tracetest Tyk

Deploy Fast, Without Breaking Things: Level Up APIOps With OpenTelemetry

Adnan Rahić, Sonja Chevre

WELCOME

Speakers

Adnan Rahić

Senior Developer Advocate

Tracetest

Sonja Chevre

Group Product Manager

Tyk Technologies

WHAT'S TO COME

Key points

01 What is APIOps?

02 APIOps in Kubernetes with ArgoCD and Tyk for fast flow

03 Getting Feedback from Production with OpenTelemetry and Jaeger

04 Getting Feedback earlier with OpenTelemetry and Tracetest

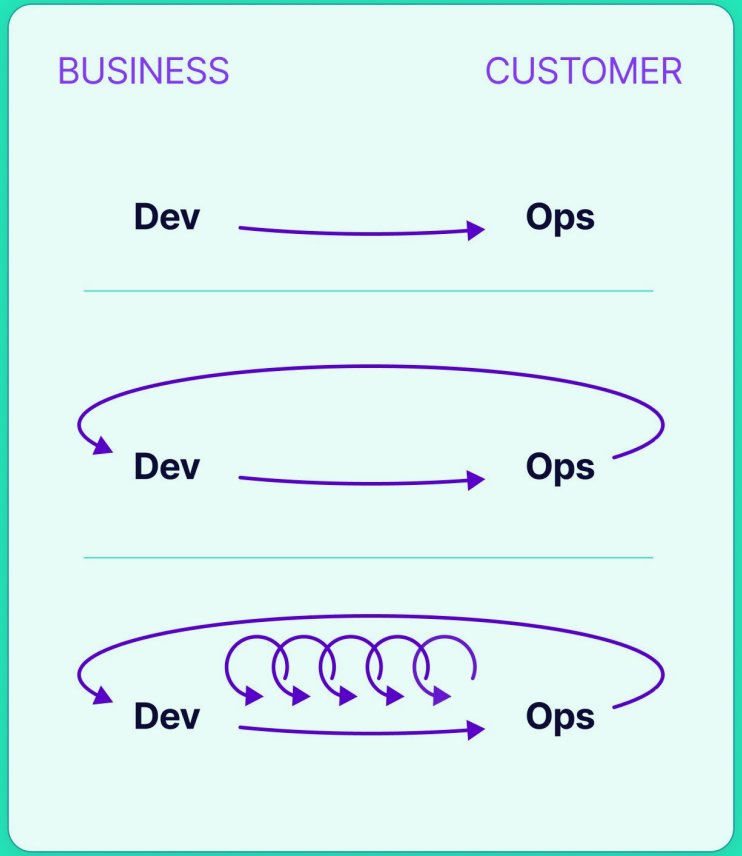
01 What is APIOps?

Traditional API Management makes us slow.

1. Manual tasks causes frequent errors
2. New API versions disrupt existing integrations
3. Loose controls expose us to security vulnerabilities
4. Scaling problems emerge with increased API usage
5. It takes weeks (or months) for developers to get feedback after committing their changes

APIOps is the offspring of DevOps and API management.

APIOps is about achieving speed and quality throughout the API management lifecycle - delivering value fast without disrupting your users.



Three Ways of DevOps by Gene Kim

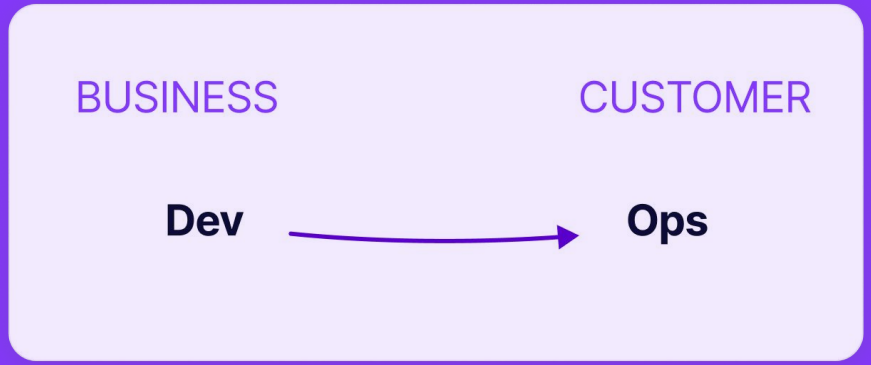
Applying the DevOps principles to API Management:

- Fast flow
- Feedback loops
- Culture of learning

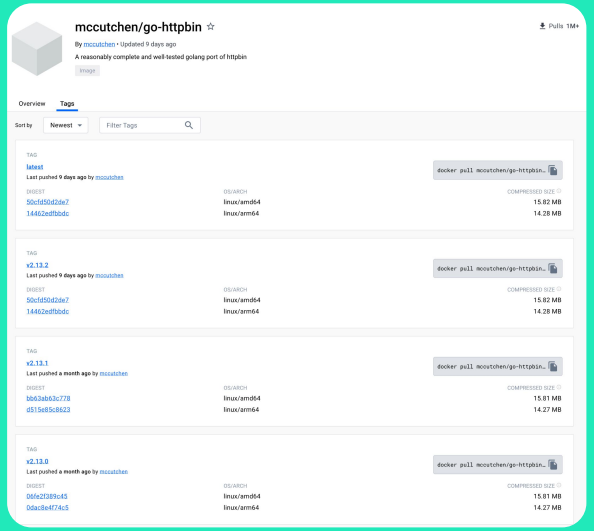
Observability as a key enabler for APIOps.

