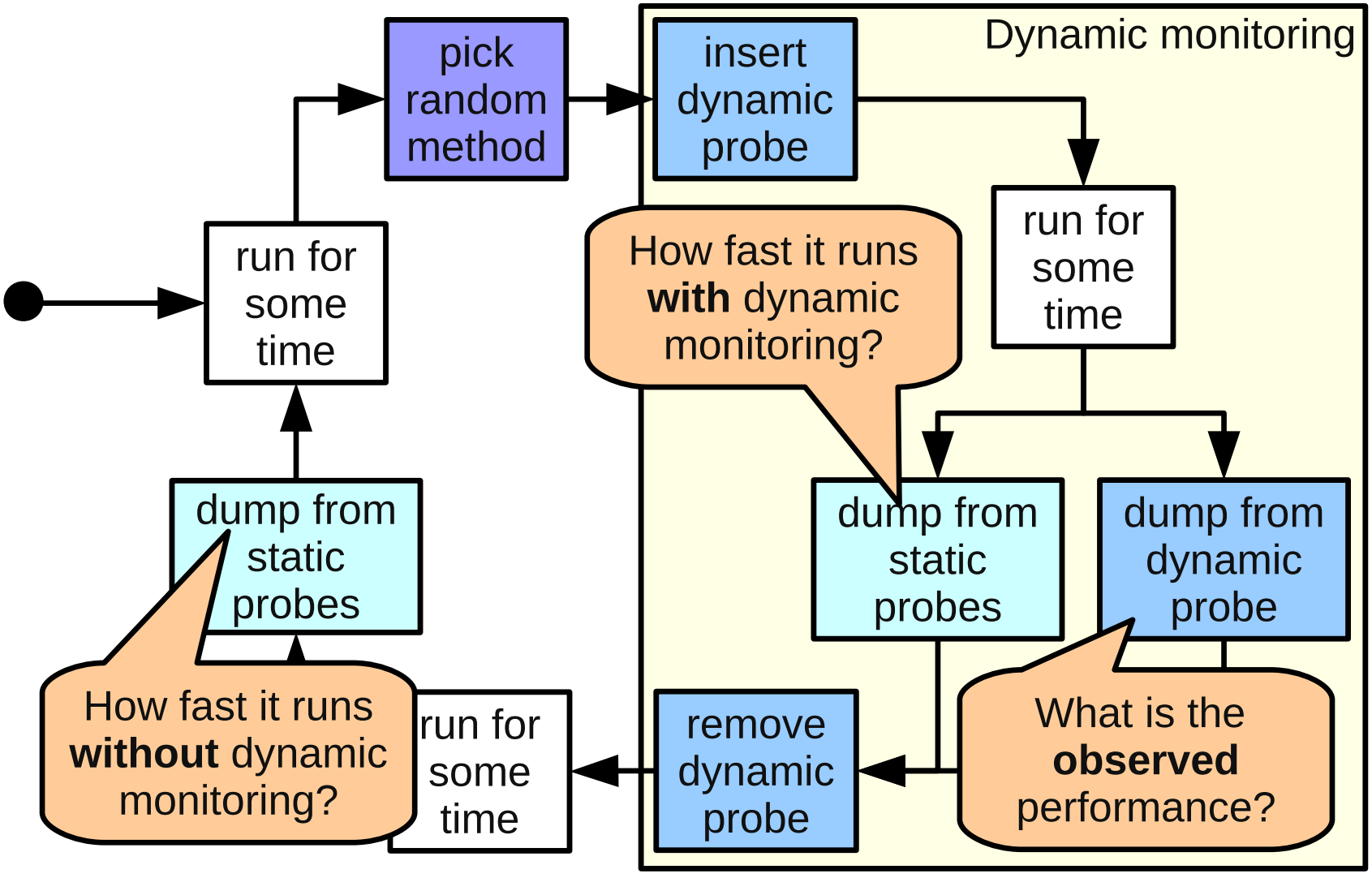

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- Several TBs of raw data per week of run-time.

Results

Overall Overhead of Dynamic Monitoring

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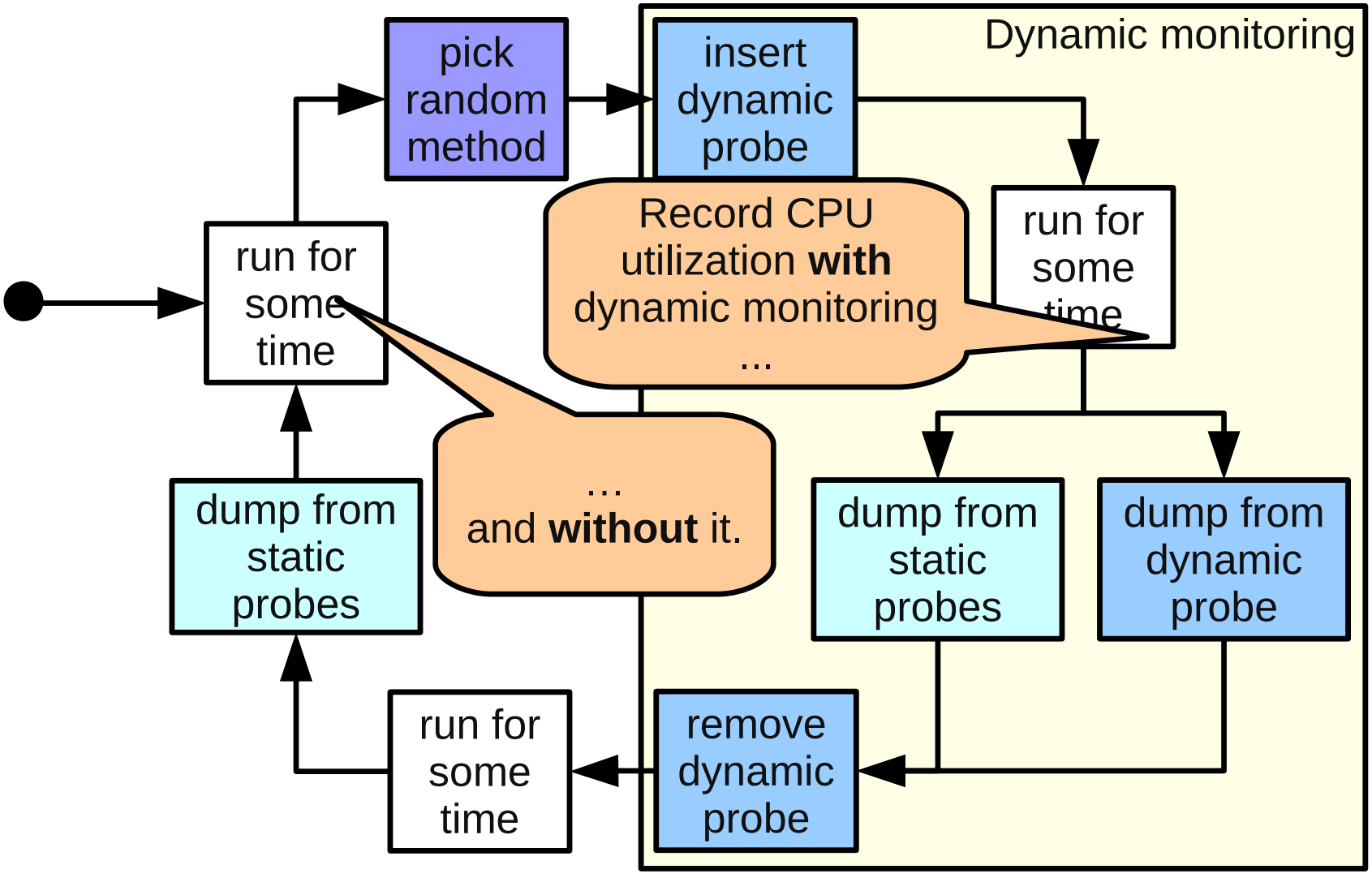

