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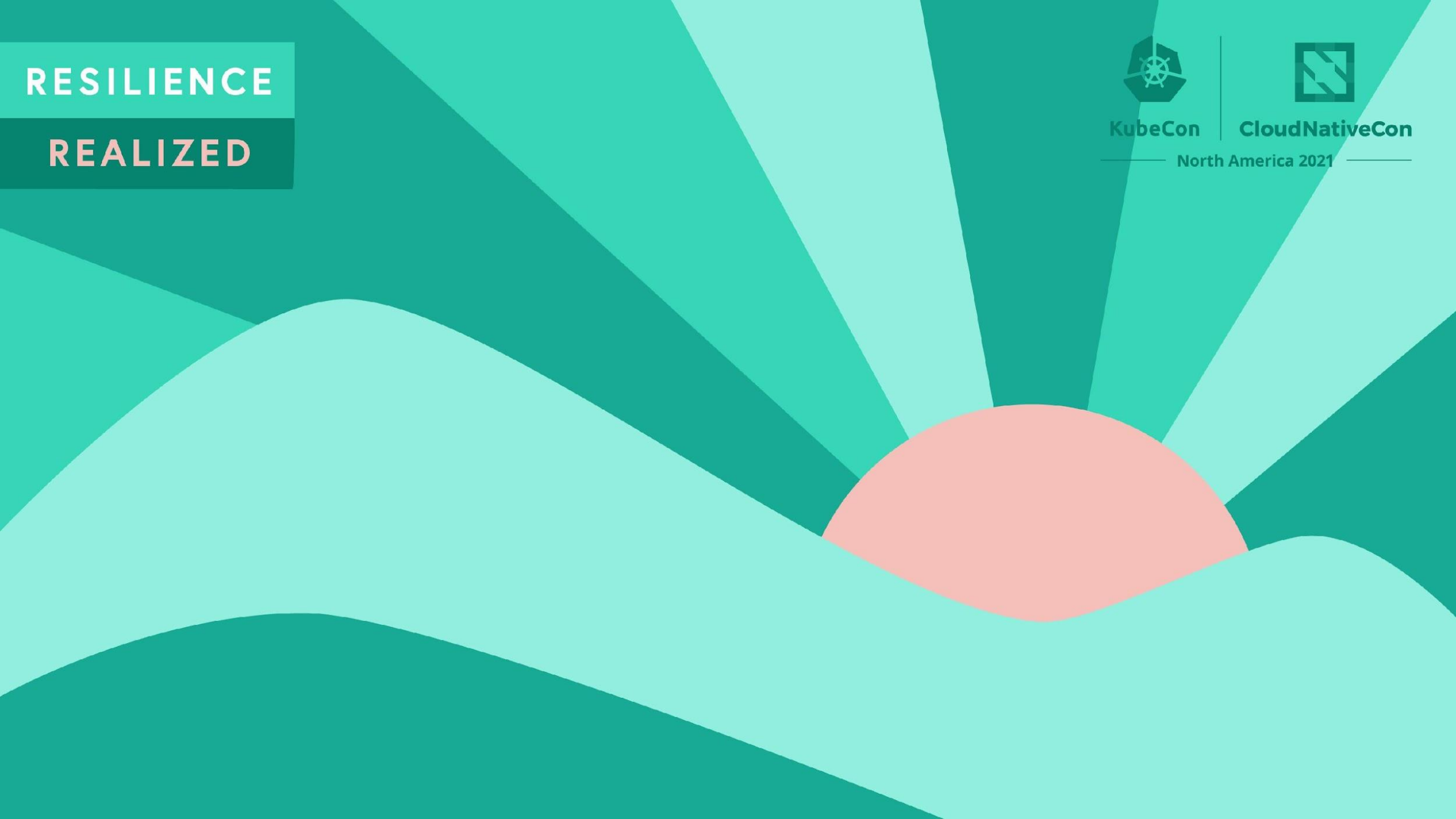

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Effortless Profiling on Kubernetes

