Ballerina

Cloud Native Programming Language

October 2018

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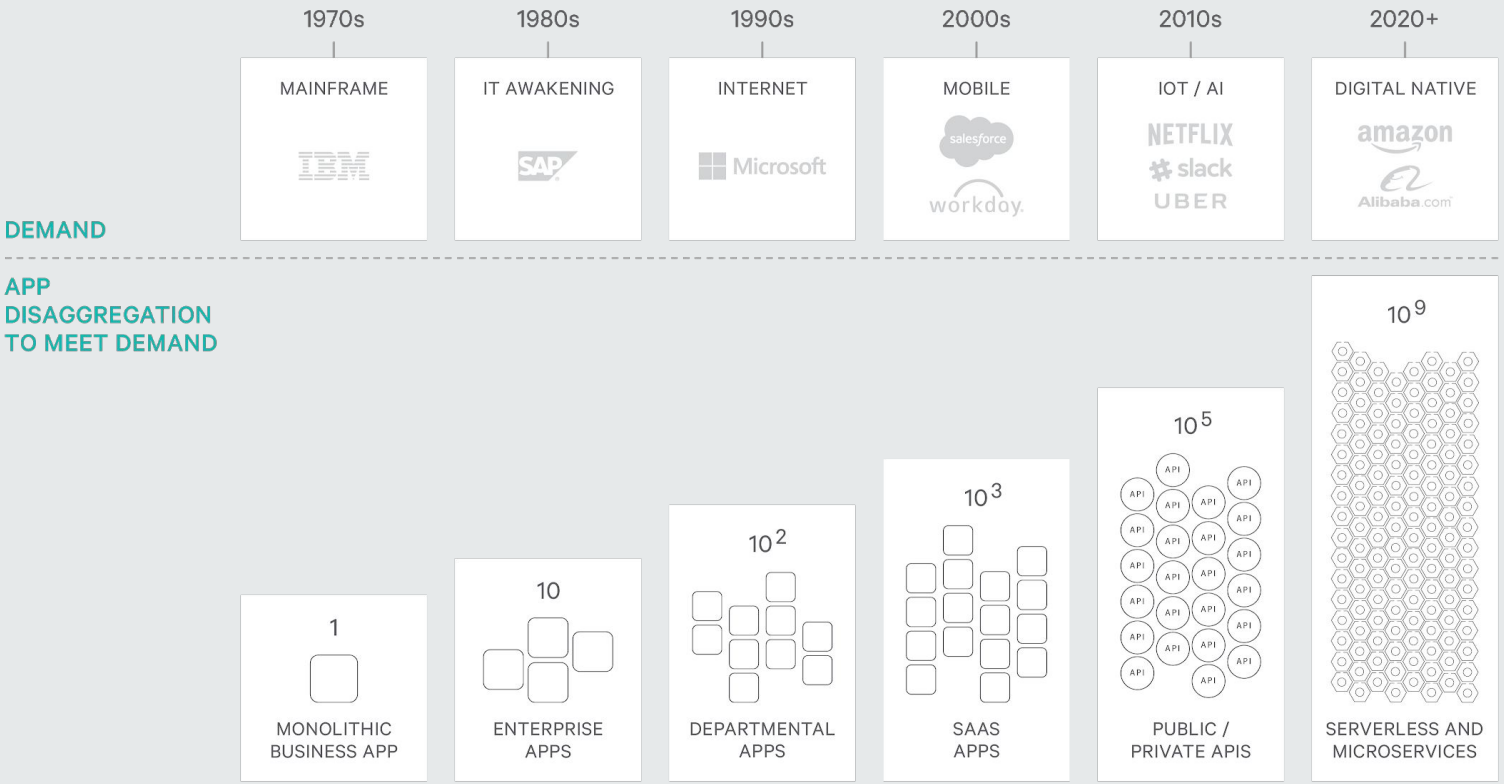
Increasing demand is causing disaggregation