02

APIOps in Kubernetes with ArgoCD and Tyk for fast flow

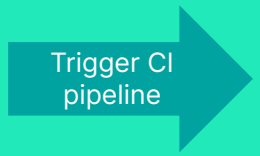


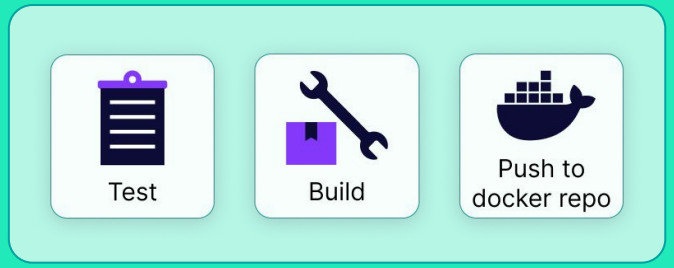
Deploying an API with APIOps Practices



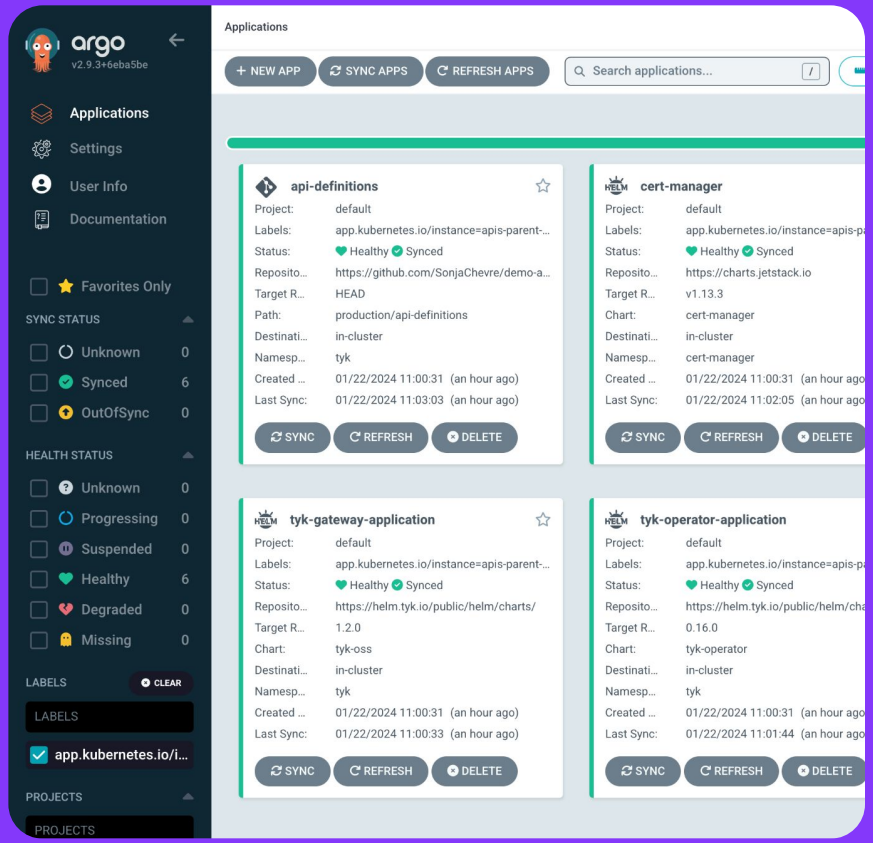
Developer

API source code repository





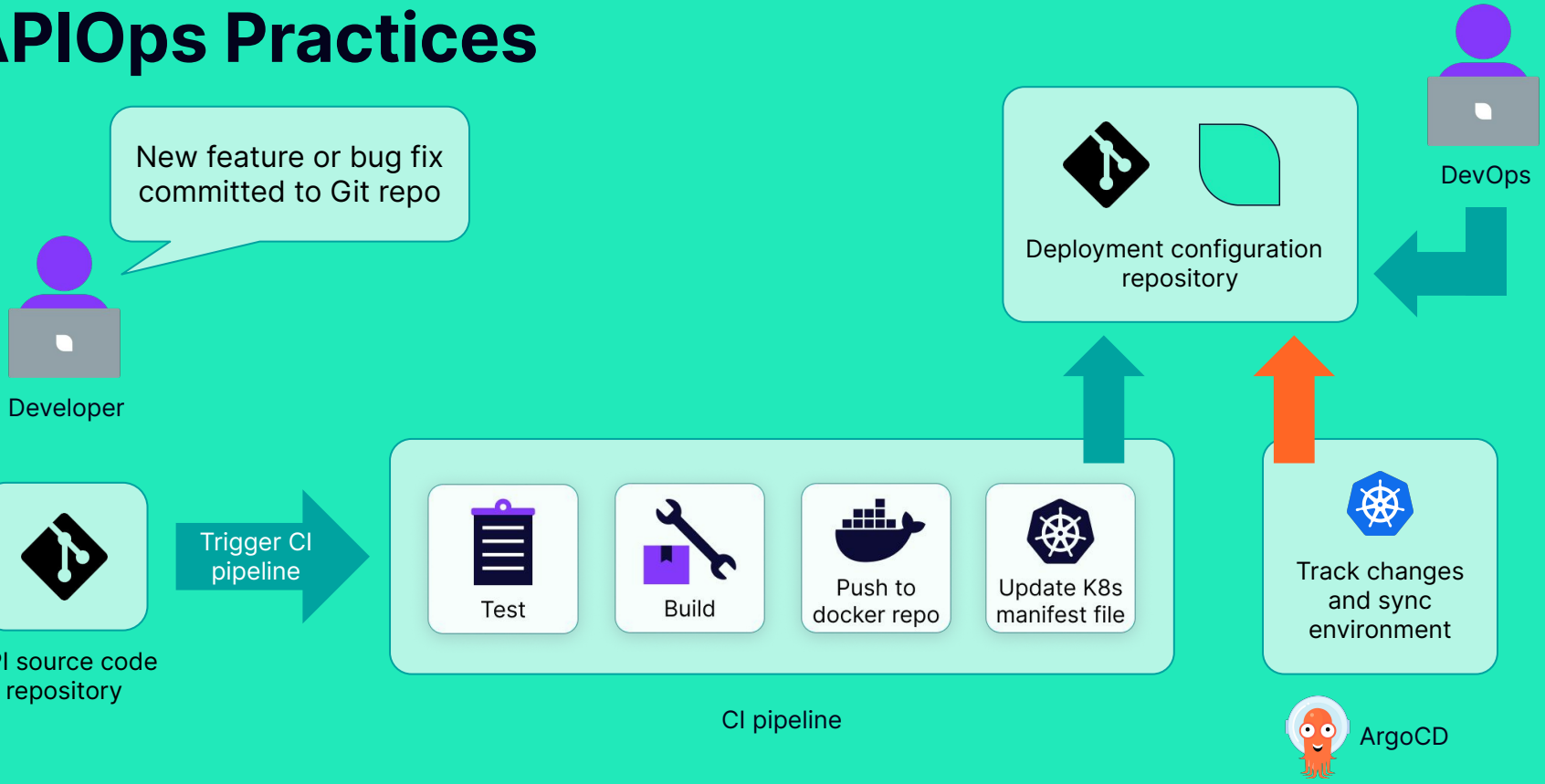
CI pipeline



GitOps continuous delivery tool for Kubernetes

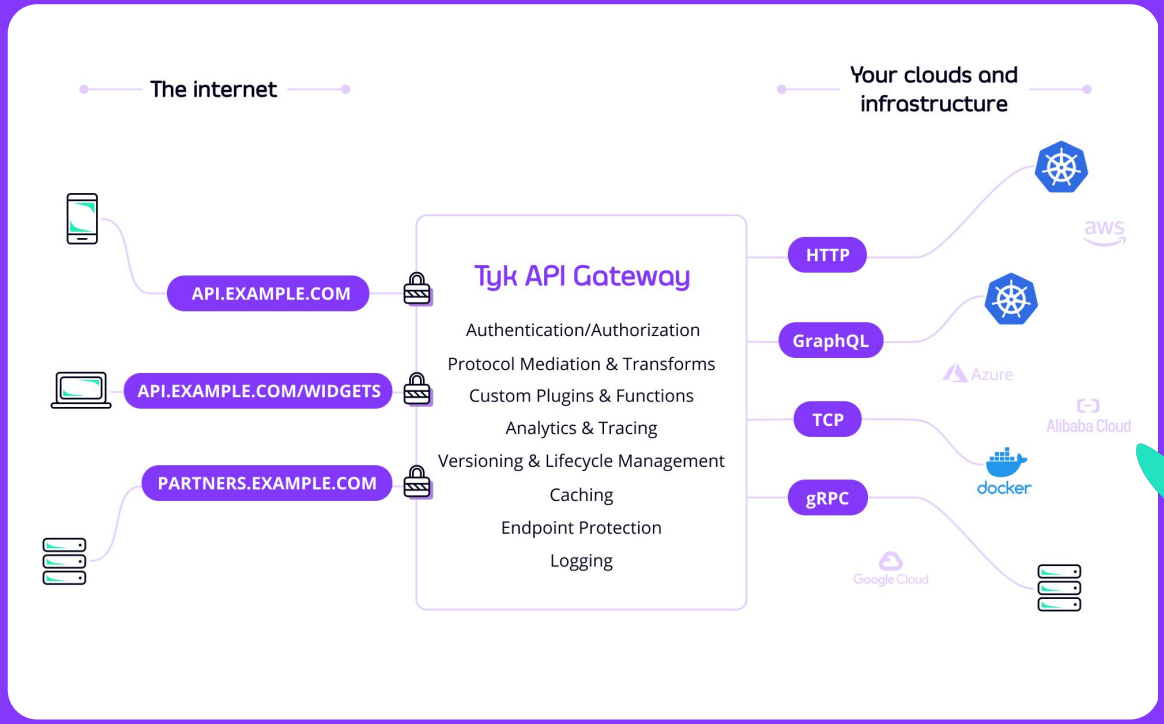
Argo CD

Deploying an API with APIOps Practices



Cloud-native and open source API Gateway for REST, GraphQL, TCP and gRPC protocols

Tyk API Gateway

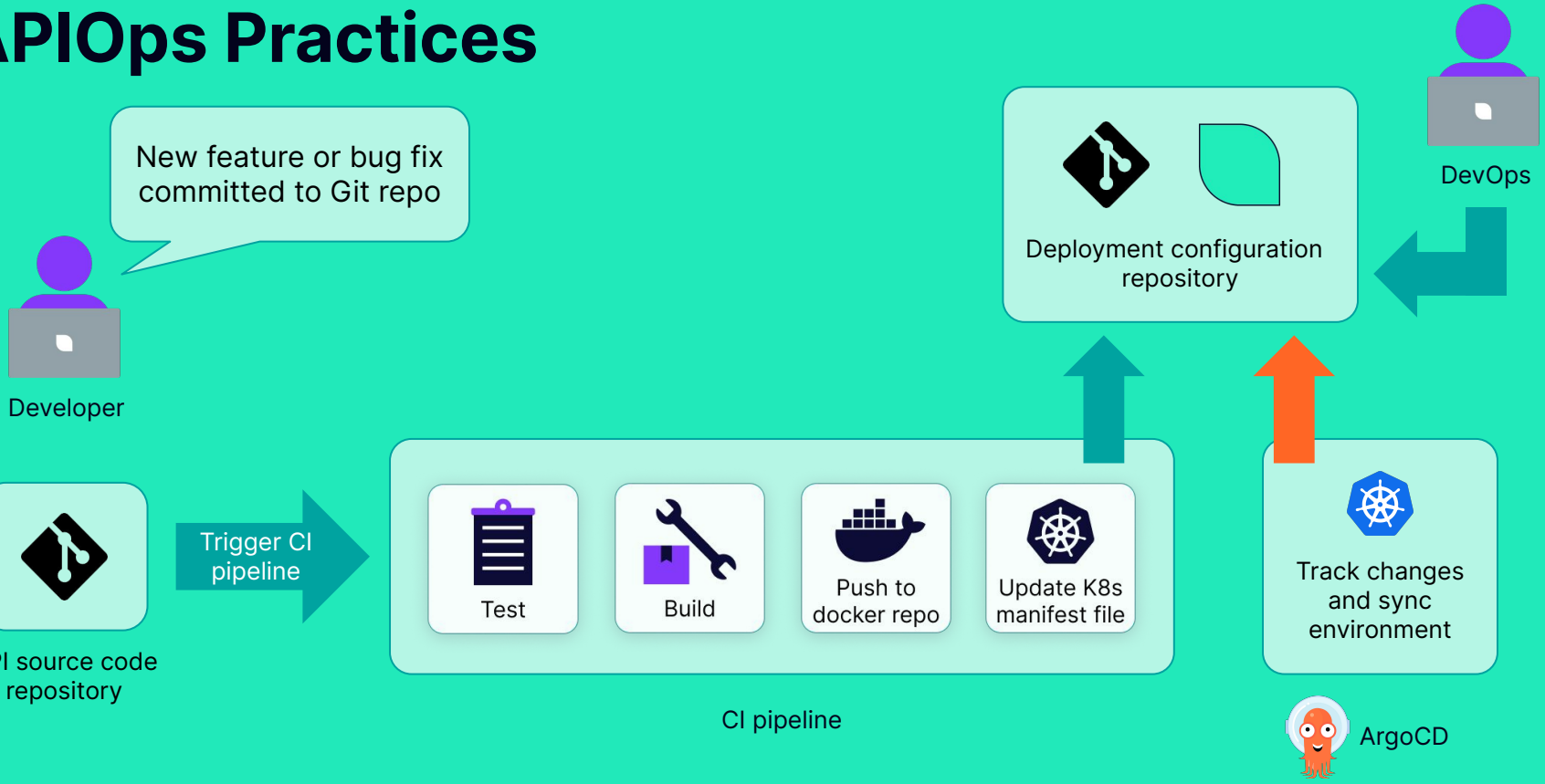


```yaml
apiVersion: tyk.tyk.io/v1alpha1
kind: ApiDefinition
metadata:
 name: httpbin
spec:
 name: httpbin
 use_keyless: true
 protocol: http
 active: true
 detailed_tracing: true
 proxy:
   target_url:
http://go-httpbin-service.go-httpbin.svc.cluster.local
   listen_path: /httpbin
   strip_listen_path: true
```

Tyk Operator

A very simple API Definition Custom Resource

Deploying an API with APIOps Practices



Dev/DevOps

Commit

Commit changes

Create pull request

Code review

Merge branch

Deployment configuration repository

ArgoCD

SYNC STATUS

Synced to HEAD (ed635ba)

Auto sync is enabled.

