Monitoring Kubernetes Endpoints

With the Prometheus Blackbox Exporter

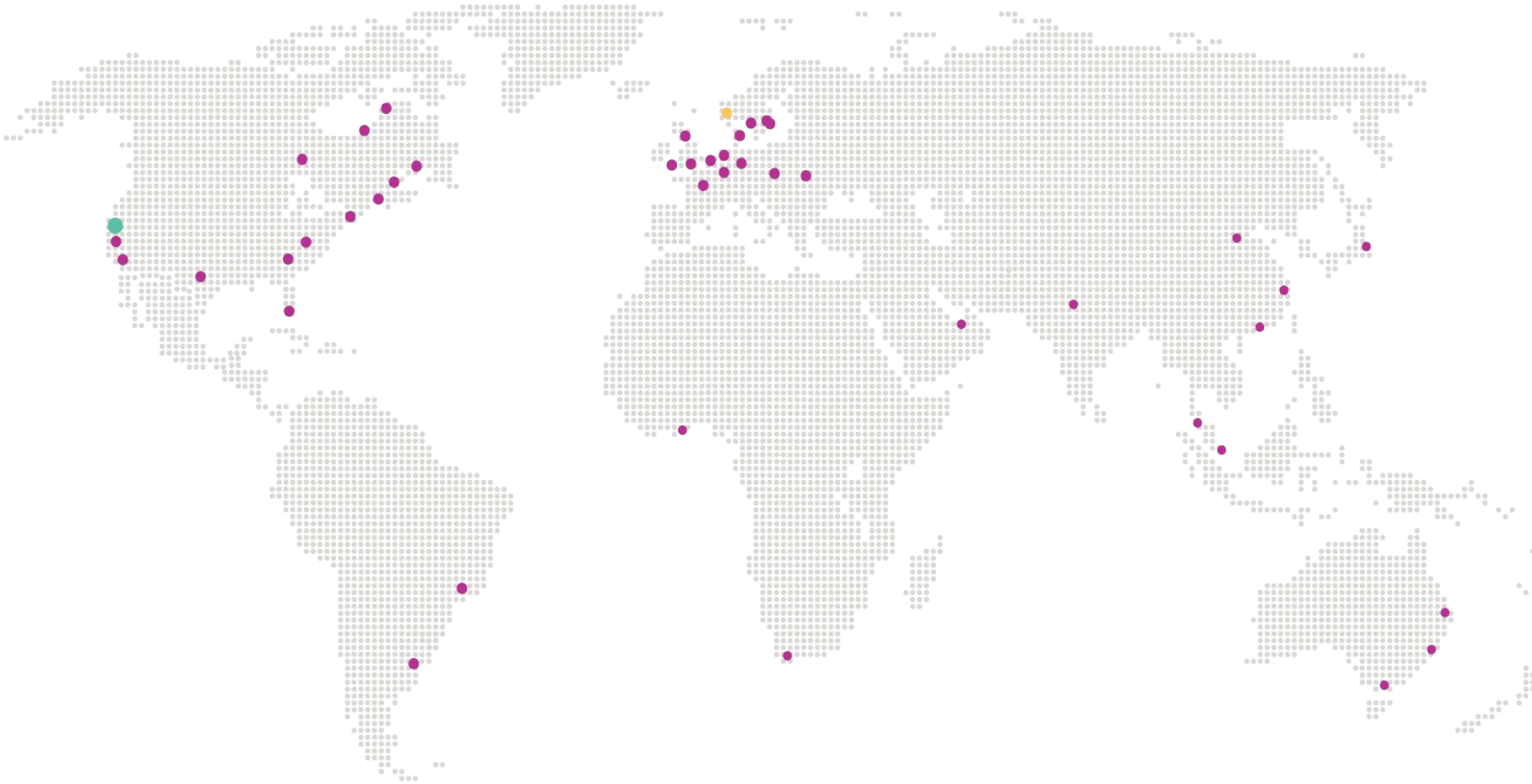# Hello!