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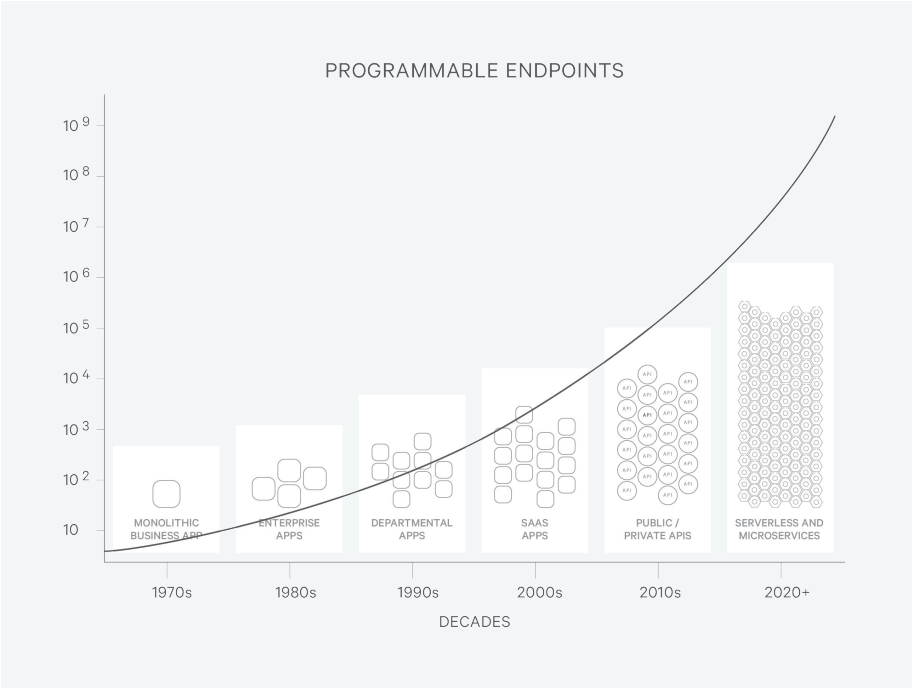
Disaggregation leads to more endpoints

Everything is An Endpoint

- Functions
- APIs
- Data
- SaaS apps
- Legacy apps
- Devices



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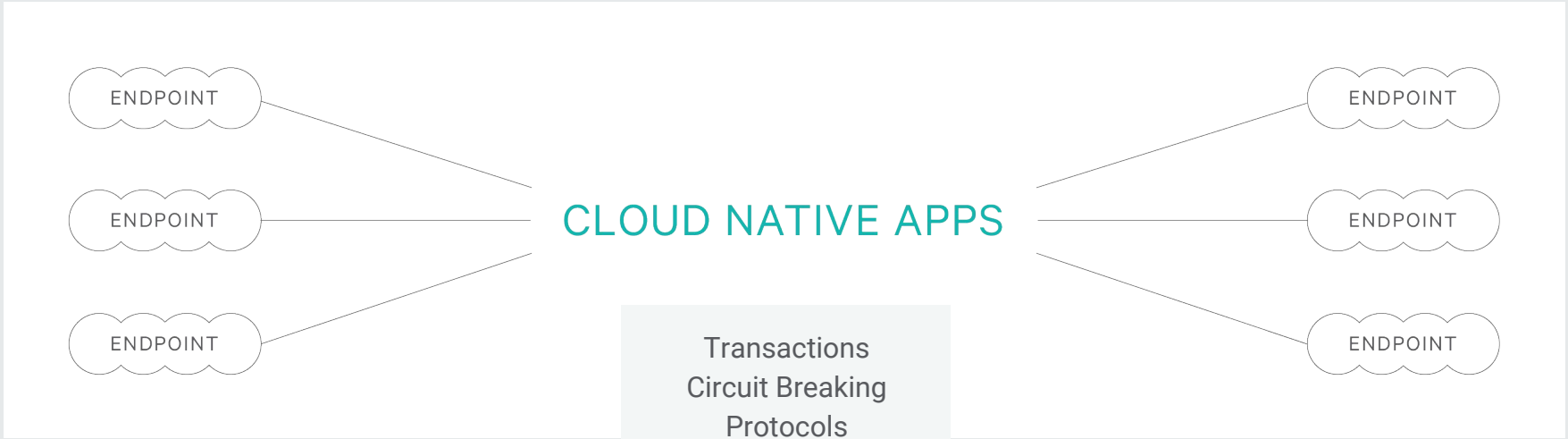
Integration in an increasingly disaggregated world



