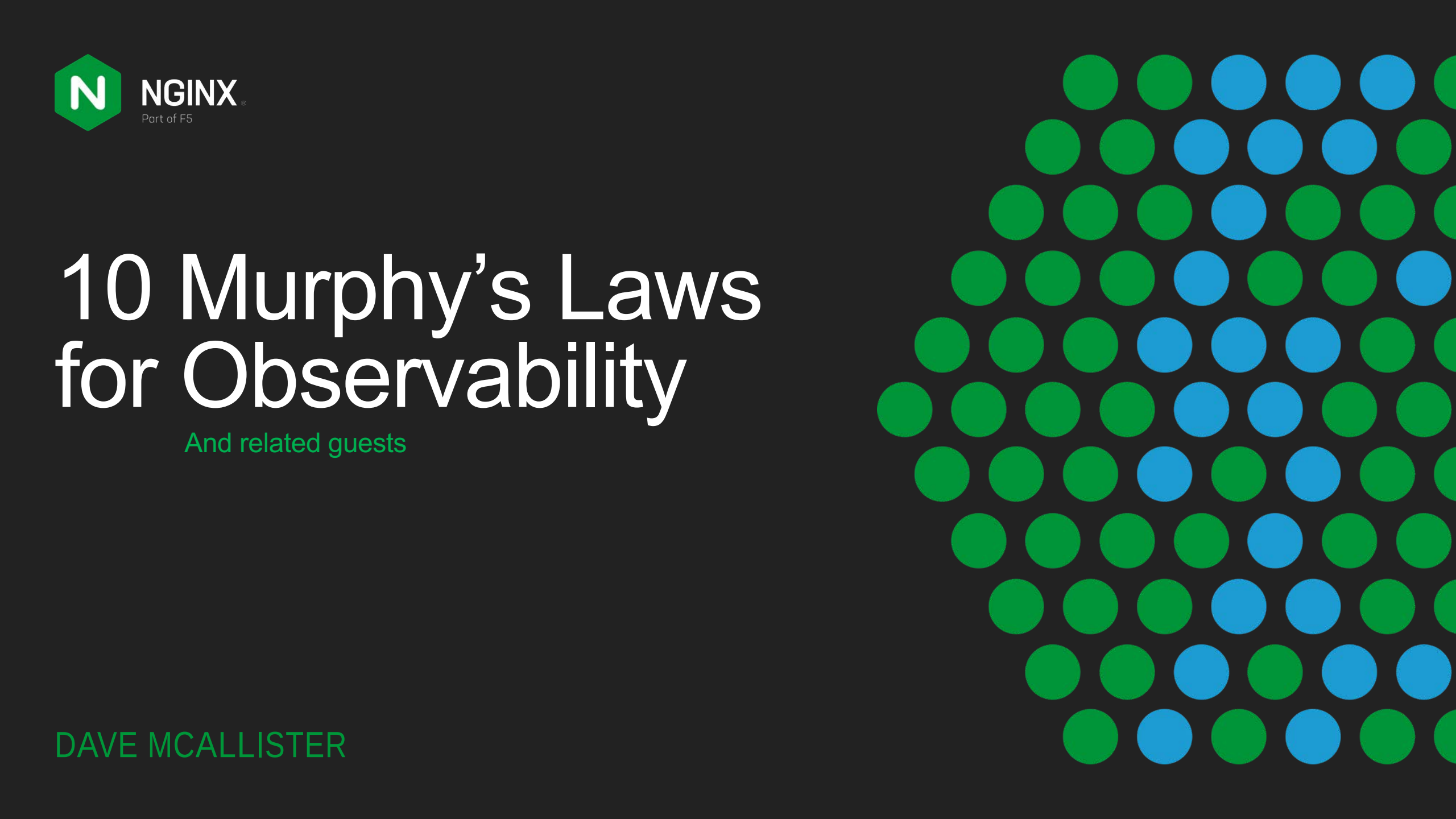
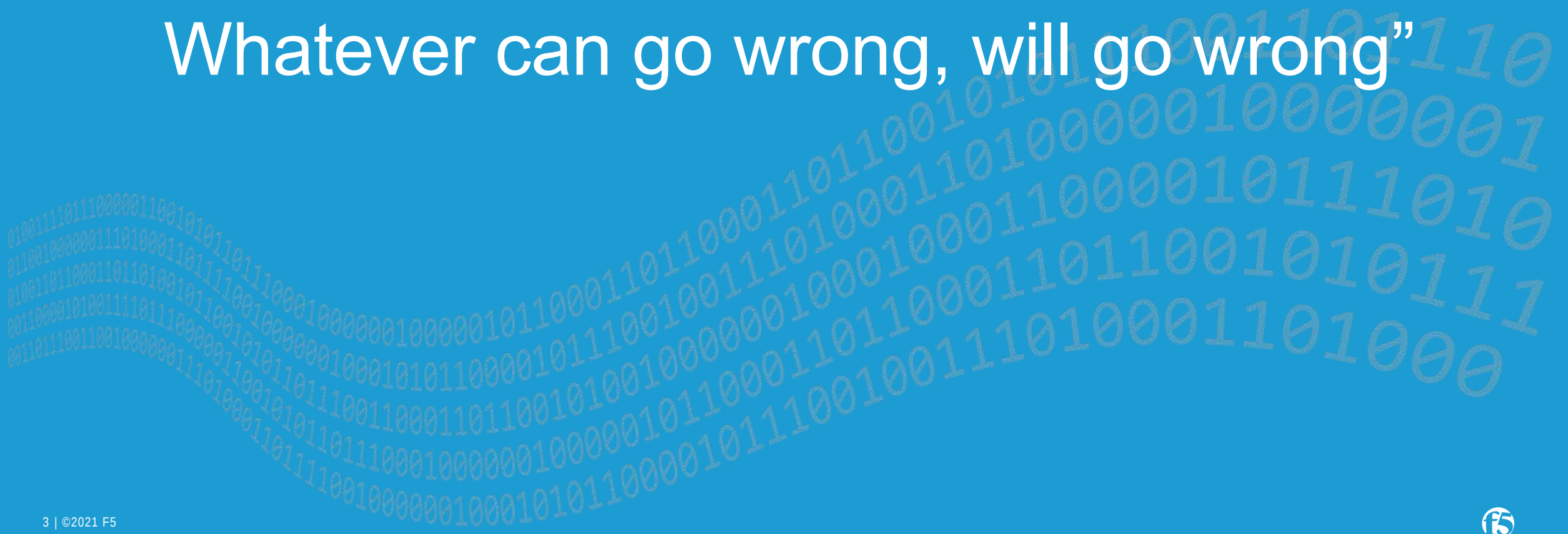

NGINX
Part of F5
10 Murphy's Laws for Observability
And related guests
DAVE MCALLISTER

Dave McAllister

Open Source Technology Evangelist
https://www.linkedin.com/in/davemc

Whatever can go wrong, will go wrong”



Whatever can go wrong, will go wrong”

at the worst possible time”

There are lots of Murphy's categories

- Murphy's Technology Laws
- Murphy's Military Laws
- Murphy's Laws on Love and Sex

And spin offs

- Abbott's Admonitions
- Allen's Axioms

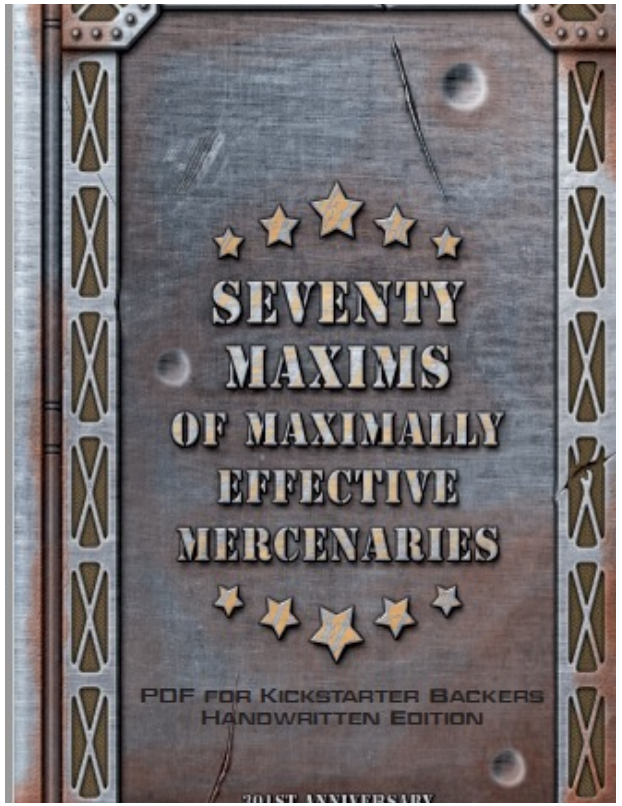
On Cooking

On Cars

On Physics

On measurements

On Vacations



Murphy's for Observability #1

If you perceive that there are four possible ways in which a procedure can go wrong, and circumvent these, then a fifth way, unprepared for, will promptly develop.

OBSERVABILITY IS A DATA PROBLEM

THE MORE OBSERVABLE A SYSTEM, THE QUICKER WE CAN UNDERSTAND WHY IT'S ACTING UP AND FIX IT

Full-Stack Visibility & Context-Rich Insights

A Brief View of Observability

Observability is data. Data from deeper sources, new sources, and data that ties our environment together to let us analyze and understand what is happening at each point across time.