Jim Sheldon
Principal Software Engineer

@bitberk

jimsheldon

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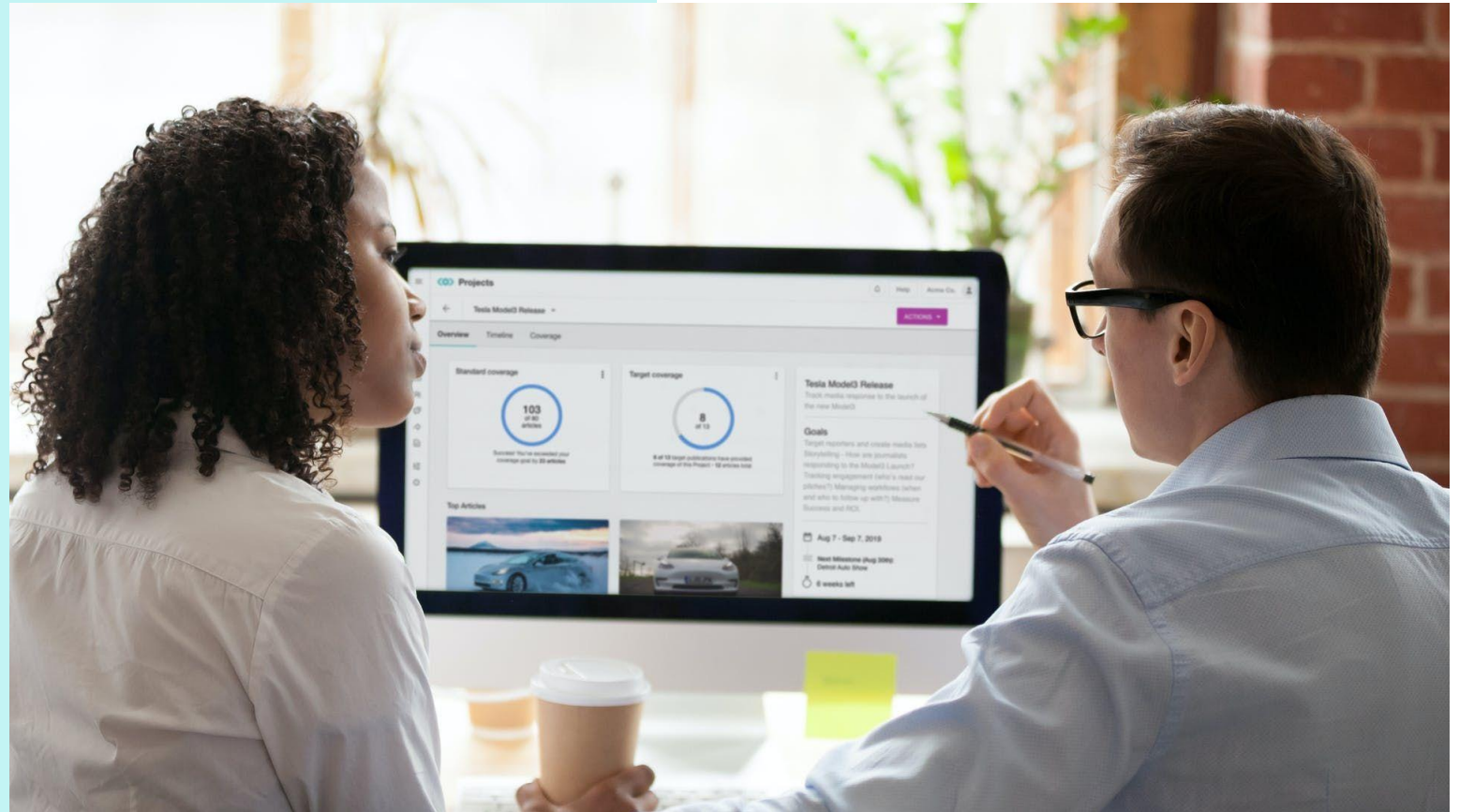# Meltwater at a Glance

30,000+
Clients
in 121 countries

60+
Offices
In 27 countries

3

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Meltwater Services

- Online Media Monitoring
- PR Analytics & Reporting
- Premium Social Media
- Social Media Management
- Dashboard Analytics

meltwater.com

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Foundation Mission

"We enable teams to **accelerate** without thinking too much about the infrastructure, allowing a rapid path from **ideation** to **prototype** to providing **business value**"

