KubeCon | CloudNativeCon

North America 2024

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OpenTelemetry

Adopting OpenTelemetry at Scale

Lessons Learned

About me

KubeCon CloudNativeCon North America 2024

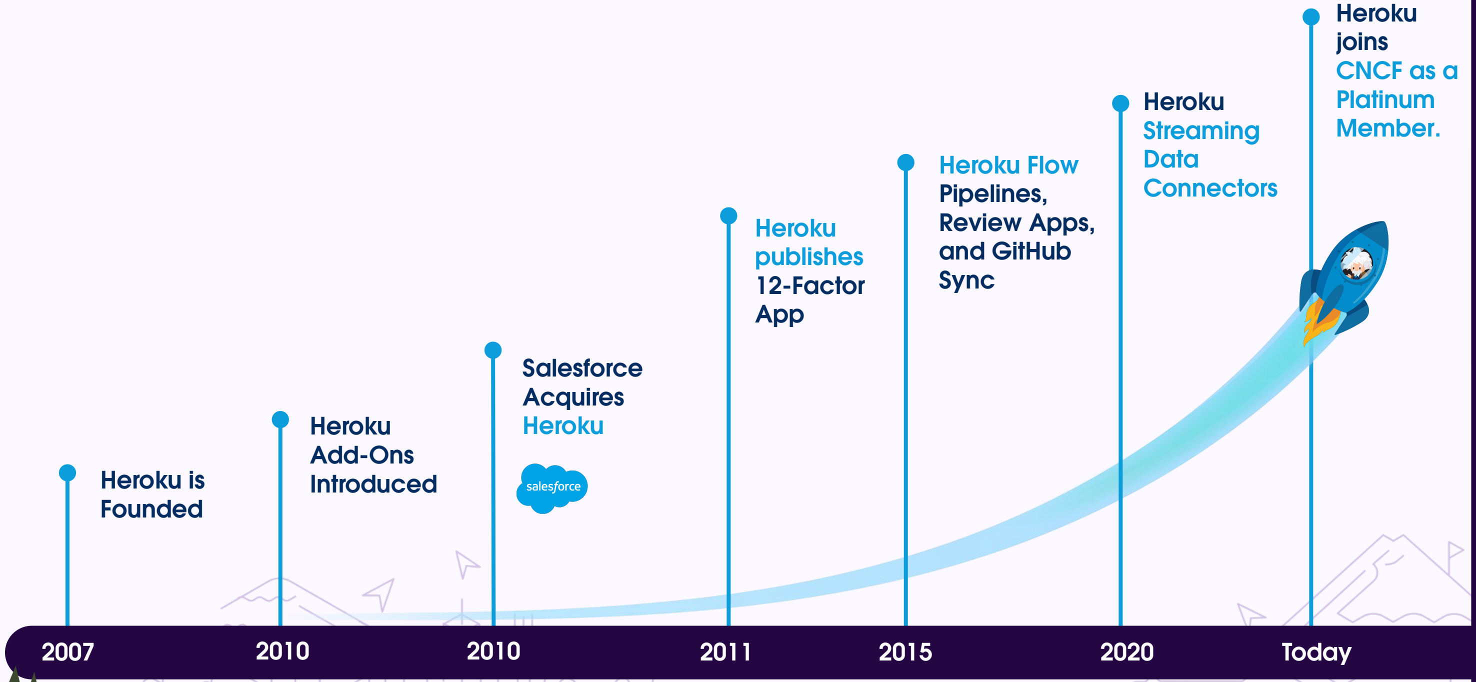
- Joined Heroku 10 years ago
- Member of Telemetry Team

github.com/alexmarnell

Agenda

- Defining “scale” for the context of this talk
- How to drive adoption
- Lessons Learned (including a deep dive into histograms)
- General Tips
    - Using terraform to save time

Innovating Since 2007 and Now With Salesforce


Heroku is Founded
Heroku Add-Ons Introduced
Salesforce Acquires Heroku
Heroku publishes 12-Factor App
Heroku Flow Pipelines, Review Apps, and GitHub Sync
Heroku Streaming Data Connectors
Heroku joins CNCF as a Platinum Member.
2007
2010
2010
2011
2015
2020
Today