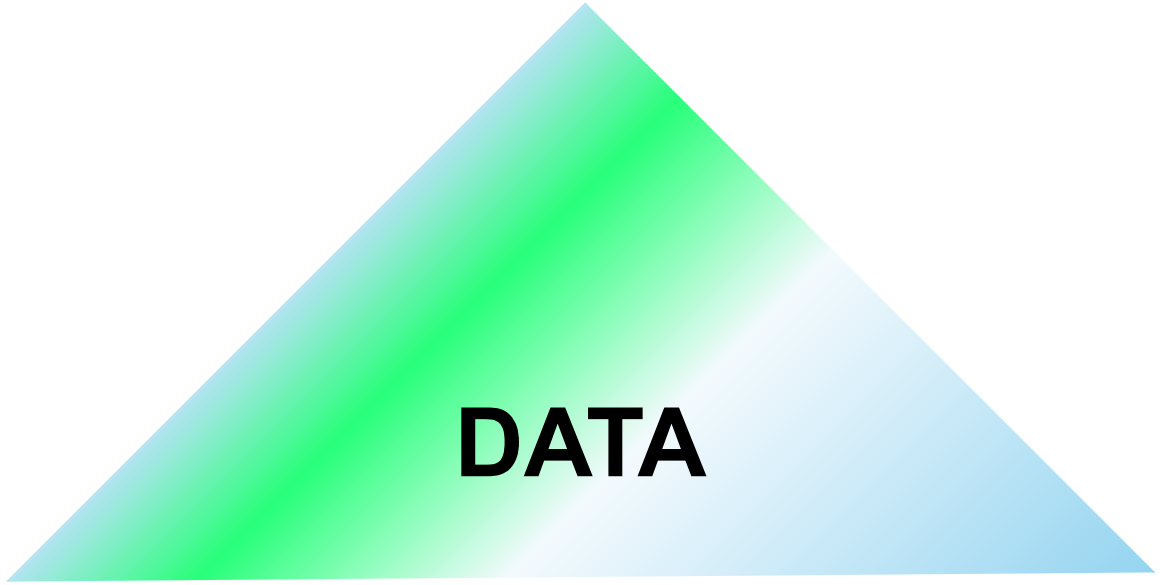
Observability can and should use any sources of data needed to help us understand

Observability is a proxy for customer happiness

For Engineering purposes:

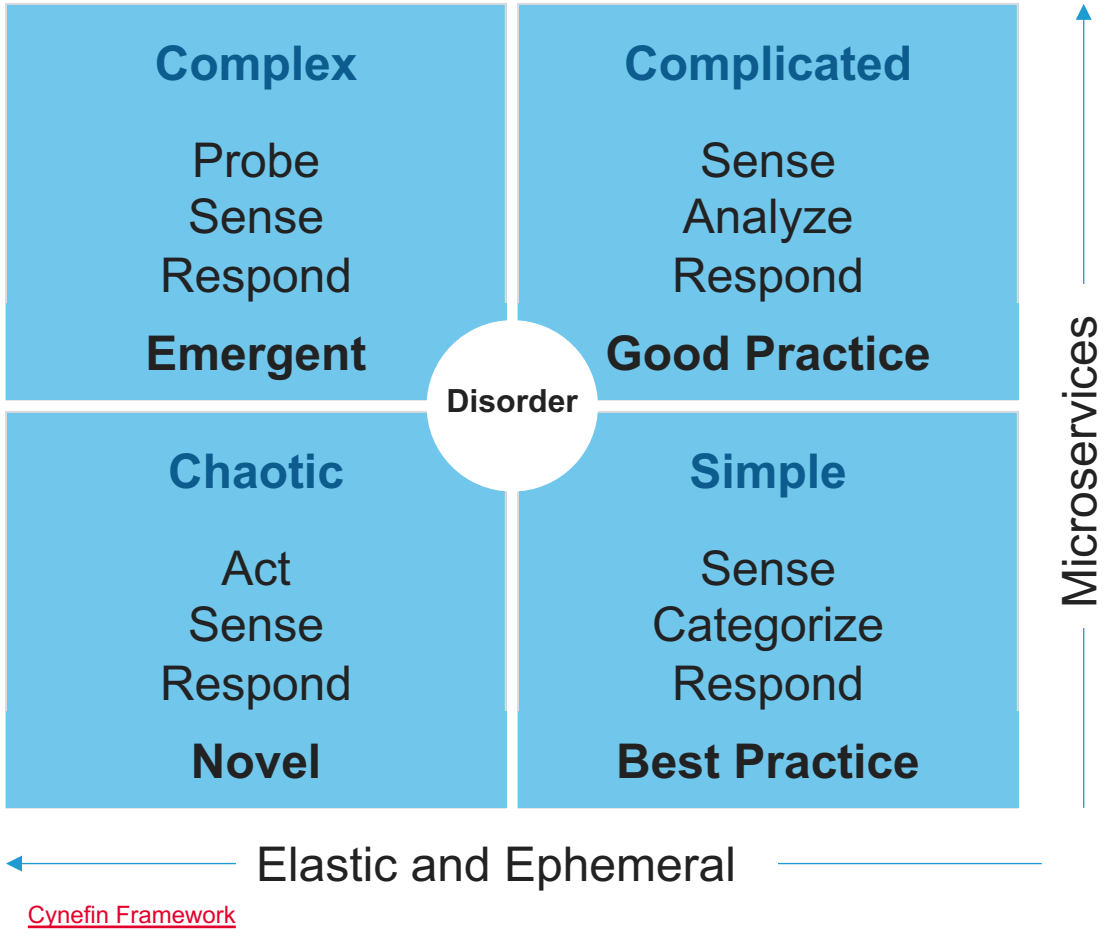
Designing / defining the exposure of state variables in a manner to allow inference of internal behavior

Murphy's for Observability #2



Every Solution Breeds New Problems

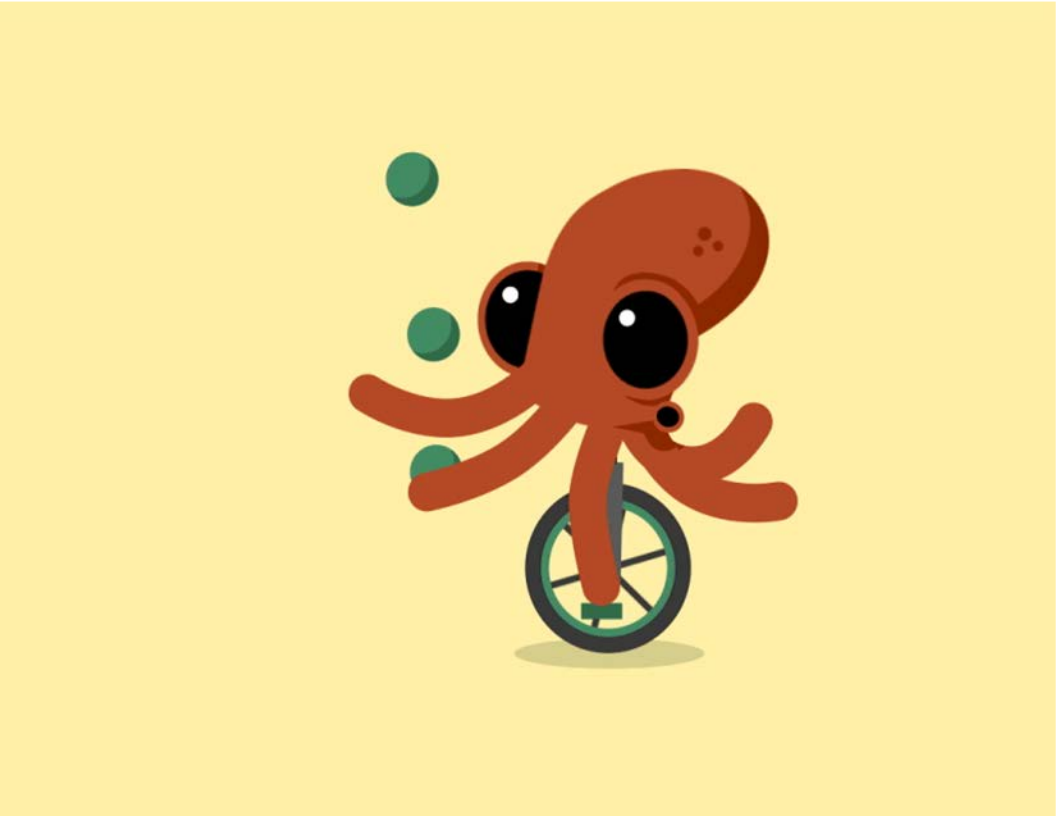
Observability Challenges



Cynefin Framework

- Microservices create complex interactions.
- Failures don't exactly repeat.
- Debugging multi-tenancy is painful.
- Traditional onitoring can no longer save us.