Eden Federman

About Me

- Eden Federman (@edenfed)
- Software Engineer at Yahoo
- ❤️ Observability and Profiling
- Created kubectl-flame

Agenda

- Intro to profiling
- Challenges of profiling on Kubernetes
- Profiling demo
  - Manually
  - kubectl-flame

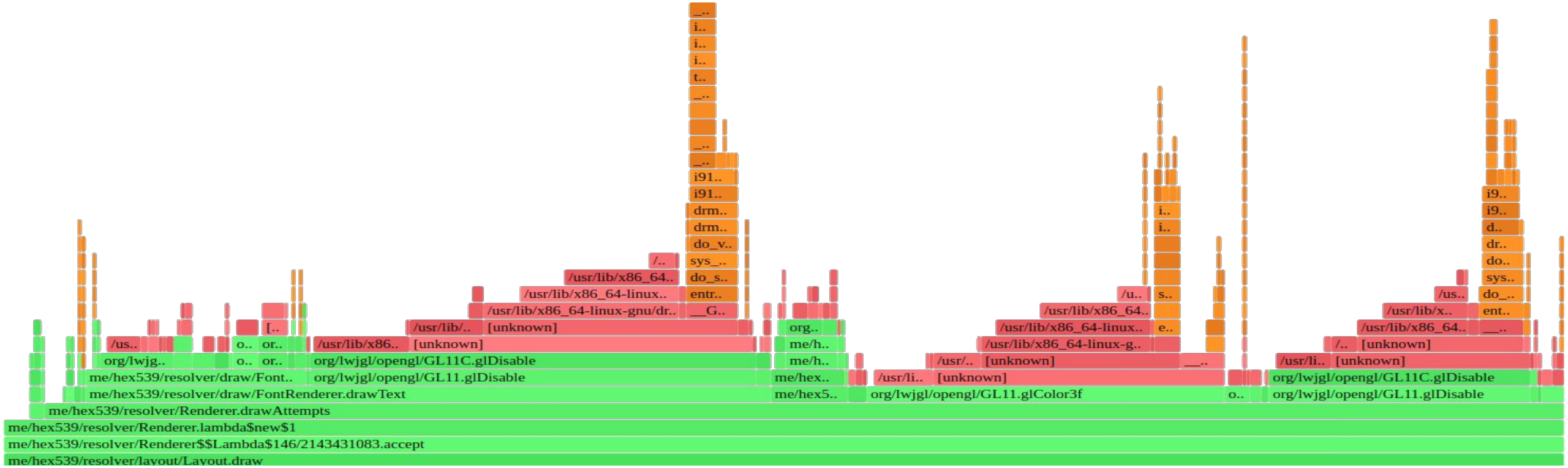
What is Profiling

Profiling is the act of analyzing the performance of applications in order to improve poorly performing sections of code.

One of the most popular ways to visualize a profile and quickly identifying performance issues is by generating a **Flame Graph**.

Flame Graphs

Y-axis is stack depth
X-axis spans the sample population
Color is used to differentiate between frame types
Order is not important



Why Profiling is Hard

- Overhead
  - Profiling in production is typically avoided
- Require application modifications
  - adding flags to the execution command
  - importing library into your code.

Choosing the right profiler may solve those problems, but it requires research and usually depends on the programming language and the operating system.

Profiling on Kubernetes

- Modify container image
  - Include profiler binaries
  - modify application code
- Deploy modified image
  - Trigger application restart
  - Performance issues may disappear due to a restart

