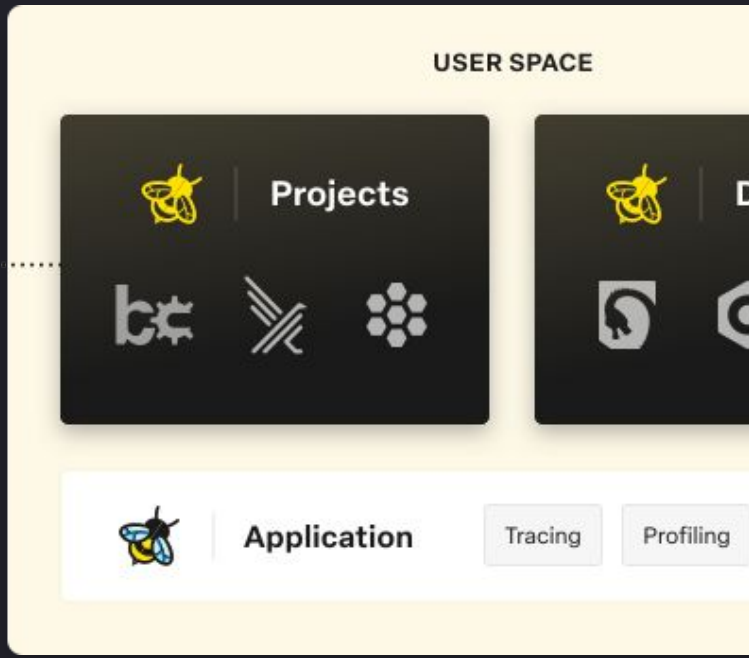
Grafana Labs

Automagic Observability with eBPF

Dominik Süß
DevEx Engineer @ Grafana Labs



Obstacles


NJ 490
in 2 min
Next stop
415
10:35 arr
Hamburg Hbf
Platform 11
08:47 arr
10:42 arr
Hamburg Dammtor
10:51 arr
Hamburg-Altona


PHILIPS
Weiß zu begeistern.
couchette

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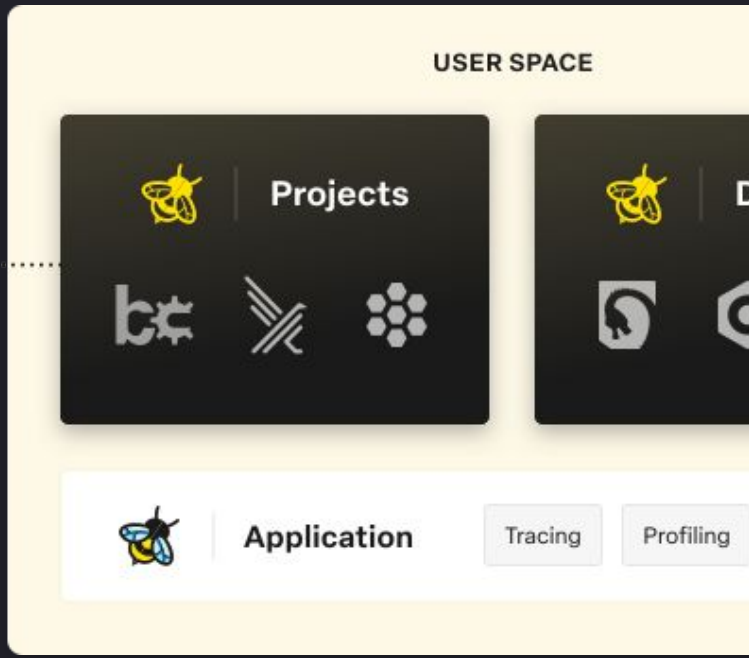


