Create Istio Filters with any Language

Develop and run Istio filters with WebAssembly

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👋 Hello

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“We create and contribute to projects that showcase the possibilities of WebAssembly, and help developers adopt this new and exciting technology”

Proxies are everywhere

Proxies are everywhere

They are required in any infrastructure

Proxies are a critical piece of infrastructure.

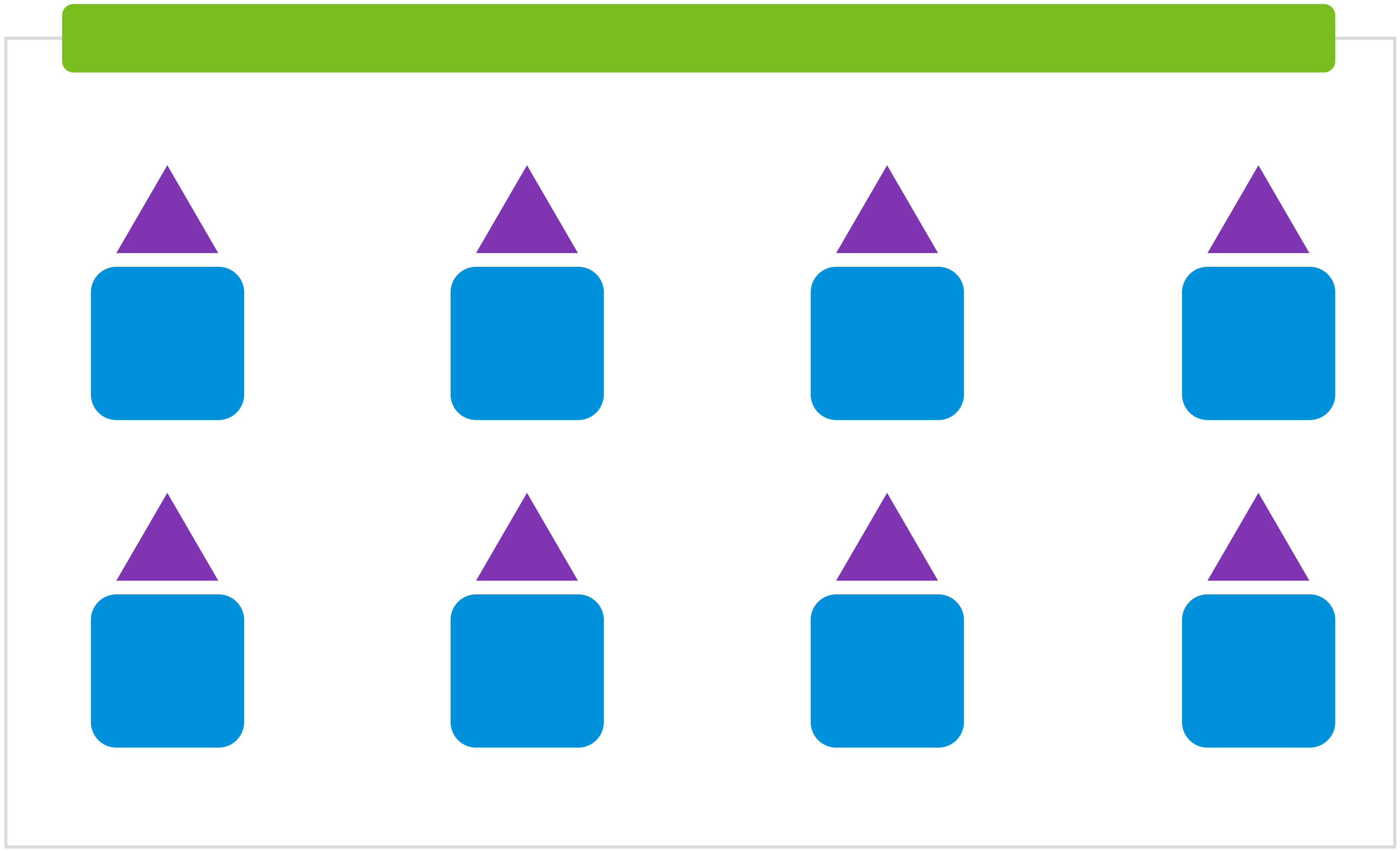
The services we develop interact with them every day.