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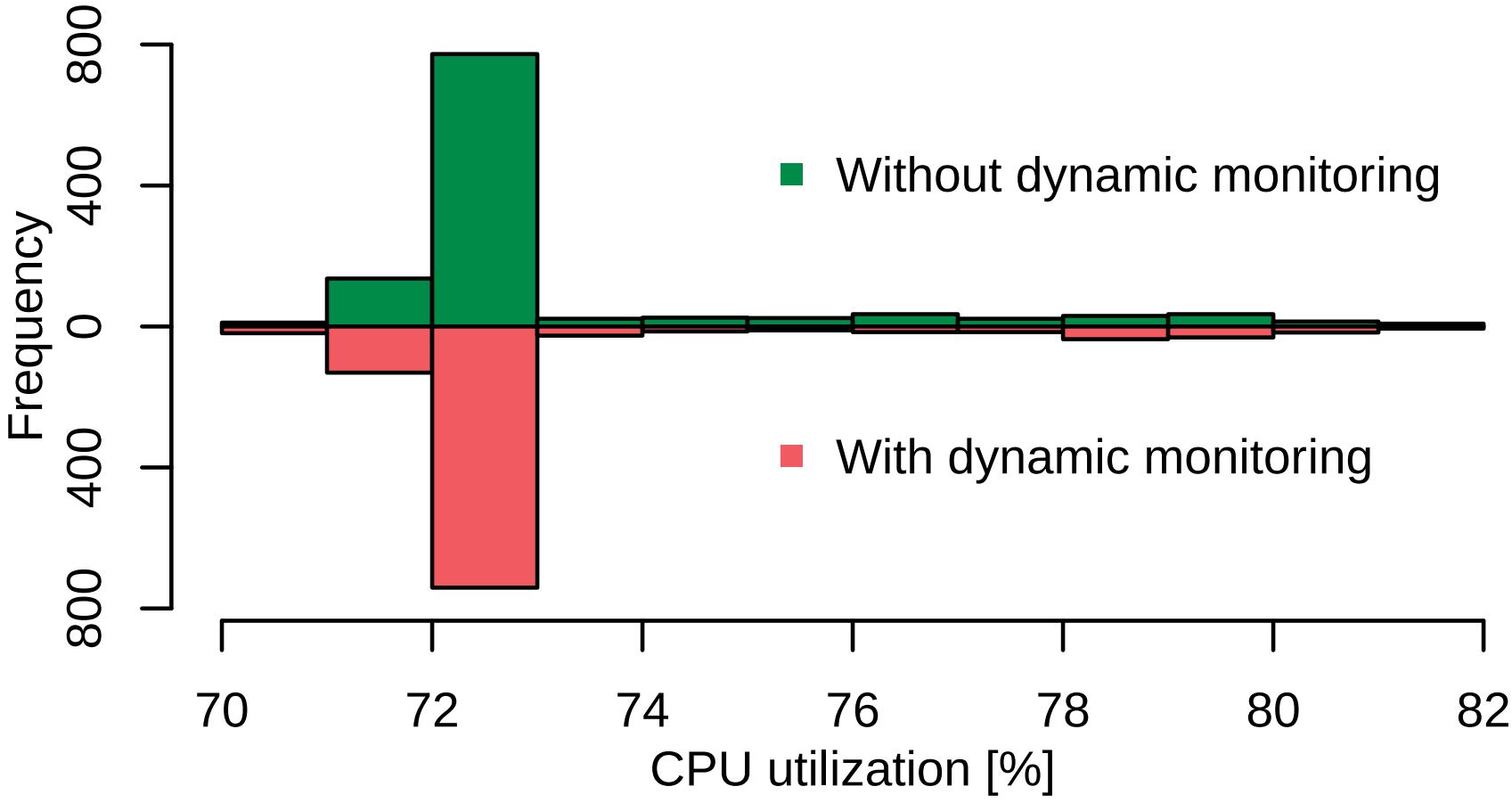

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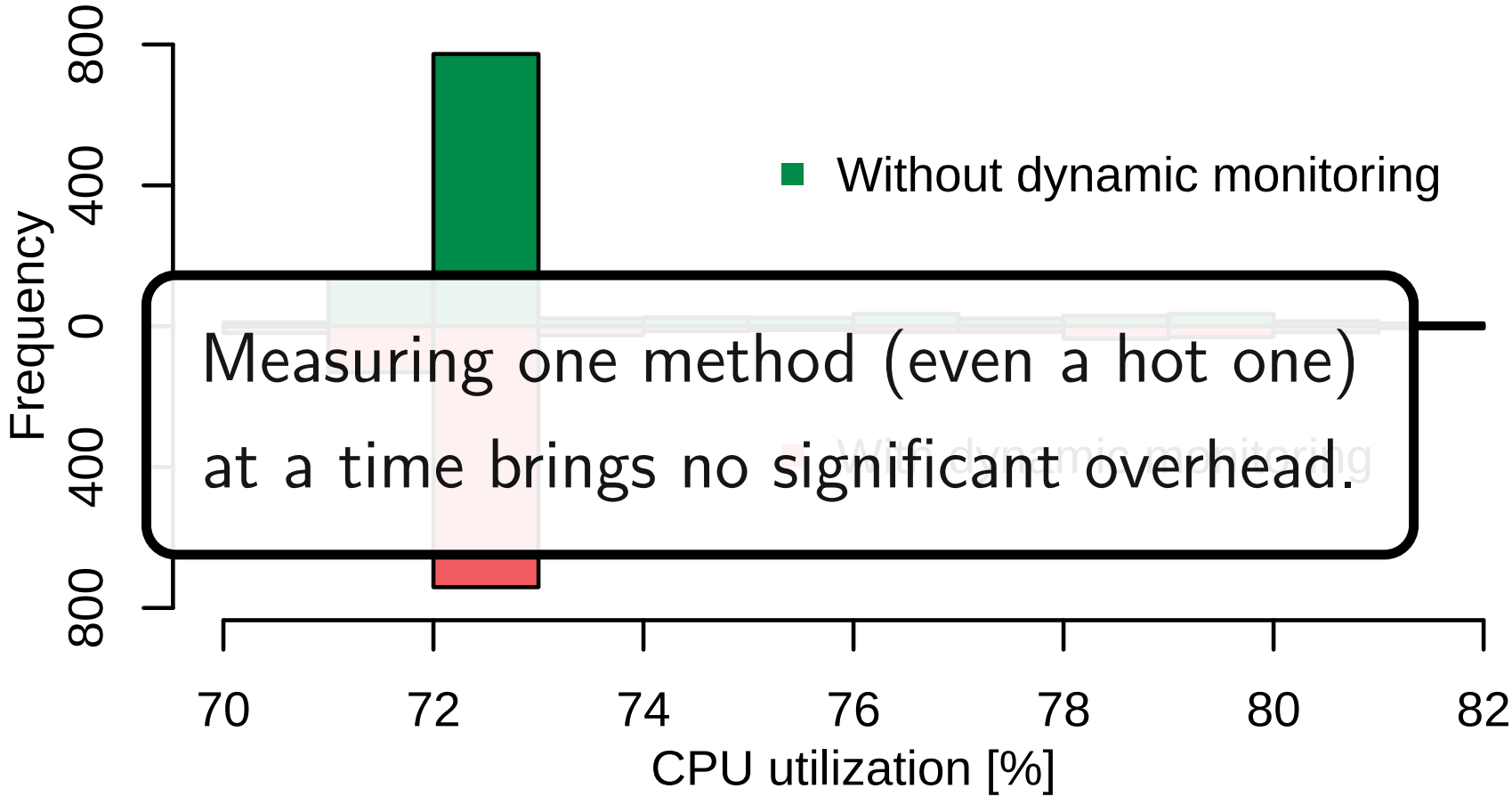