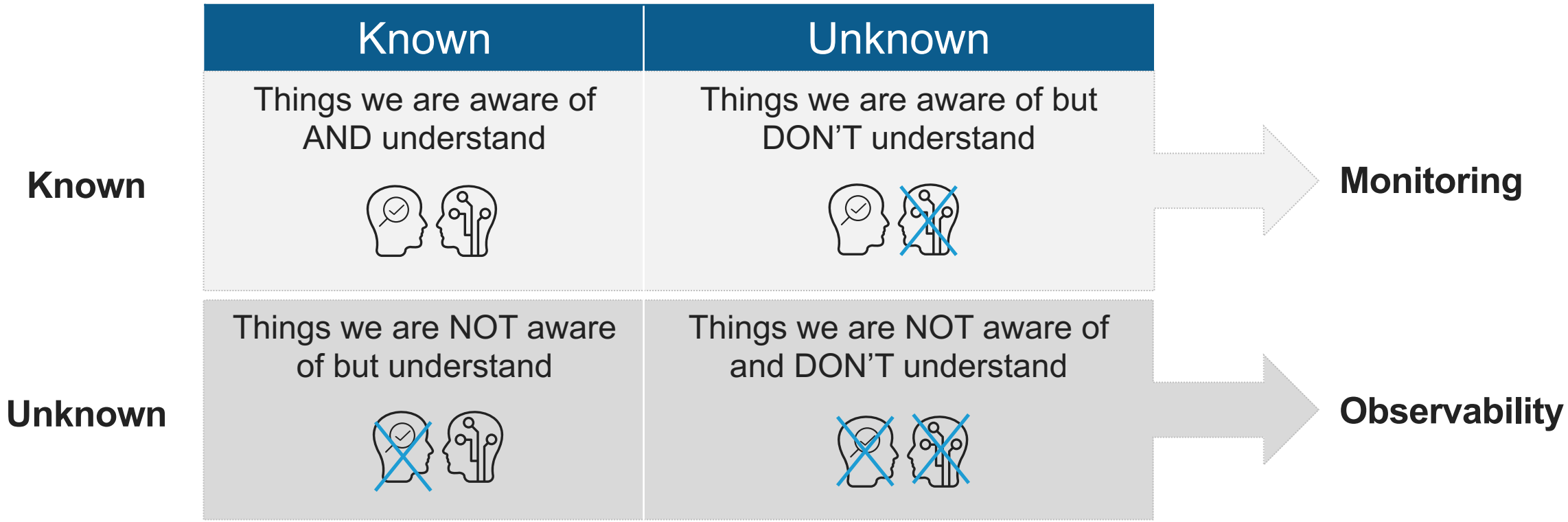
Murphy’s for Observability #3



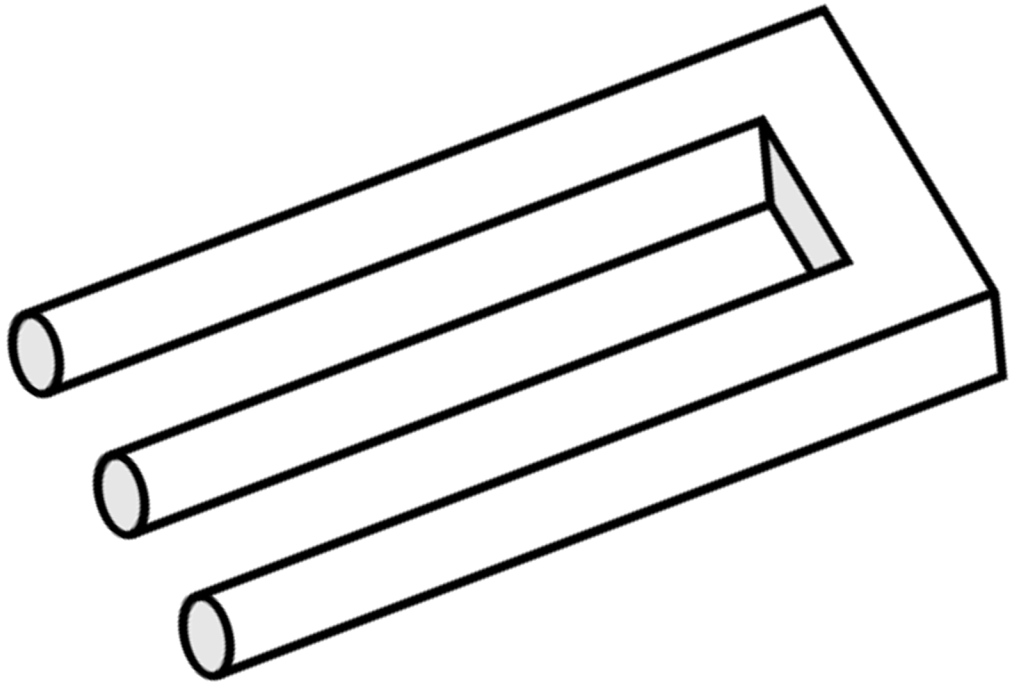
You can never run out of things that can go wrong