envoy

NGINX

Service infrastructure

Nowadays



Extending a proxy

Extending proxies

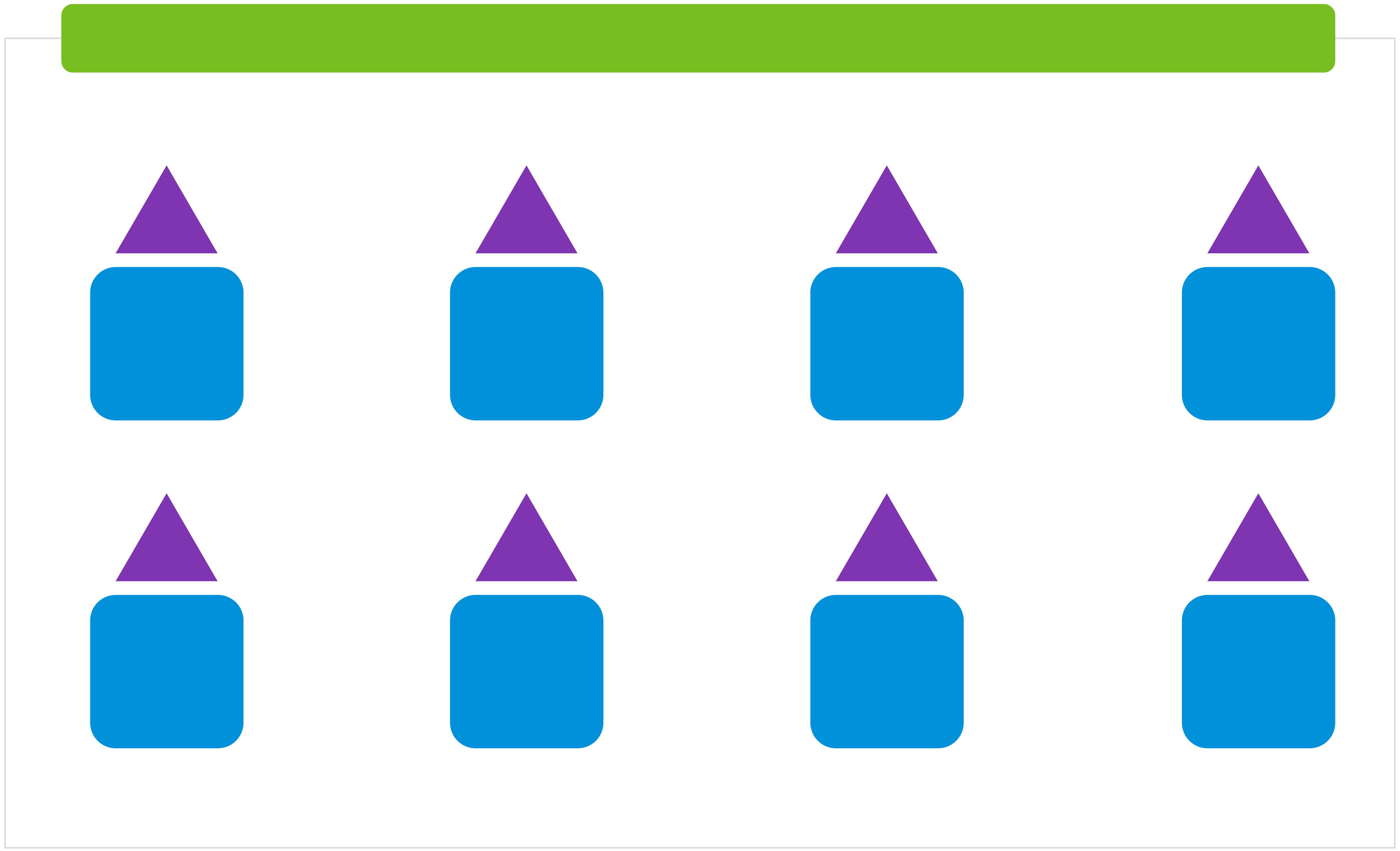
Why?

Add a custom behavior that it’s tailored to specific use cases.

Why? Why is it useful?

Extending proxies

Why?

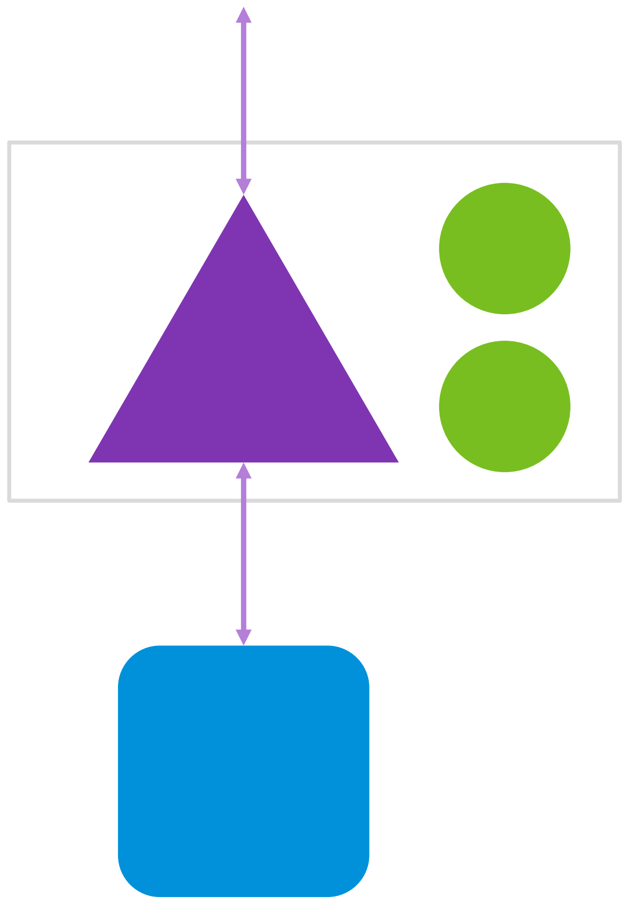


Extending proxies

How?

