Flamegraphs, Tracers...

Muhammad Falak R Wani
IIIT-D

Agenda

- Profiling
- Flamegraphs
- Tracing

Code and Slides:

github.com/mfrw/flamegraphs-go_meetup (#ZgotmplZ)

```
NOTE: The code was delbrately written as badly as possible.
The only intention was to show how to use tools on bad code.
```

Profiling

Periodic sampling of stack traces.

pprof

Go has powerful profiling built into the runtime
- CPU profiles (stack sampling)
- Heap profiles using allocation profiling
- and more (block profiles, traces, etc)

Accessible through **pprof** and **runtime** packages.

Started off as google/gperftools (C++)

pprof

- Tests/Bechmarks: -cpuprofile & -memprofile flags

```
go test . -bench=. -cpuprofile prof.cpu
go tool pprof [binary] prof.cpu
```

- Manual Instrumentation:

```
runtime.StartCPUProfile & runtime.WriteHeapProfile
```

- Import:

```
import _ net/http/pprof (adds /debug/pprof endpoints)

http.ListenAndServe(":8080", nil) || If you don't have a listener

go tool pprof -seconds 5 http://localhost:8080/debug/pprof/profile
```

Profile Types

Tools

- Native

```
go tool pprof [binary] prof.cpu
```

- google/pprof

```
go get github.com/google/pprof
```

The profile is a **gziped** protbuff. So you can write your own tooling around it.

- For more information:

```
runtime/pprof/proto.go
```

Flamegraph

- What ?

  FlameGraph (Brendan Gregg) (http://www.brendangregg.com/flamegraphs.html)

  ACMQ FlameGraph (https://queue.acm.org/detail.cfm?id=2927301)

- Old way: **go-torch** (UBER)

```
go-torch prof.cpu [generates torch.svg]
```

- Now: **pprof**

  Flame Graph support on Web UI #188 (https://github.com/google/pprof/pull/188)

```
pprof -http :8080 [binary] prof.cpu
```

Tracing

Unlike profiling, trace events exactly. Track down latency issues, poor parallelism etc.

- Direct:

```
import runtime/trace
trace.Start & trace.Stop
```

- Testing:

```
go test -trace ...
```

- Import:

```
import _ net/http/pprof
```

It has an intuitive UI (Chrome only)

MISC

Please feel free to email/ping whatever works for you. I am not an expert and would really love to learn more. (help if possible)

- GOGC : control the gc (GARBAGE COLLECTOR)
- httptrace : tracing http on steriods
- GOSSAFUNC : SSA dump of the function (all the phases)
- ssadump : Displaying and interpreting the SSA form of Go programs.

Thank you

Muhammad Falak R Wani
IIIT-D
@iamfrw (http://twitter.com/iamfrw)
falakreyaz@gmail.com (mailto:falakreyaz@gmail.com)