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INTEGRATION
PRODUCTS

ESB, BPM, EAI

NOT AGILE

The
Integration
Gap

GENERAL PURPOSE
PROGRAMING LANGUAGES

Java / Spring
JavaScript / Node

NOT INTEGRATION SIMPLE

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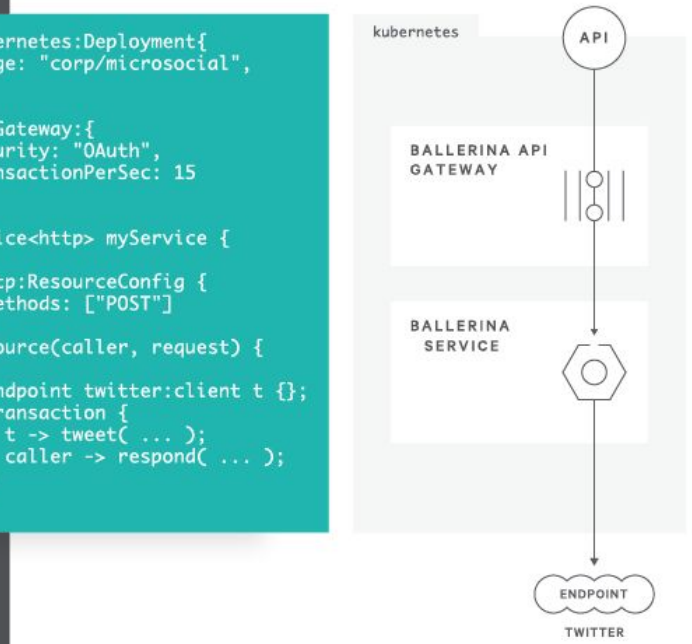
Cloud Native Programming Language

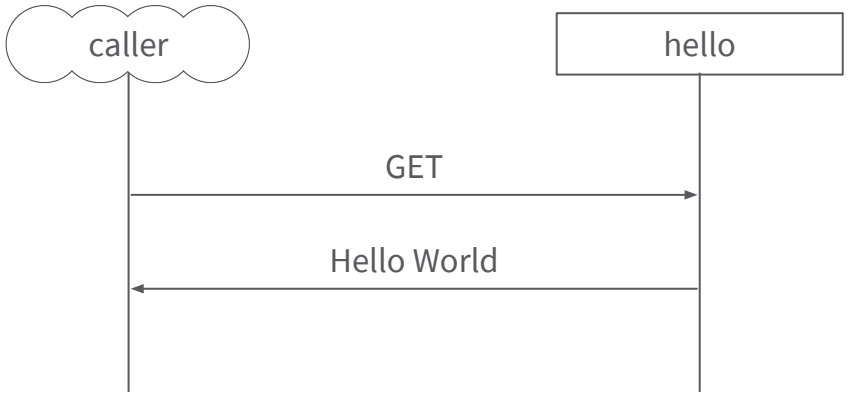
```
@kubernetes:Deployment{
  image: "corp/microsocial",
}

@apiGateway:{
  security: "OAuth",
  transactionPerSec: 15
}

service<http> myService {

  @http:ResourceConfig {
    methods: ["POST"]
  }
  resource(caller, request) {

    endpoint twitter:client t {};
    transaction {
      t -> tweet( ... );
      caller -> respond( ... );
    }
}
```



AGILE
INTEGRATION SIMPLE

Ballerina is a compiled, type safe, concurrent programming language.