The issue


no

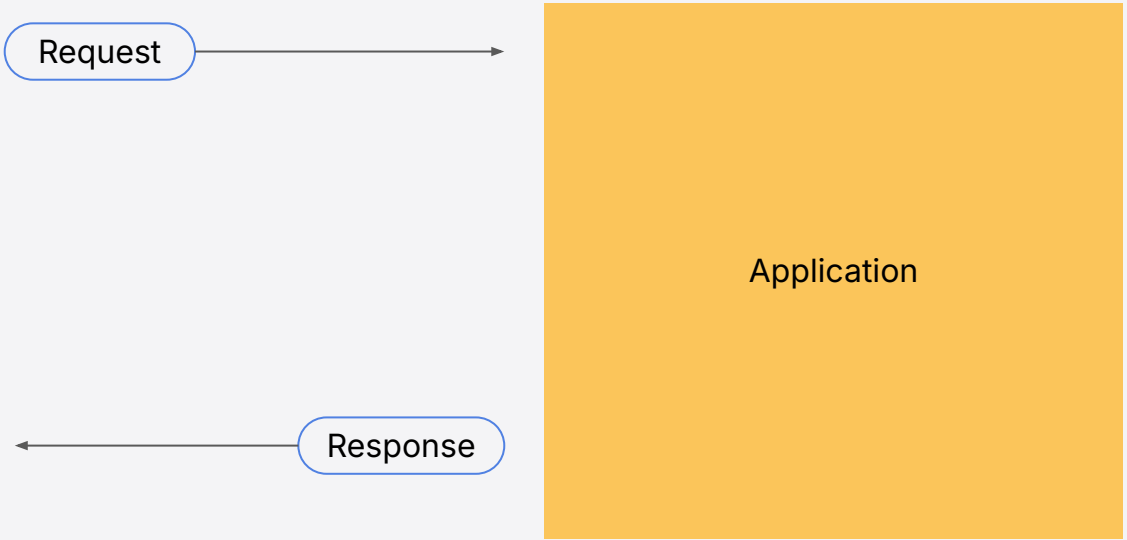
The issue

Proxy

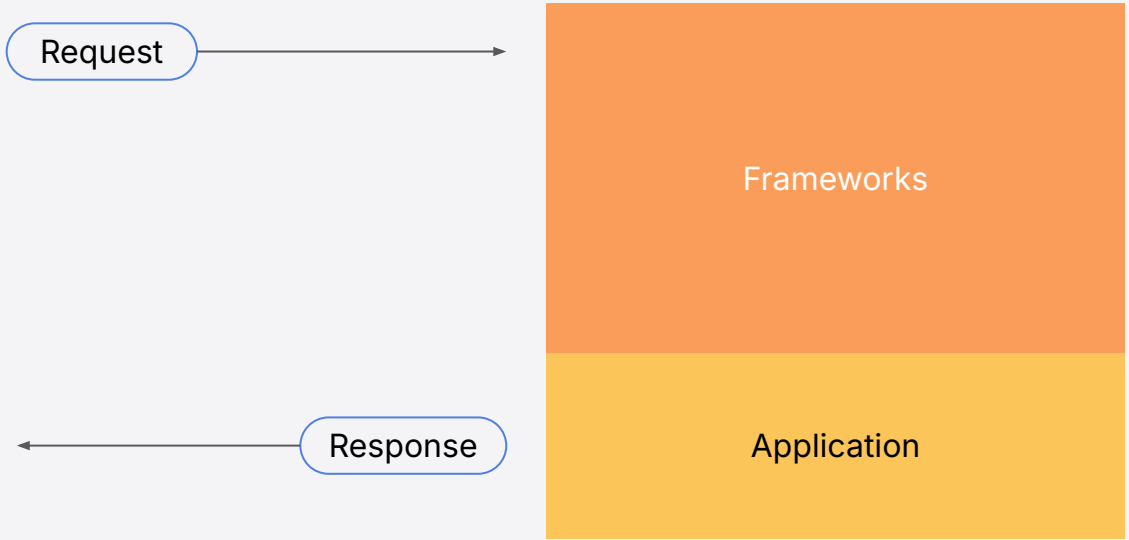
Patch

Pray

Layers upon Layers

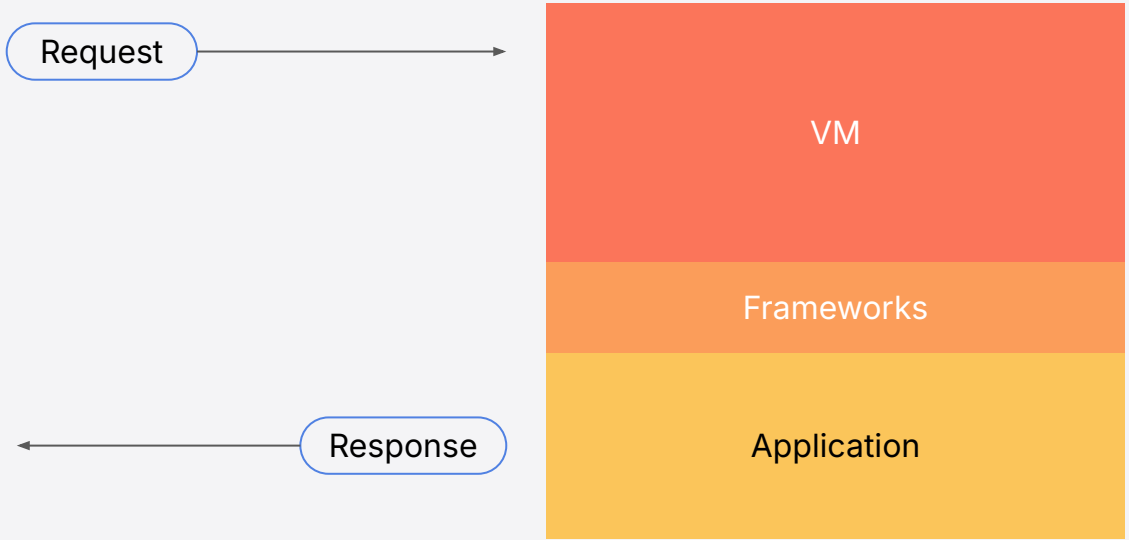


Layers upon Layers



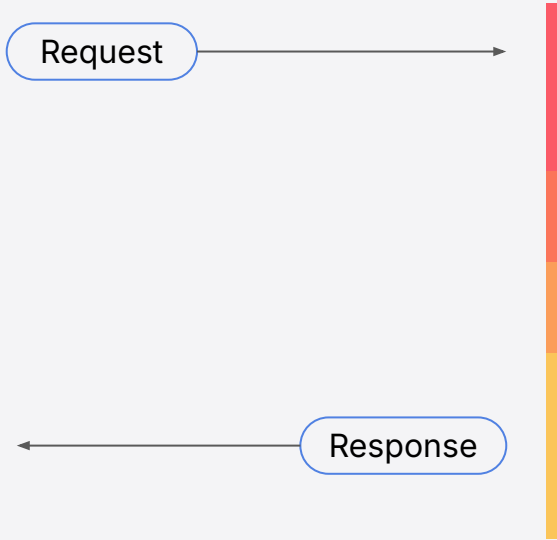
- FastAPI
- Flask
- Django
- Bottle
- Tornado
- Pyramid
- Sanic
- Falcon
- CherryPy
- Hug