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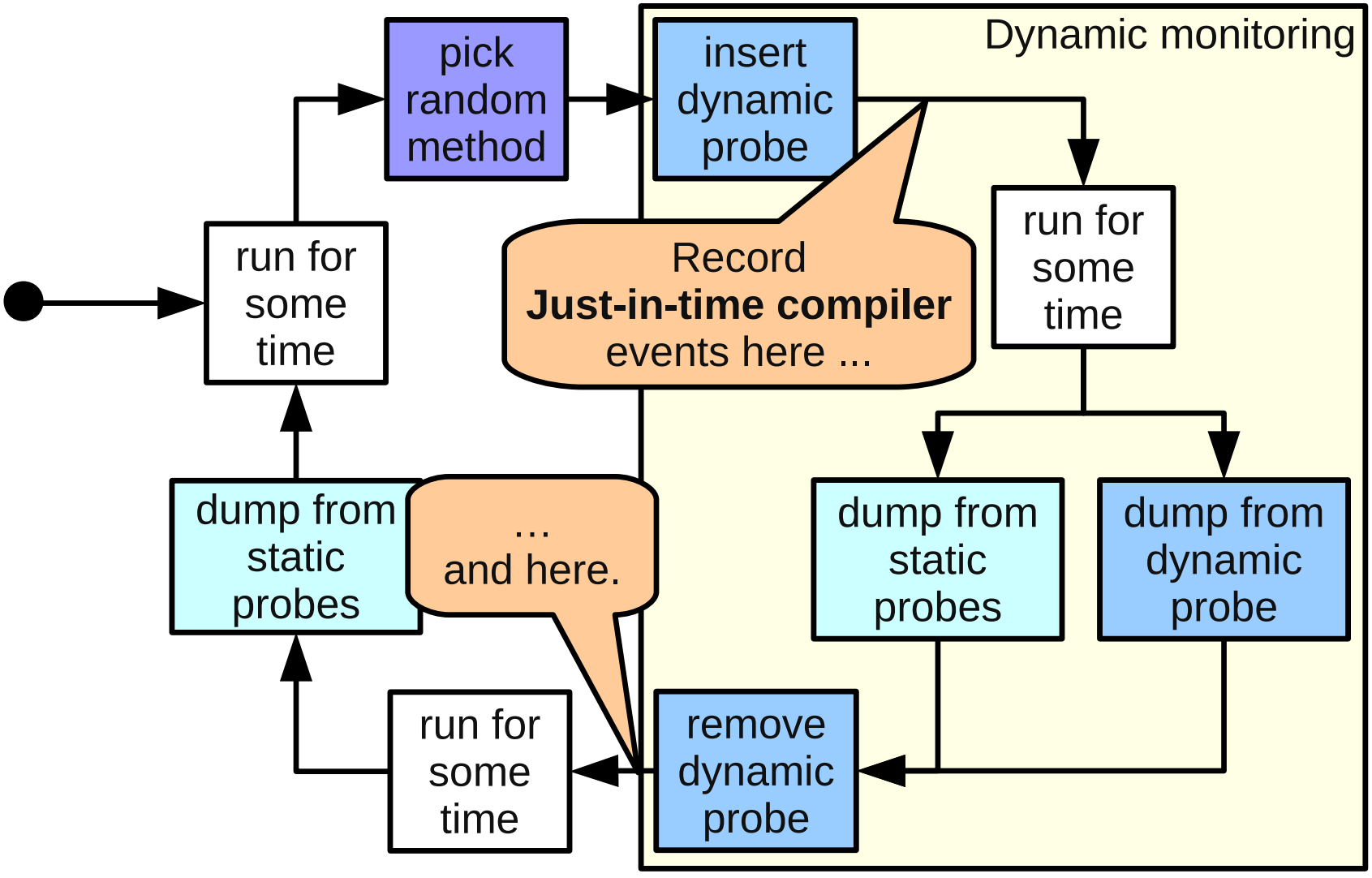

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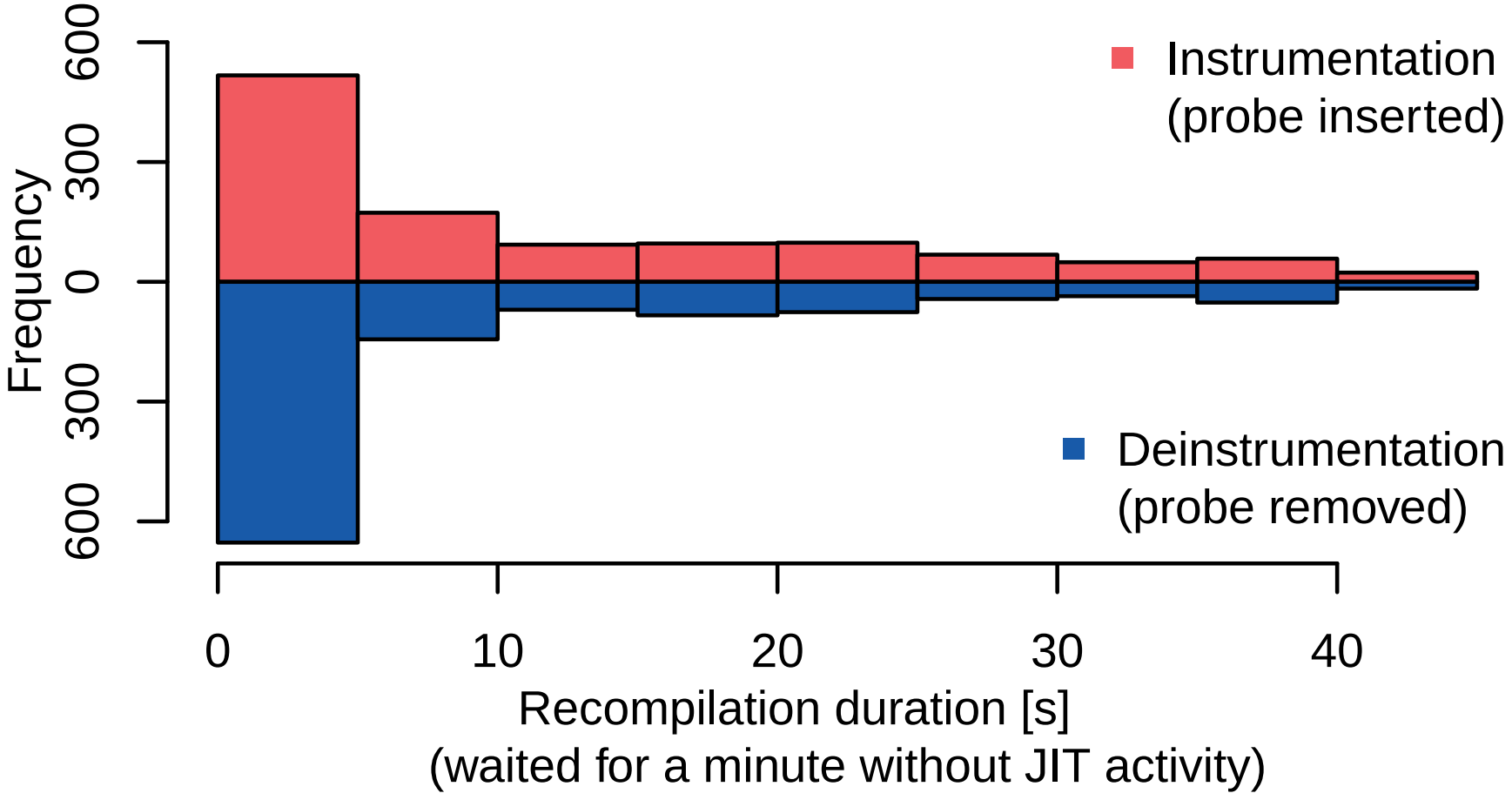