HEROKU from Salesforce

Our Daily Impact

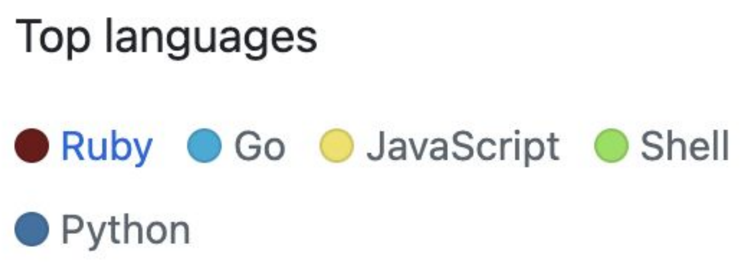
60 Billion
Requests Per Day

Across Every Industry

LIVE NATION
align
HealthSherpa
TRAILHEAD

Defining scale

- 17 years of code
- 844 public repositories on GitHub



Top languages

● Ruby ● Go ● JavaScript ● Shell ● Python

HEROKU from Salesforce

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Influencing Change

Pop Quiz

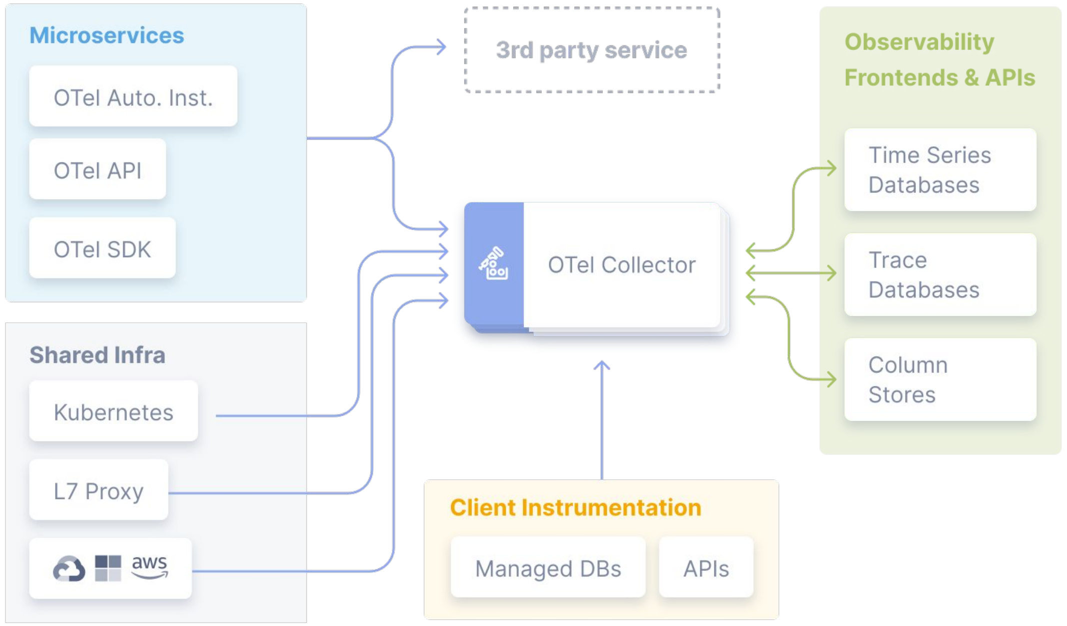
Does anyone recognize who this is?

Carnegie’s Principle 5

Get the other person saying “yes, yes” immediately

OpenTelemetry Interoperability

It’s strength is also what make adoption hard



OpenTelemetry Distributions

A distribution, not to be confused with a fork, is customized version of an OpenTelemetry component.

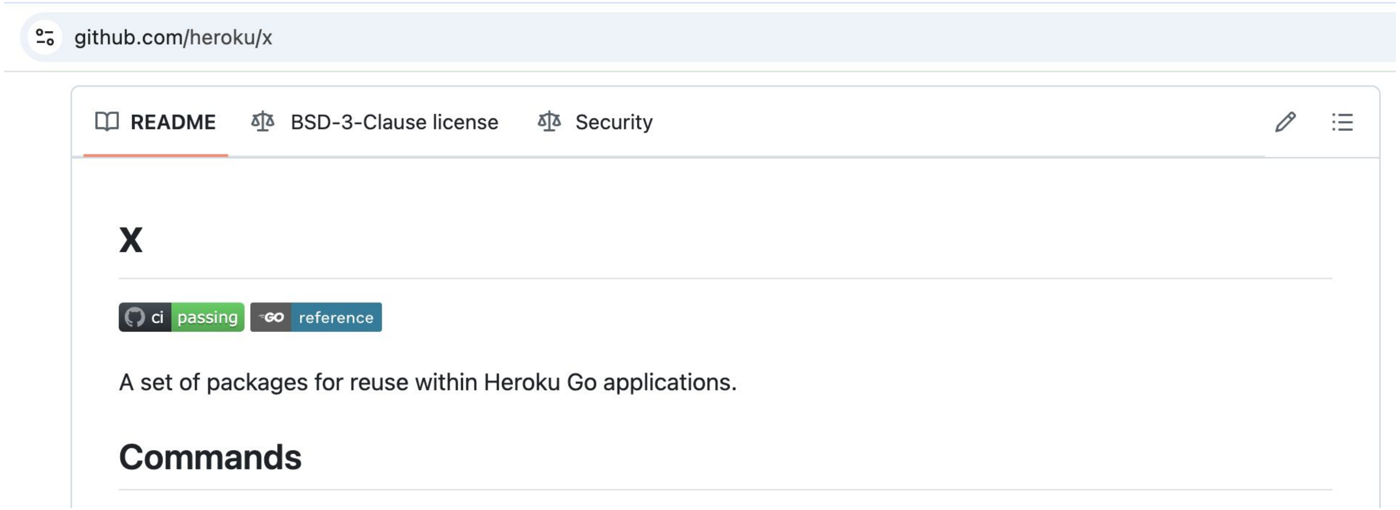
In our case, we have two wrapped SDKs:

- telemetry-go
- telemetry-ruby

Carnegie's Principle 6

Let the other person do a great deal of the talking

Heroku's Core Bootstrap Package



github.com/heroku/x

README BSD-3-Clause license Security

X

ci passing GO reference

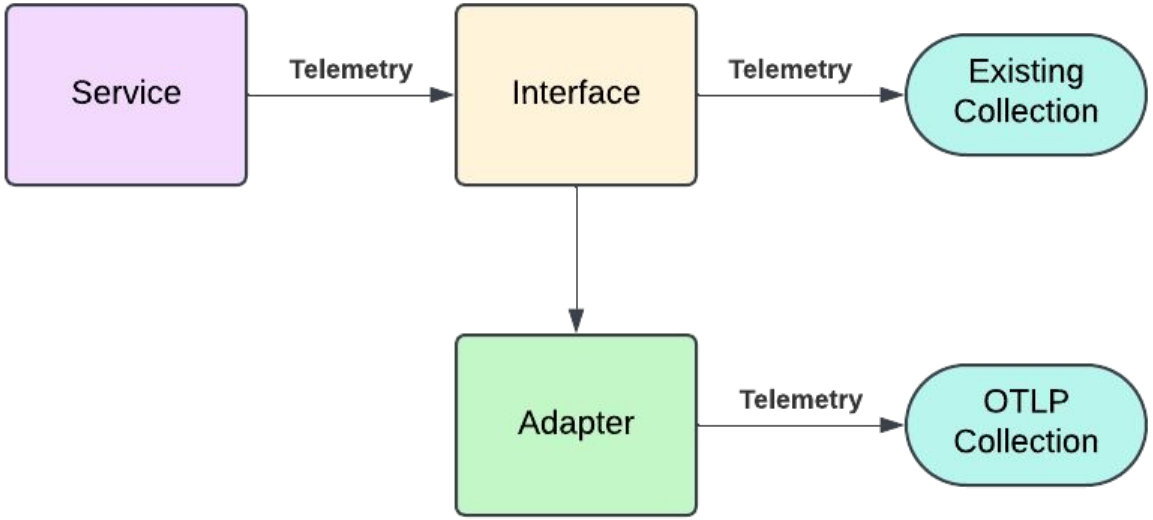
A set of packages for reuse within Heroku Go applications.

Commands

Adapters

```
type Provider interface {
    NewCounter(name string) metrics.Counter
    NewGauge(name string) metrics.Gauge
    NewHistogram(name string, buckets int) metrics.Histogram
}
```