Use the mechanisms provided by the proxy to extend it for different use cases.

Filters and **modules** are a common way to extend proxies.



How to extend Envoy?

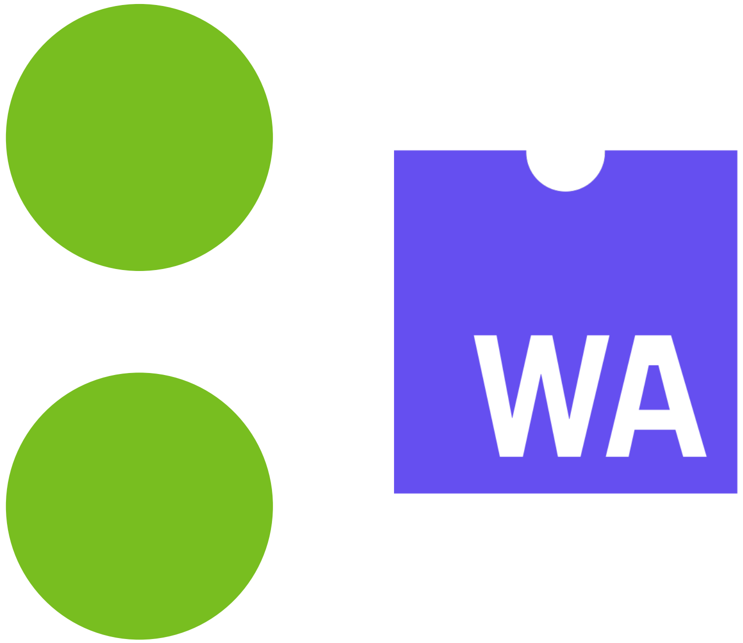
Custom C++ filters

Envoy

- Default filters / modules
- C++ API filter
  - Requires a new Envoy compilation and distribution
- Lua filters