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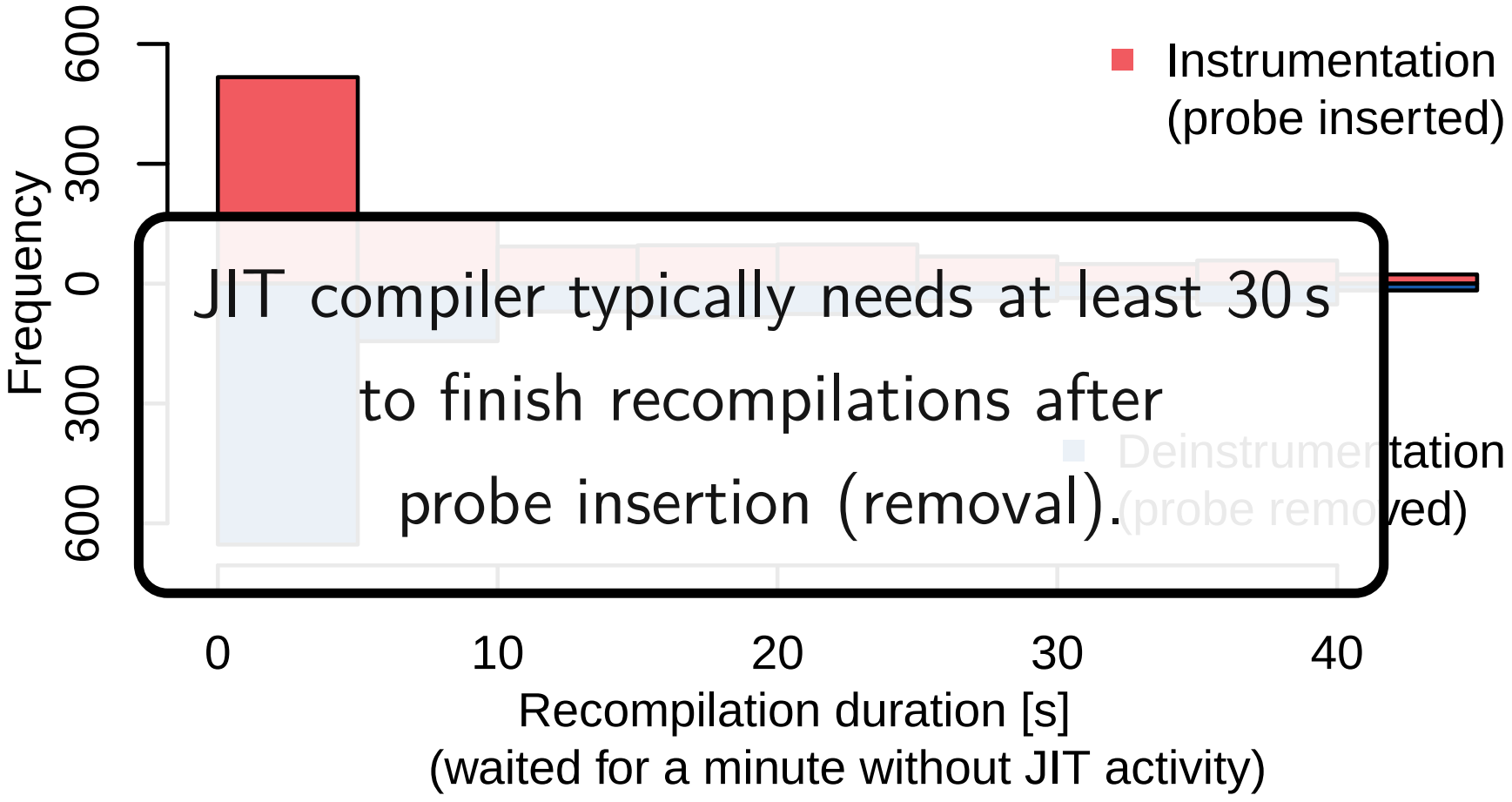

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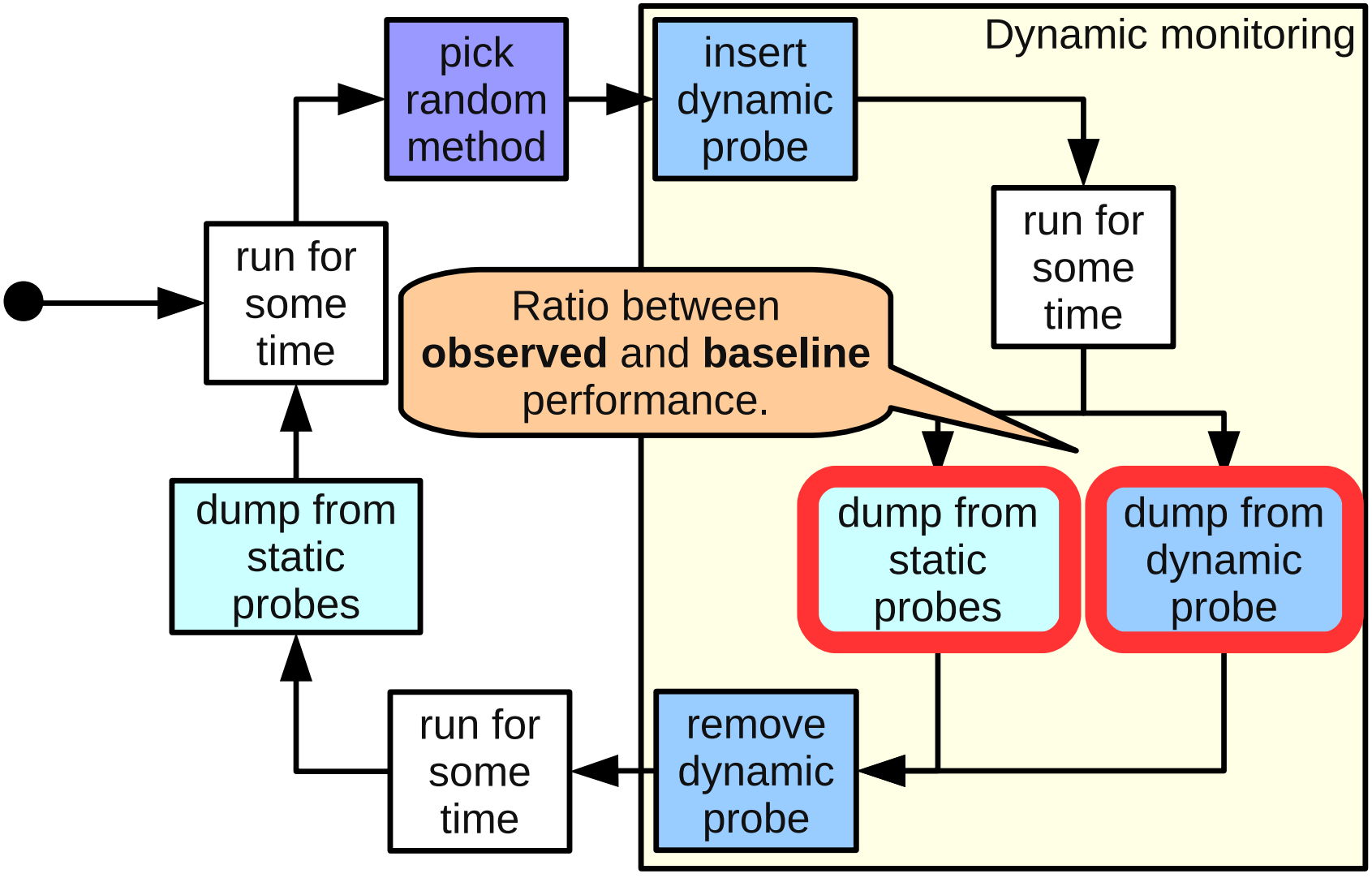