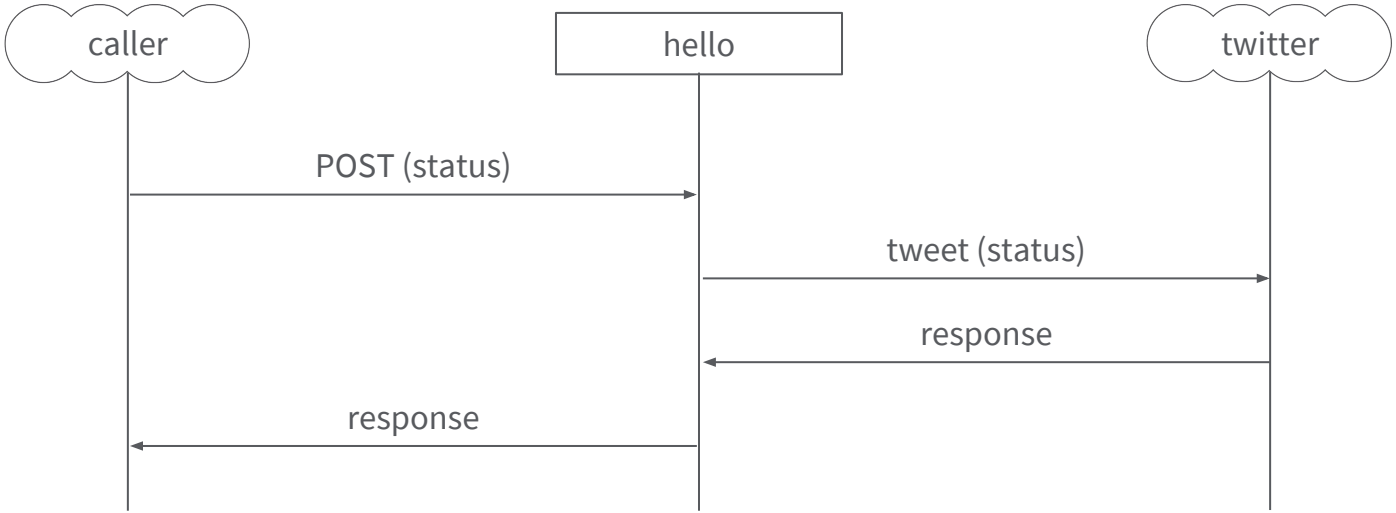
Hello World

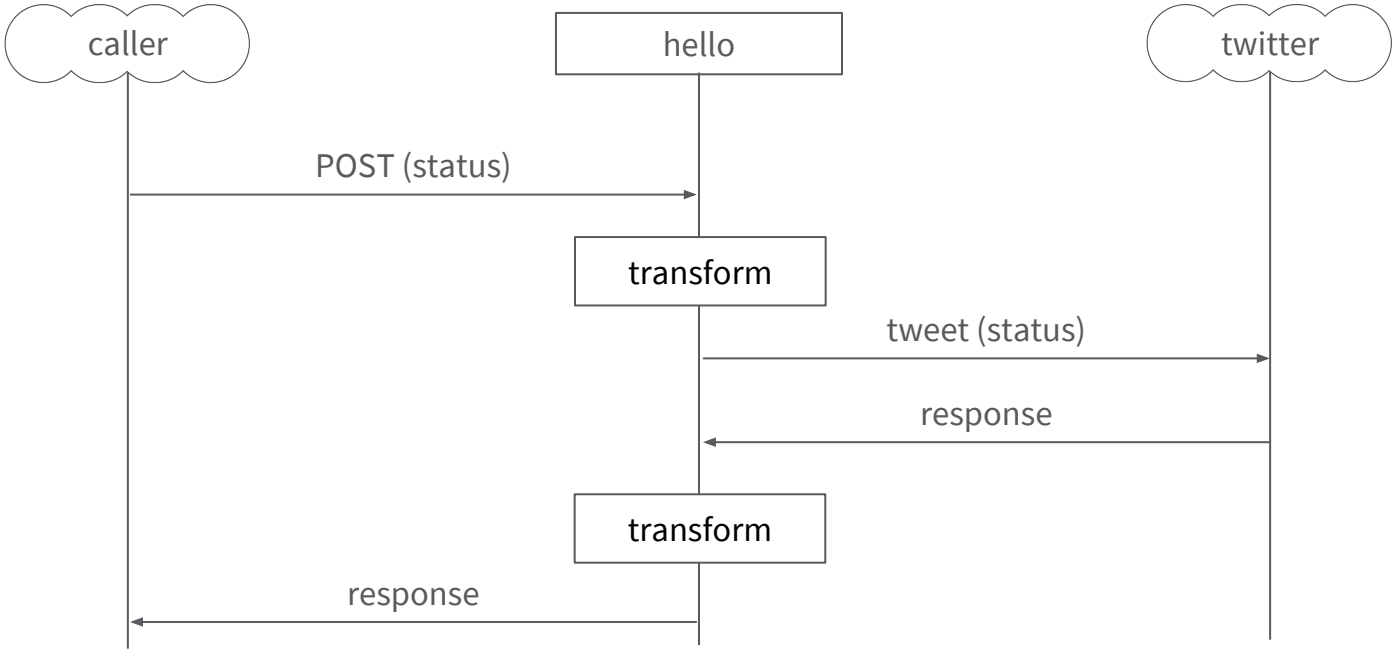

caller
hello
GET
Hello World

Annotations


caller
hello
POST (name)
Hello, name!

