HACKING VS ENGINEERING

NGINX UPSTREAMS & CONSUL

HACKING VS ENGINEERING

- **HACKING**
  - The act of producing an inelegant solution to a problem
- **ENGINEERING**
  - Skillful or artful contrivance; maneuvering

HACKING VS ENGINEERING

- **Systems are products of the constraints enforced during the design/production process**
- **HACKING**
  - Time
  - Functional (does it work)
- **ENGINEERING**
  - Time
  - Functional
  - Lifecycle
  - Maintenance
  - Operational Characteristics

HACKING VS ENGINEERING

- **WHICH** of these sets of constraints can guarantee success for the future (sustainability)?
  - **ENGINEERING**
- **WHY** must we constantly bring this up?
  - The **JUST MAKE IT WORK** mentality is pervasive in our industry
  - Continuously presented with examples of work where there is no evidence that **ANY** prior art was considered

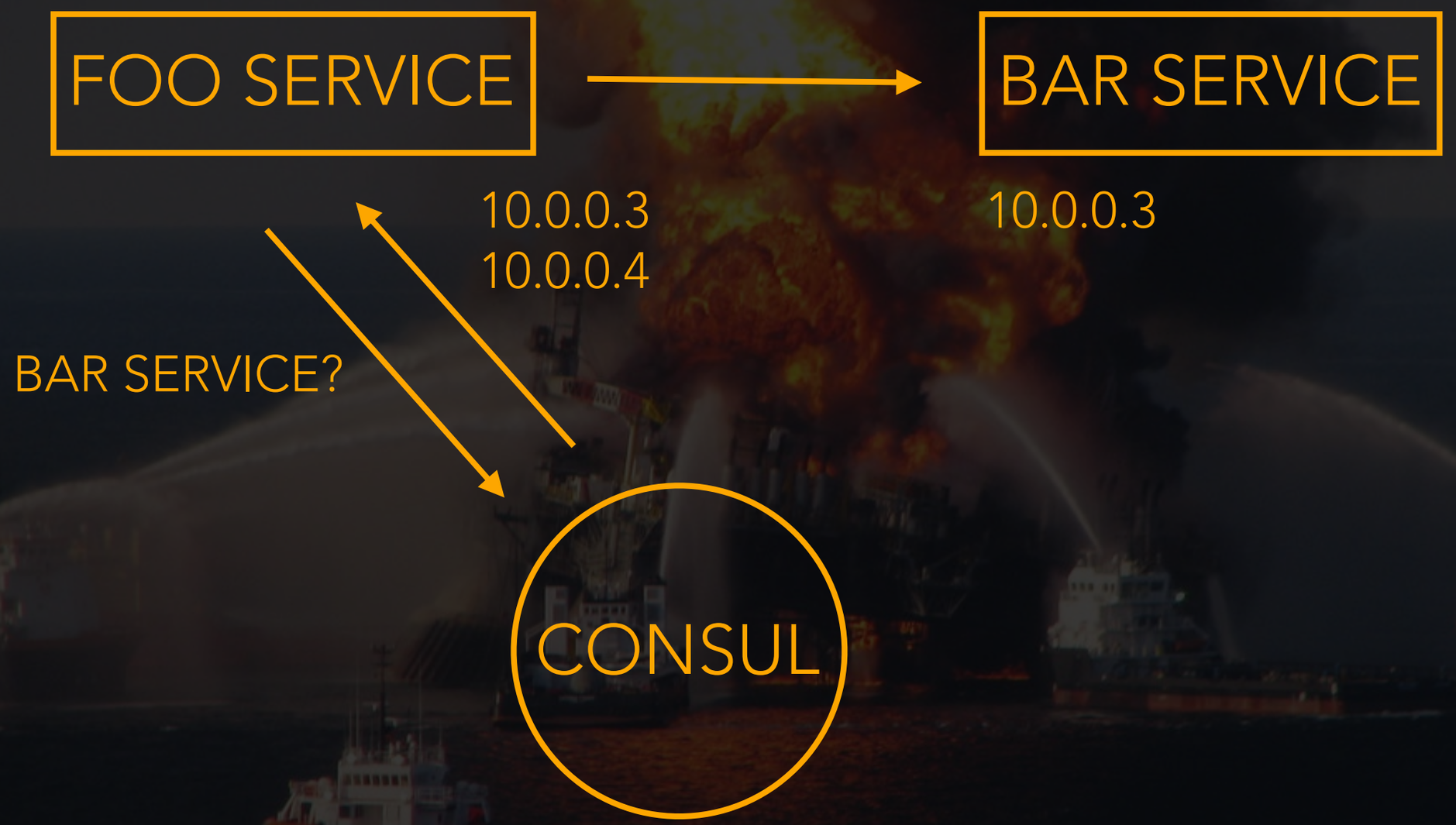
HACKING VS ENGINEERING

- The **PROBLEM** NGINX upstreams via Consul
- **HACKING** pre-existing solutions
- **ENGINEERING** a solution utilizing ngx-lua

THE PROBLEM :: ARCHITECTURE

- **PULSE** is a service architecture
- Some services depend on other services
  - Relatively straight forward to implement service connectivity within each service
  - Consul service discovery via http
  - Load balancing http client seeded with IPs discovered via consul

THE PROBLEM :: ARCHITECTURE



THE PROBLEM :: ARCHITECTURE

- We want to present a unified external surface to the user, in this case https://api.truesight.bmc.com
    - URIs terminated at the edge loadbalancer (NGINX)
    - Multiple instances of each service
    - Each service owns a namespace (uri path)
        - Example /measurements -> sasquatch
    - Should be able to dynamically add service nodes without running configuration management