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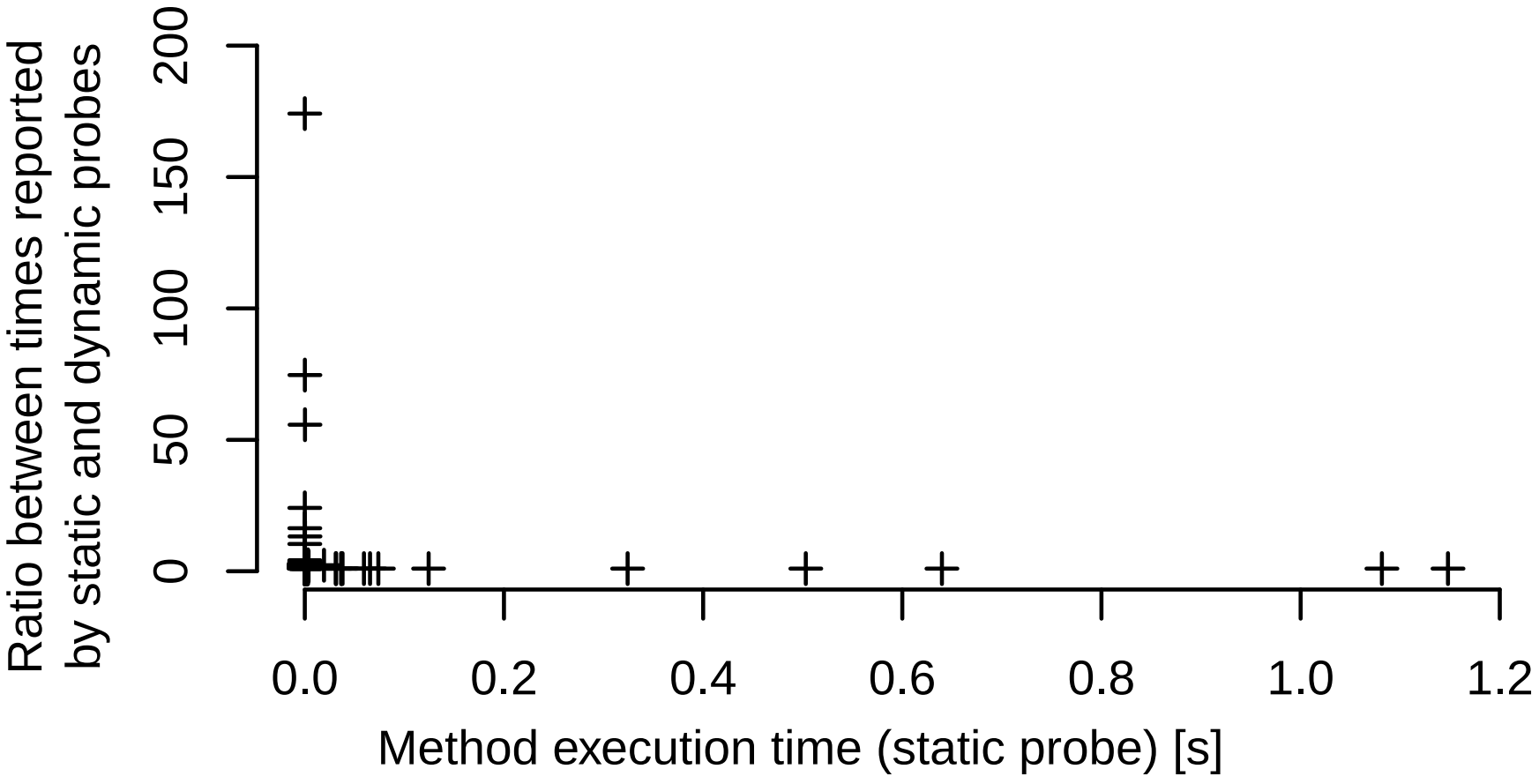