Observability Allows Us to Monitor For the Unknown Unknowns

Today's knowns are yesterday unknowns

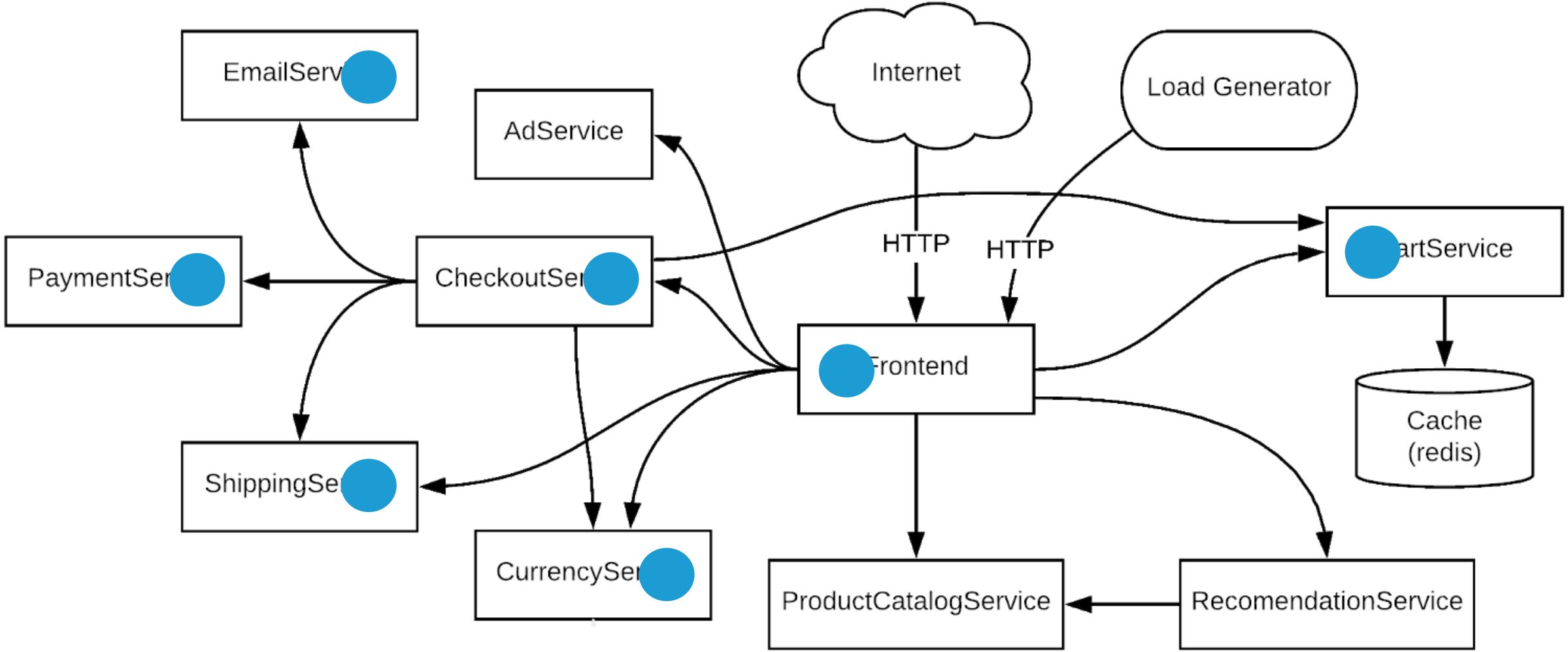


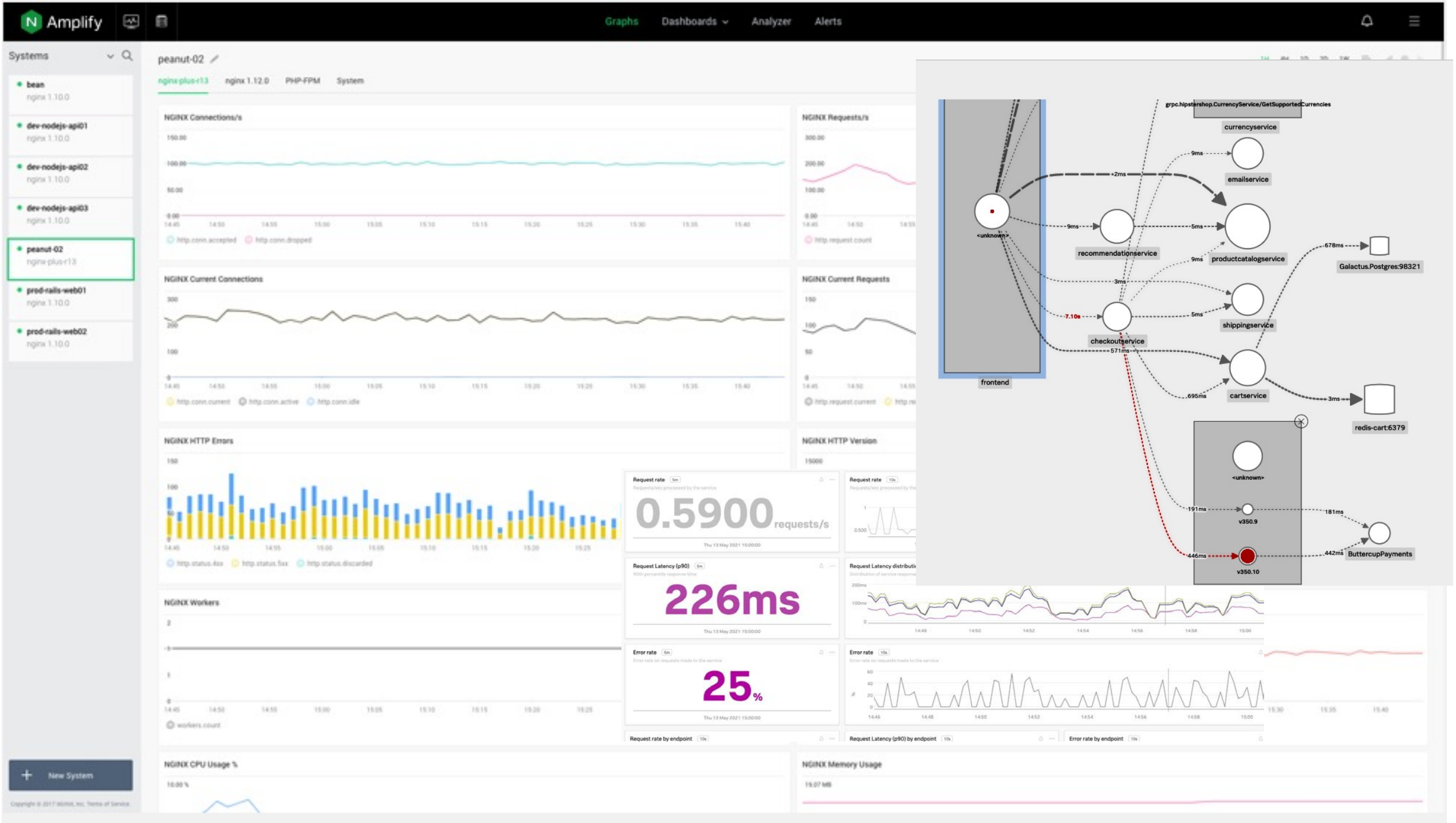
Murphy’s for Observability #4



Nothing is as easy as it looks

EXAMPLE MICROSERVICE ARCHITECTURE




Amplify
Graphs
Dashboards
Analyzer
Alerts
Systems
bean
nginx 1.10.0
dev-nodejs-api01
nginx 1.10.0
dev-nodejs-api02
nginx 1.10.0
dev-nodejs-api03
nginx 1.10.0
peanut-02
nginx-plus-r13
prod-rails-web01
nginx 1.10.0
prod-rails-web02
nginx 1.10.0
New System
peanut-02
nginx-plus-r13
nginx 1.12.0
PHP-FPM
System
NGINX Connections/s
NGINX Requests/s
NGINX Current Connections
NGINX Current Requests
NGINX HTTP Errors
NGINX HTTP Version
NGINX Workers
Request rate
0.5900 requests/s
Request Latency (p90)
226ms
Error rate
25%
Request rate by endpoint
Request Latency (p90) by endpoint
Error rate by endpoint
NGINX CPU Usage %
NGINX Memory Usage
grpc.hipstershop.CurrencyService/GetSupportedCurrencies
currencyservice
emailservice
recommendationservice
productcatalogservice
shippingservice
checkoutservice
cartservice
frontend
<unknown>
Galactus.Postgres:98321
redis-cart:6379
ButtercupPayments
v350.9
v350.10
9ms
2ms
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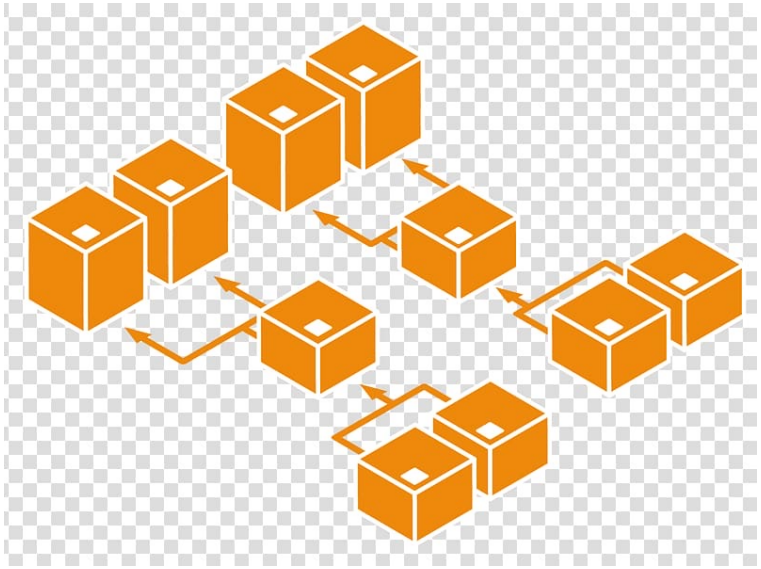
678ms
3ms
7.10s
571ms
695ms
191ms
181ms
446ms
442ms

Complexity

Cloud-compute Elasticity



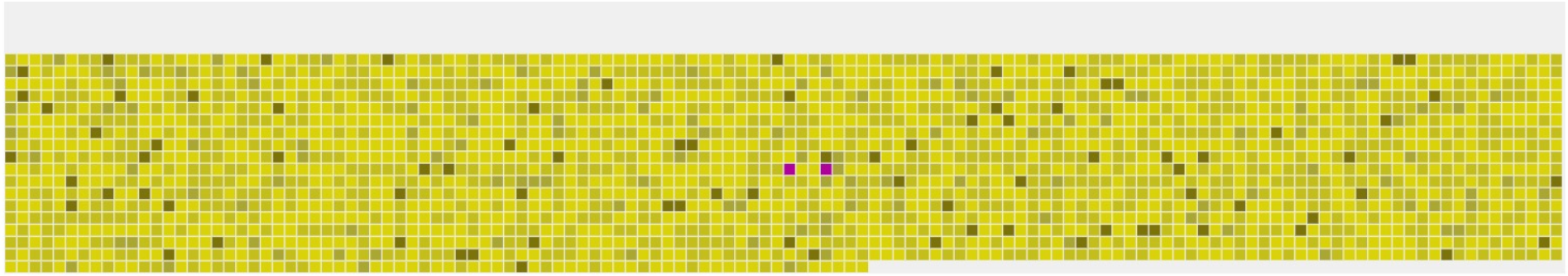
Ephemeral Behavior

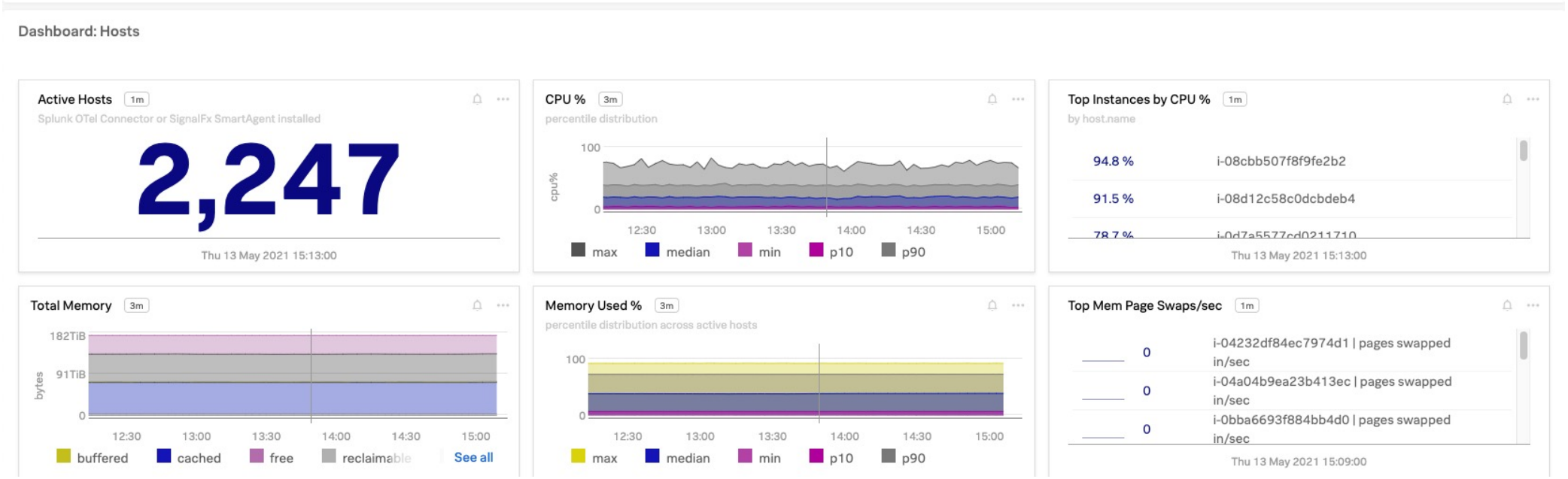
Drift and Skew

Murphy’s for Observability #5

Things get worse under pressure

All about scale





The Scalability Envelope

System scale is multi-dimensional

- Kubernetes objects
- Backend services
- Deployed microservices
- Frequency of deployments
- Dimensions (e.g. pod labels) and high-cardinality
- Streaming vs batch & query analytics
- Alerting on multiple metric time series