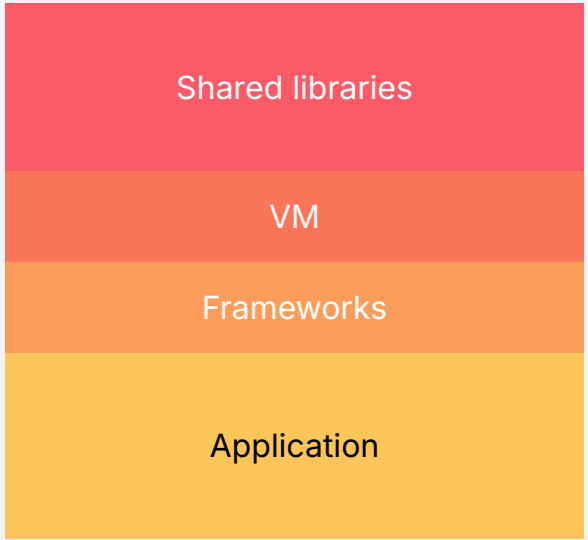
Layers upon Layers



- Implementation differences
- Not every language

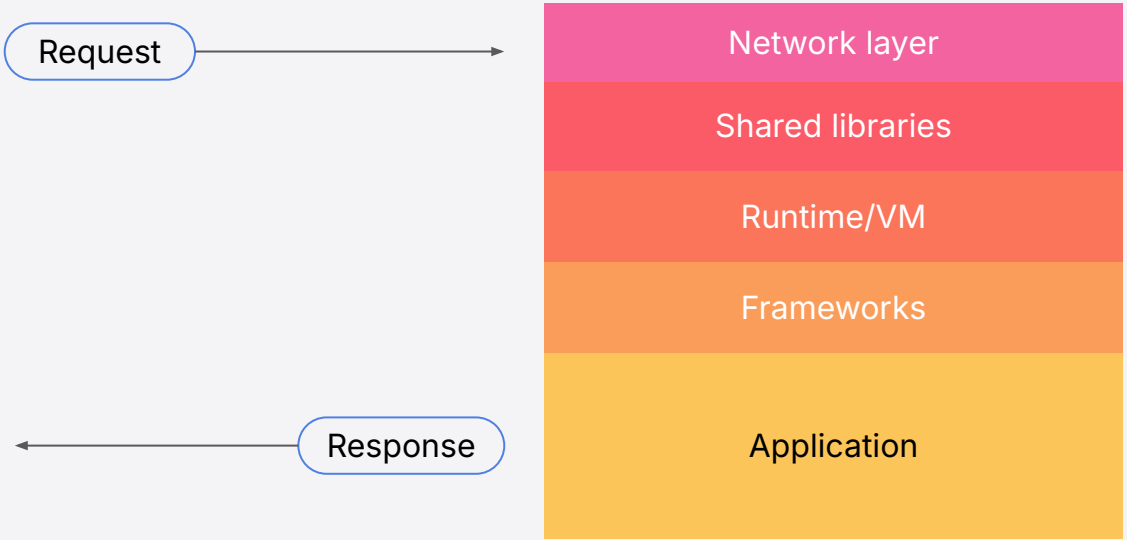
Layers upon Layers





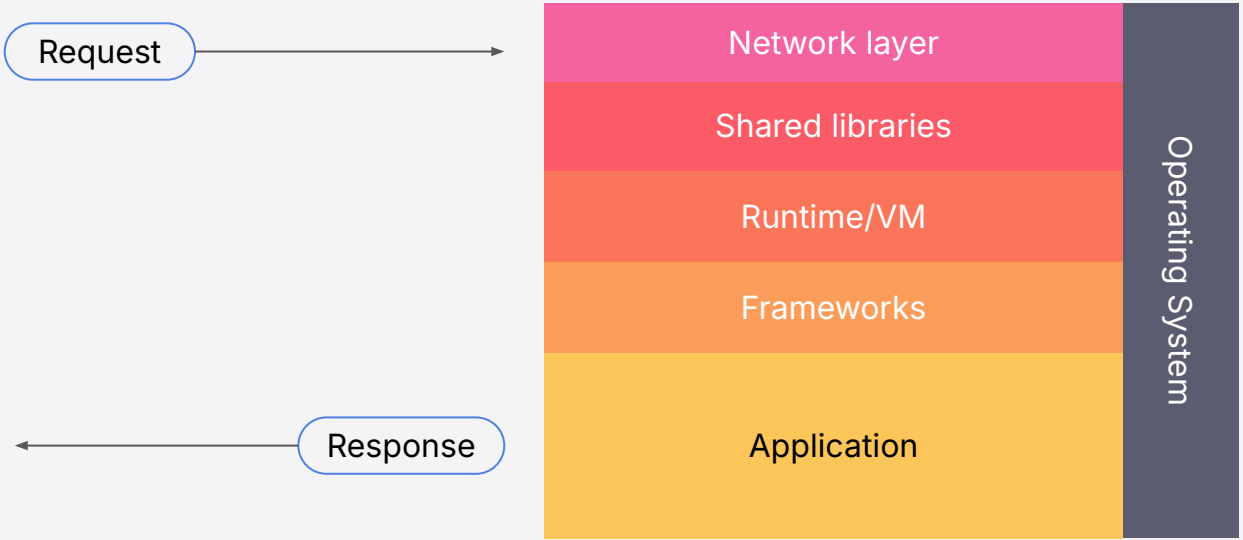
- Very specific
- No correlation

Layers upon Layers



- Not detailed enough

Layers upon Layers




eBPF