Author: Sonja Chèvre <sonja+github@tyk.io> -

Comment: Create apidef-trevorblades.yaml

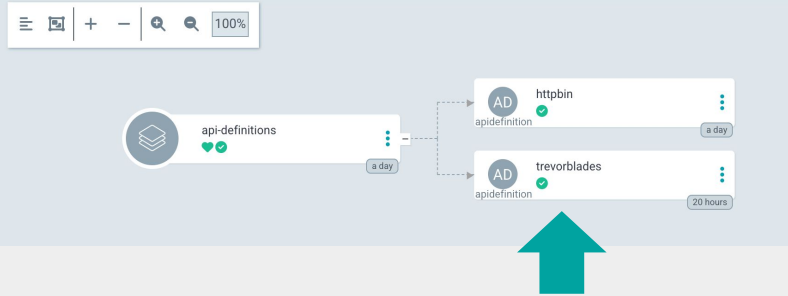
LAST SYNC

Sync OK to ed635ba

Succeeded 20 hours ago (Mon Jan 22 2024 14:46:17 GMT+0100)

Author: Sonja Chèvre <sonja+github@tyk.io> -

Comment: Create apidef-trevorblades.yaml



Tyk Operator will update API definitions within the API Gateway.

Tyk's API Gateway

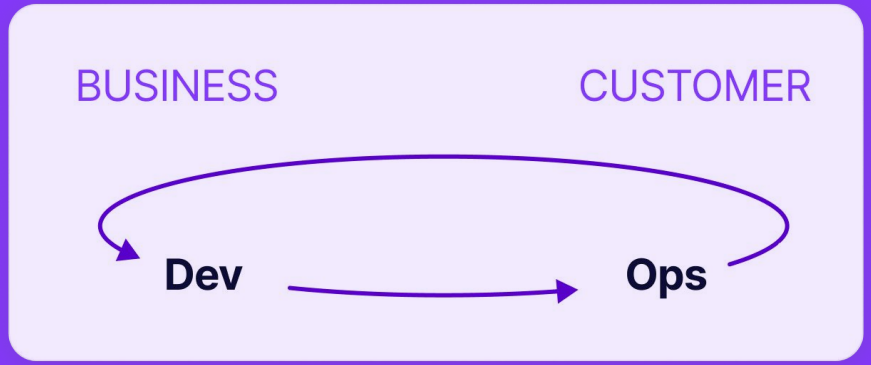
WHAT WE HAVE ACHIEVED

✅ Automation for Fast flow

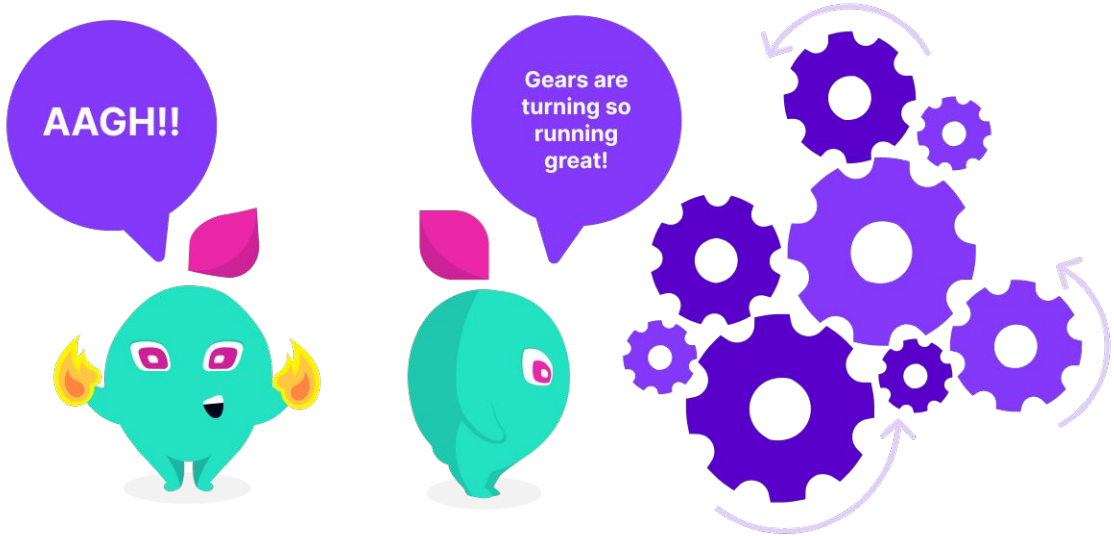
- Preventing Configuration Drift
- Enhanced Security
- Improved Reliability
- Efficiency in Operations
- Better Audit Trails
- Collaboration and Visibility

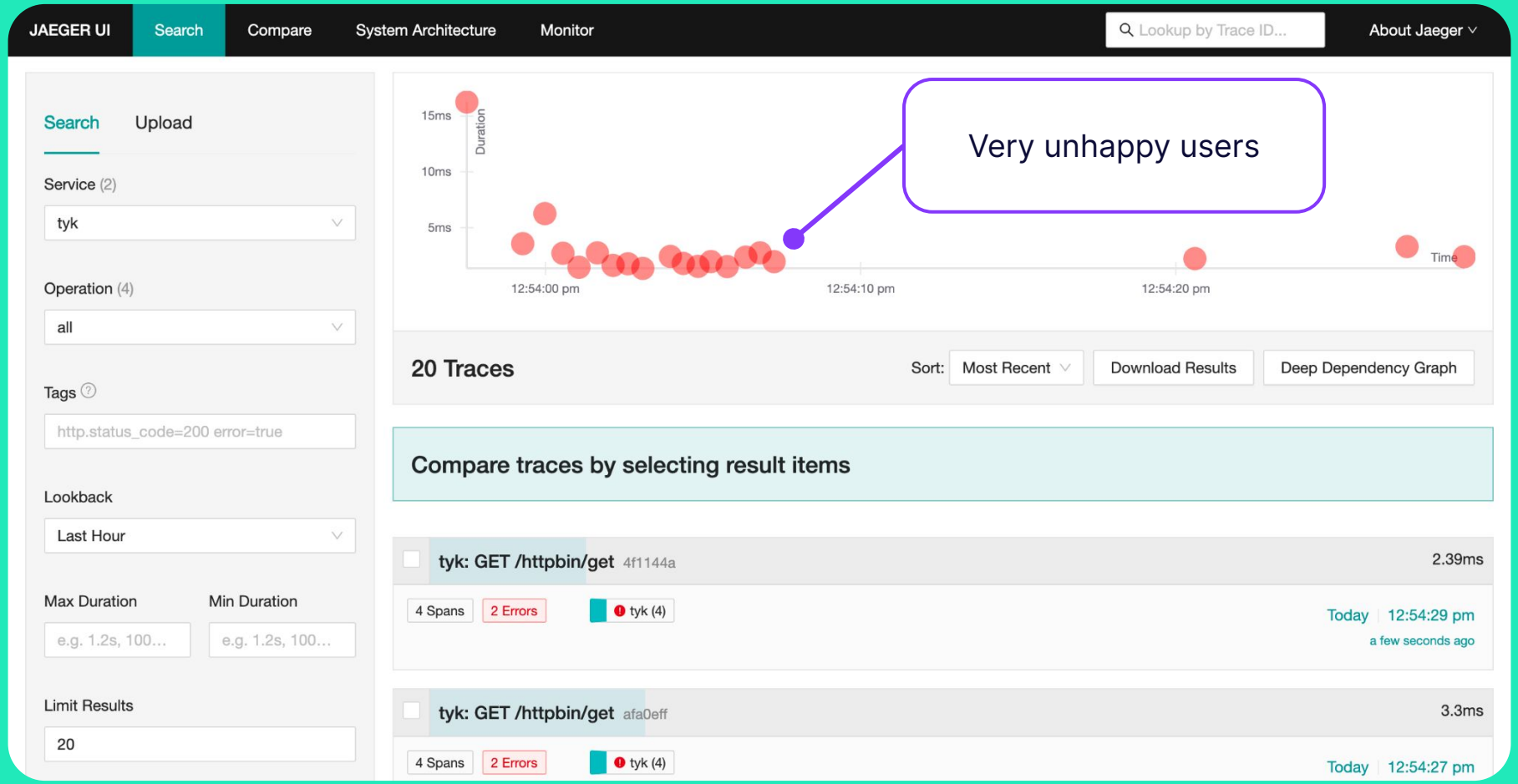
But that’s not enough…

03 Getting Feedback from Production with OpenTelemetry and Jaeger



Without Observability we don't know if our users are happy




JAEGER UI
Search
Compare
System Architecture
Monitor
Lookup by Trace ID...
About Jaeger
Search
Upload
Service (2)
tyk
Operation (4)
all
Tags
http.status_code=200 error=true
Lookback
Last Hour
Max Duration
e.g. 1.2s, 100...
Min Duration
e.g. 1.2s, 100...
Limit Results
20
15ms
10ms
5ms
Duration
12:54:00 pm
12:54:10 pm
12:54:20 pm
Time
Very unhappy users
20 Traces
Sort:
Most Recent
Download Results
Deep Dependency Graph
Compare traces by selecting result items
tyk: GET /httpbin/get 4f1144a
2.39ms
4 Spans
2 Errors
tyk (4)
Today 12:54:29 pm
a few seconds ago
tyk: GET /httpbin/get afa0eff
3.3ms
4 Spans
2 Errors
tyk (4)
Today 12:54:27 pm

Cloud Native Observability

See it all with OpenTelemetry and Jaeger

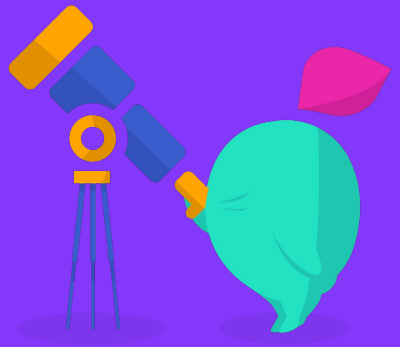
OpenTelemetry: Open standard to generate, collect, and export telemetry from API requests.