An alternative way to extend Envoy

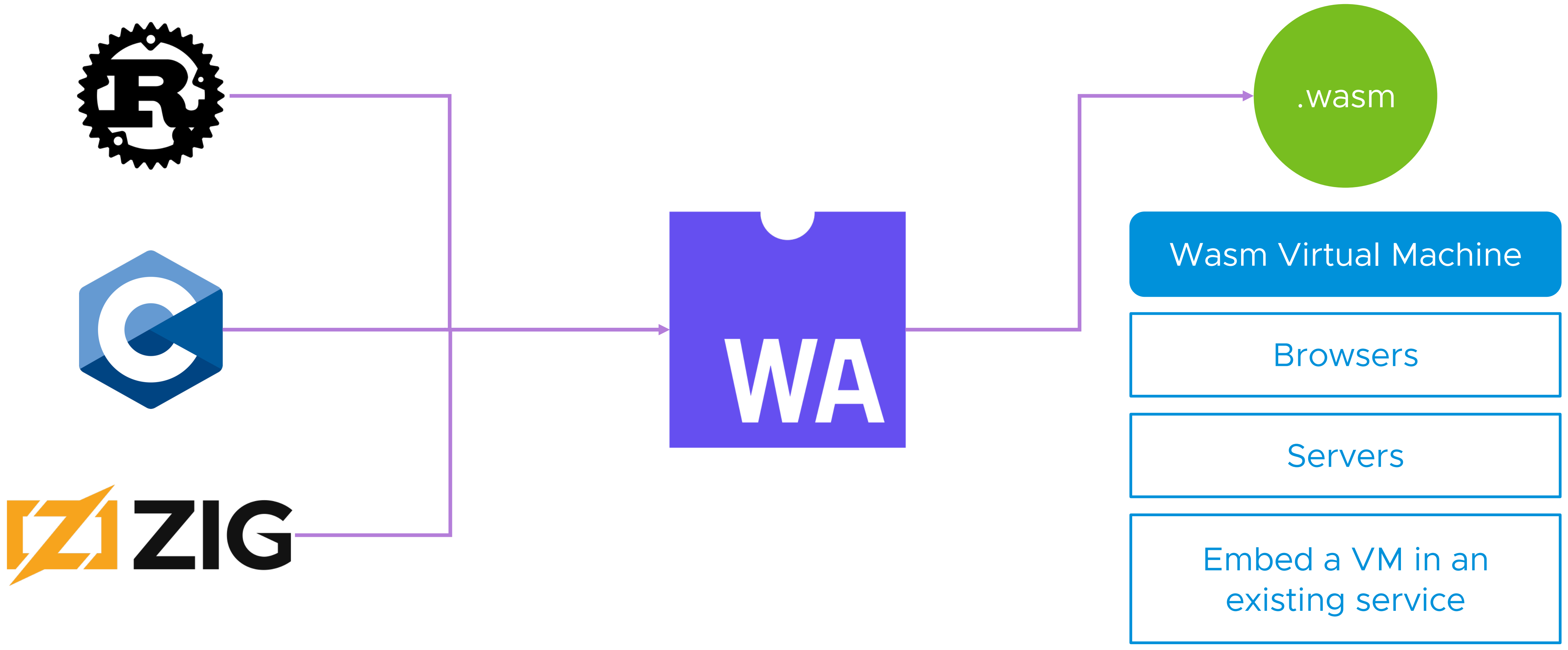
Write filters with different languages



WebAssembly and ProxyWasm

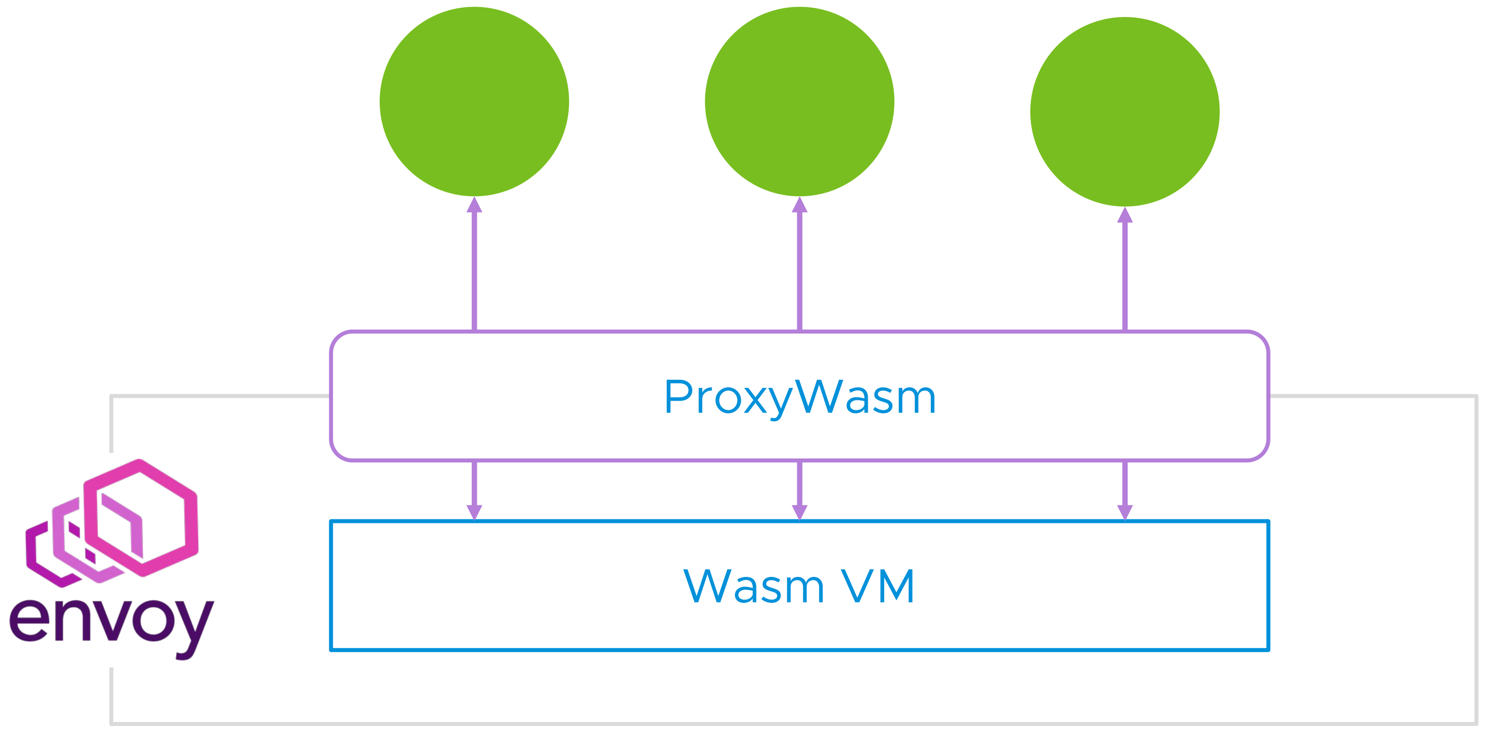
Extending proxies

WebAssembly



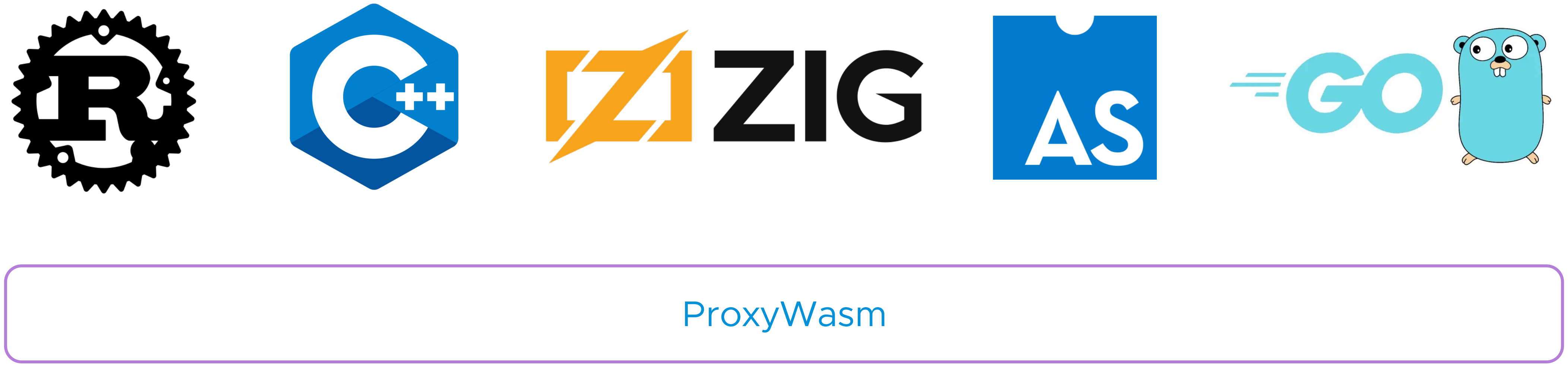
Extending proxies

ProxyWasm



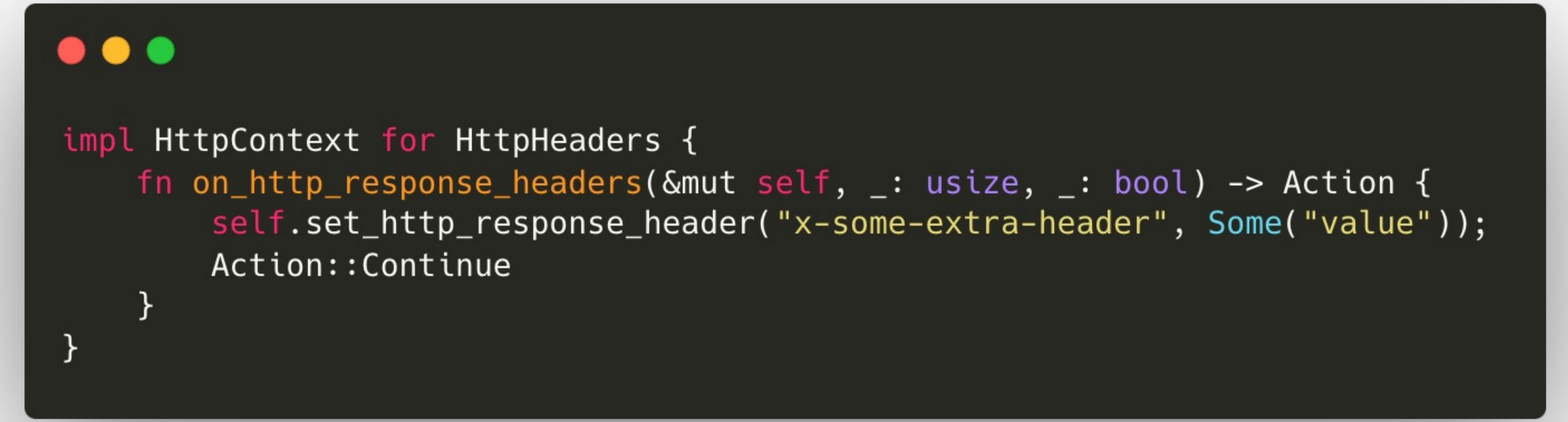
Create your first filter

With ProxyWasm Rust SDK



Create your first filter

With ProxyWasm Rust SDK



```
impl HttpContext for HttpHeaders {
    fn on_http_response_headers(&mut self, _: usize, _: bool) -> Action {
        self.set_http_response_header("x-some-extra-header", Some("value"));
        Action::Continue
    }
}
```