Connectors

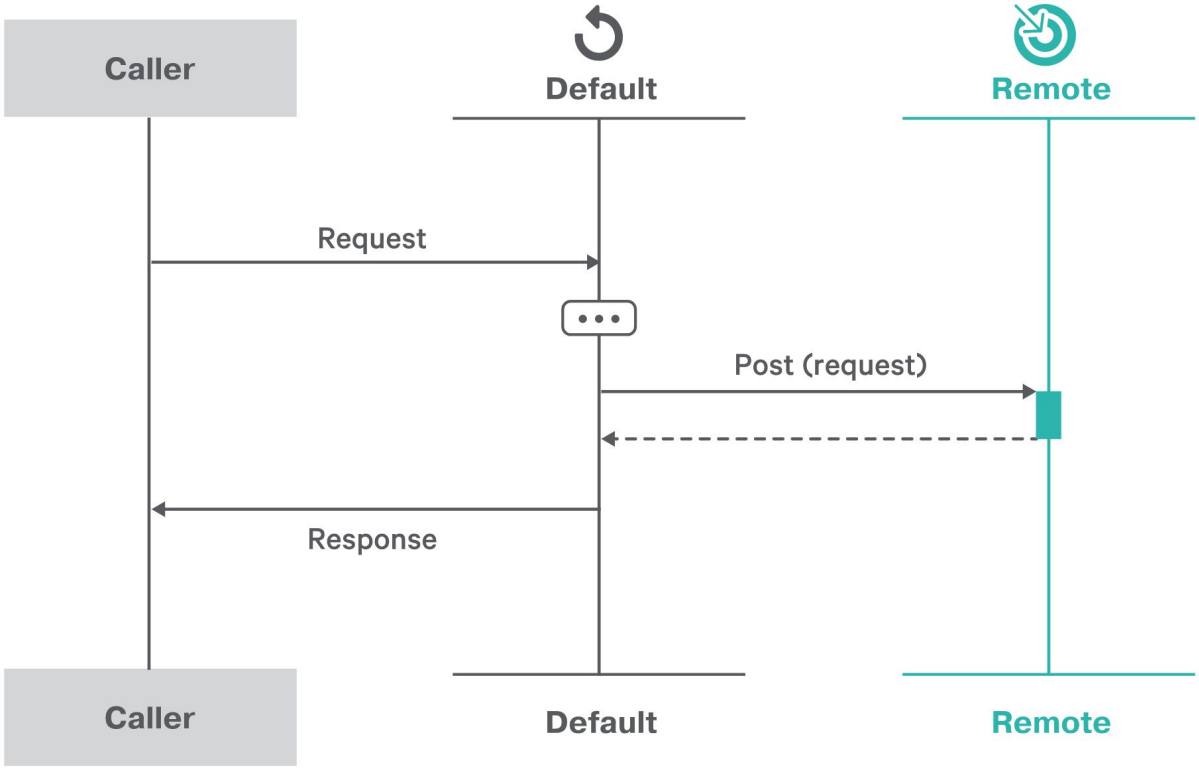

caller
hello
twitter
POST (status)
tweet (status)
response
response


caller
hello
twitter
POST (status)
transform
tweet (status)
response
transform
response

Inherently Async I/O

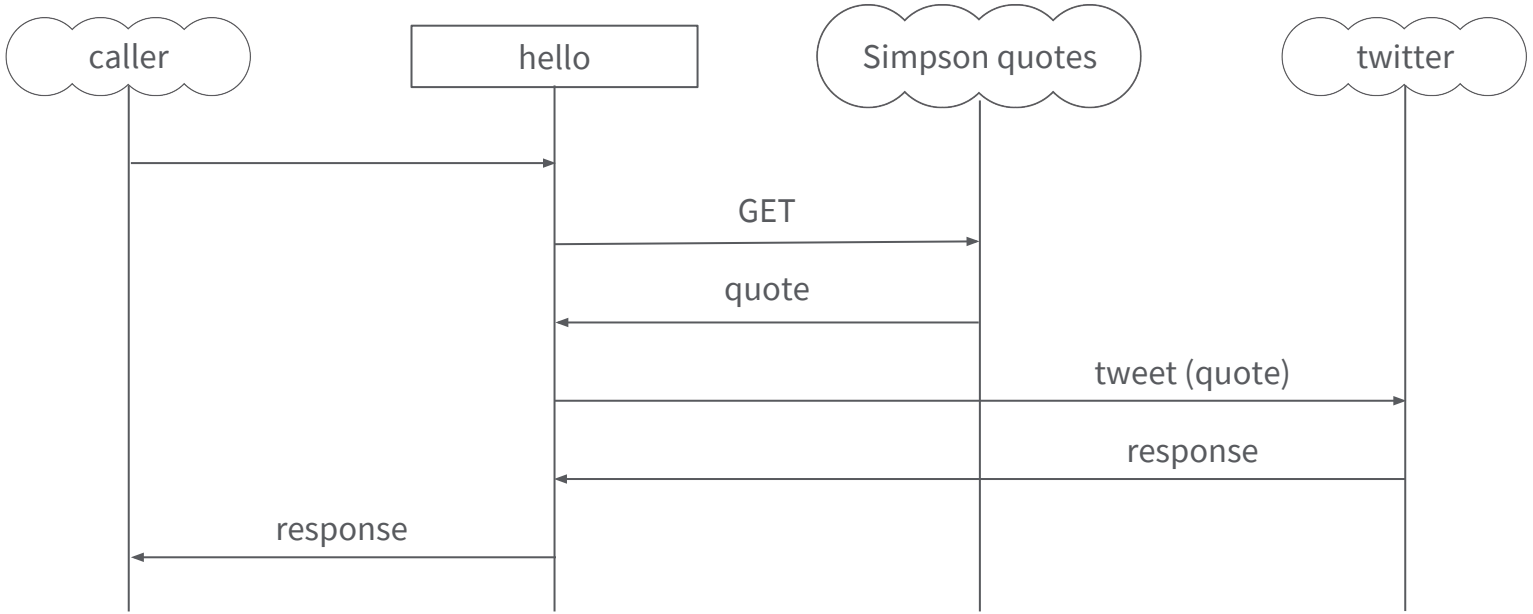
```
endpoint http:Client remoteHttpEndpoint {
    url: "http://www.simpsonquotes.xyz"
};

service<http:Service> hello  bind listener {
    hi (endpoint caller, http:Request request, string name) {
        http:Response res = check remoteHttpEndpoint -> get("/quote");
        // this does not block a thread
        string quote = check res.getTextPayload();
        _ = caller -> respond(untaint quote);
    }
}
```