Jaeger: Back-end to store telemetry for monitoring and troubleshooting.

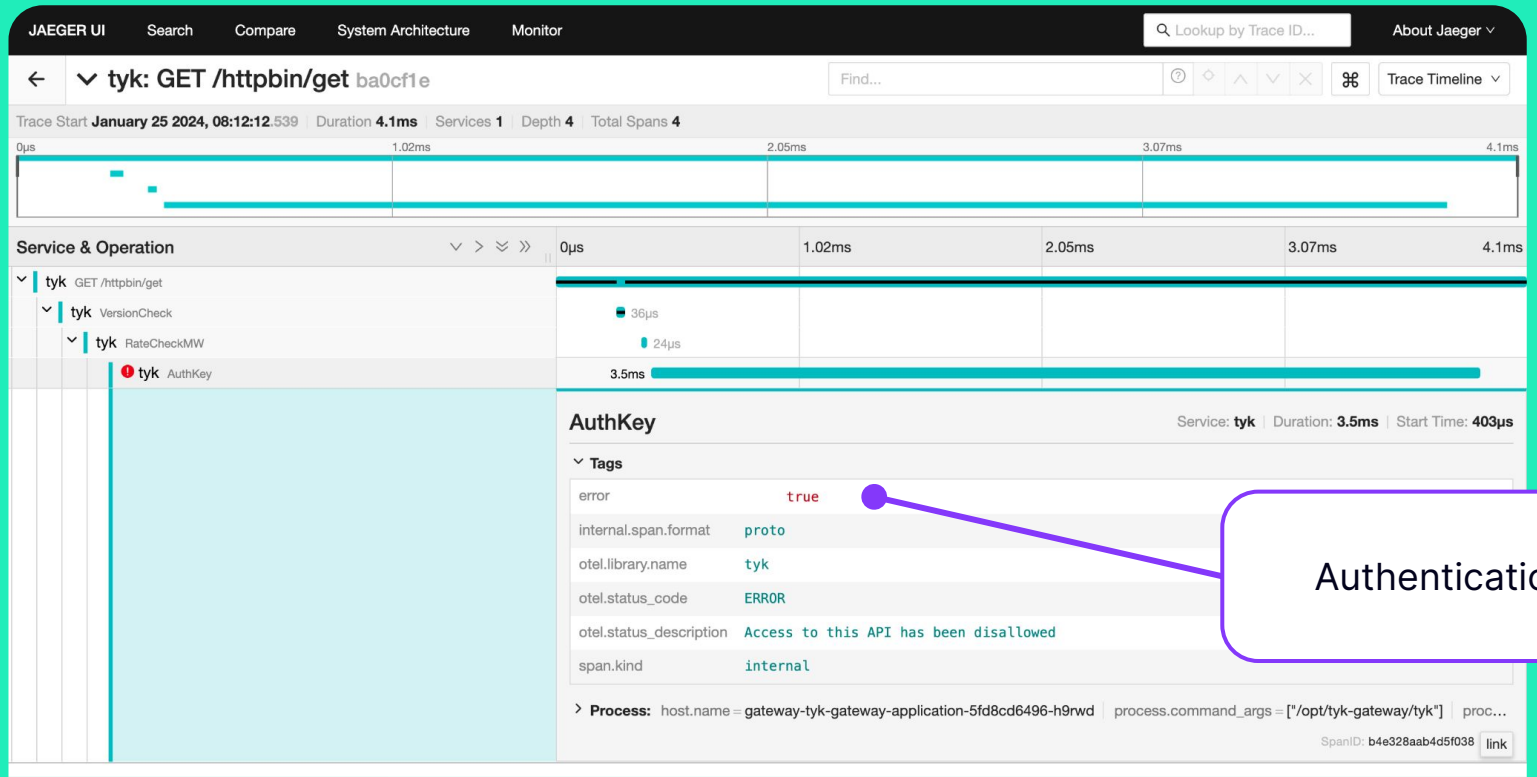
Configure OpenTelemetry in Tyk

tyk-gateway.gateway.opentelemetry.enabled	true
tyk-gateway.gateway.opentelemetry.endpoint	opentelemetry-collector.observability.svc:4317
tyk-gateway.gateway.opentelemetry.exporter	grpc

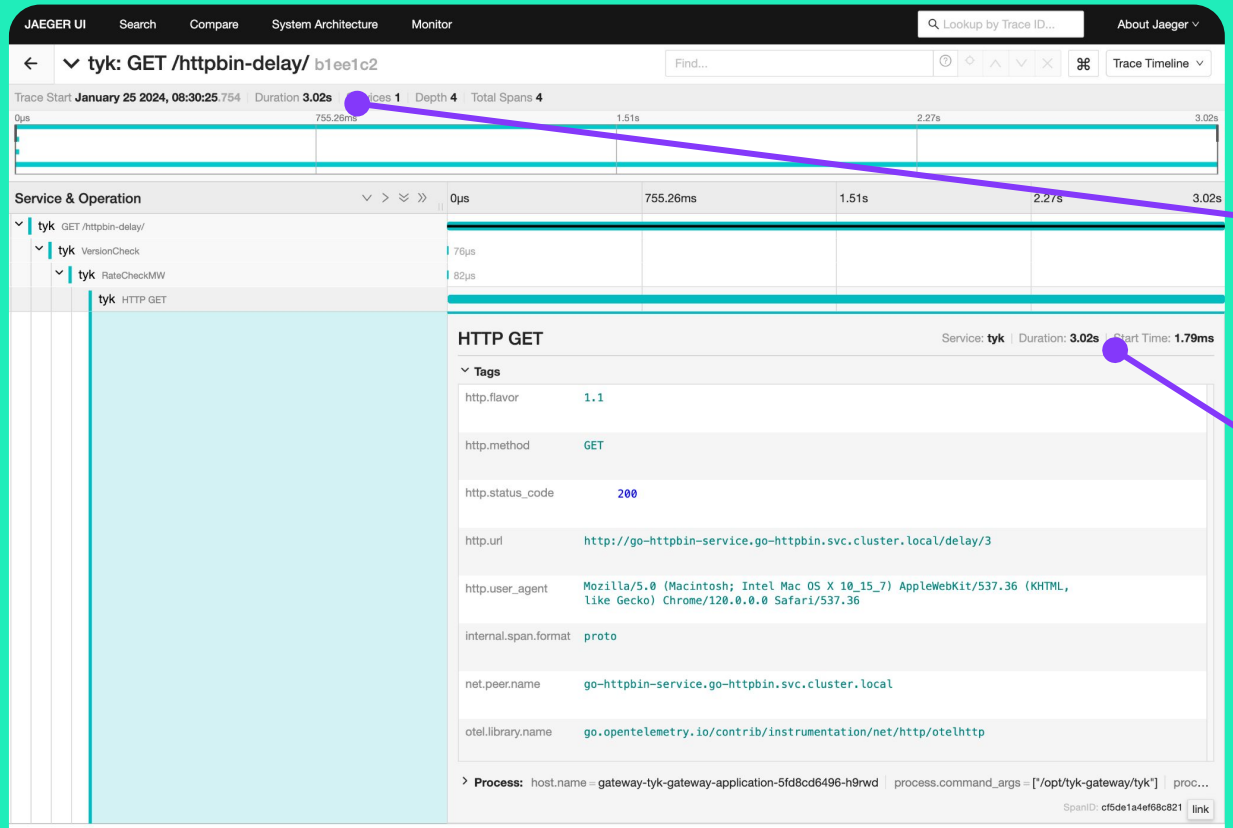
Enable OpenTelemetry and configure OpenTelemetry Collector as endpoint