ProxyWasm

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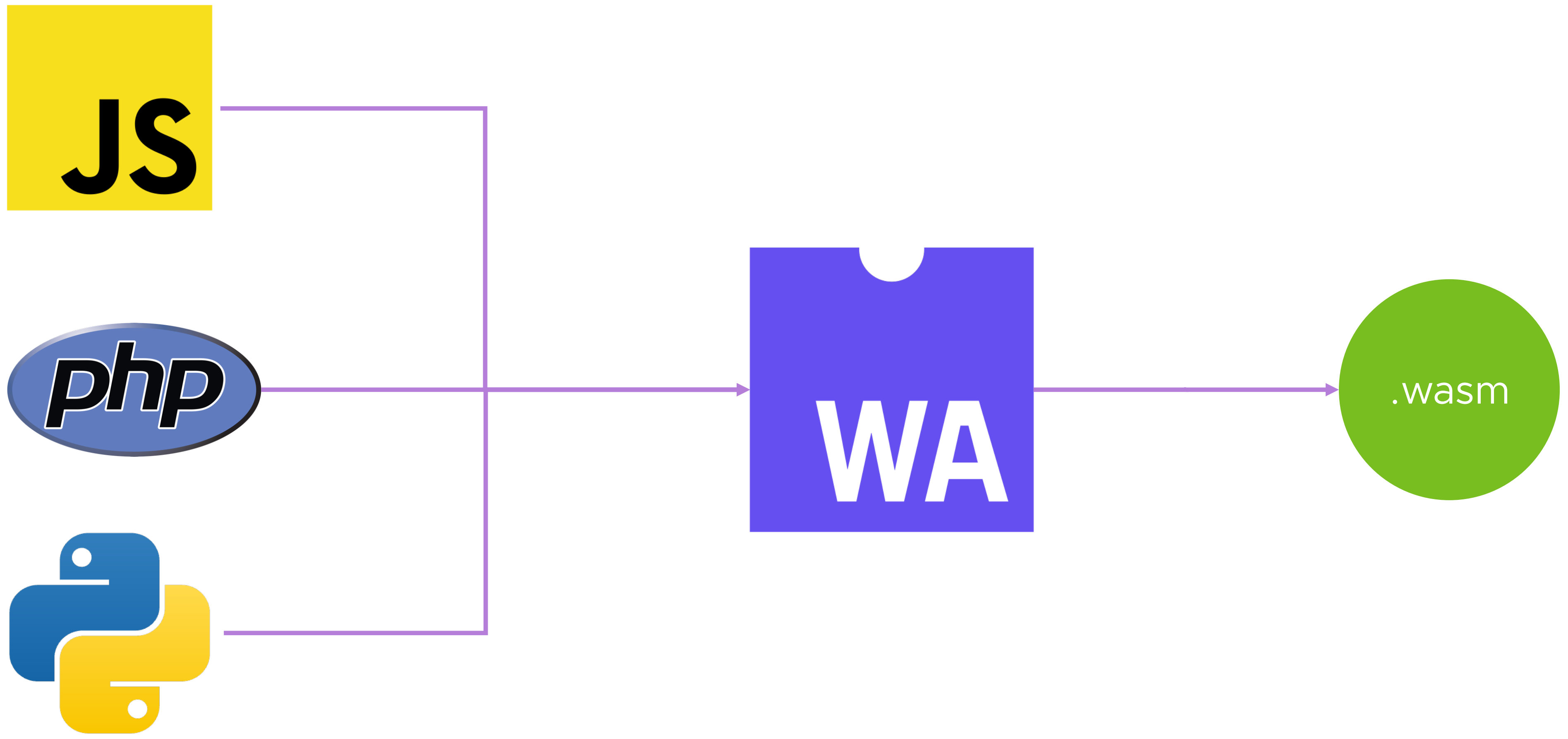
What about interpreted languages?

WebAssembly



What about interpreted languages?

