Process Introspection in Production

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About Us

- Members of the Technical Staff at RetailNext
- Analytics for brick and mortar stores
- Distributed systems, embedded systems, video processing
- Using Go in production for three years
- Hiring

Process Introspection

- Looking inside a process to see what's going on, often for debugging purposes
- Not arbitrary inspection like with a debugger, but rather using pre-defined debugging hooks to examine or sometimes alter application state

Standard Library Tools

- net/http/pprof

```
func init() {
    http.Handle("/debug/pprof/", http.HandlerFunc(Index))
    http.Handle("/debug/pprof/cmdline", http.HandlerFunc(Cmdline))
    http.Handle("/debug/pprof/profile", http.HandlerFunc(Profile))
    http.Handle("/debug/pprof/symbol", http.HandlerFunc(Symbol))
    http.Handle("/debug/pprof/trace", http.HandlerFunc(Trace))
}
```

- expvar

```
func init() {
    http.HandleFunc("/debug/vars", expvarHandler)
}
```

Demo server

```
var hits = expvar.NewInt("hits")

var buf bytes.Buffer

func main() {
    http.HandleFunc("/fub", fub)

    log.Fatal(http.ListenAndServe(":9999", nil))
}

func fub(w http.ResponseWriter, r *http.Request) {
    hits.Add(1)

    for i := 0; i < 50000000; i++ {
        now := time.Now()
        seconds := now.Hour()*3600 + now.Minute()*60 + now.Second()

        buf.WriteString("seconds so far: ")
        buf.WriteString(strconv.Itoa(seconds))

        buf.WriteTo(ioutil.Discard)
    }
    w.Write([]byte("fub done\n"))
}
```

Demos

- get current goroutines
- cpu profile
- heap profiling
- expvar

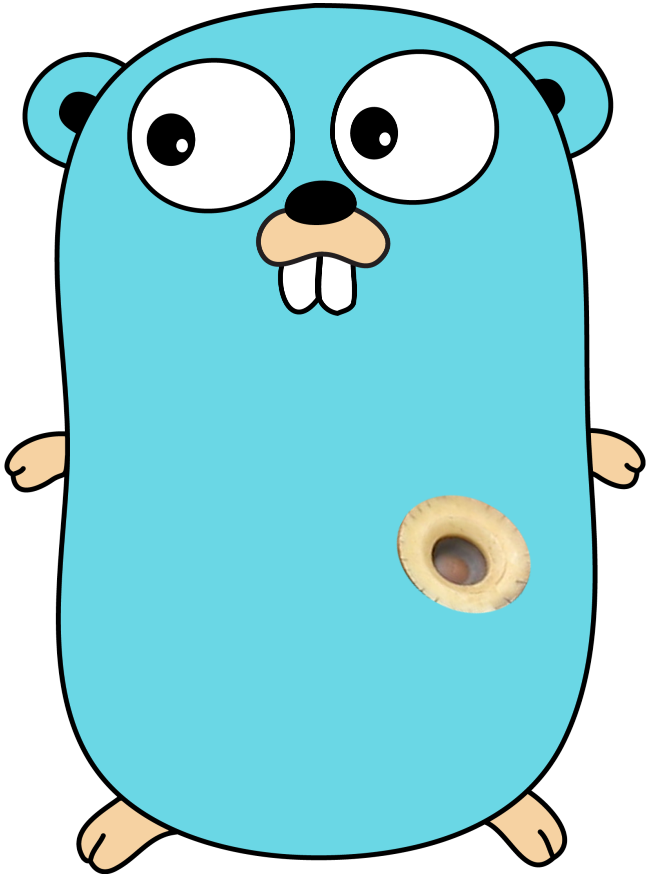
Security Issues

- net/http/pprof and expvar expose their handlers on the default ServeMux
- RetailNext runs our debug server on a unix socket
- We have a proxy tool that allows us to run `go tool pprof` against it
- This also allows us to define custom debug handlers

Demo Custom Handlers

Open Source version available!

- https://github.com/retailnext/cannula



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Thank you

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RetailNext
http://github.com/retailnext/cannula (http://github.com/retailnext/cannula)
https://github.com/psanford/gopherfest-2016-slides (https://github.com/psanford/gopherfest-2016-slides)