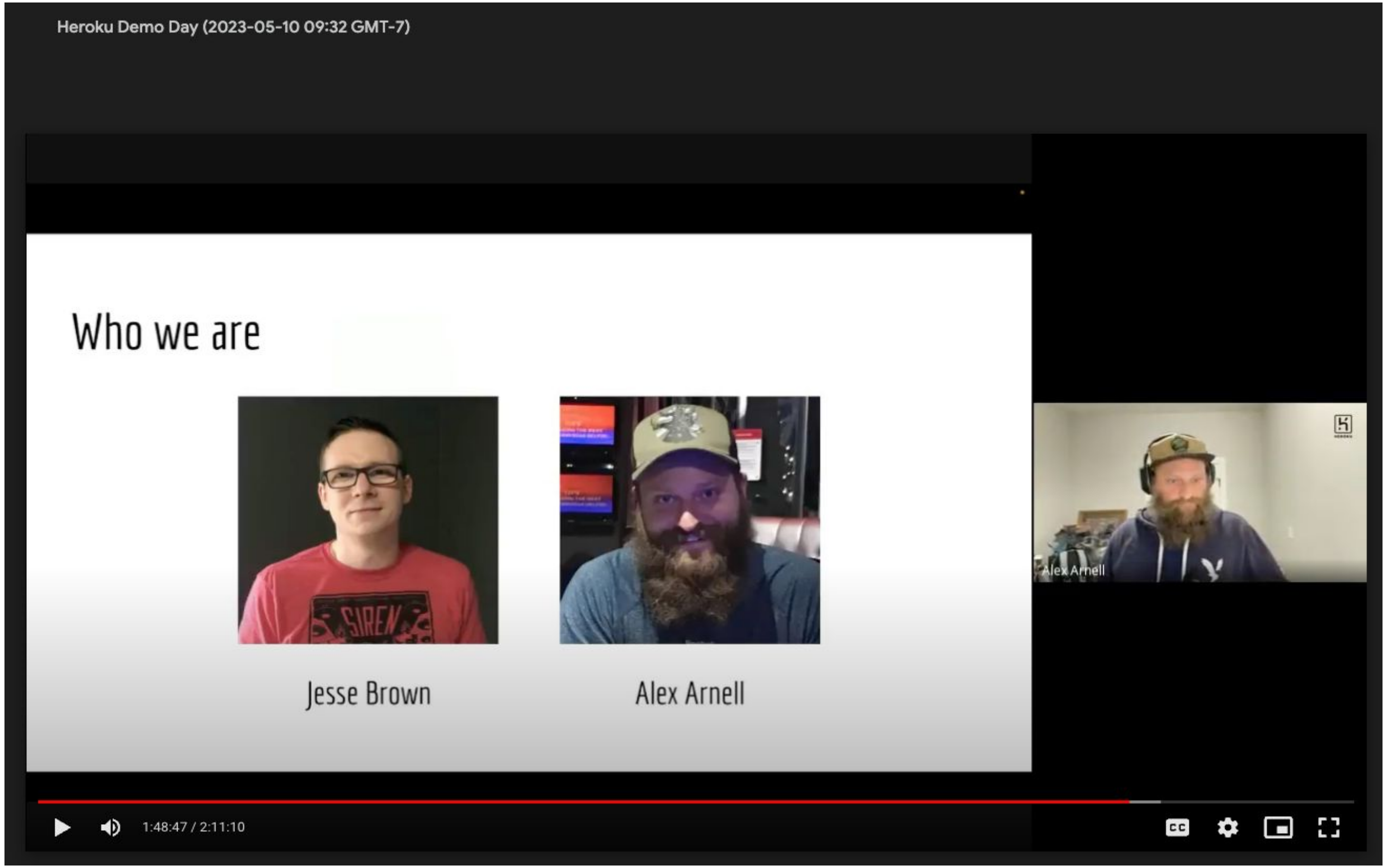
Adapters


Service
Telemetry
Interface
Telemetry
Existing Collection
Adapter
Telemetry
OTLP Collection

Carnegie’s Principle 11

Dramatize your ideas

Heroku Demo Days



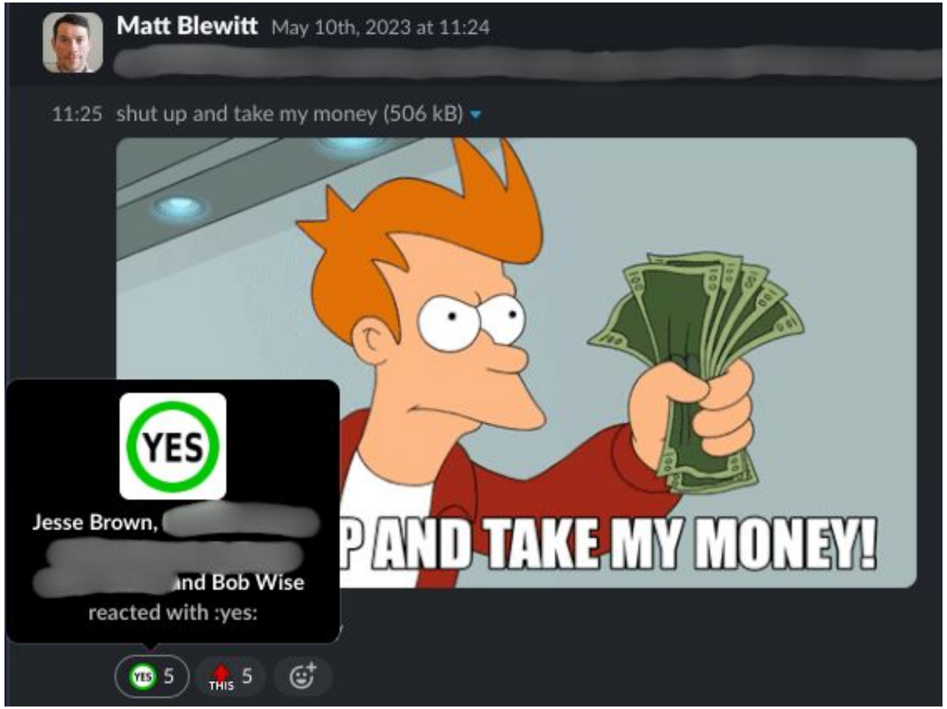
Heroku Demo Day (2023-05-10 09:32 GMT-7)

Who we are

Jesse Brown

Alex Arnell

Success



Matt Blewitt May 10th, 2023 at 11:24

[redacted]

11:25 shut up and take my money (506 kB)

Jesse Brown, [redacted]

[redacted] and Bob Wise

reacted with :yes:

Carnegie’s Principle 12

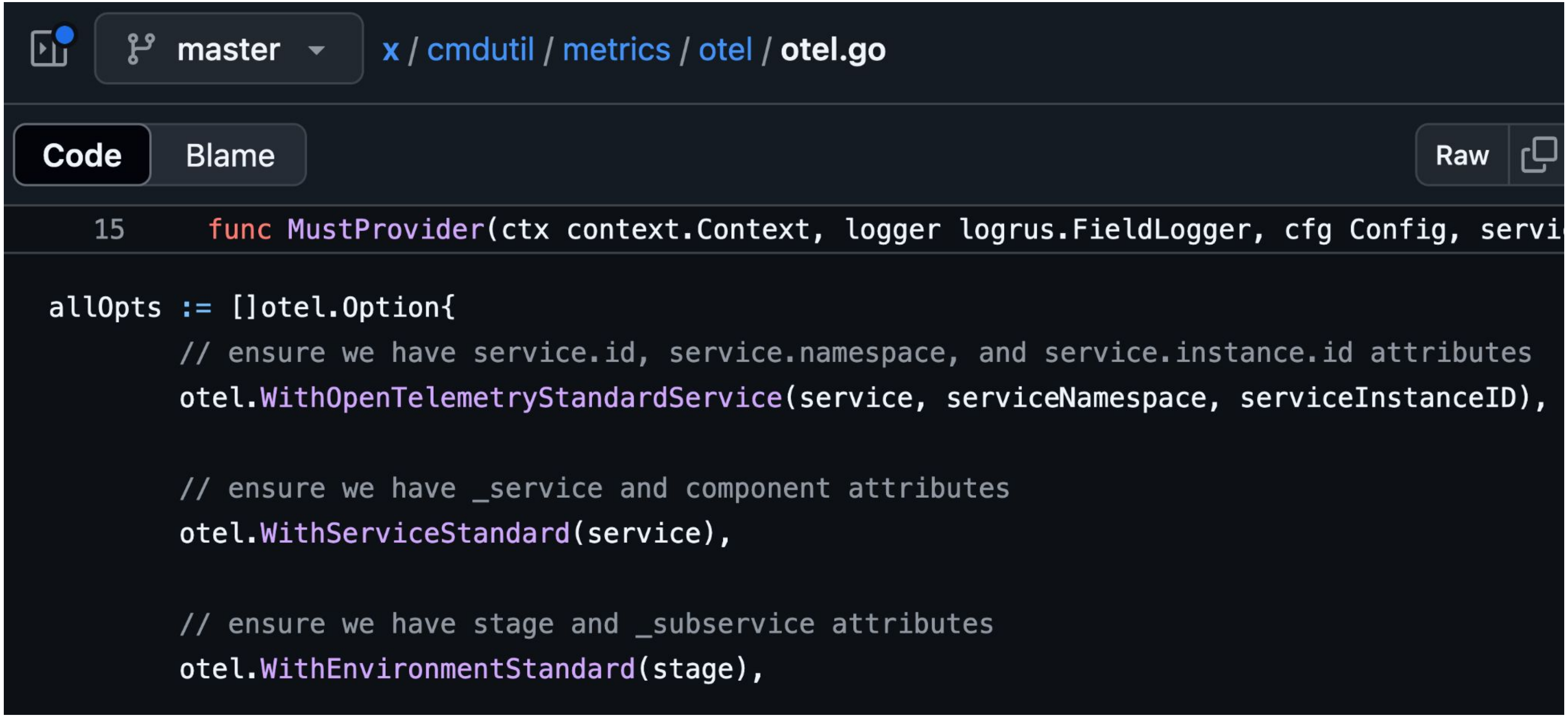
Throw down a challenge

Or have a mandated Observability vendor swap

Lessons Learned

Semantic Conventions & Standardization

Three iterations of standards


master

x / cmdutil / metrics / otel / otel.go

Code Blame Raw

```
func MustProvider(ctx context.Context, logger logrus.FieldLogger, cfg Config, servi
```

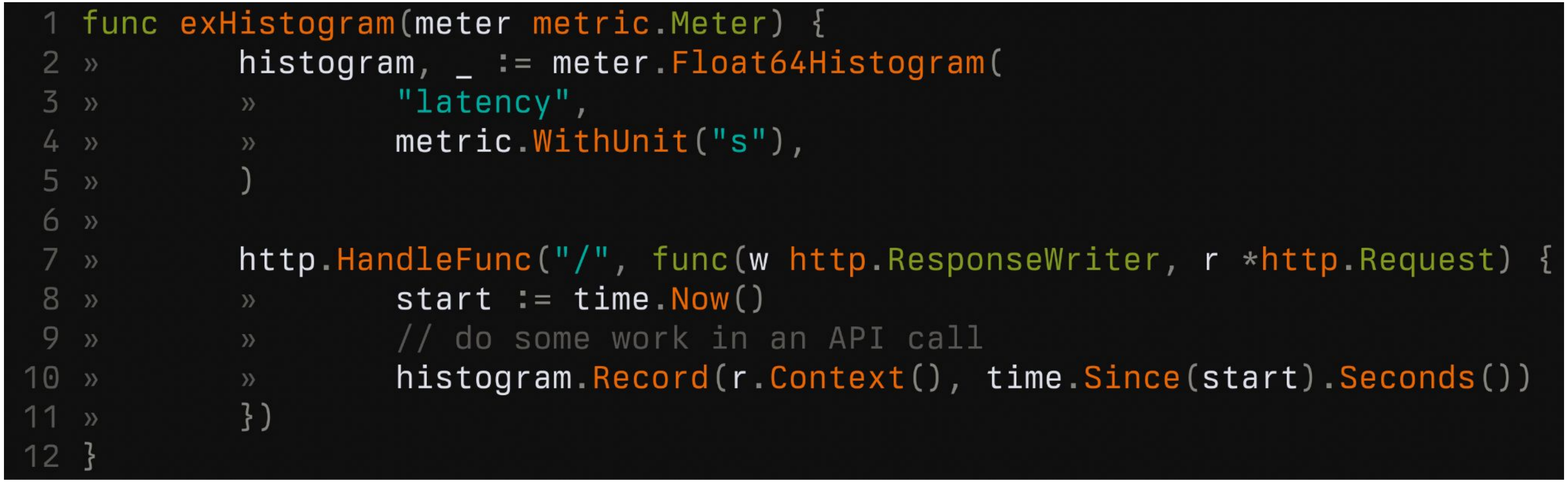
```
allOpts := []otel.Option{
        // ensure we have service.id, service.namespace, and service.instance.id attributes
        otel.WithOpenTelemetryStandardService(service, serviceNamespace, serviceInstanceID),

        // ensure we have _service and component attributes
        otel.WithServiceStandard(service),

        // ensure we have stage and _subservice attributes
        otel.WithEnvironmentStandard(stage),
```