Quiz Time

A. Extended Berkley Packet Filters
B. External Binary Plugin Framework
C. Emerging Bin Packing Foundations
D. None of the above

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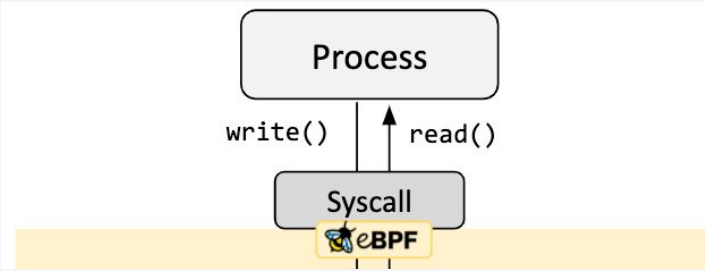
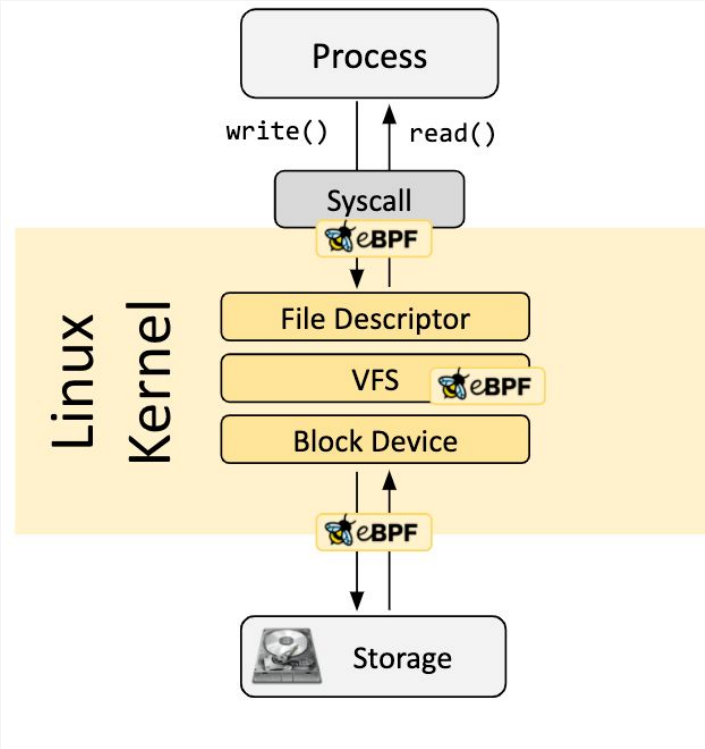
eBPF

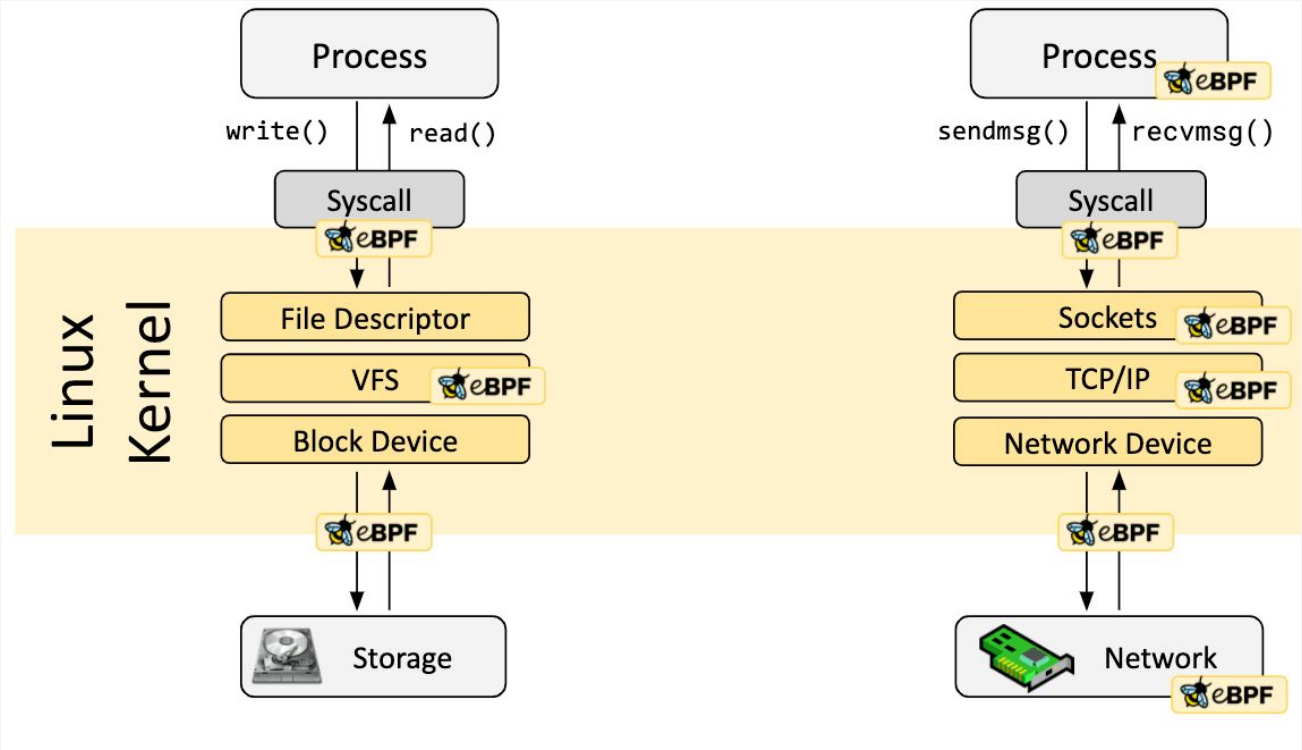
Where to hook?