Our experiments

ProxyWasm ABI

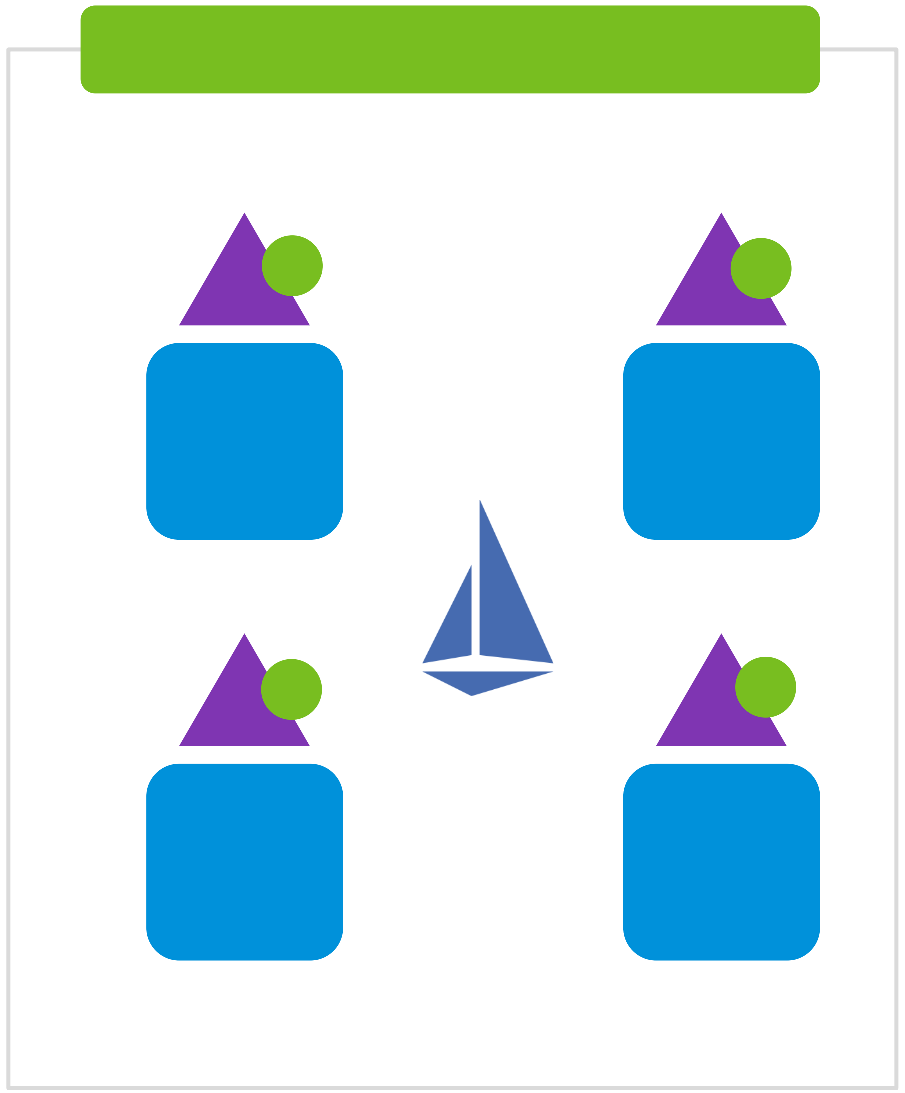
Filter distribution with Istio

Distribute filters

Configure it on Istio

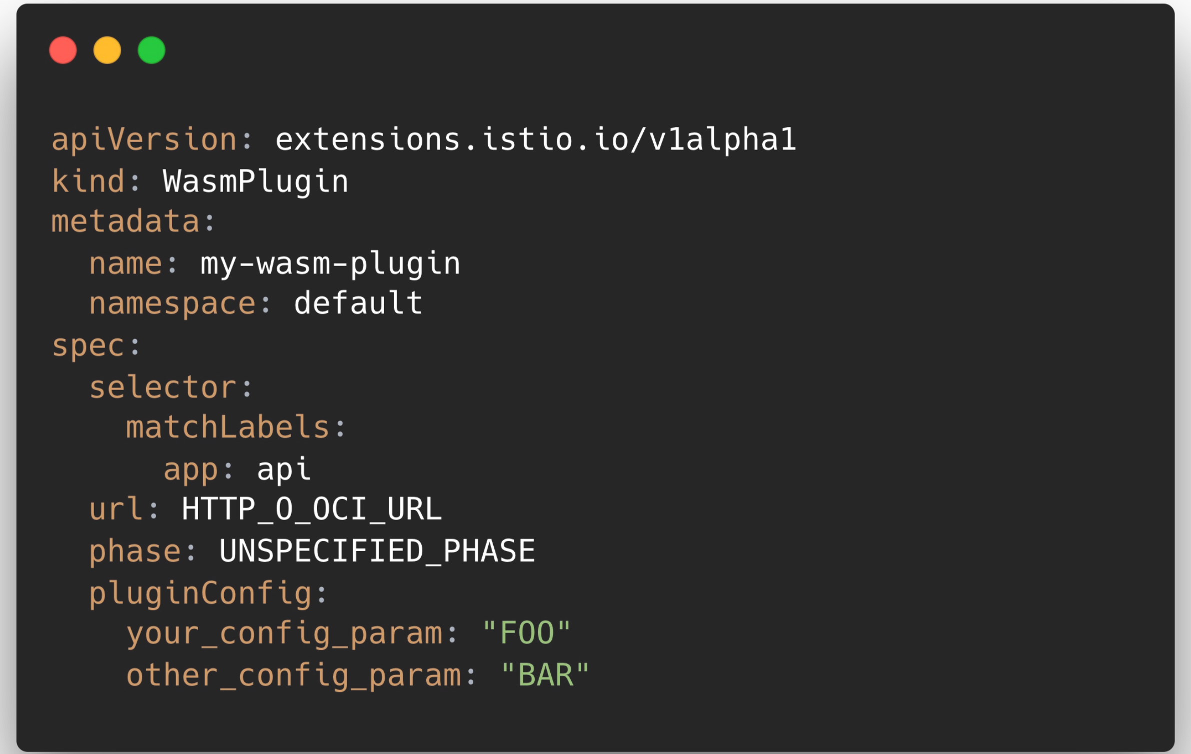
To add a Wasm filter to your Istio installation:

- Configure via YAML
- Distribute the module:
  - OCI
  - HTTP

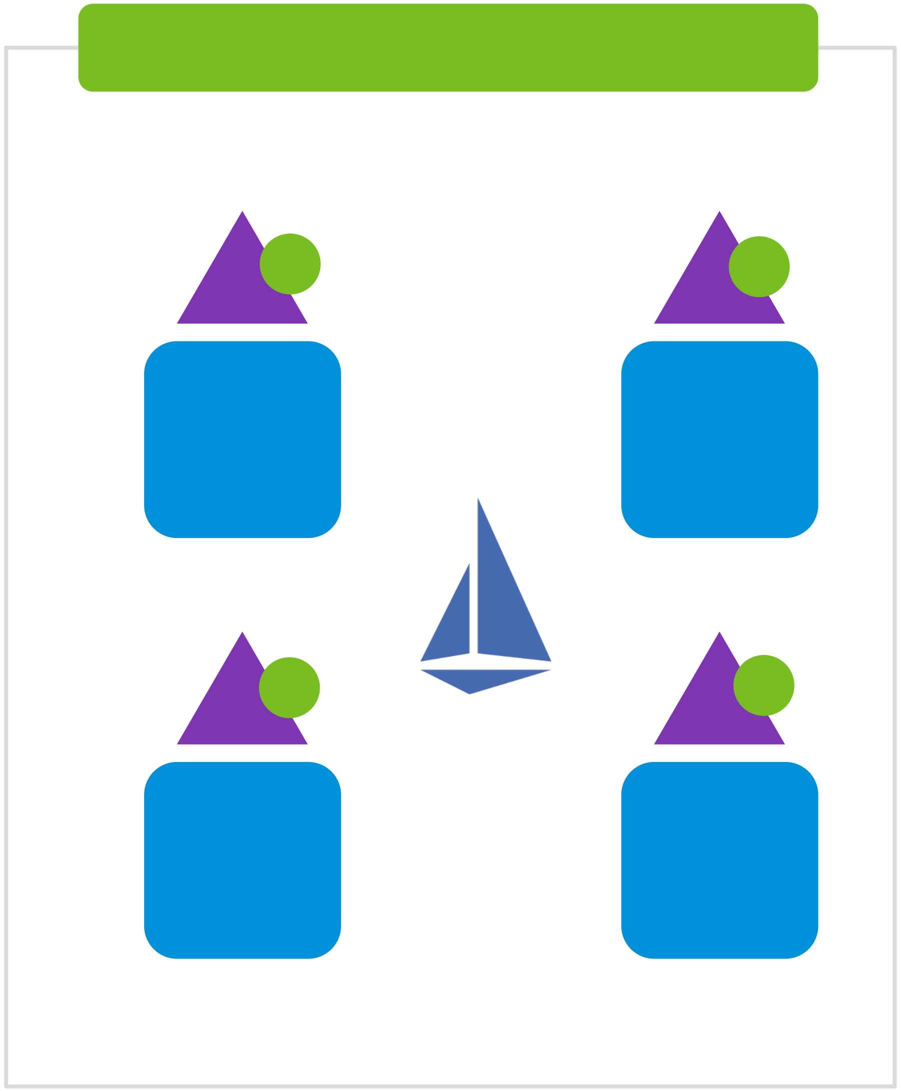


Distribute filters

Configure it on Istio



```
apiVersion: extensions.istio.io/v1alpha1
kind: WasmPlugin
metadata:
  name: my-wasm-plugin
  namespace: default
spec:
  selector:
    matchLabels:
      app: api
  url: HTTP_O_OCI_URL
  phase: UNSPECIFIED_PHASE
  pluginConfig:
    your_config_param: "FOO"
    other_config_param: "BAR"
```



Distribute filters

Configure it on Istio

Envoy requires the filter to be present in the filesystem, and Istio is **the wizard that makes that happen**

”

NGINX

Same module, different proxies

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ProxyWasm and Kong

Run Wasm filters with WasmX

Kong announced a new project called WasmX. It adds support for ProxyWasm filters in Nginx and Kong.

https://incubator.konghq.com/p/wasmx/

Kong

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Thank You

https://wasmlabs.dev