Histograms

Histograms



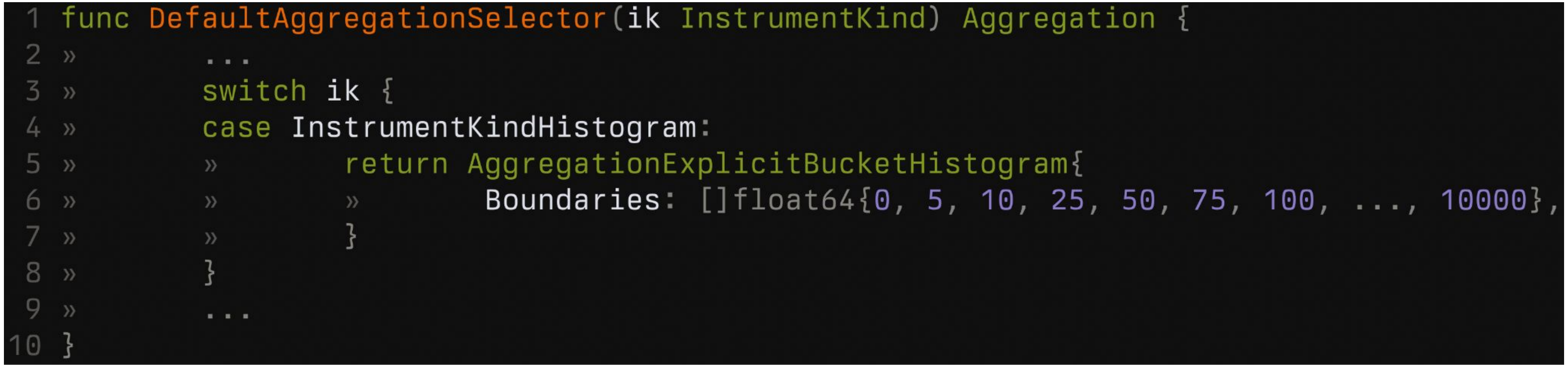
```
func exHistogram(meter metric.Meter) {
»       histogram, _ := meter.Float64Histogram(
»       »       "latency",
»       »       metric.WithUnit("s"),
»       )
»
»       http.HandleFunc("/", func(w http.ResponseWriter, r *http.Request) {
»       »       start := time.Now()
»       »       // do some work in an API call
»       »       histogram.Record(r.Context(), time.Since(start).Seconds())
»       })
}
```

Aggregation - circa 2020-2021

```
"metrics": [
 {
  "name": "request.duration",
  "Data": {
   "Histogram": {
     "data_points": [
      { ... },
      ...,
     ]
   }
```

**May not be 100% accurate*

Explicit Histograms



```go
func DefaultAggregationSelector(ik InstrumentKind) Aggregation {
	...
	switch ik {
	case InstrumentKindHistogram:
		return AggregationExplicitBucketHistogram{
			Boundaries: []float64{0, 5, 10, 25, 50, 75, 100, ..., 10000},
		}
	}
	...
}
```