Distributed trace for every API requests



Distributed trace for every API requests

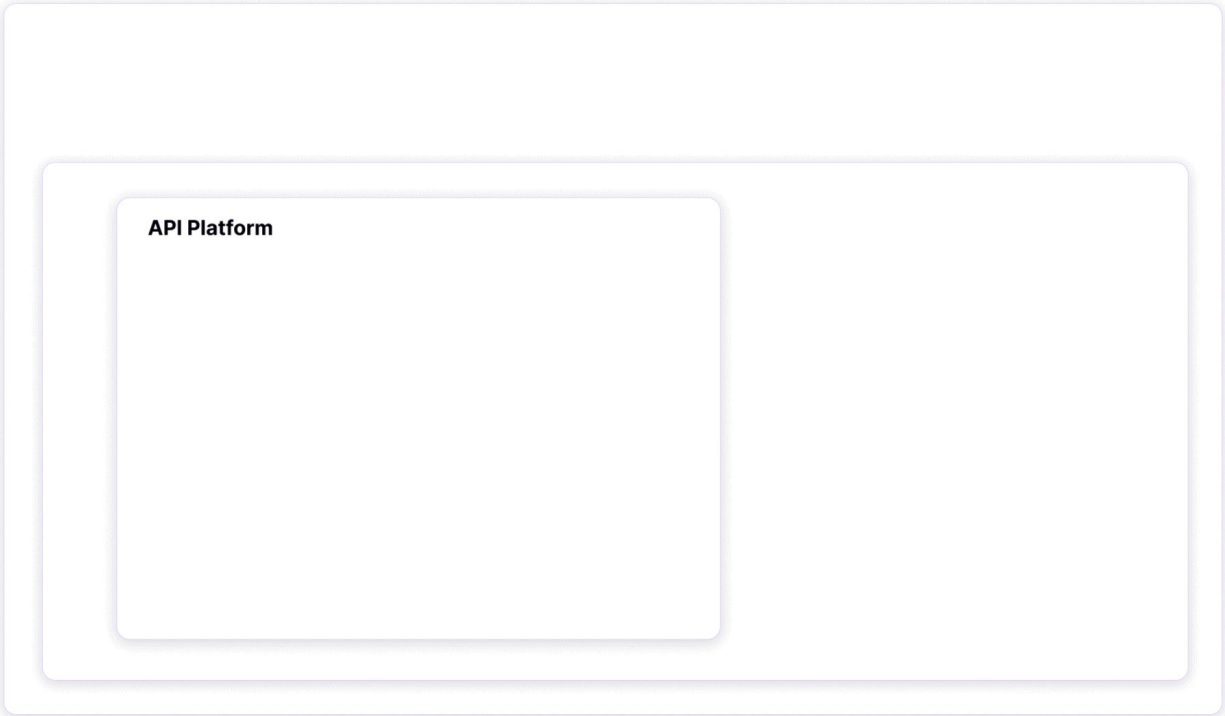


API request
is taking 3 s

Most of the time is
spent in the upstream
service

WHAT WE HAVE ACHIEVED

✅ Feedback from P



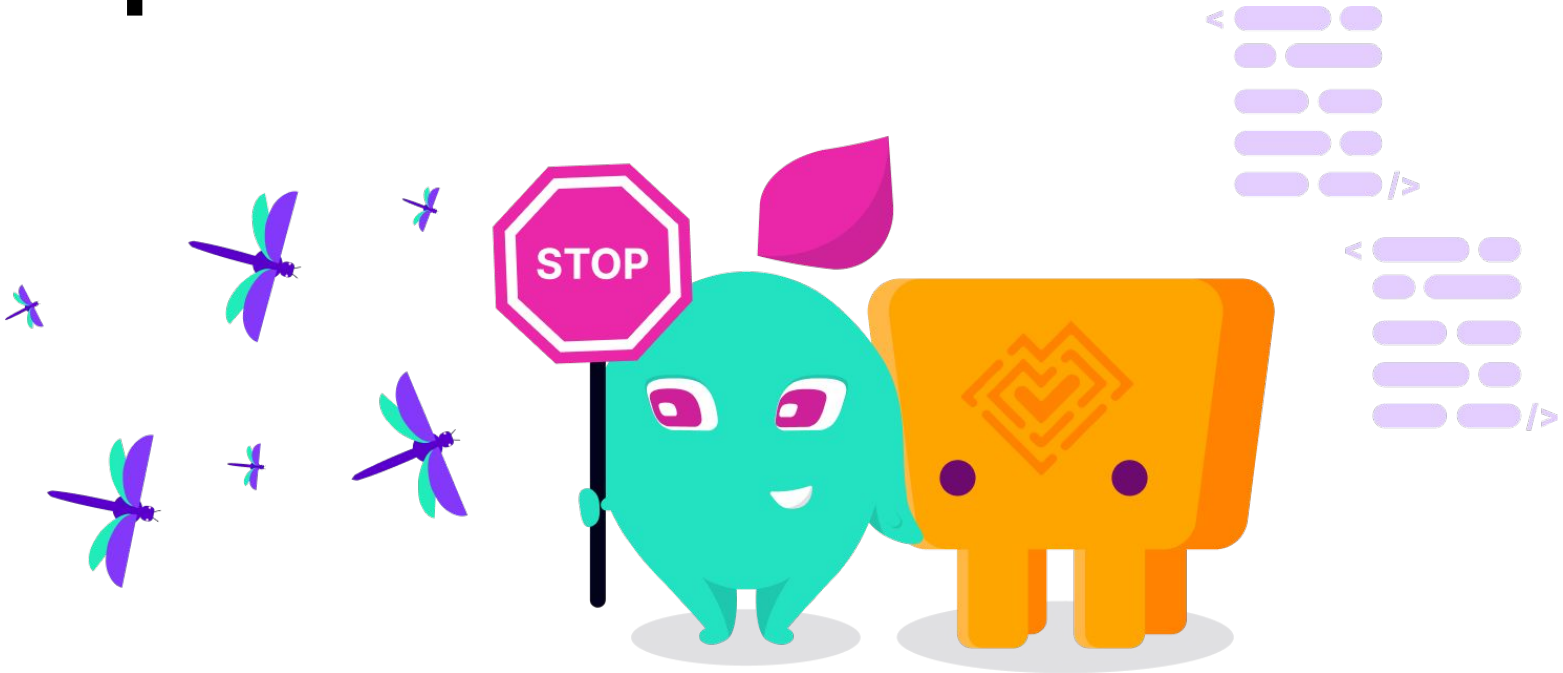
WHAT WE HAVE ACHIEVED

✅ Feedback from Production

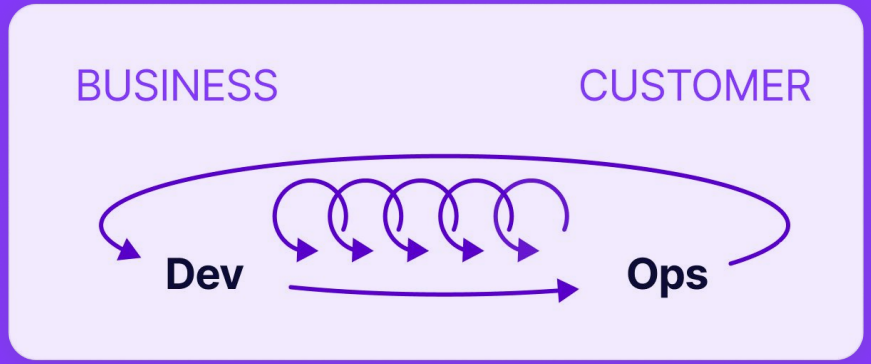
- No longer relying on users reporting failures
- Understand API performance
- Pinpoint the root cause of issues and outages
- Solving issues faster

But that’s not enough…

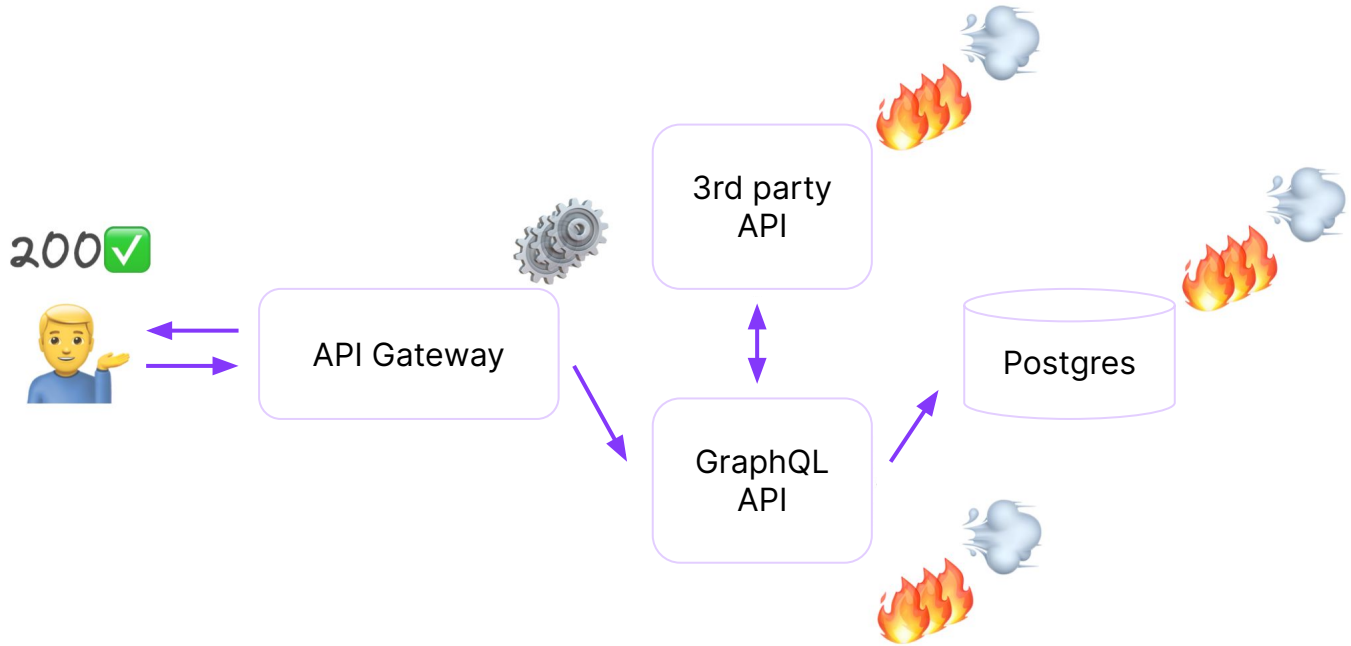
Stopping bugs before they impact our users