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Third-Party Services

Third-Party Services

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Datadog Synthetics
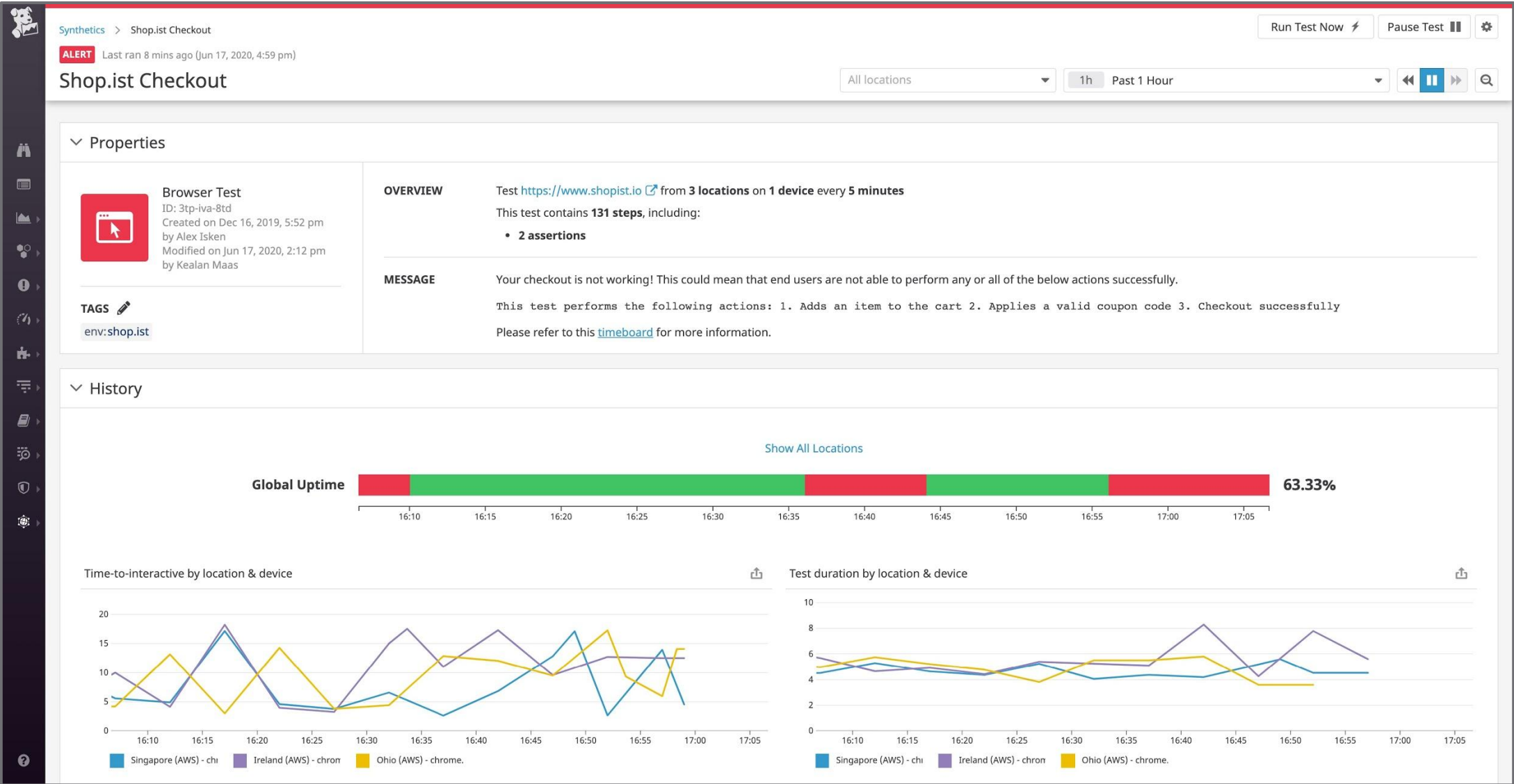
Prometheus
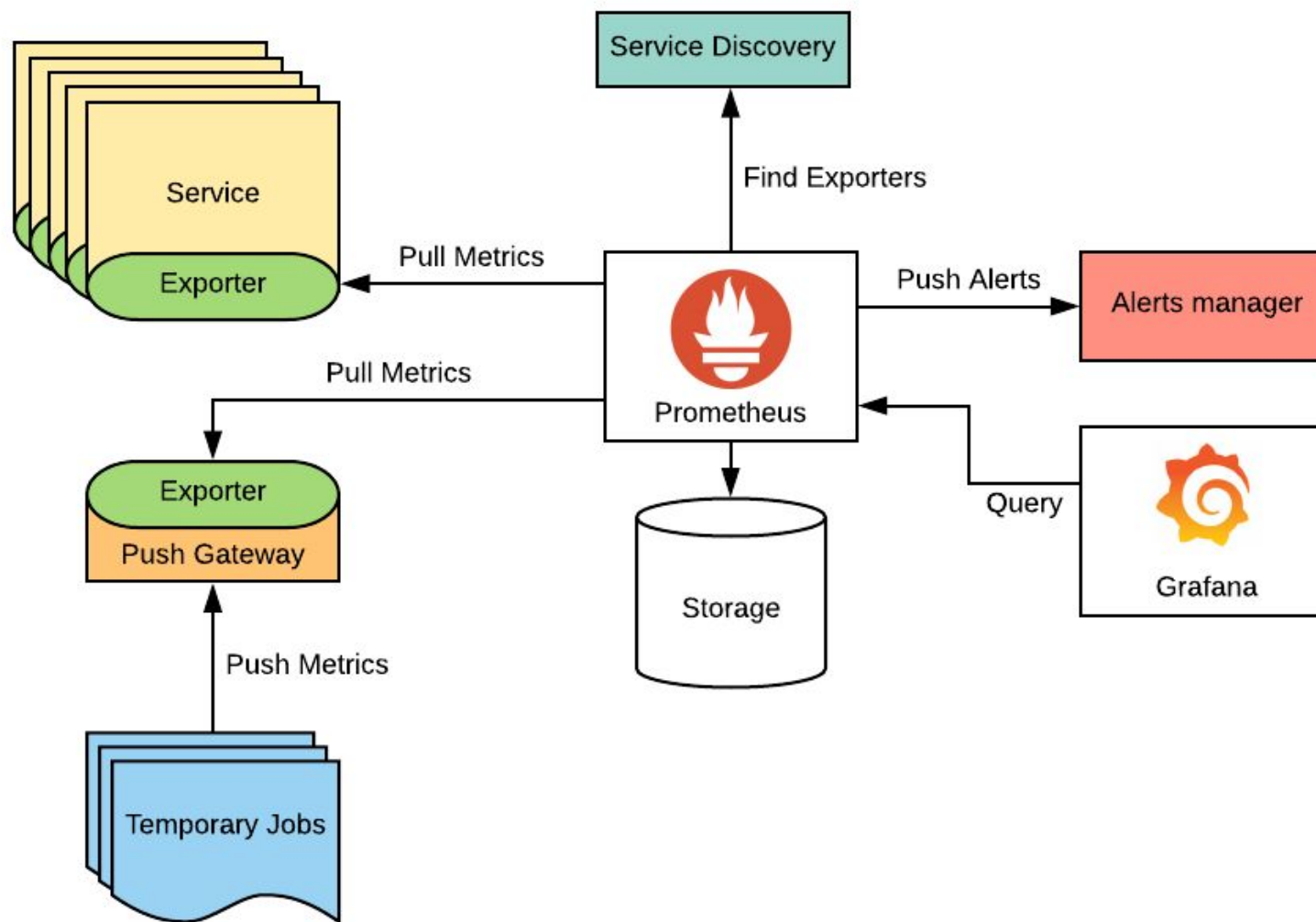
Prometheus & Blackbox

```
+-----------+              +-----------+              +-----------+
|Prometheus |              | Blackbox  |              | Server1   |
+----+------+              +-----+-----+              +-----+-----+