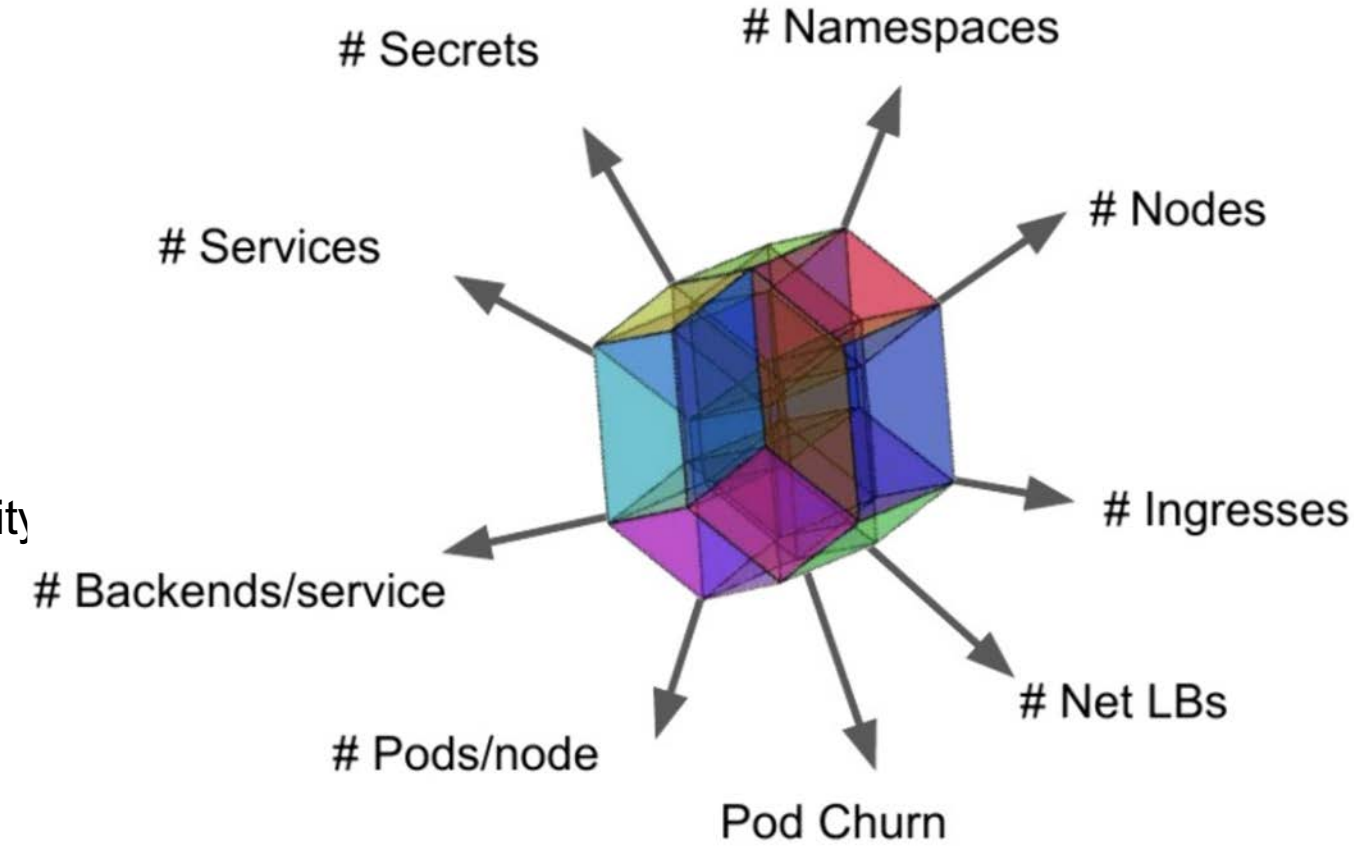
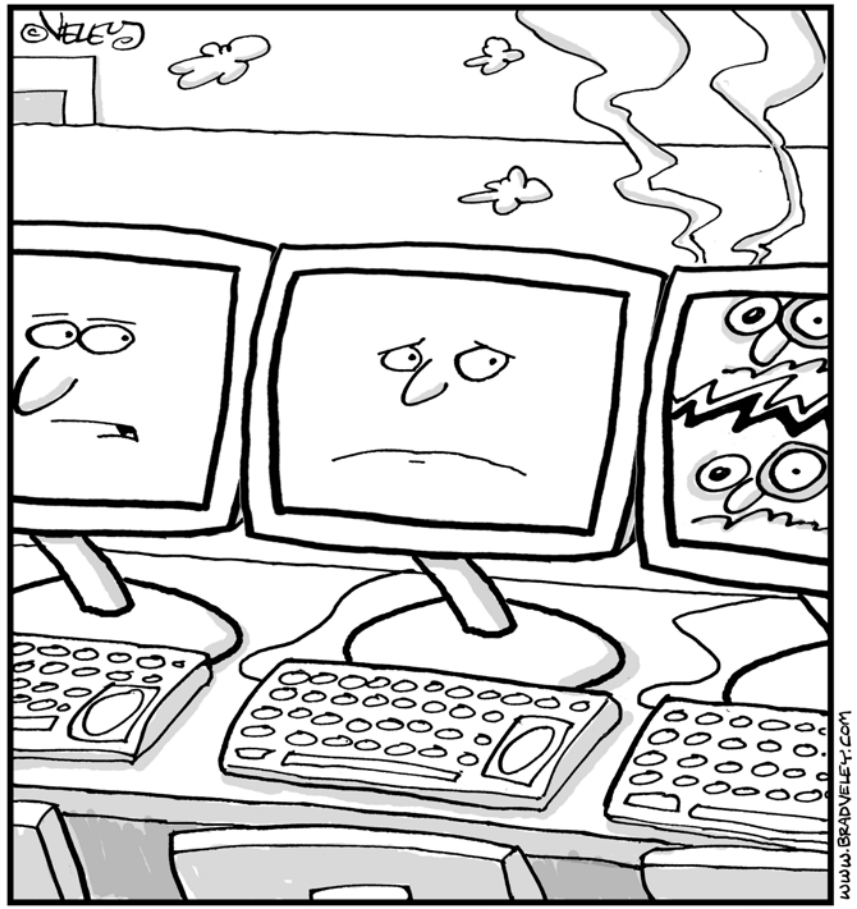


Image source:
https://github.com/kubernetes/community/blob/master/sig-scalability/configs-and-limits/thresholds.md

Murphy's for Observability #6

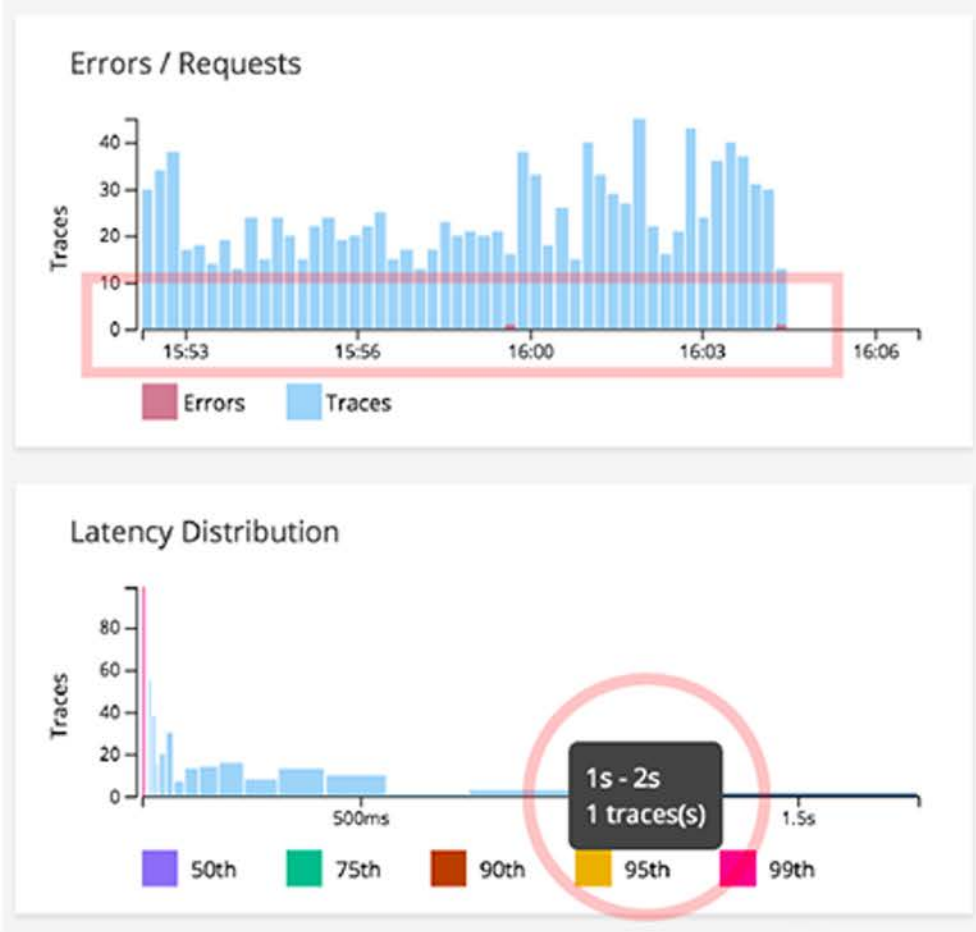


"It's the age-old question of our existence, Bill: 'Why does bad data happen to good computers?'"