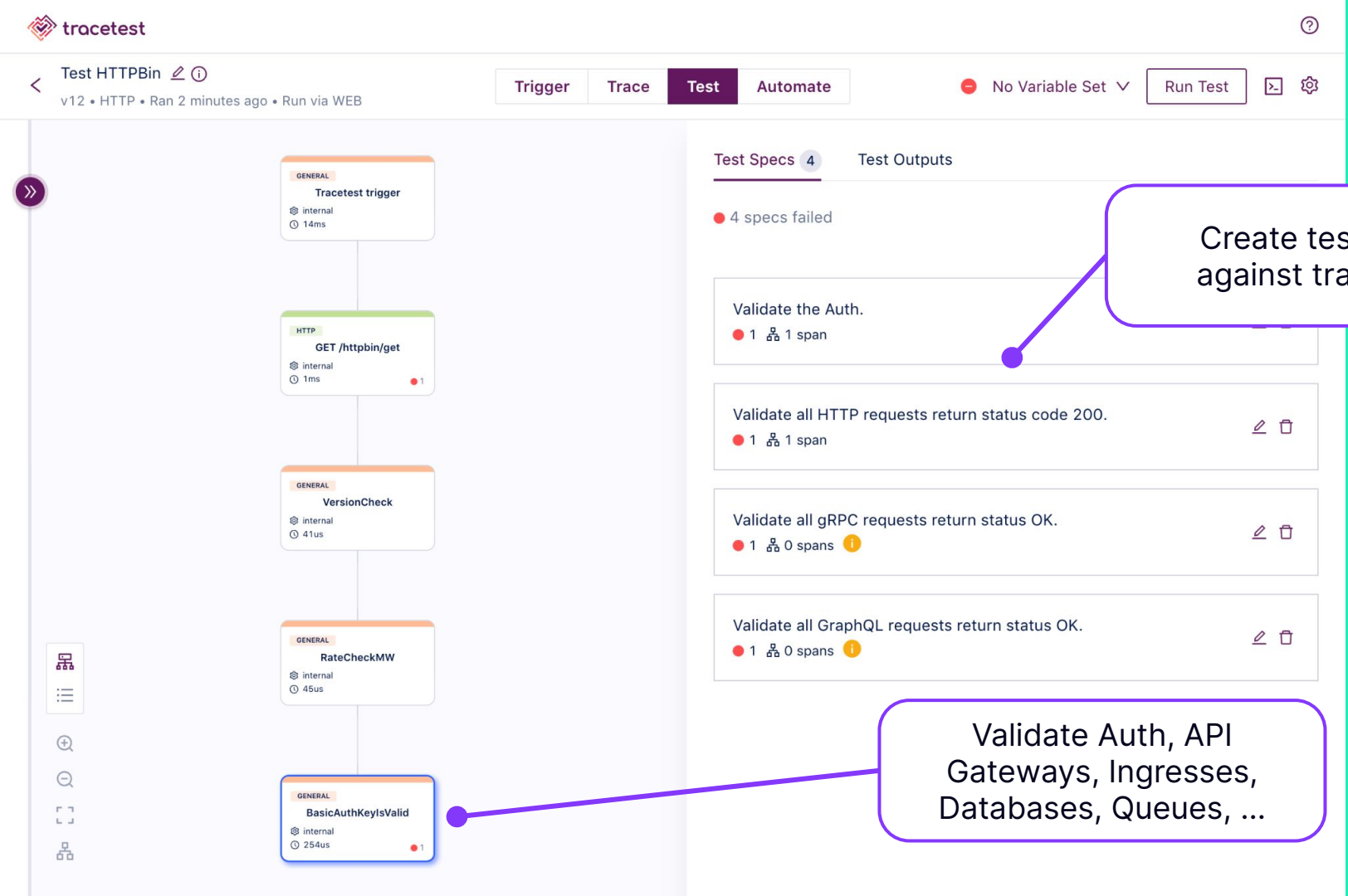


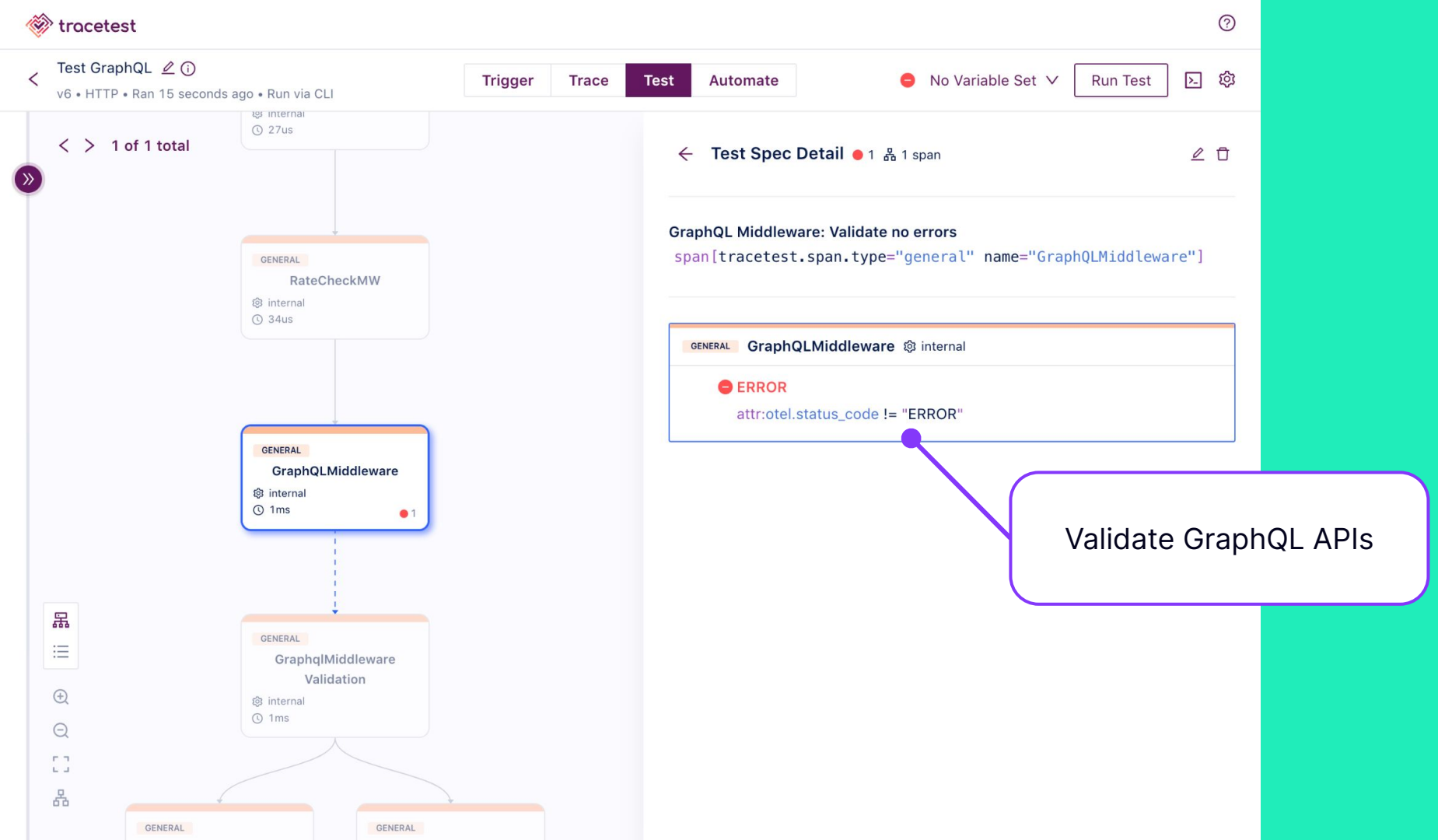
04 Getting Feedback earlier with OpenTelemetry and Tracetest