     |                           |                          |
     |      target=server1       |                          |
     +-------------------------->|                          |
     |      module=http_2xx      |                          |
     |                           |    http://server1        |
     |                           +------------------------->|
     |                           |                          |
     |                           |      http_result         |
     |                           |<-------------------------+
     |                           |                          |
     |       scrape_result       |                          |
     |<--------------------------+                          |
     |                           |                          |
     |                           |                          |
     +                           +                          +
```
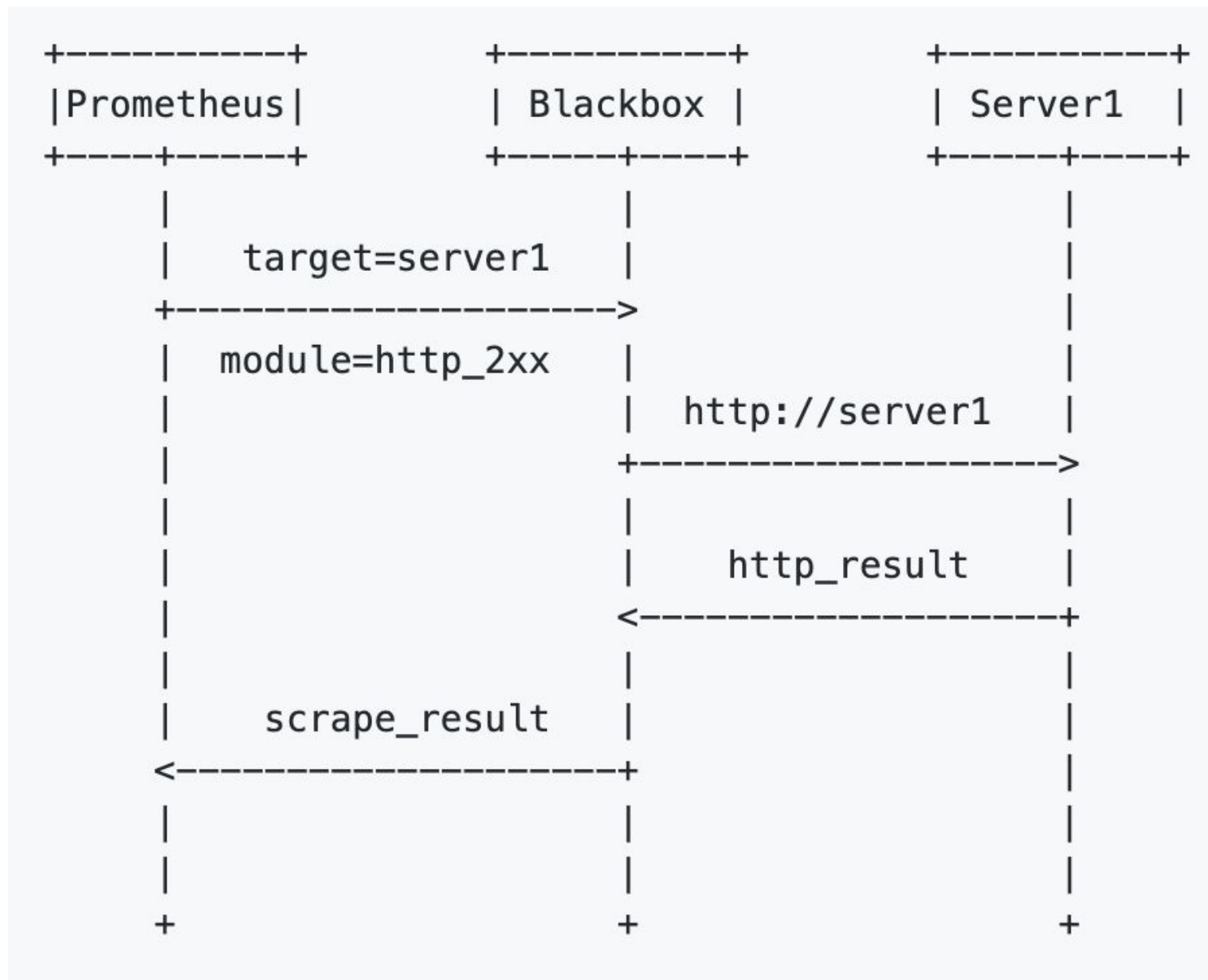
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prometheus.yml