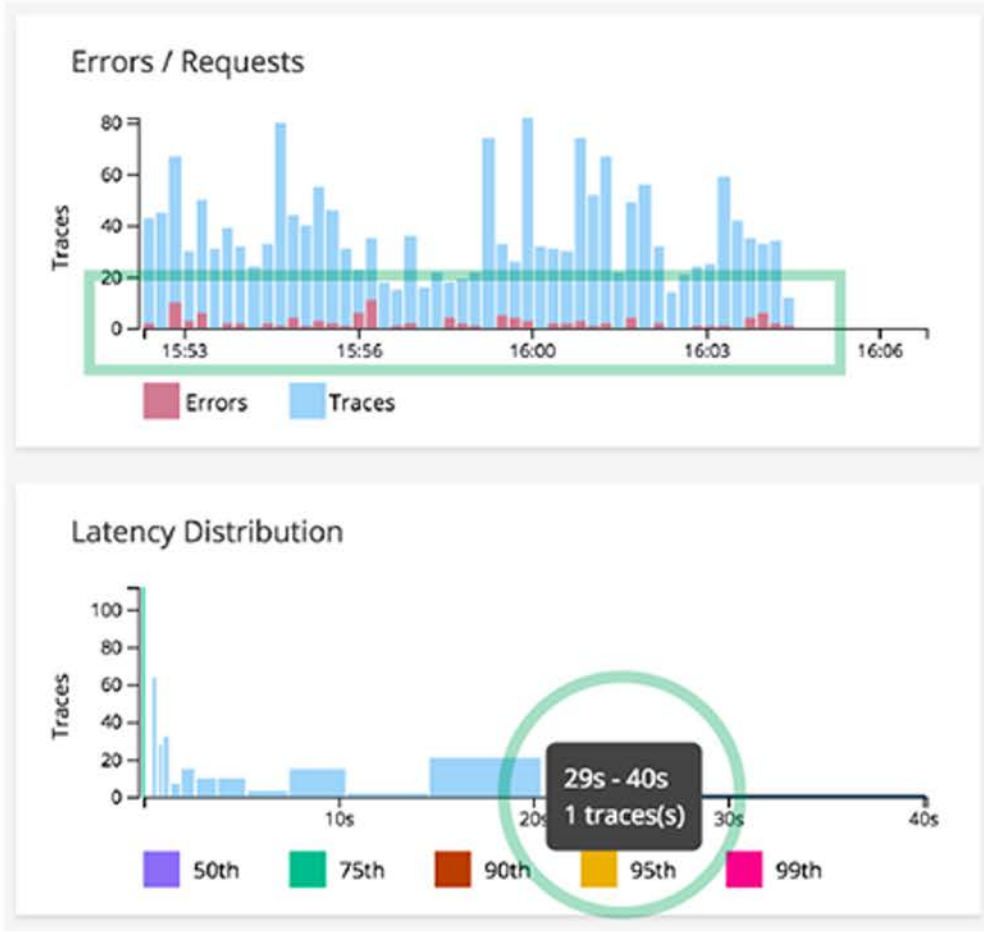
CartoonStock.com

If it is not in the computer, it doesn't exist

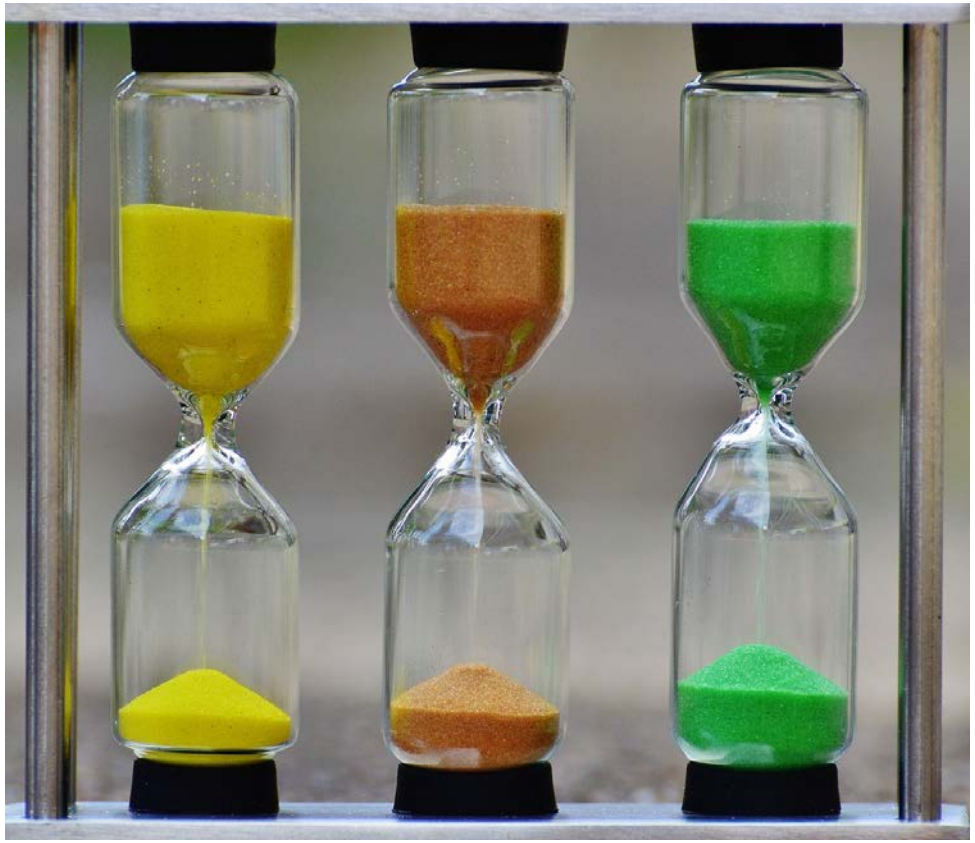
Sampling



No Sampling

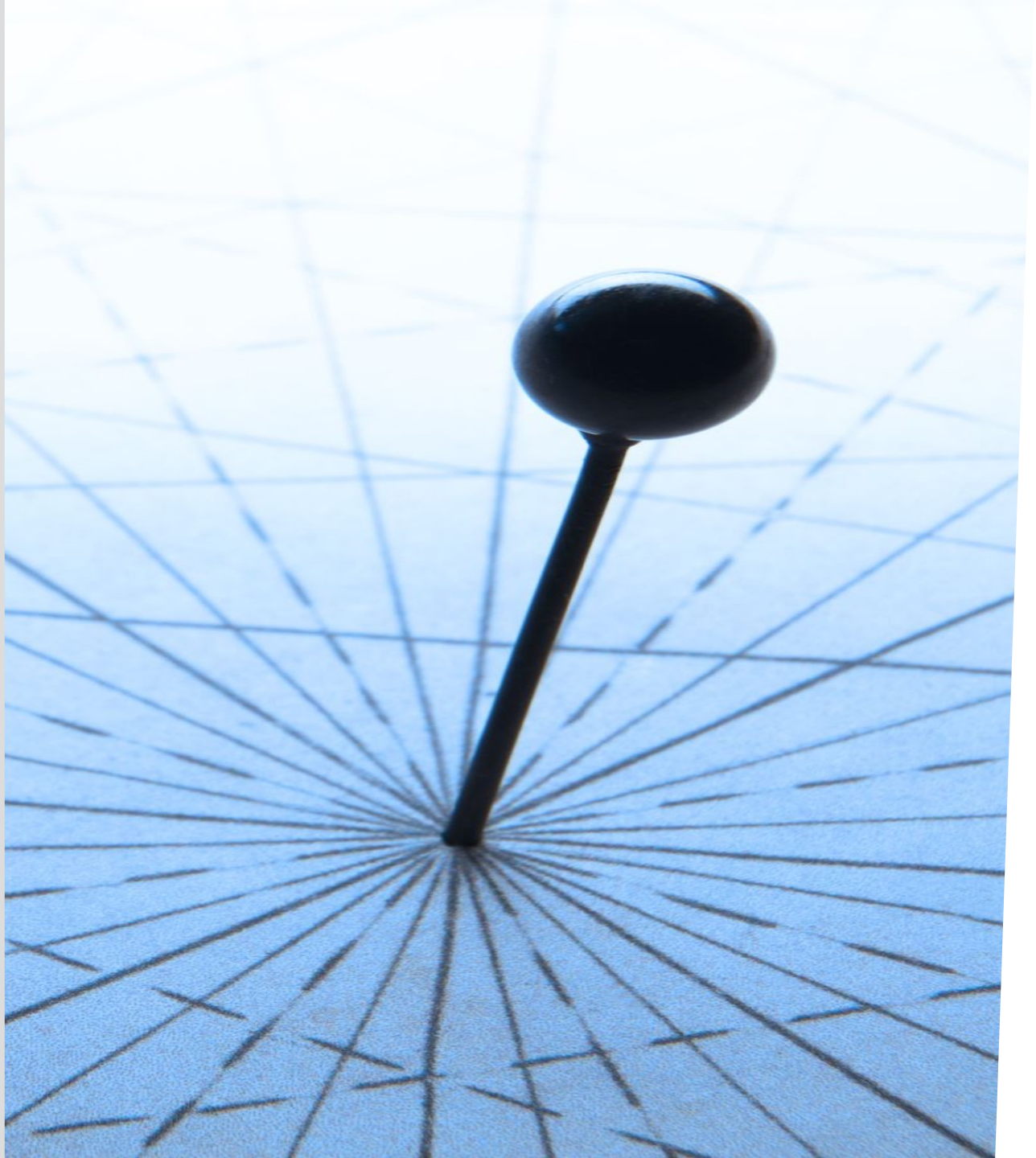


Murphy’s for Observability #7



Availability is a function of time

The resolution and speed of the data directly impact the insights you gain



Discussing accuracy and precision

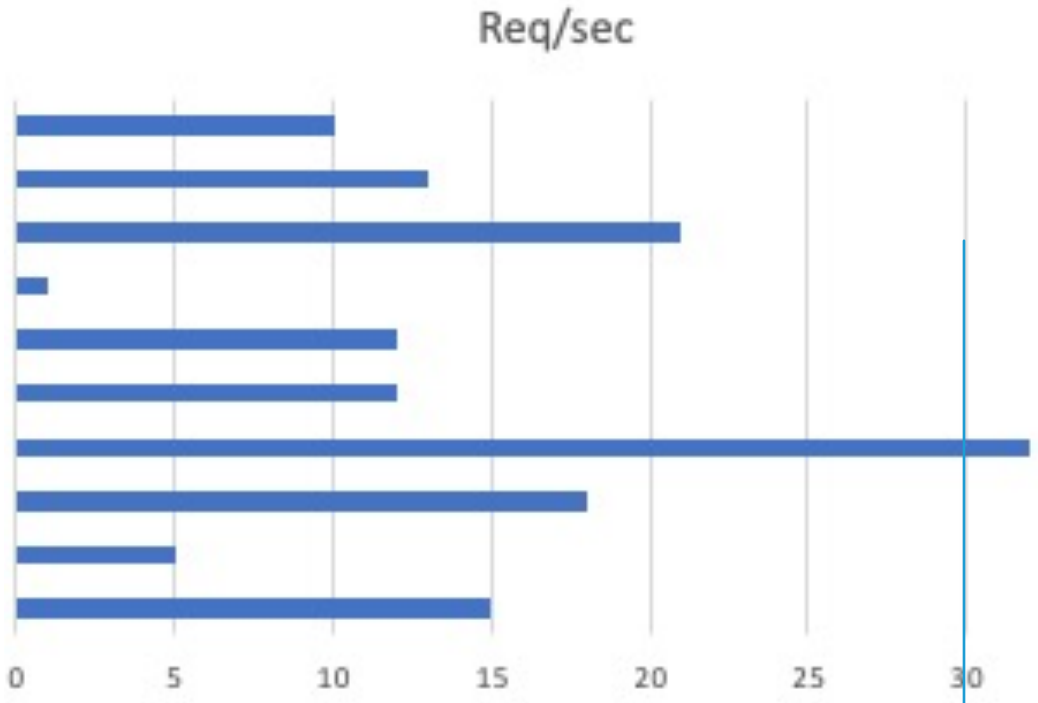
Interchangeable?