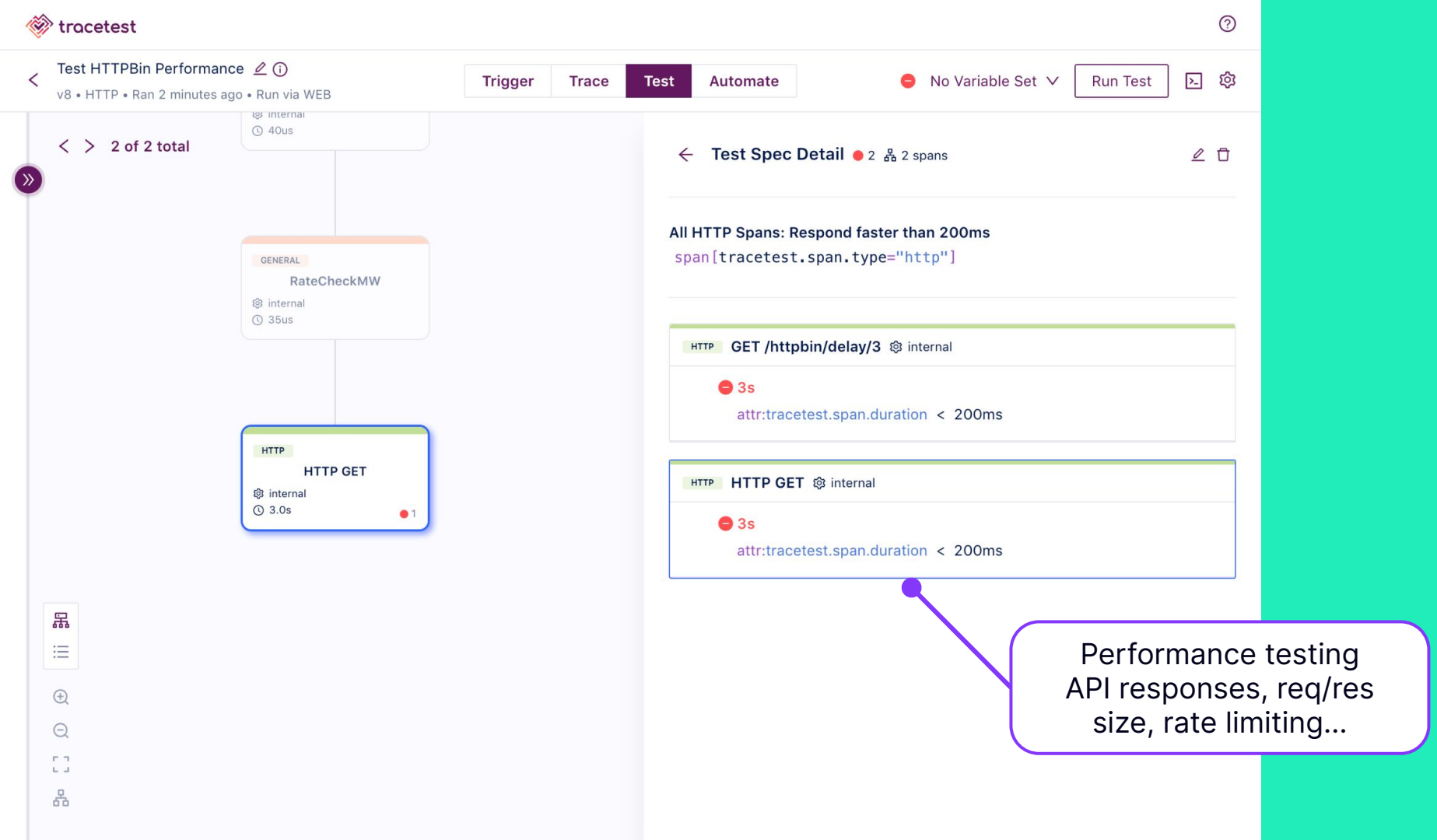


Without Trace-based testing we don’t know if releases are reliable



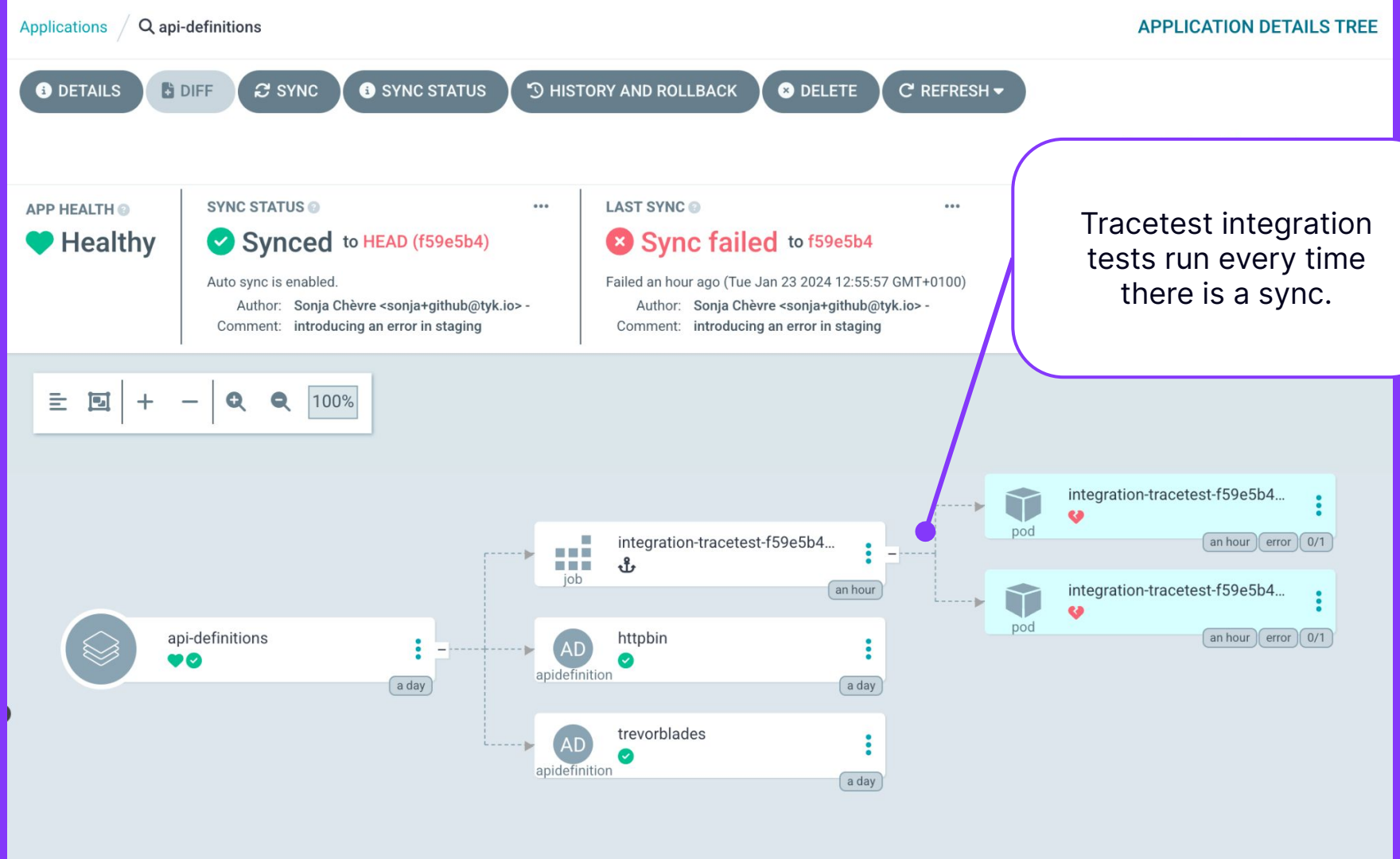

tracetest
Test HTTPBin
v12 • HTTP • Ran 2 minutes ago • Run via WEB
Trigger
Trace
Test
Automate
No Variable Set
Run Test
GENERAL
Tracetest trigger
internal
14ms
HTTP
GET /httpbin/get
internal
1ms
1
GENERAL
VersionCheck
internal
41us
GENERAL
RateCheckMW
internal
45us
GENERAL
BasicAuthKeyIsValid
internal
254us
1
Test Specs 4
Test Outputs
4 specs failed
Validate the Auth.
1 1 span
Validate all HTTP requests return status code 200.
1 1 span
Validate all gRPC requests return status OK.
1 0 spans
Validate all GraphQL requests return status OK.
1 0 spans
Create test specs against trace data
Validate Auth, API Gateways, Ingresses, Databases, Queues, ...

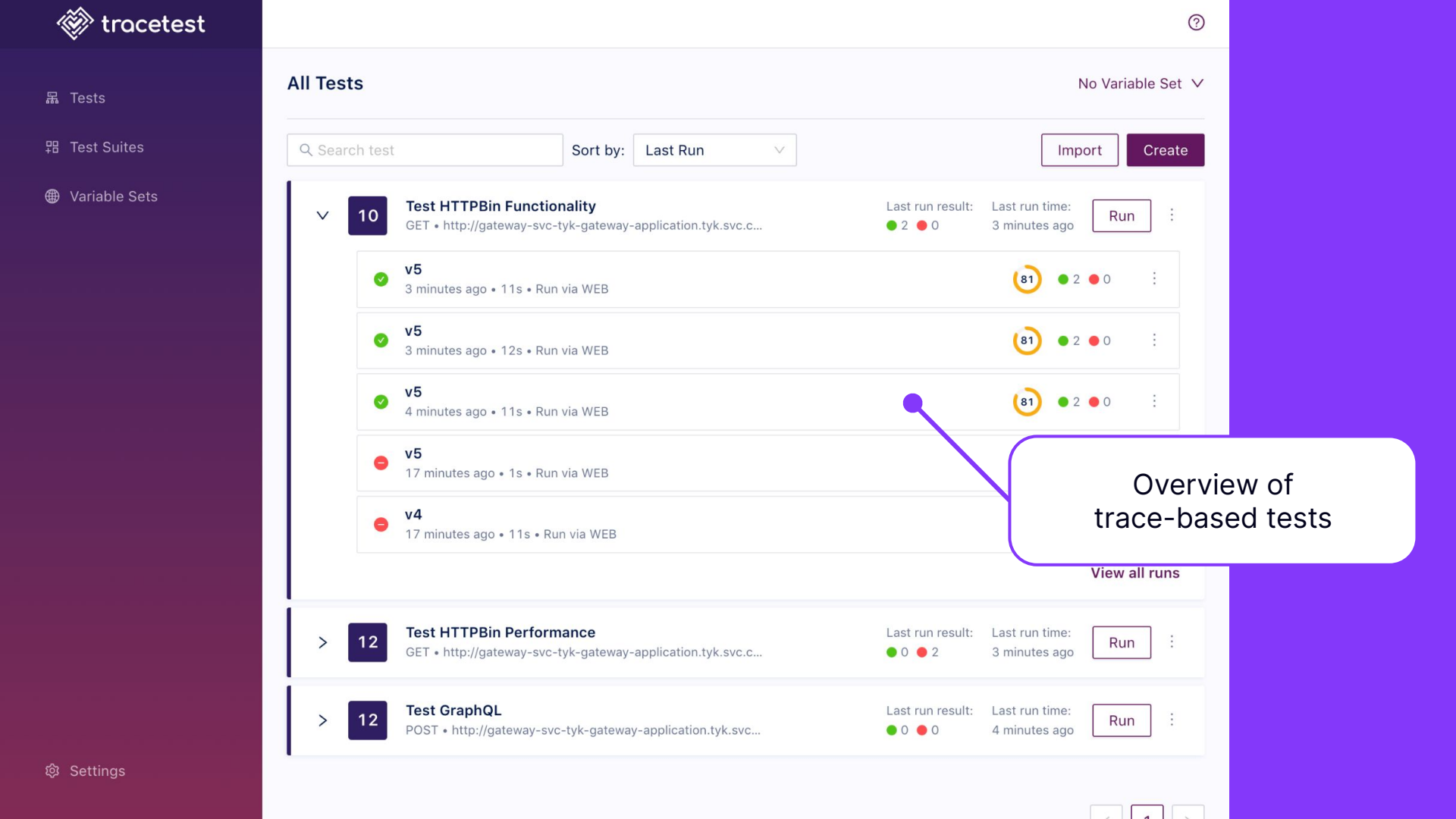

tracetest
Test GraphQL
v6 • HTTP • Ran 15 seconds ago • Run via CLI
Trigger
Trace
Test
Automate
No Variable Set
Run Test
1 of 1 total
27us
GENERAL
RateCheckMW
internal
34us
GENERAL
GraphQLMiddleware
internal
1ms
1
GENERAL
GraphqlMiddleware Validation
internal
1ms
GENERAL
GENERAL
Test Spec Detail
1
1 span
GraphQL Middleware: Validate no errors
span[tracetest.span.type="general" name="GraphQLMiddleware"]
GENERAL
GraphQLMiddleware
internal
ERROR
attr:otel.status_code != "ERROR"
Validate GraphQL APIs