Exponential Histograms

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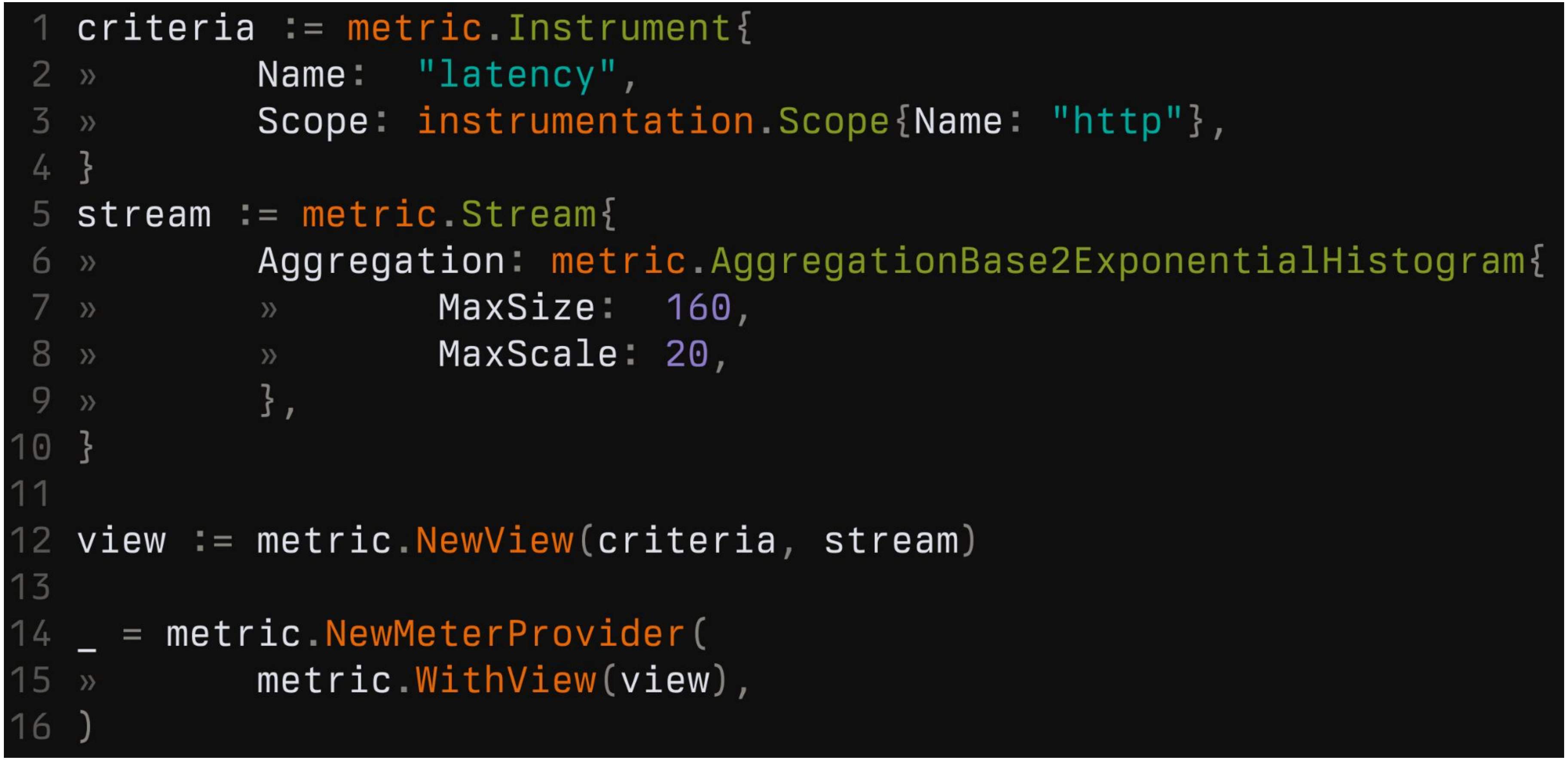

```go
criteria := metric.Instrument{
        Name:   "latency",
        Scope:  instrumentation.Scope{Name: "http"},
}
stream := metric.Stream{
        Aggregation: metric.AggregationBase2ExponentialHistogram{
                MaxSize:  160,
                MaxScale: 20,
        },
}

view := metric.NewView(criteria, stream)

_ = metric.NewMeterProvider(
        metric.WithView(view),
)
```