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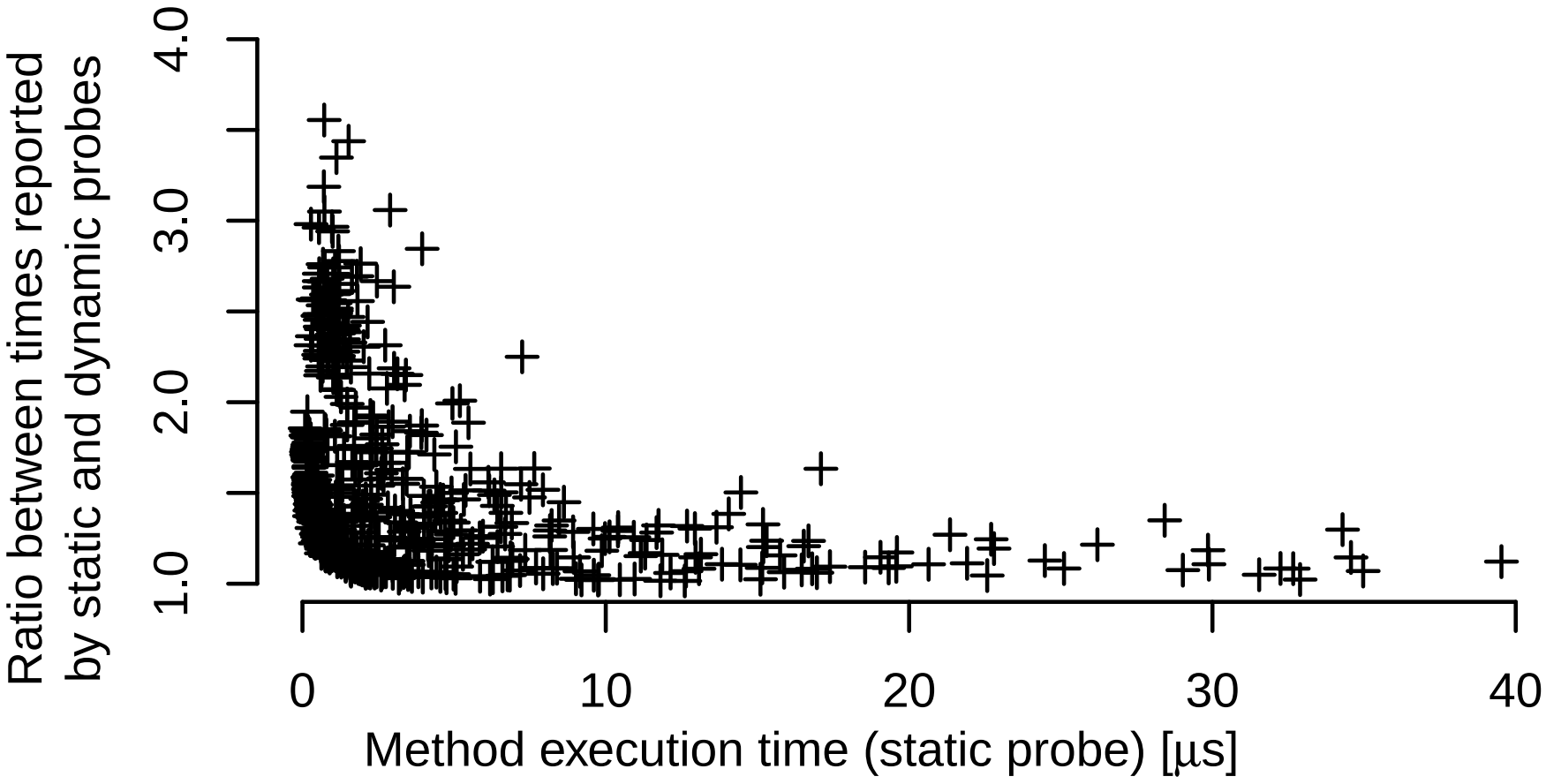

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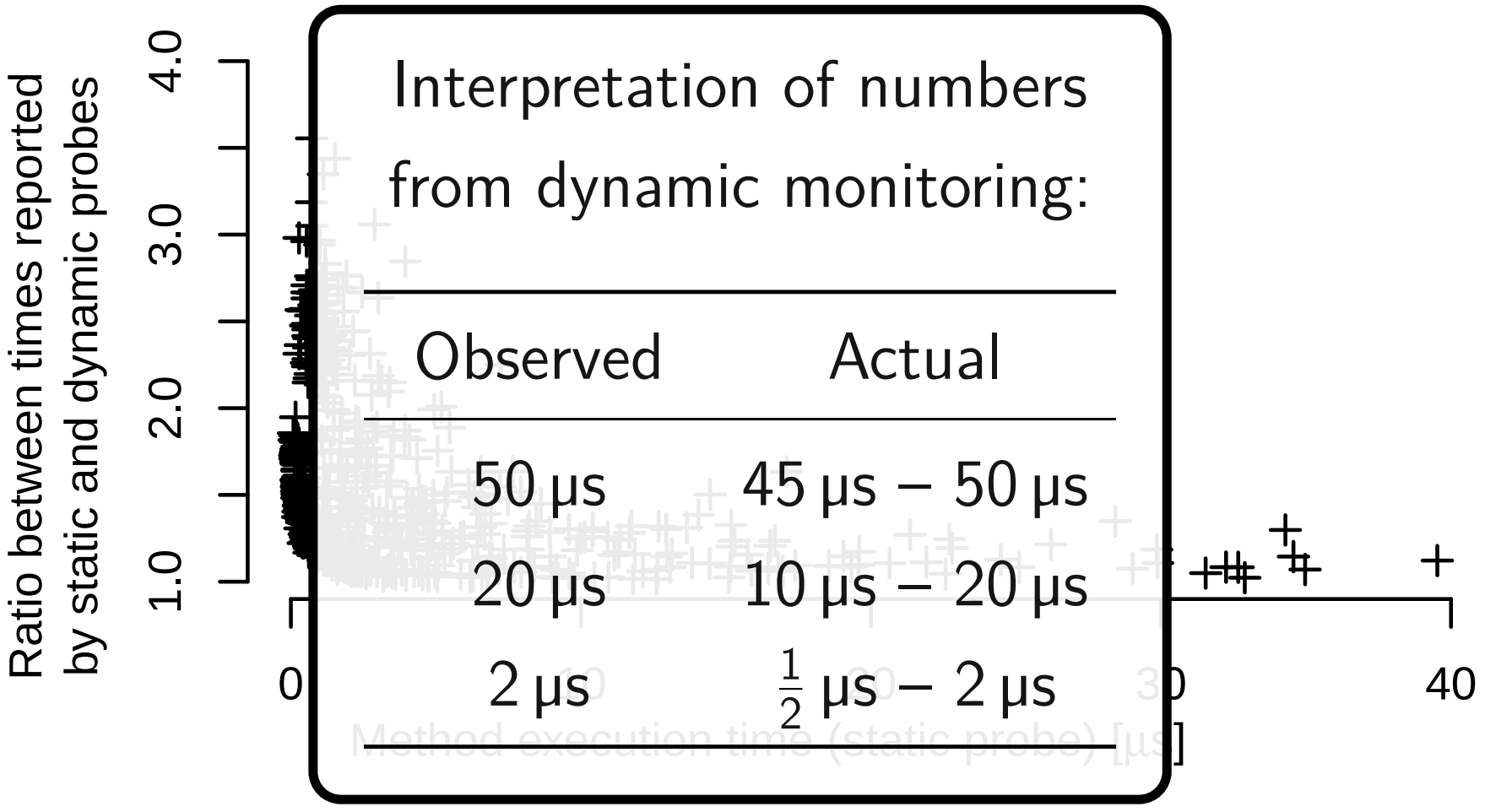

Interpretation of numbers from dynamic monitoring:

Observed	Actual
50 µs	45 µs – 50 µs
20 µs	10 µs – 20 µs
2 µs	$\frac{1}{2}$ µs – 2 µs

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Impact of Dynamic Monitoring

