Alternative Visualisation of Trace Data in a complex, large-scale distributed system

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Distributed Tracing is a modern concept first introduced to the world by Google in 2010 through their whitepaper outline of Dapper, their internal distributed systems tracing service.

The concept was coined to describe the instrumenting of applications to trace operations and requests through distributed systems and microservice architected software services, as well as the visualisation of the data generated by the instrumenting of said software services.

With the shift from traditional monolithic applications to modern service-oriented designs where requests can traverse the network between multiple services and even datacenters, traditional tooling used to derive introspection into applications and their operations are no longer viable, especially at larger scale.

Distributed Tracing data is most commonly presented to users in a Flame Graph style along a time-axis. This gives the user an overview of the duration of each operation as instrumented by the developers. Each so-called “trace” consists of multiple “spans”, where each span constitutes one bar in the flame graph. Spans can also have additional metadata associated with it to give users additional context for the entire operation and its individual.

The aim of this project is to explore alternative ways to visualise distributed tracing data as well as implementing one or more of the explored alternatives. The challenge lies in proposing alternatives that provide tangible value to the end user besides eye-candy visuals. Users must be able to derive introspective value from the visualisations to