- Accuracy is that the measure is correct
- Precise means it is consistent with other measurements

Observability depends on both

But aggregation and analysis can skew this

Missing the point



10 sec average =13.9

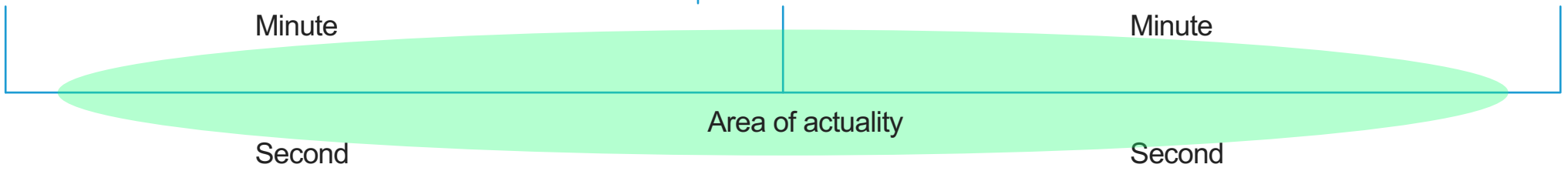
95% = 27.05

First 5 sec average =16.4

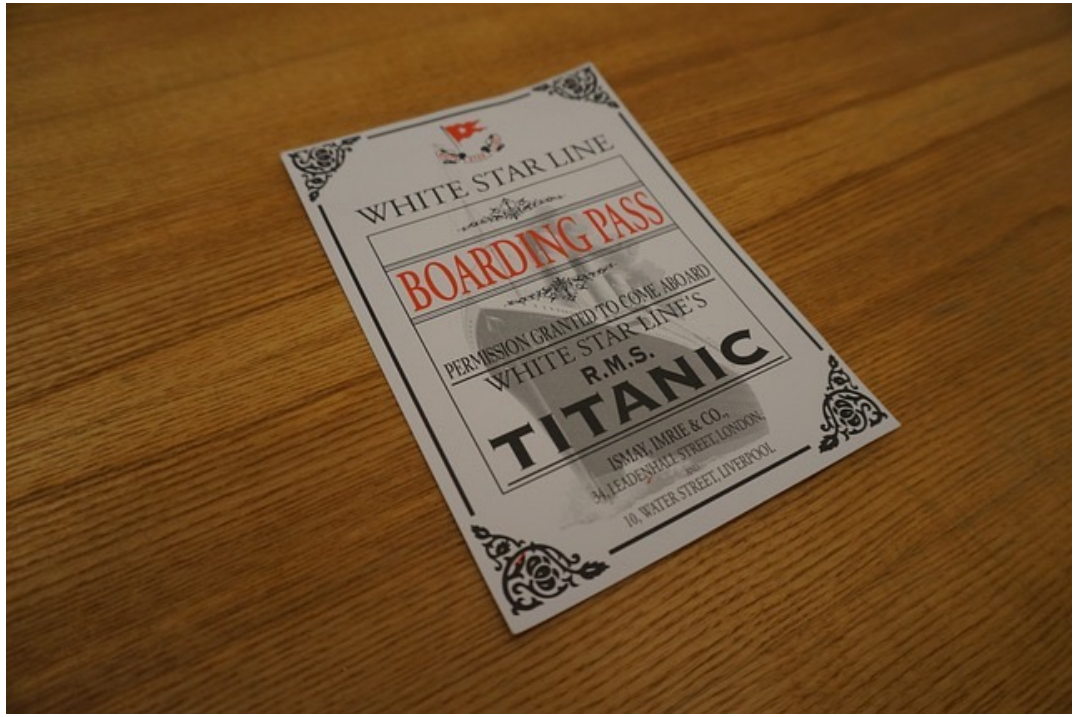
95% = 29.2

Second 5 sec average =11.4

95% = 19.4

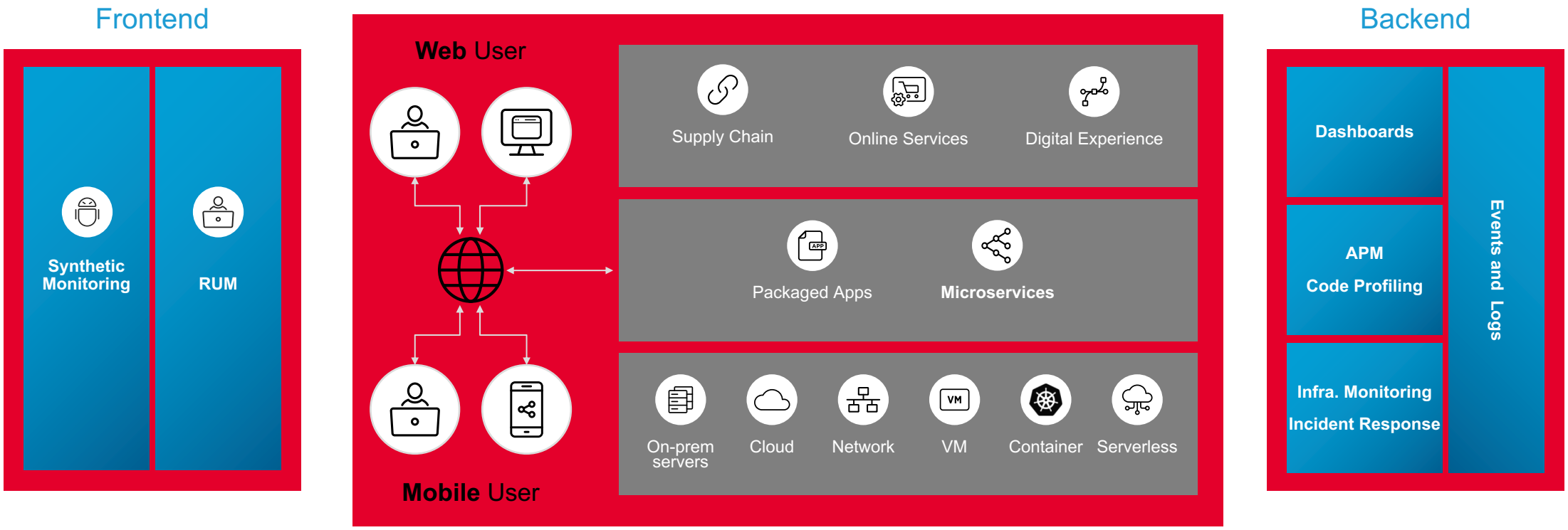


Murphy's for Observability #8



If anything cannot go wrong, it will anyway

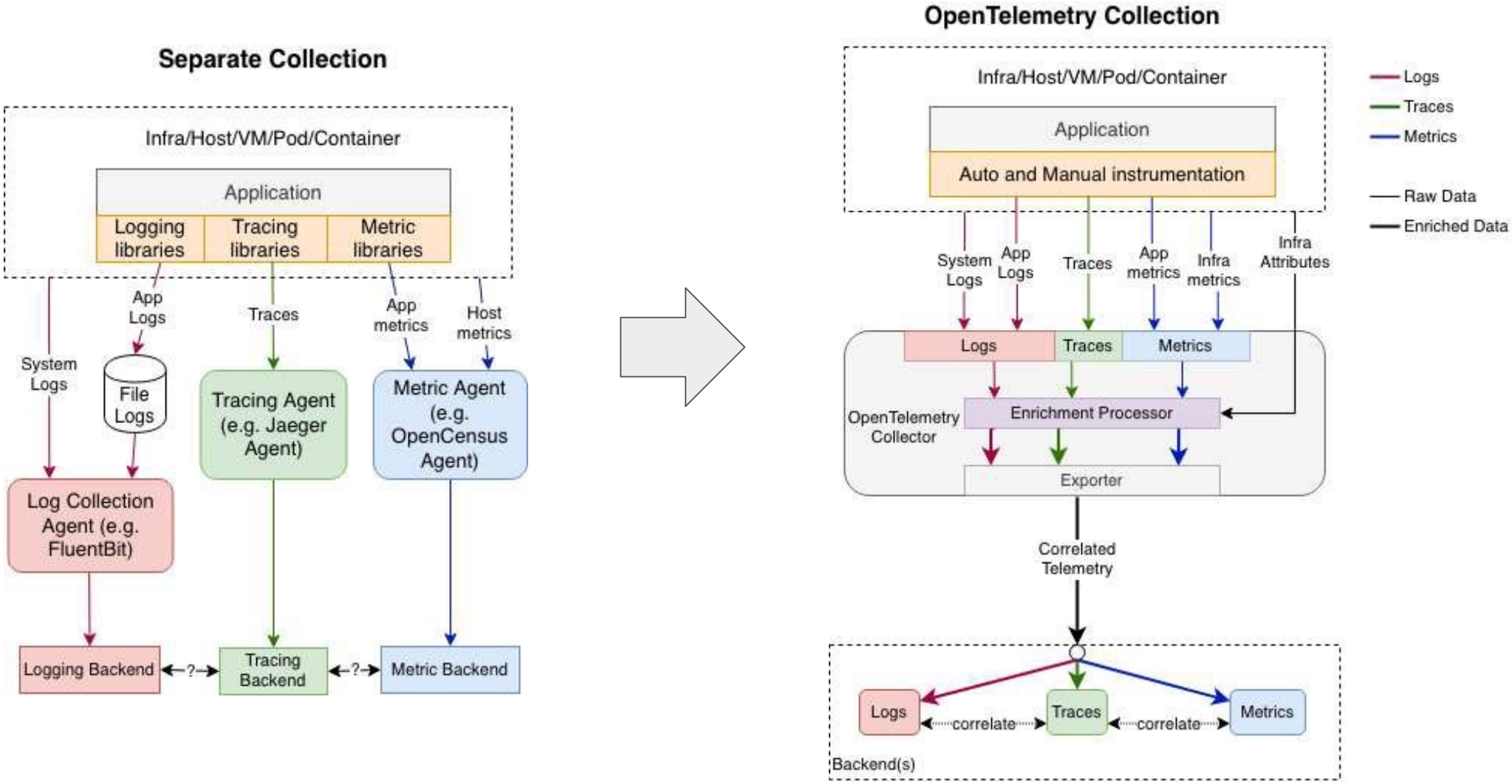
Facets of Technology



Murphy’s for Observability #9

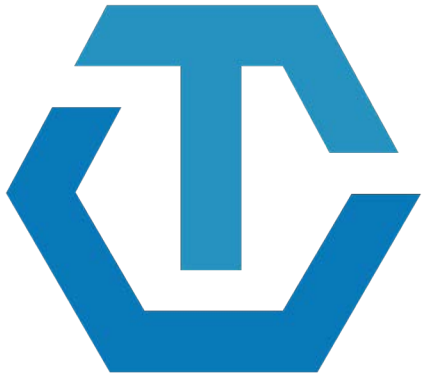
Whenever you set out to do something, something else must be done first.

From Observability 1.0 to 2.0



Thanks to Kevin Brockhoff

What is OpenTelemetry?



OPENTRACING

+

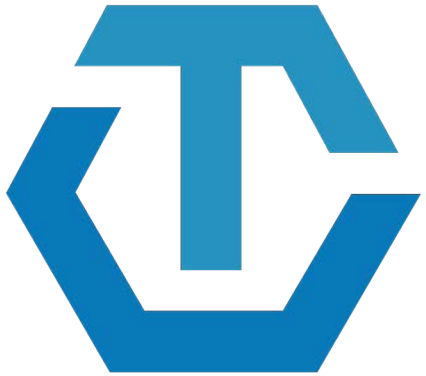
OpenCensus

=

OpenTelemetry

OpenTelemetry: **the next major version**
of *both* OpenTracing and OpenCensus