scrape_configs

```
prometheus.yml

global:
  scrape_interval:     15s
  evaluation_interval: 15s

scrape_configs:
  - job_name: prometheus
    static_configs:
      - targets:
        - localhost:9090

  - job_name: node
    static_configs:
      - targets:
        - host-01:9100
        - host-02:9100
```

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prometheus.yml

scrape_configs

blackbox

```yaml
scrape_configs:
  - job_name: 'blackbox'
    metrics_path: /probe
    params:
      module: [http_2xx]  # Look for a HTTP 200 response.
    static_configs:
      - targets:
        - http://prometheus.io      # Target to probe with http.
        - https://prometheus.io     # Target to probe with https.
        - http://example.com:8080   # Target to probe with http on port 8080.
    relabel_configs:
      - source_labels: [__address__]
        target_label: __param_target
      - source_labels: [__param_target]
        target_label: instance
      - target_label: __address__
        replacement: 127.0.0.1:9115   # The blackbox exporter's real
hostname:port.
```

```
http://127.0.0.1:9115/probe?target=http://prometheus.io&module=http_2xx
http://127.0.0.1:9115/probe?target=https://prometheus.io&module=http_2xx
http://127.0.0.1:9115/probe?target=http://example.com:8080&module=http_2xx
```

prometheus.yml

kubernetes_sd_configs

services

```yaml
# Example scrape config for probing services via the Blackbox Exporter.
#
# The relabeling allows the actual service scrape endpoint to be configured
# for all or only some services.
- job_name: 'kubernetes-services'

  metrics_path: /probe
  params:
    module: [http_2xx]

  kubernetes_sd_configs:
  - role: service

  relabel_configs:
  # Example relabel to probe only some services that have "example.io/should_be_probed = true" annotation
  #  - source_labels: [__meta_kubernetes_service_annotation_example_io_should_be_probed]
  #    action: keep
  #    regex: true
  - source_labels: [__address__]
    target_label: __param_target
  - target_label: __address__
    replacement: blackbox-exporter.example.com:9115
  - source_labels: [__param_target]
    target_label: instance
  - action: labelmap
    regex: __meta_kubernetes_service_label_(.+)
  - source_labels: [__meta_kubernetes_namespace]
    target_label: kubernetes_namespace
  - source_labels: [__meta_kubernetes_service_name]
    target_label: kubernetes_name
```

https://github.com/prometheus/prometheus/blob/master/documentation/examples/prometheus-kubernetes.yml

blackbox config.yml

modules

http_2xx

```
config.yml

modules:
    http_2xx:
        prober: http
    http_post_2xx:
        prober: http
        http:
            method: POST
    tcp_connect:
        prober: tcp
```

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kubernetes yaml

annotations

prometheus.io/probe

```yaml
k8s.yml

apiVersion: apps/v1
kind: Deployment
spec:
  template:
    metadata:
      annotations:
        prometheus.io/probe: 'true'


apiVersion: v1
kind: Service
metadata:
  name: myservice
  annotations:
    prometheus.io/probe: 'true'


apiVersion: extensions/v1beta1
kind: Ingress
metadata:
  annotations:
    prometheus.io/probe: 'true'
    prometheus.io/probe-scheme: 'https'
```

prometheus.yml

kubernetes_sd_configs

pod probe

```yaml
scrape_configs:
  - job_name: 'kubernetes-pods-probe'
    metrics_path: /probe
    params:
      module: [generic_http_get]
    kubernetes_sd_configs:
    - role: pod
    scrape_interval: 30s
    scrape_timeout: 25s
    relabel_configs:
    - source_labels: [__meta_kubernetes_pod_annotation_prometheus_io_probe]
      action: keep
      regex: true
    - source_labels: [__address__]
      target_label: __param_target
    - target_label: __address__
      replacement: blackbox.k8s-namespace:9115
    - source_labels: [__param_target]
      target_label: instance
    - action: labelmap
      regex: __meta_kubernetes_pod_label_(.+)
    - source_labels: [__meta_kubernetes_namespace]
      target_label: kubernetes_namespace
    - source_labels: [__meta_kubernetes_pod_name]
      target_label: kubernetes_name
```

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prometheus.yml

kubernetes_sd_configs

service probe

```yaml
prometheus.yml

scrape_configs:
  - job_name: 'kubernetes-services-probe'
    metrics_path: /probe
    params:
      module: [generic_http_get]
    kubernetes_sd_configs:
    - role: service
    scrape_interval: 30s
    scrape_timeout: 25s
    relabel_configs:
    - source_labels: [__meta_kubernetes_service_annotation_prometheus_io_probe]
      action: keep
      regex: true
    - source_labels: [__address__]
      target_label: __param_target
    - target_label: __address__
      replacement: blackbox.k8s-namespace:9115
    - source_labels: [__param_target]
      target_label: instance
    - action: labelmap
      regex: __meta_kubernetes_service_label_(.+)
    - source_labels: [__meta_kubernetes_namespace]
      target_label: kubernetes_namespace
    - source_labels: [__meta_kubernetes_service_name]
      target_label: kubernetes_name
```