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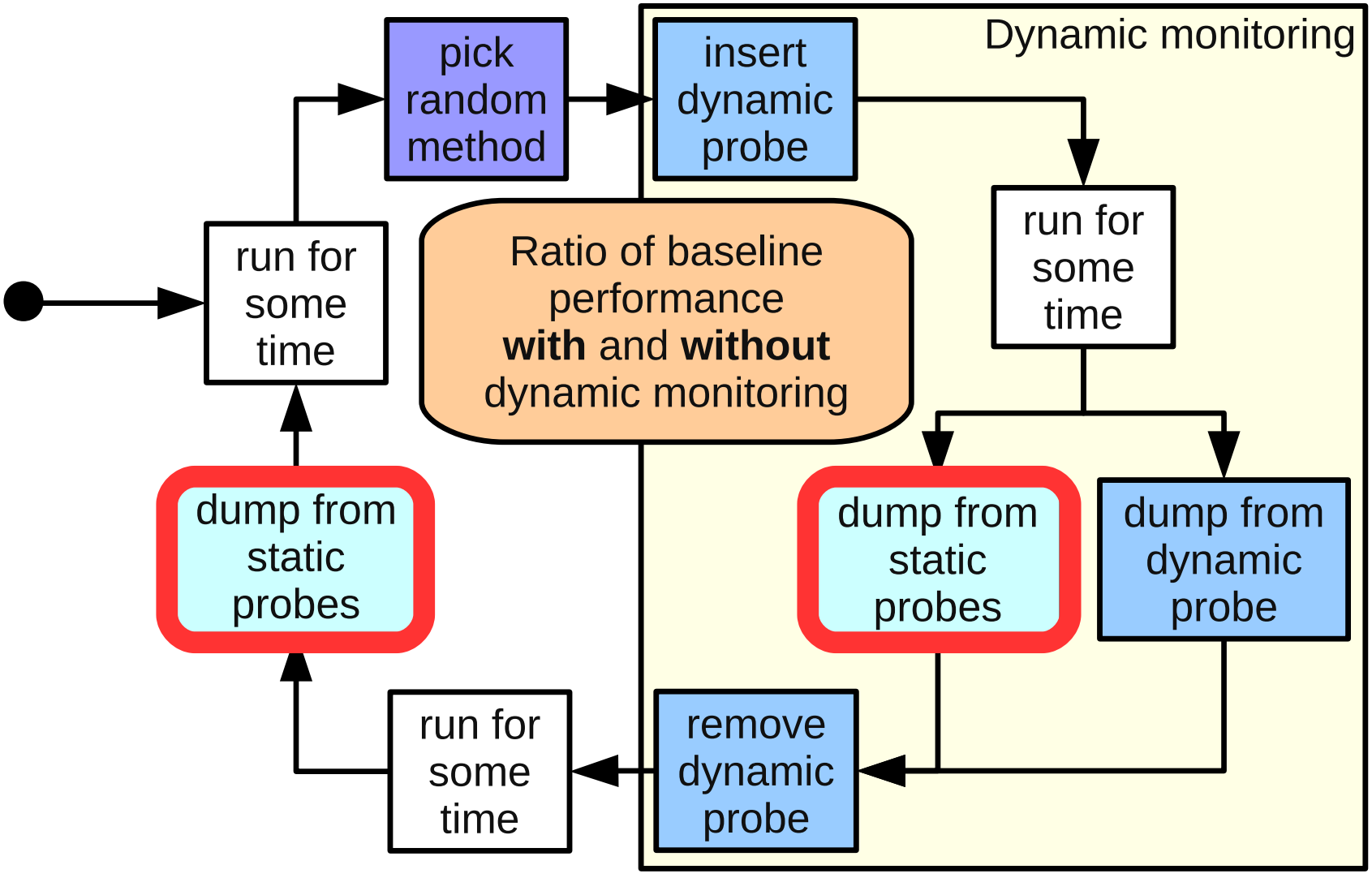

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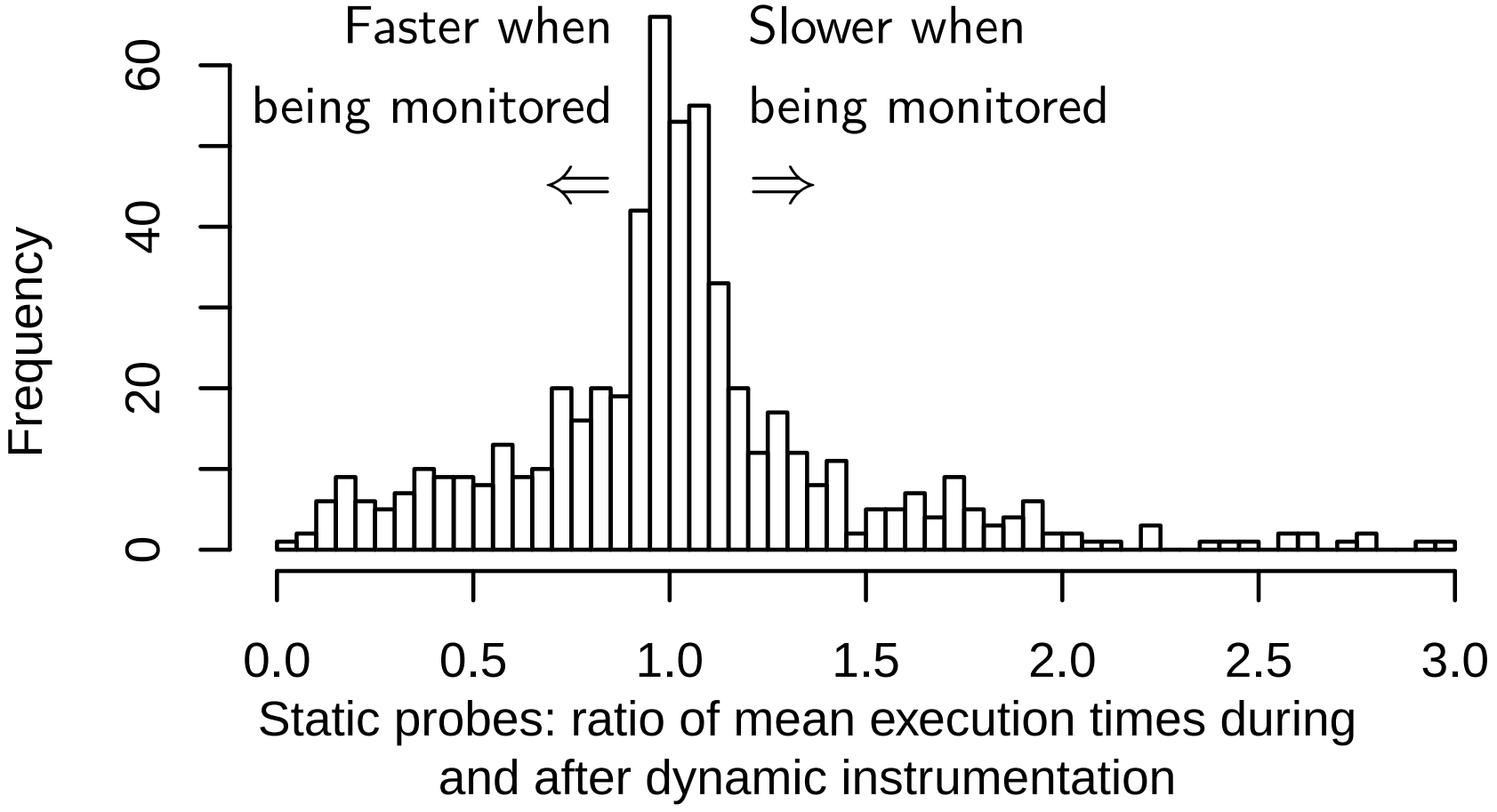