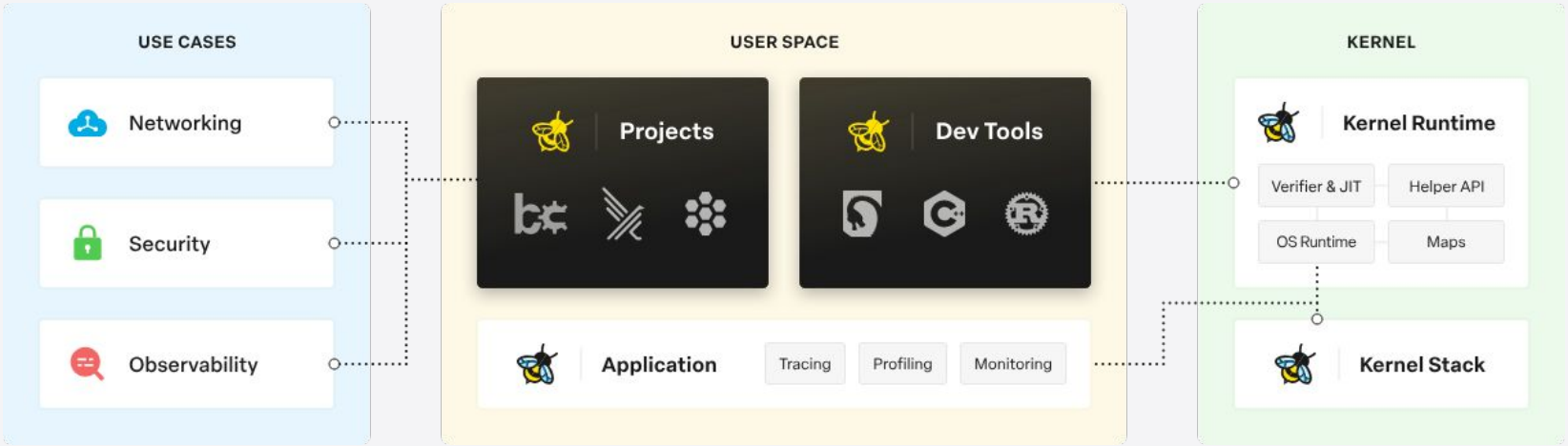


Where to hook?