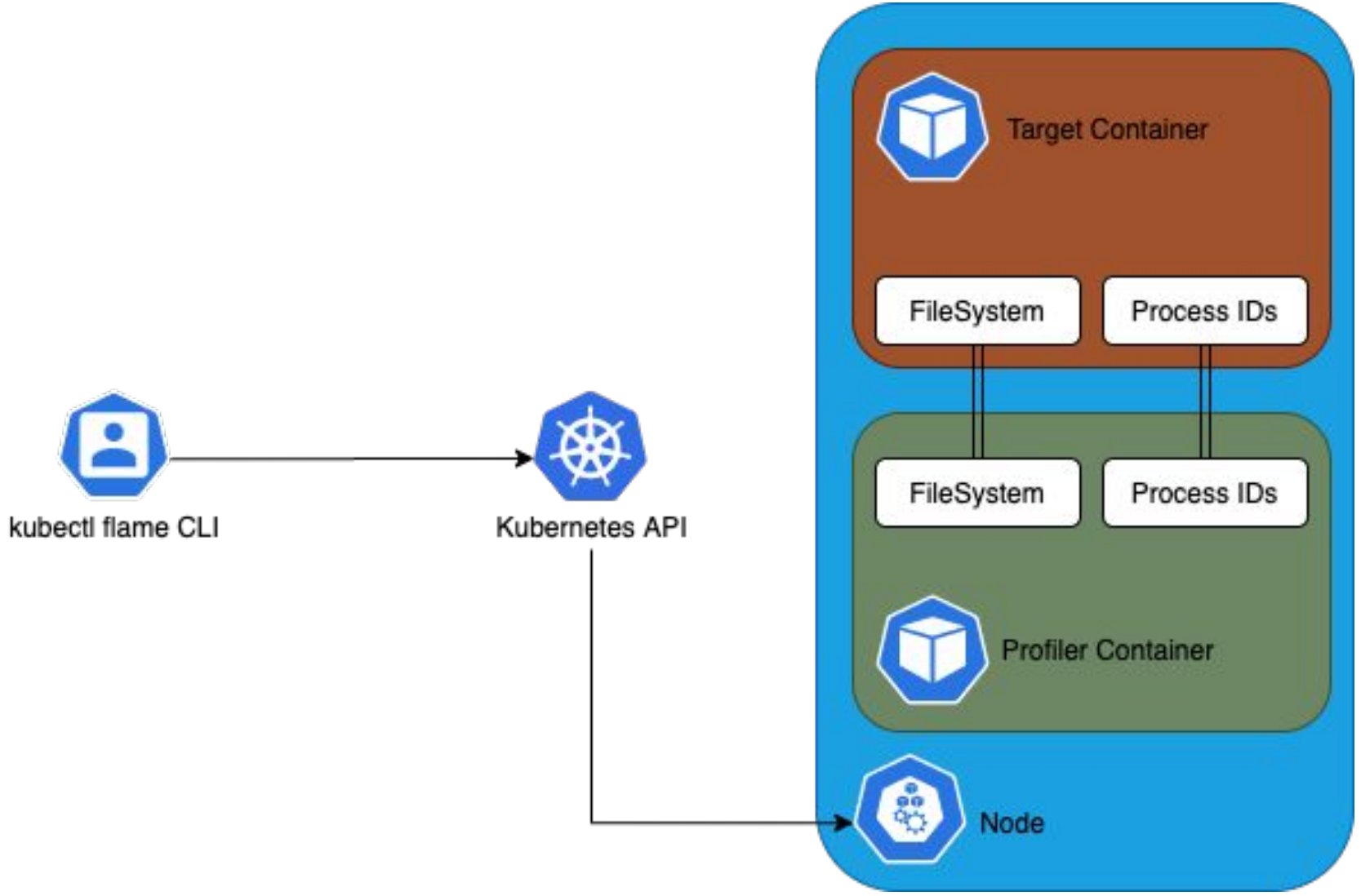
Introducing kubectl flame

- https://github.com/yahoo/kubectl-flame
- A kubectl plugin (installable via krew)
- No code modifications
- No restart / downtime

The best profiler for the programming language:

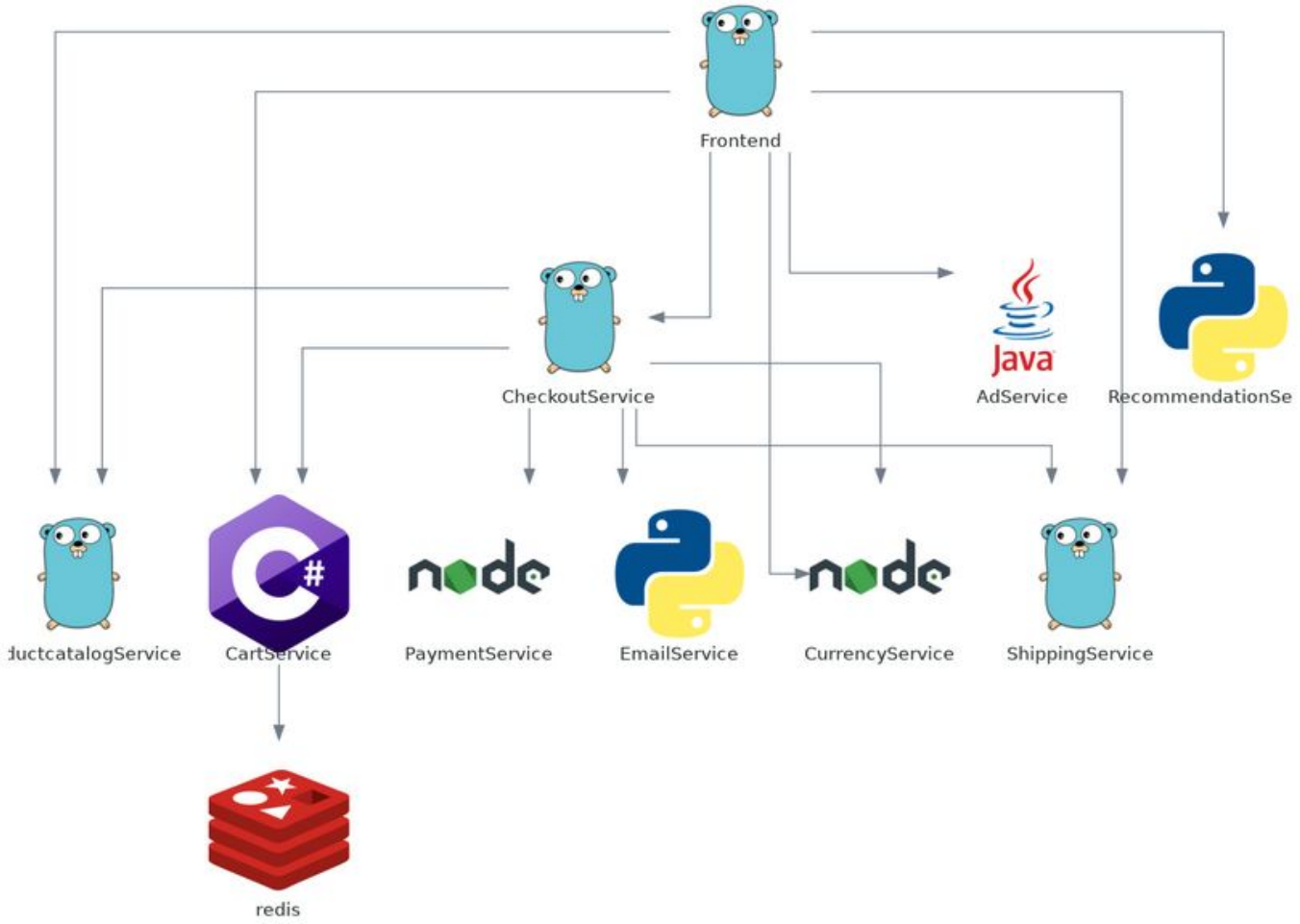
Go	eBPF
Java (or any JVM based)	async-profiler
Python	py-spy
Ruby	rbspy

How kubectl flame works



Profiling in Action

Demo application based on
https://github.com/GoogleCloudPlatform/microservices-demo

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Demo

Future of Profiling

- Ephemeral Containers
  - alpha in v1.22 with feature gate
- eBPF CO-RE
- Continuous profiling tools are getting popular


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Thank you