What is OpenTelemetry?



OPENTRACING

+

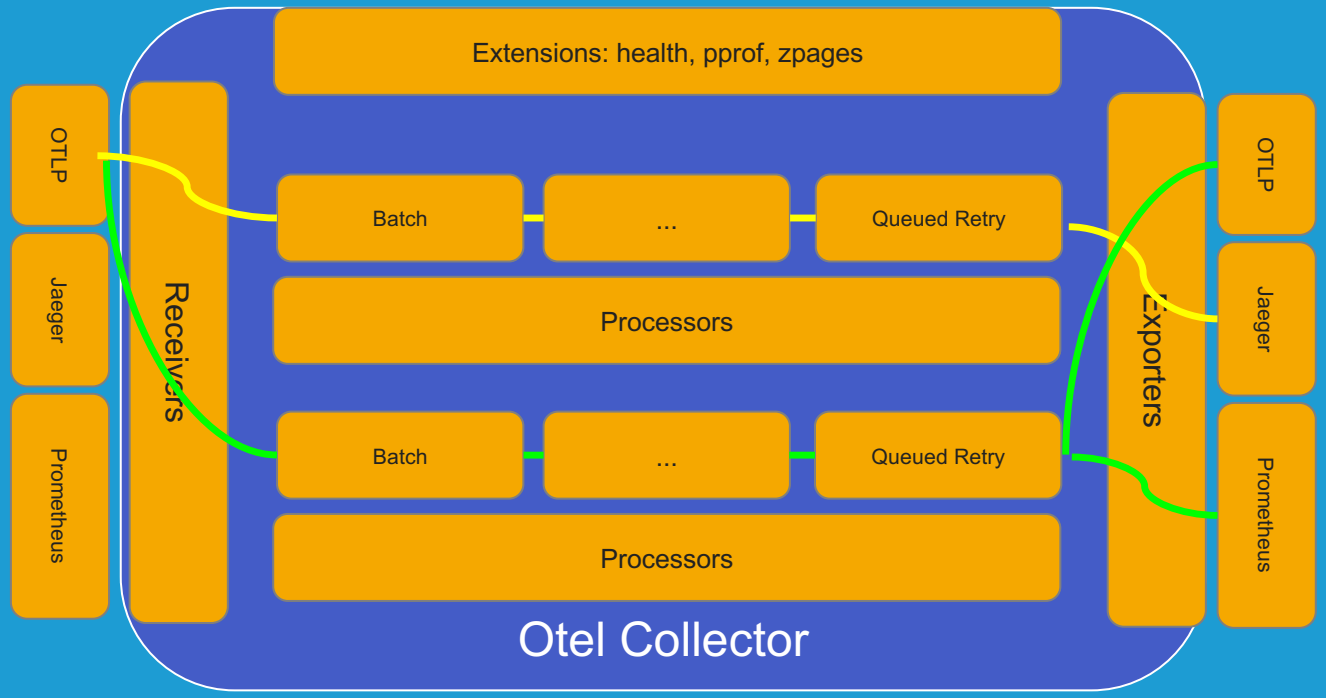
OpenCensus

=

OpenTelemetry

https://github.com/open-telemetry/community

Collector Architecture



Ashley-Perry Statistical Axiom

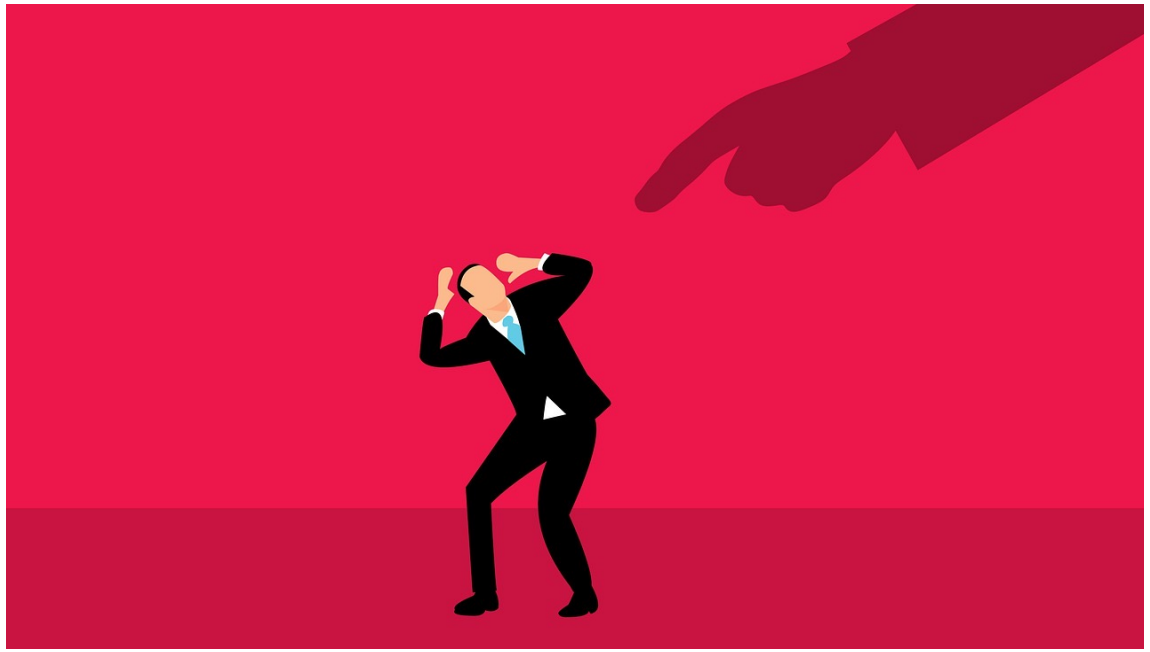
Numbers are tools, not rules

Predictive behavior

Sometimes you want to know what's coming

- Prediction is only as good as the data precision and accuracy
- Historic versus Sudden Change
- (Trend) Stationary
- Expect false positives (and negatives)

Baker’s Law



Misery no longer loves company.
Now it insists on it

Hills Commentaries

- If we lose much by having things go wrong, take all possible care
- If we have nothing to lose by change, relax
- If we have everything to gain by change, relax
- **If it doesn't matter, it does not matter**

McAllister Corollary: Until it does

Murphy’s for Observability #10

All’s well that ends

Thanks for listening

https://wwww.linkedin.com/in/davemc