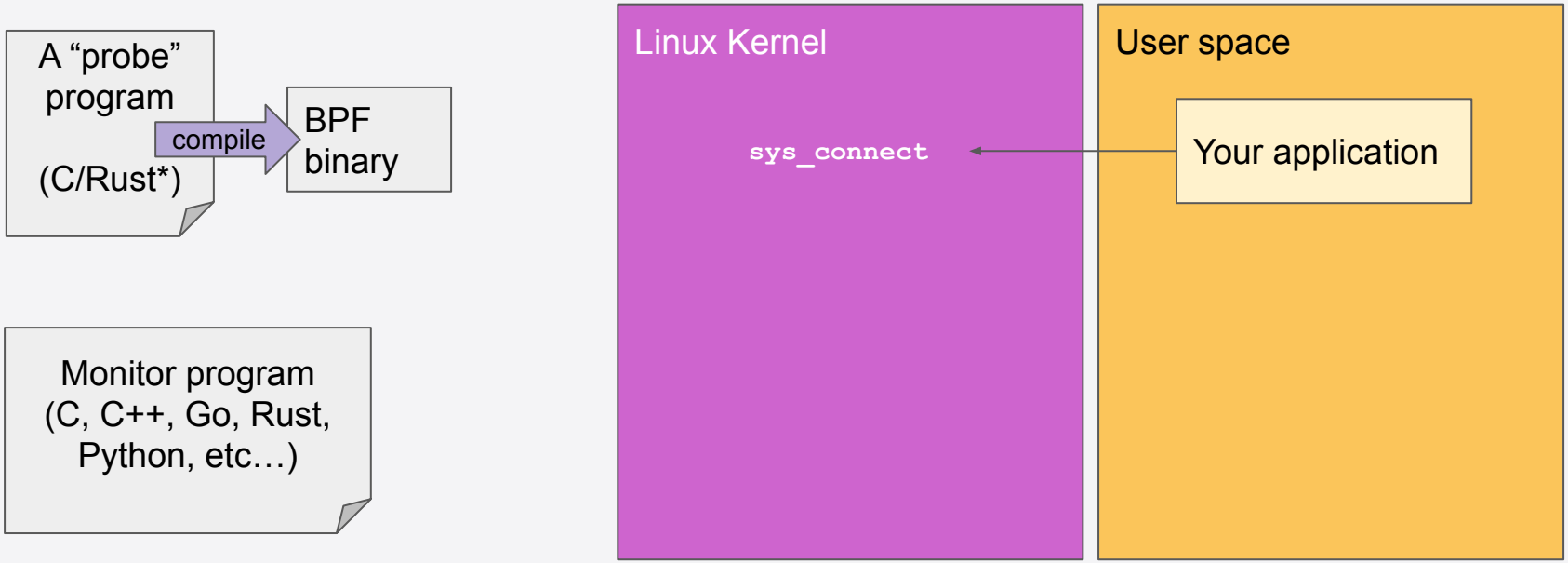
Where to hook?




USE CASES
Networking
Security
Observability
USER SPACE
Projects
Dev Tools
Application
Tracing
Profiling
Monitoring
KERNEL
Kernel Runtime
Verifier & JIT
Helper API
OS Runtime
Maps
Kernel Stack

Example: track a new client TCP connection

```
int sys_connect(int fd, struct sockaddr *uservaddr…);
```



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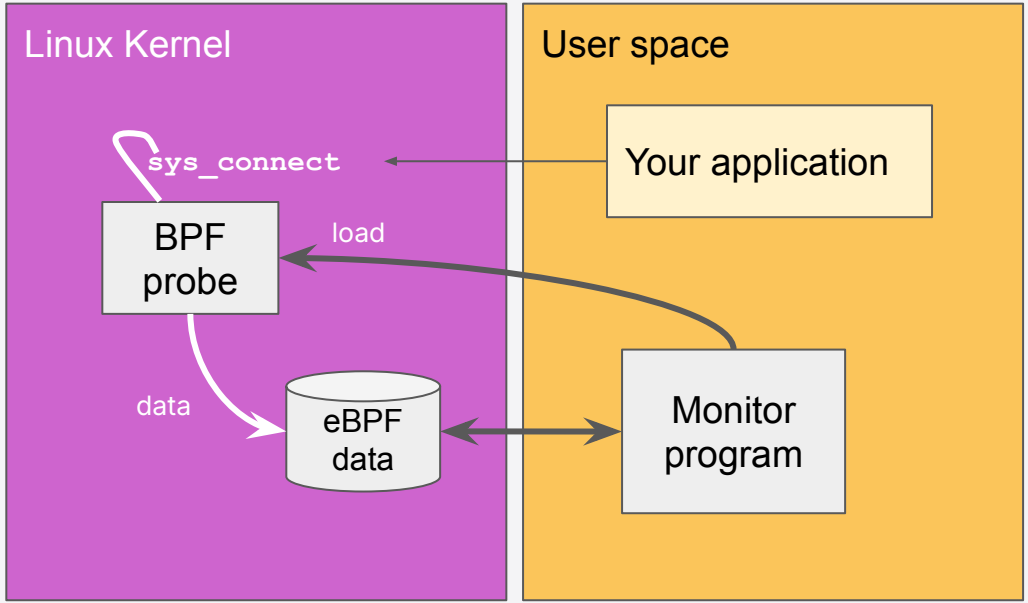


ebpf.c

```
/* HTTP Server */

// This instrumentation attaches uprobe to the following function:
// func (mux *ServeMux) ServeHTTP(w ResponseWriter, r *Request)
// or other functions sharing the same signature (e.g
http.Handler.ServeHTTP)
SEC("uprobe/ServeHTTP")
int obi_uprobe_ServeHTTP(struct pt_regs *ctx) {
    bpf_dbg_printk("=== uprobe/ServeHTTP === ");
    void *goroutine_addr = GOROUTINE_PTR(ctx);

    bpf_dbg_printk("goroutine_addr %lx", goroutine_addr);
    void *req = GO_PARAM4(ctx);
    go_addr_key_t g_key = {};
    go_addr_key_from_id(&g_key, goroutine_addr);
```


