Performance Issues Detection by Comparing Nested Execution Traces in Distributed Systems

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Motivation

- Help users understand what is happening when something is different
  - Performance differences between versions of the application.
  - Performance differences between system configurations.
  - Why some requests are slower than others?

Previous Work at Dorsal Lab

electronics

MDPI

Article

Combining Distributed and Kernel Tracing for Performance Analysis of Cloud Applications

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Diagnosing Performance Variations by Comparing Multi-Level Execution Traces

François Doray, *Student Member, IEEE* and Michel Dagenais, *Senior Member, IEEE*

Roadmap

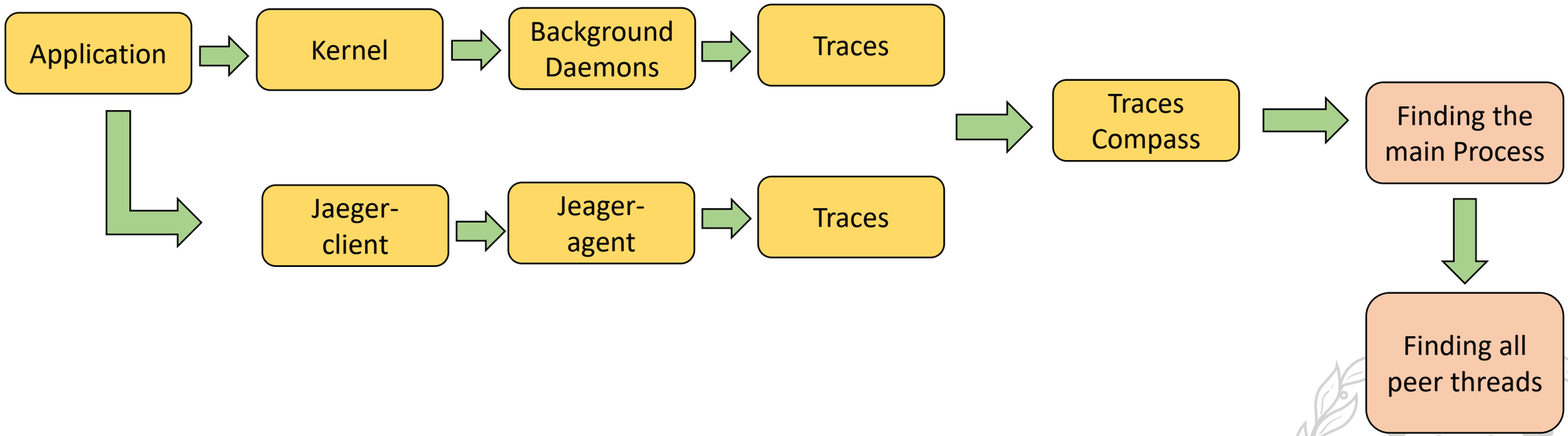
- Detecting nested trace requests.
- Collecting User-space and kernel-level events of all machines.
- Comparing similar traces for detecting performance issues.
- Extend Trace Compass or one of the performance analysis tools to analyze micro-services.

Strategy

- Creating trees of several threads from the nested requests.
- Linking system calls, critical path, and remote procedure calls of all related threads.
- Grouping and showing the differences between similar execution traces.

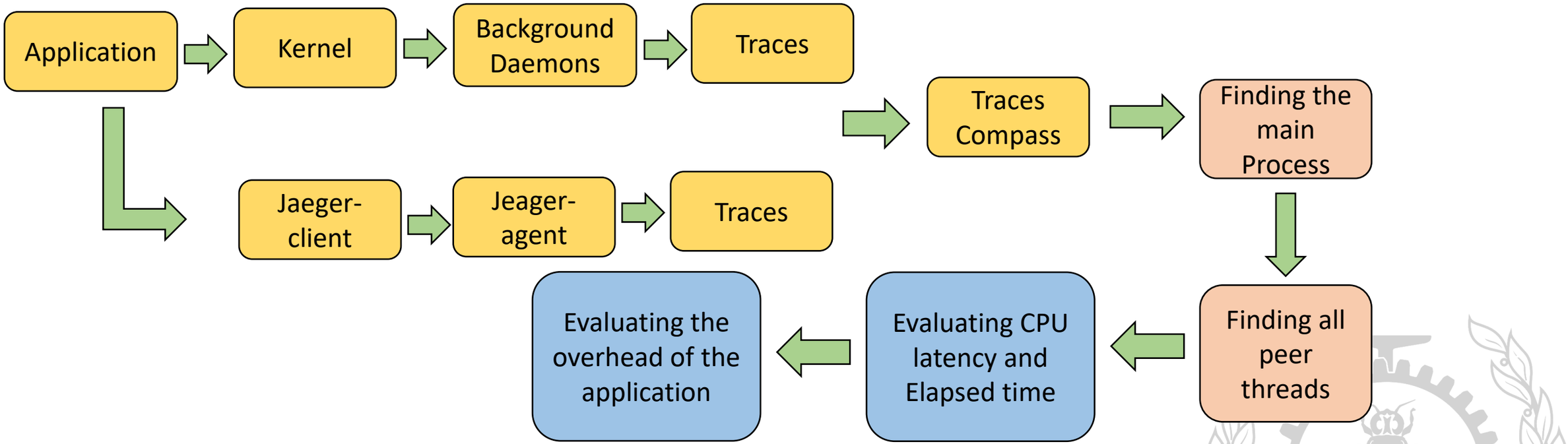
Accomplished

- Instrumenting Jaeger python source code with LTTng
  - Defining the start and endpoint of each span.
- Illustrating the communication between the main thread and its peer on the kernel side.



Accomplished

- Calculating the CPU latency and elapsed time for all related spans of the specific request through distributed systems.
- Evaluating my work by applying workload to the system.



Future Goal

- Mapping the execution flow of similar requests.
- Grouping similar traces and finding differences.

Thank you

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Source Code: https://github.com/maryamekhlasi/jaeger-client-python.git