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Tips

Double write your data

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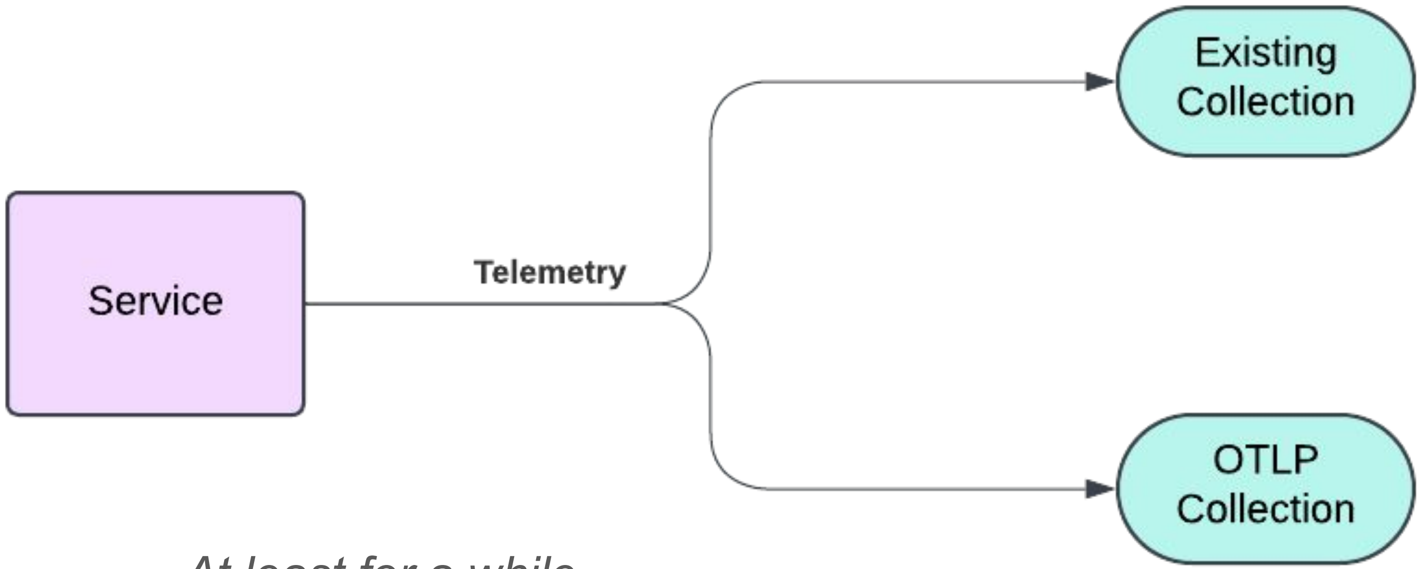
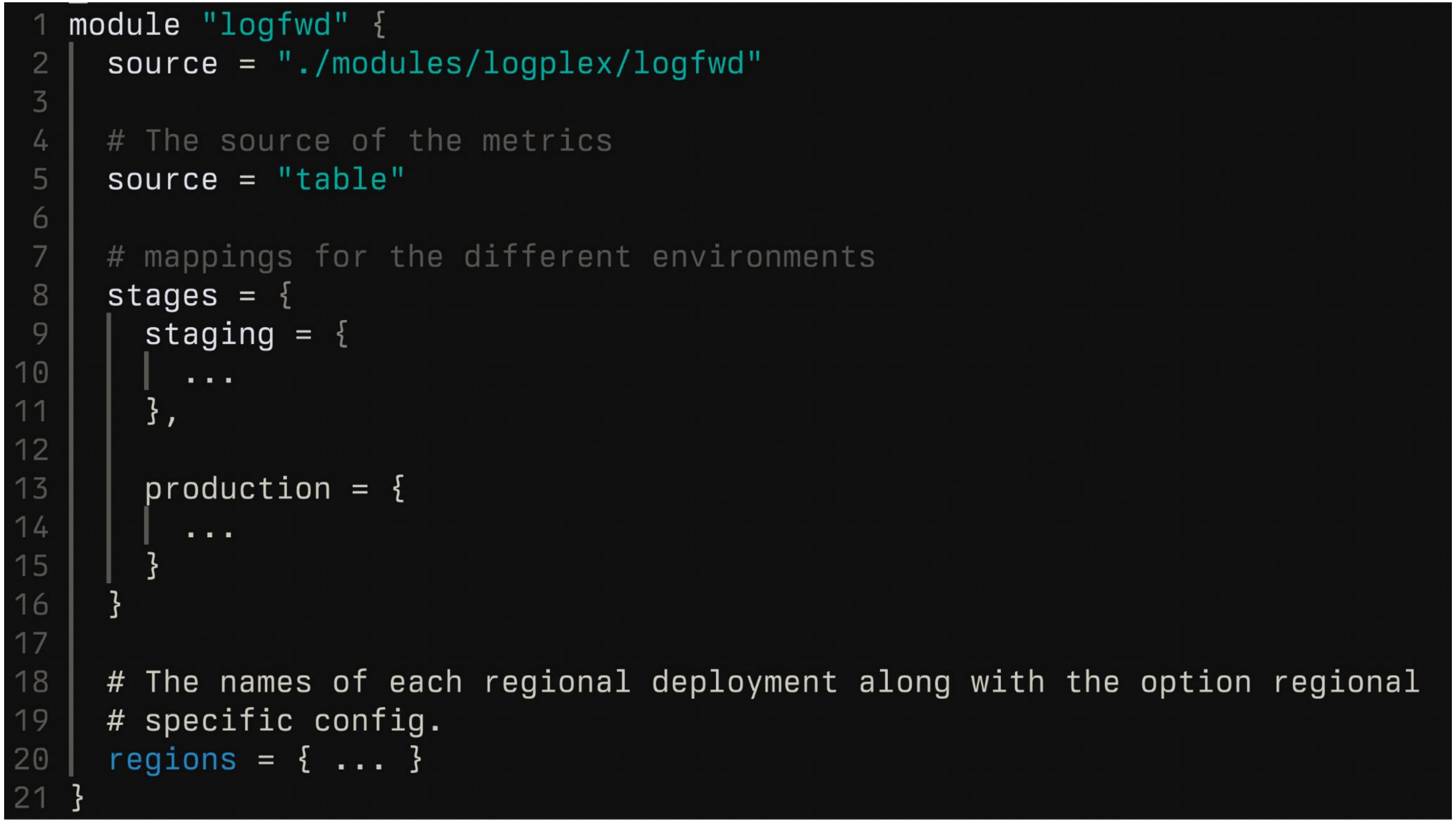


At least for a while

Migrating Dashboards



```
module "logfwd" {
  source = "./modules/logplex/logfwd"

  # The source of the metrics
  source = "table"

  # mappings for the different environments
  stages = {
    staging = {
      ...
    },

    production = {
      ...
    }
  }

  # The names of each regional deployment along with the option regional
  # specific config.
  regions = { ... }
}
```

Recap - Influencing Change

Carnegie's Principles:

- *Principle 5:* Get the other person saying "yes, yes" immediately
- *Principle 6:* Let the other person do a great deal of the talking
- *Principle 11:* Dramatize your ideas
- *Principle 12:* Throw down a challenge

Recap - Lessons and Tips

Lessons Learned

- Explicit Histograms create fixed buckets
- Exponential Histograms are your friend

Plan for the future

- Plan out our standards and their adoption
- Modularize / Codify your Dashboards & Alerts

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HEROKU from Salesforce

Visit the Heroku at KubeCon Website to…

- Register for Heroku + AWS Happy Hour
- Book a meeting with a Heroku expert

Keynotes & Talks

Honoring the Past to Forge Ahead
Friday, Nov. 15 @ 9:25am

Visit our Demo Booth (with prizes!)

Booth N11 in the Solutions Showcase

Thank you

Feedback

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Questions?