tracetest
Test HTTPBin Performance
v8 • HTTP • Ran 2 minutes ago • Run via WEB
Trigger
Trace
Test
Automate
No Variable Set
Run Test
2 of 2 total
40us
GENERAL
RateCheckMW
internal
35us
HTTP
HTTP GET
internal
3.0s
1
Test Spec Detail
2
2 spans
All HTTP Spans: Respond faster than 200ms
span[tracetest.span.type="http"]
HTTP
GET /httpbin/delay/3
internal
3s
attr:tracetest.span.duration < 200ms
HTTP
HTTP GET
internal
3s
attr:tracetest.span.duration < 200ms
Performance testing
API responses, req/res
size, rate limiting...

Shift Left with Tracetest!

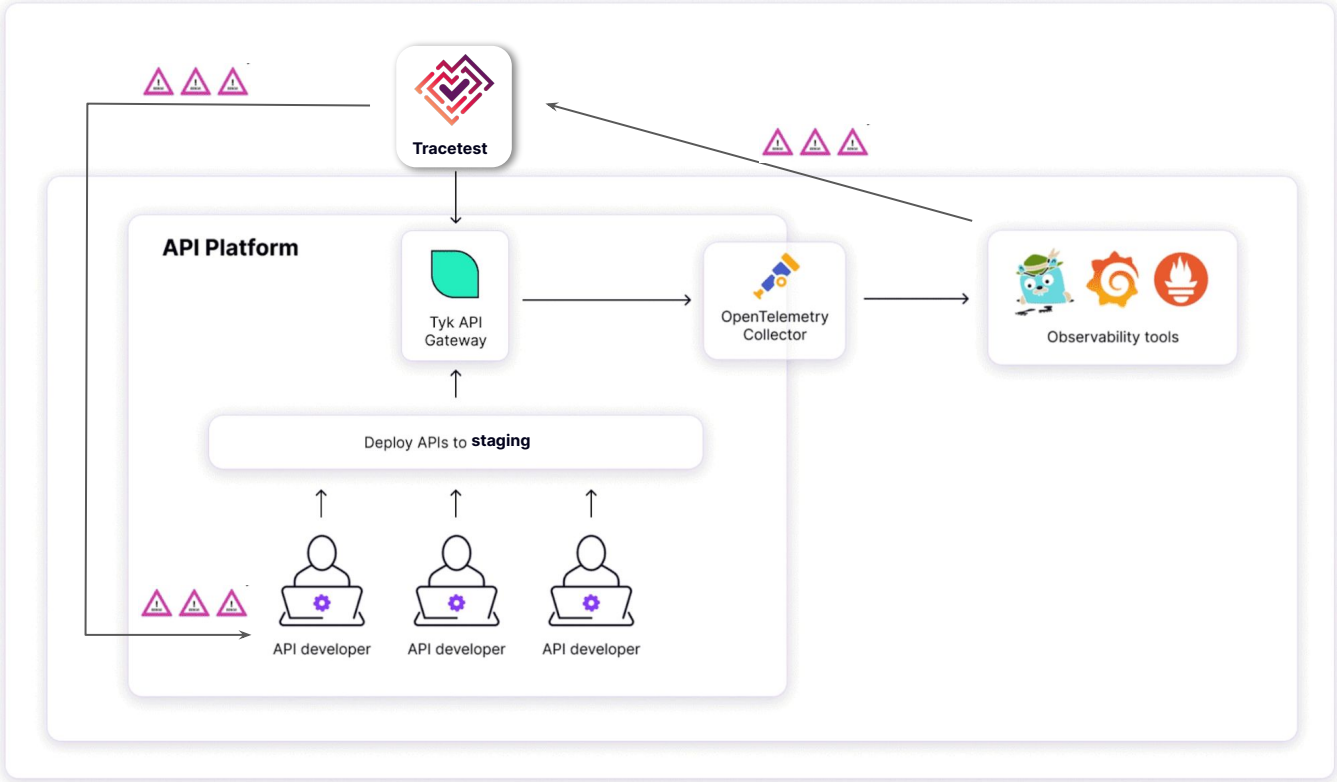
Tracetest: Leverage existing OpenTelemetry data for deep API and integration tests.


Applications
api-definitions
APPLICATION DETAILS TREE
DETAILS
DIFF
SYNC
SYNC STATUS
HISTORY AND ROLLBACK
DELETE
REFRESH
APP HEALTH
Healthy
SYNC STATUS
Synced to HEAD (f59e5b4)
Auto sync is enabled.
Author: Sonja Chèvre <sonja+github@tyk.io> -
Comment: introducing an error in staging
LAST SYNC
Sync failed to f59e5b4
Failed an hour ago (Tue Jan 23 2024 12:55:57 GMT+0100)
Author: Sonja Chèvre <sonja+github@tyk.io> -
Comment: introducing an error in staging
100%
api-definitions
a day
integration-tracetest-f59e5b4...
job
an hour
httpbin
AD
apidefinition
a day
trevorblades
AD
apidefinition
a day
integration-tracetest-f59e5b4...
pod
an hour
error
0/1
integration-tracetest-f59e5b4...
pod
an hour
error
0/1
Tracetest integration tests run every time there is a sync.


tracetest
Tests
Test Suites
Variable Sets
Settings
All Tests
No Variable Set
Search test
Sort by:
Last Run
Import
Create
10
Test HTTPBin Functionality
GET • http://gateway-svc-tyk-gateway-application.tyk.svc.c...
Last run result:
2 0
Last run time:
3 minutes ago
Run
v5
3 minutes ago • 11s • Run via WEB
81
2 0
v5
3 minutes ago • 12s • Run via WEB
81
2 0
v5
4 minutes ago • 11s • Run via WEB
81
2 0
v5
17 minutes ago • 1s • Run via WEB
v4
17 minutes ago • 11s • Run via WEB
View all runs
12
Test HTTPBin Performance
GET • http://gateway-svc-tyk-gateway-application.tyk.svc.c...
Last run result:
0 2
Last run time:
3 minutes ago
Run
12
Test GraphQL
POST • http://gateway-svc-tyk-gateway-application.tyk.svc...
Last run result:
0 0
Last run time:
4 minutes ago
Run
Overview of
trace-based tests

WHAT WE HAVE ACHIEVED

✅ Validating releases in Pre-Production

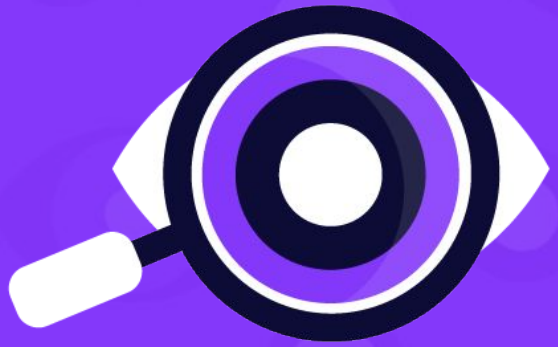


WHAT WE HAVE ACHIEVED

✅ Validating releases in Pre-Production

- Functional testing:
  - Validate upstream/downstream APIs at every point of a request transaction
- Performance testing:
  - HTTP/gRPC/GraphQL response times
  - Cache and database response times

See you space cowboy...

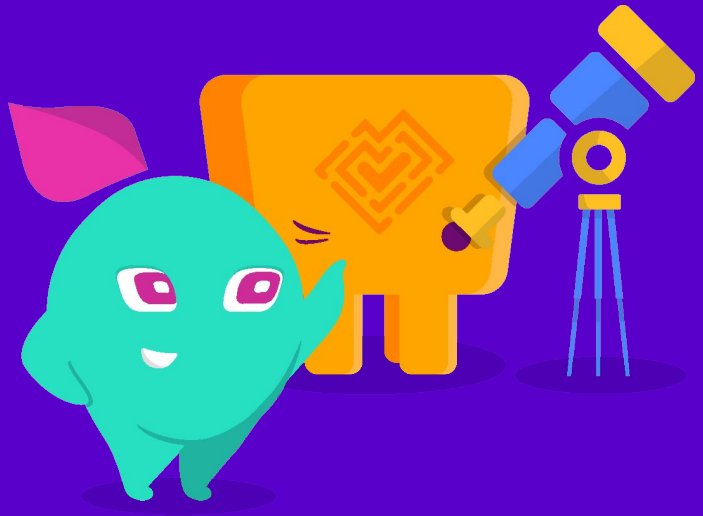


LEAP 2024

THE API OBSERVABILITY CONFERENCE

A VIRTUAL EVENT HOSTED BY Tyk | 29 FEB 2024

Register today



tracetest Tyk

Thank you!

Come talk to us to continue the discussion or reach out:

- Adnan Rahić
  - linkedin.com/in/adnanrahic/
- Sonja Chevre
  - linkedin.com/in/sonjachevre/