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prometheus.yml

kubernetes_sd_configs

ingress probe

```yaml
scrape_configs:
  - job_name: 'kubernetes-ingresses-probe'
    metrics_path: /probe
    kubernetes_sd_configs:
      - role: ingress
    scrape_interval: 30s
    scrape_timeout: 25s
    relabel_configs:
      - source_labels: [__meta_kubernetes_ingress_annotation_prometheus_io_probe]
        action: keep
        regex: true
      - source_labels: [__meta_kubernetes_ingress_annotation_prometheus_io_probe_scheme]
        action: replace
        target_label: __meta_kubernetes_ingress_scheme
        regex: ^(http|https)$
      - source_labels: [__meta_kubernetes_ingress_scheme]
        regex: (.*)
        target_label: __param_module
        replacement: generic_${1}_get
      - source_labels: [__meta_kubernetes_ingress_scheme,__address__,__meta_kubernetes_ingress_path]
        regex: (.+);(.+);(.+)
        replacement: ${1}://${2}${3}
        target_label: __param_target
      - target_label: __address__
        replacement: blackbox.k8s-namespace:9115
      - source_labels: [__param_target]
        target_label: instance
      - action: labelmap
        regex: __meta_kubernetes_ingress_label_(.+)
      - source_labels: [__meta_kubernetes_namespace]
        target_label: kubernetes_namespace
      - source_labels: [__meta_kubernetes_ingress_name]
        target_label: kubernetes_name
```

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DEMO!
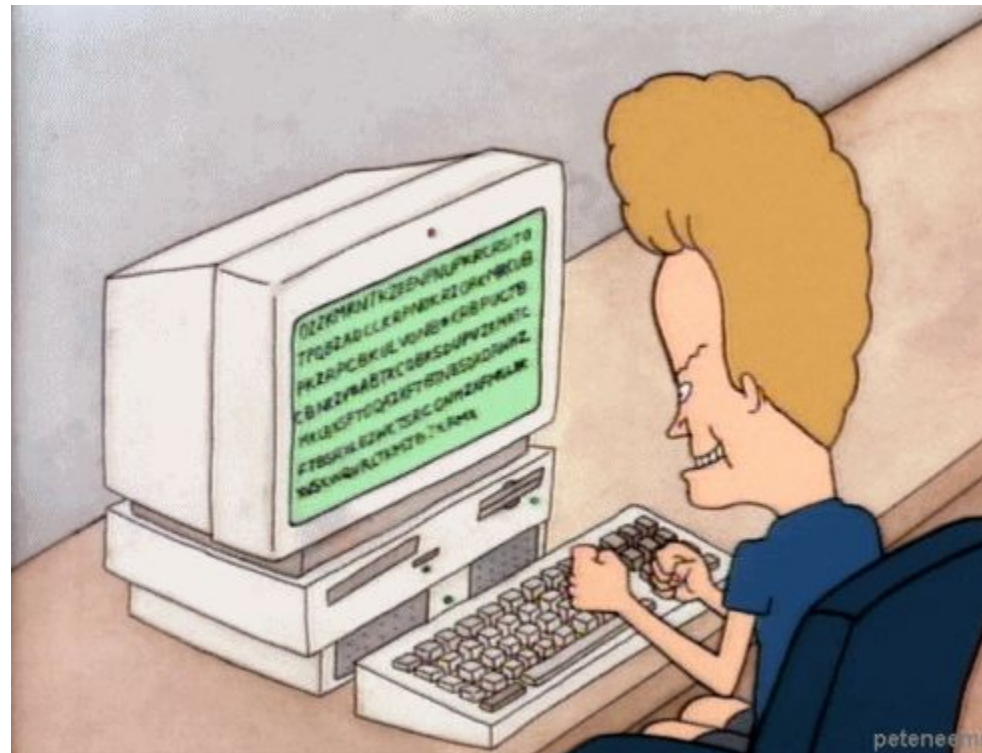
Us vs. Datadog

- **Our probes can get much closer than Datadog ***

- **We scrape 2x more**

- **We (will) have the ability to support more complex checks**

- **Very low cost**

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// TODO

- **Single "pane of glass" in grafana**
  - **Pod/Service/Ingress dashboard view doesn't show the whole picture**

- **Custom blackbox modules for teams**
  - **Support all the features that blackbox modules provide**

- **Global probes**
  - **https://github.com/discordianfish/blackbox-exporter-lambda (?)**

- **Authentication between Prometheus and Blackbox Exporter**

- **At least one team has asked to support custom paths**

- **Ingress controller probes (?)**

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Thank You!

underthehood.meltwater.com
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