OBI

/

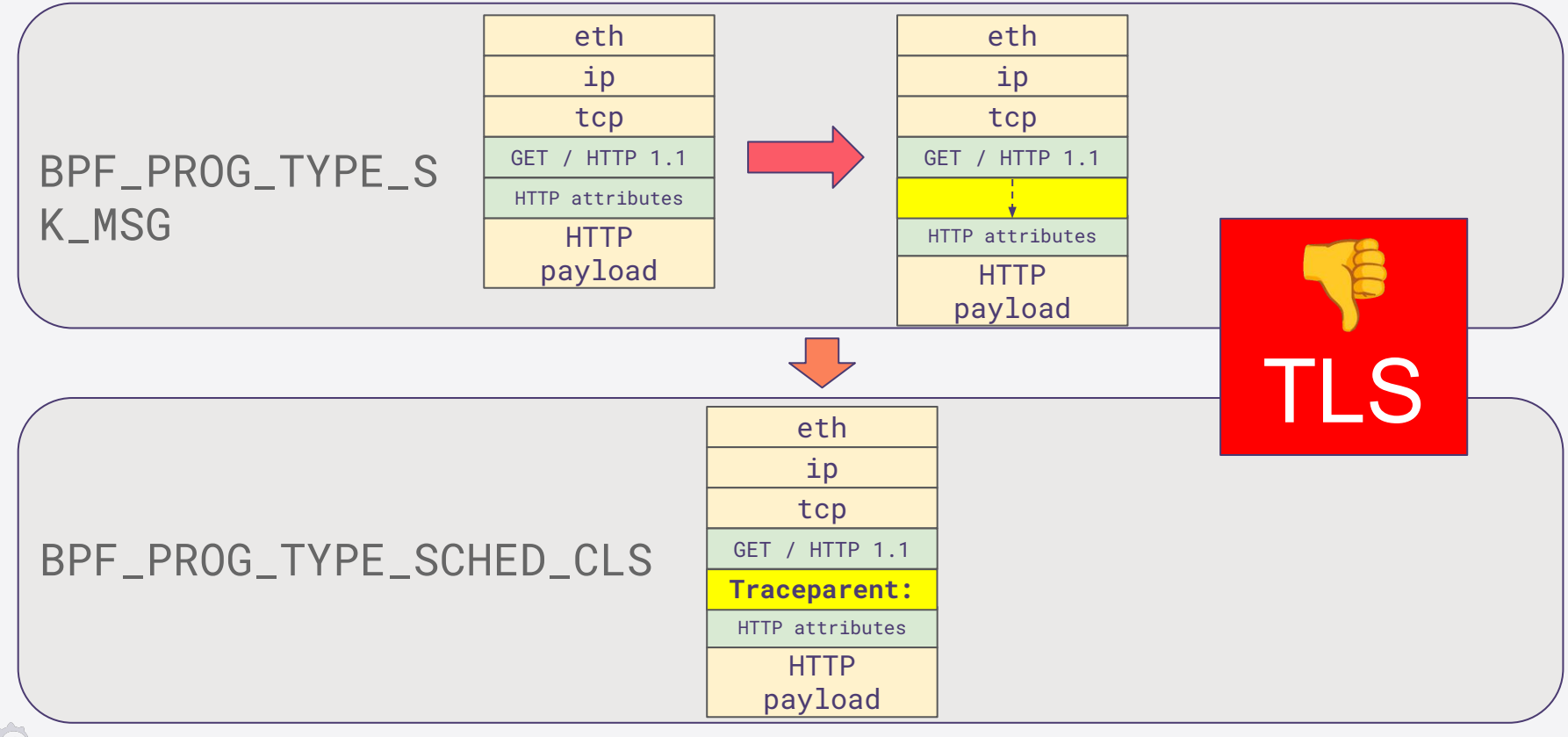
OBI

OpenTelemetry e**B**PF **I**nstrumentation

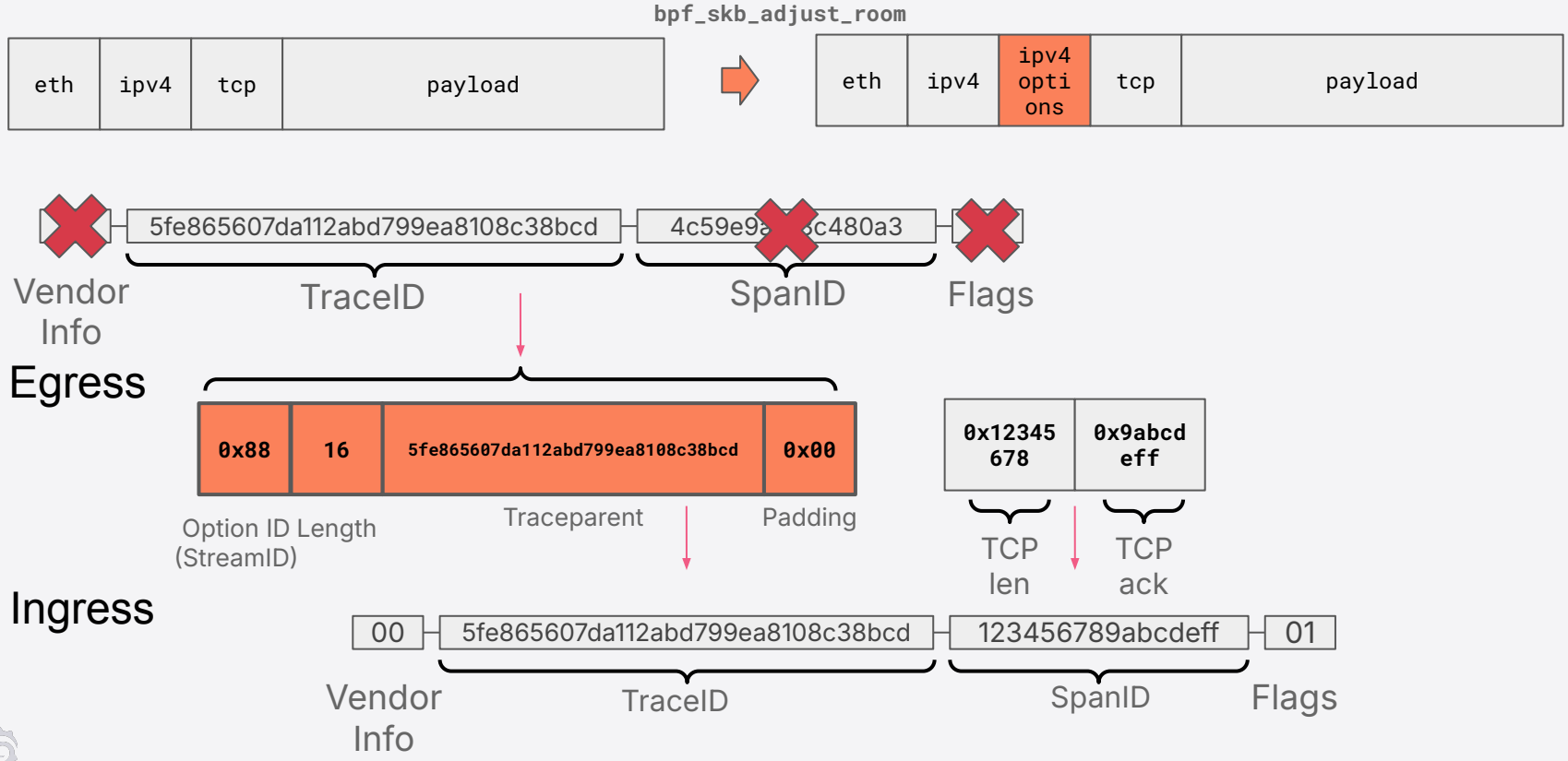
Demo

Distributed tracing deep dive

Context Propagation



Context Propagation



Considerations

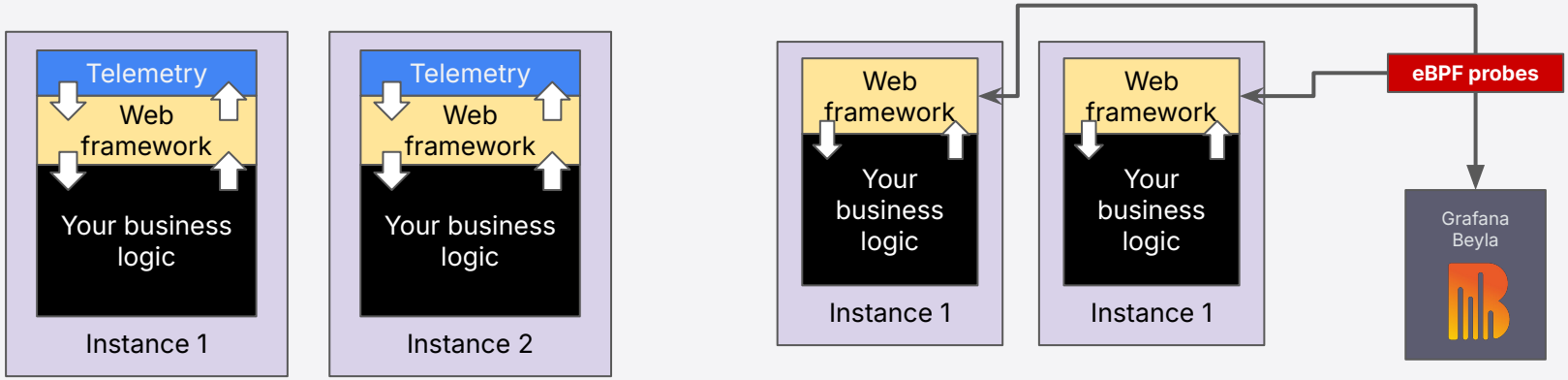
Network O11y Demo

Performance

Maturity

Flexibility

Decoupling trace/metric generation from your workload



In *single-threaded* apps, the telemetry might slow down business logic.

Performance

Maturity

Flexibility

Maturity

- OTel Ruby Metrics SDK isn’t ready yet
- Different SDKs emit different semantic conventions 🤦
- Some SDKs don’t support older versions of the runtime

Performance

Maturity

Flexibility

Flexibility

- You *cannot* add custom attributes to spans.
  - `customer_id`? nope.
  - `order_id`? Nope.
- Metrics will tell you *something* is wrong.
  - Not what.
- What comes from *traces / logs*.
  - Not being able to attach attributes decreases the value.

Summary

- If there is no / poor instrumentation, use Beyla
- For Java and .Net use auto-instrumentation
- Beyla / OBI is *NOT* the end
  - Low fidelity
  - Lack of custom attributes
  - You will very likely need manual instrumentation.

Grafana Labs

Thanks for participating!

Have more questions?

Join us at community.grafana.com

or Grafana public slack #beyla

Get involved:

#beyla

grafana/beyla

community.grafana.com