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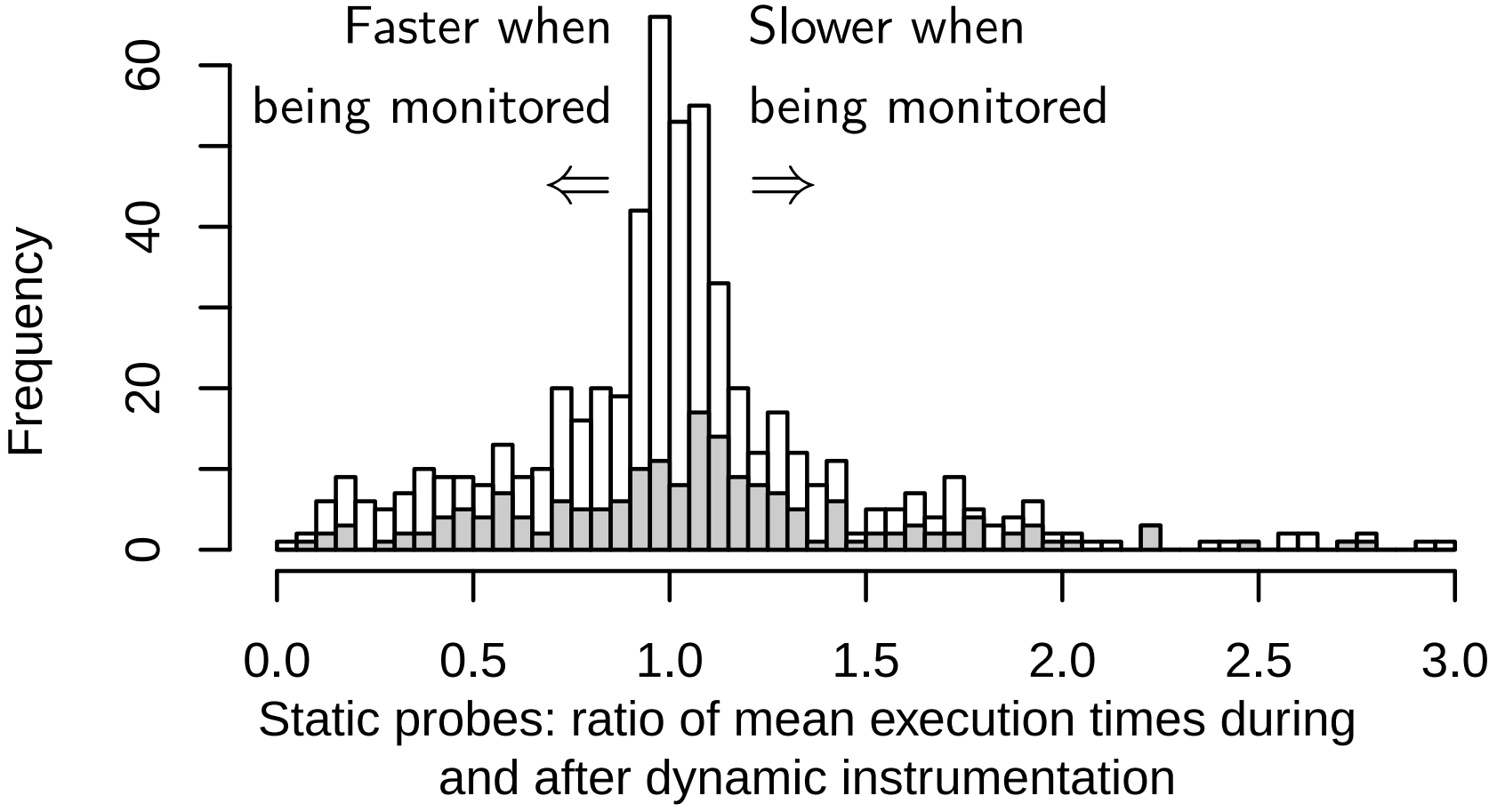

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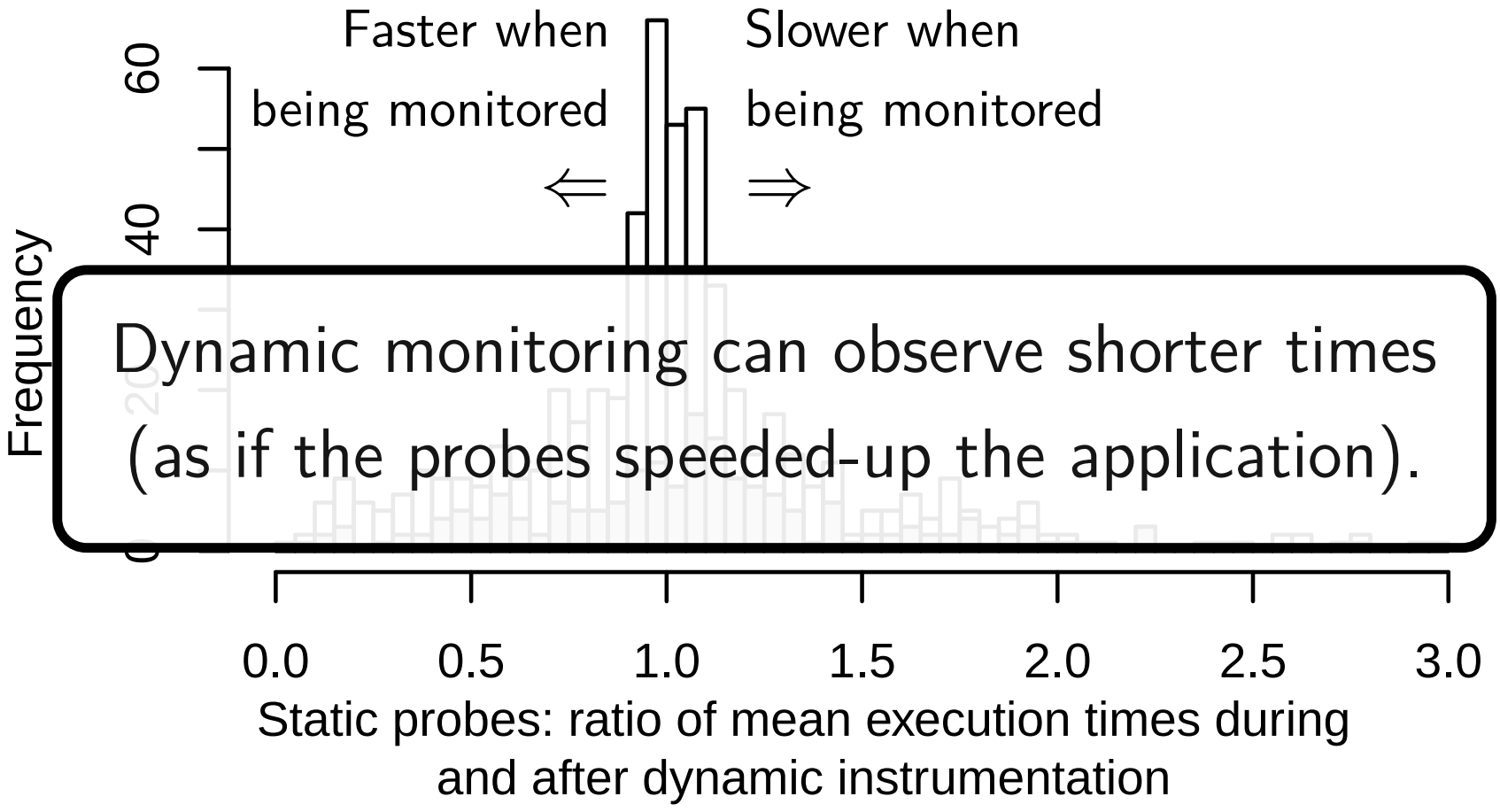

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Conclusion

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– At least 30 s are needed for (JIT) recompilation.

– If the reported time is 30 µs . . .

. . . the actual duration is between 20 µs and 40 µs

(durations of at least 100 µs are more “trustworthy”, though).

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