HACKING :: EXISTING SOLUTIONS

- Rebuild existing configuration every so often with config management
    - Lot's of issues, though mostly with local development
- Rebuild upstreams with a script via Consul watch and reload NGINX configuration
    - As it turns out consul watches on service membership are a bit noisy
    - Requires configuration management to manage to Consul watches and scripts
    - Scripted reloads of a service typically not the best idea
- Consul-Template
    - Watch for changes in consul, update an upstream template, reload nginx

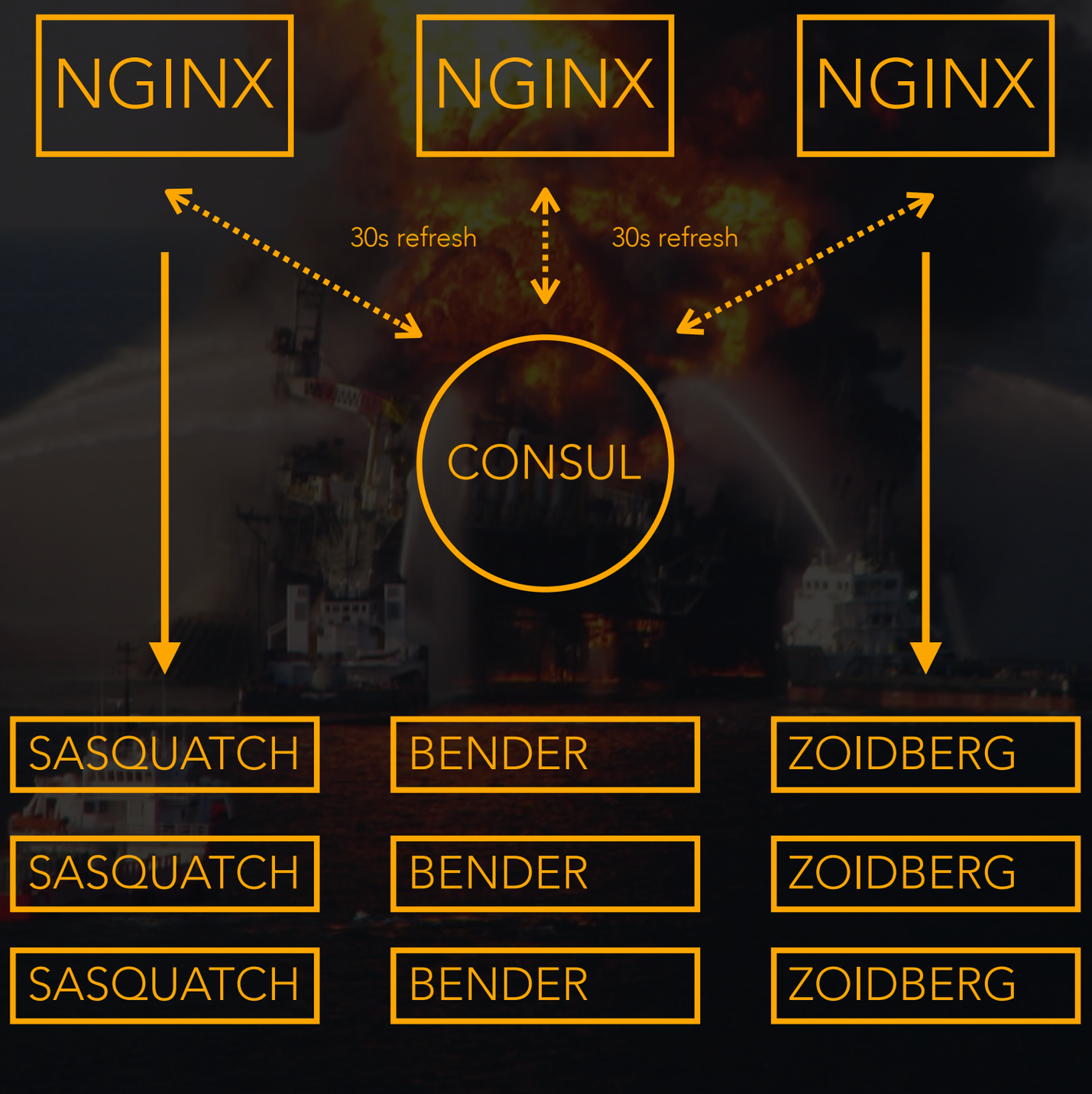
HACKING :: CONSUL-TEMPLATE

- The best of all the **HACKING** solutions, … or is it
  - Need to run **ANOTHER** service on each loadbalancer
  - I need more configuration management to manage consul-template, the templates, the consul agent, and the NGINX reload
  - I am interacting with NGINX via a file interface and a possibly brittle reload
  - Don’t get me wrong: consul-template is great for certain use cases

ENGINEERING :: DESIGN GOAL

/v1/measurements
(POST)

https://api.truesight.bmc.com



EGINEERING :: RESEARCH

- What do we know about **NGINX** now?
    - Has a module system, can be extended in **C**
    - Some portion of the C API is surfaced in **lua**
- What do we do first? **RESEARCH PRIOR ART**
    - Found some examples of similar work in **C**
        - By doing this research we gained a lot of insight into NGINX internals
        - We can do this in **C**, what can we do in **lua**?
            - Doing this research we learned about
                - OpenResty
                - lua-nginx-module
                    - lua-nginx-module api and what can be accomplished on top of NGINX internals

ENGINEERING :: IMPLEMENTATION

- Code Configuration Walkthrough