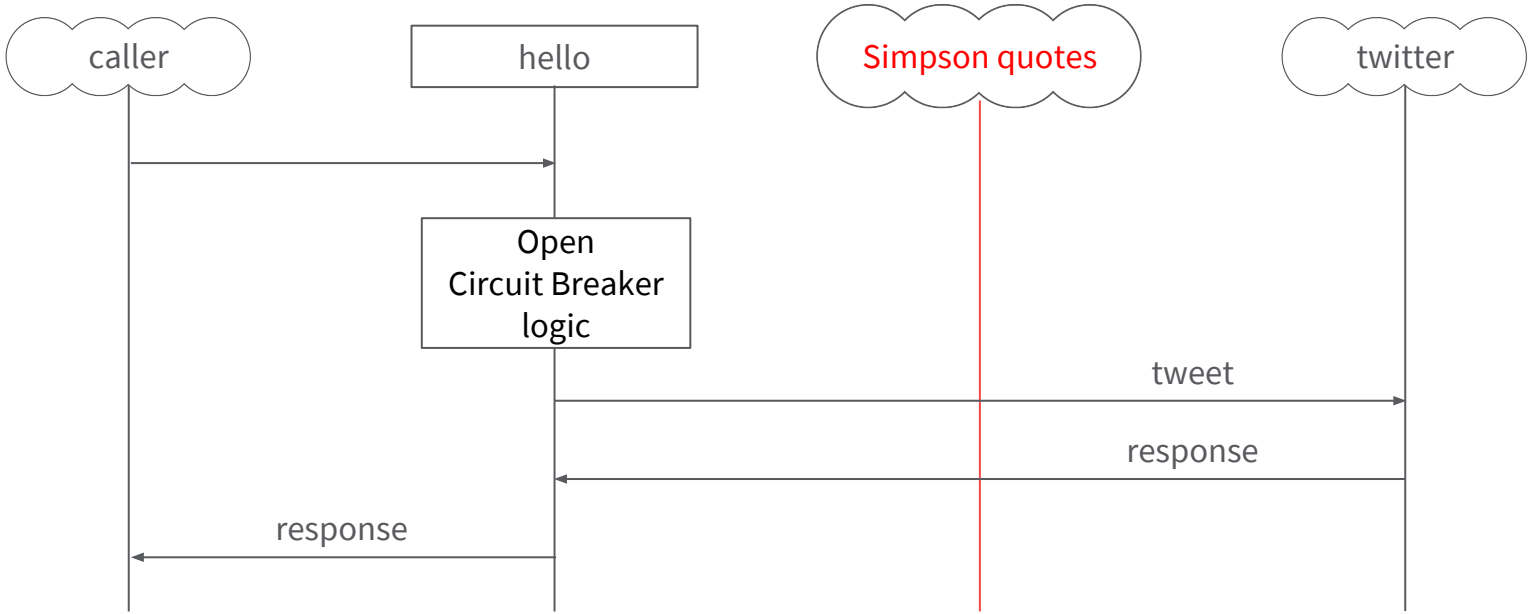
Sequence Diagrammatic


Caller
Default
Remote
Request
Post (request)
Response
Caller
Default
Remote

Docker & Kubernetes

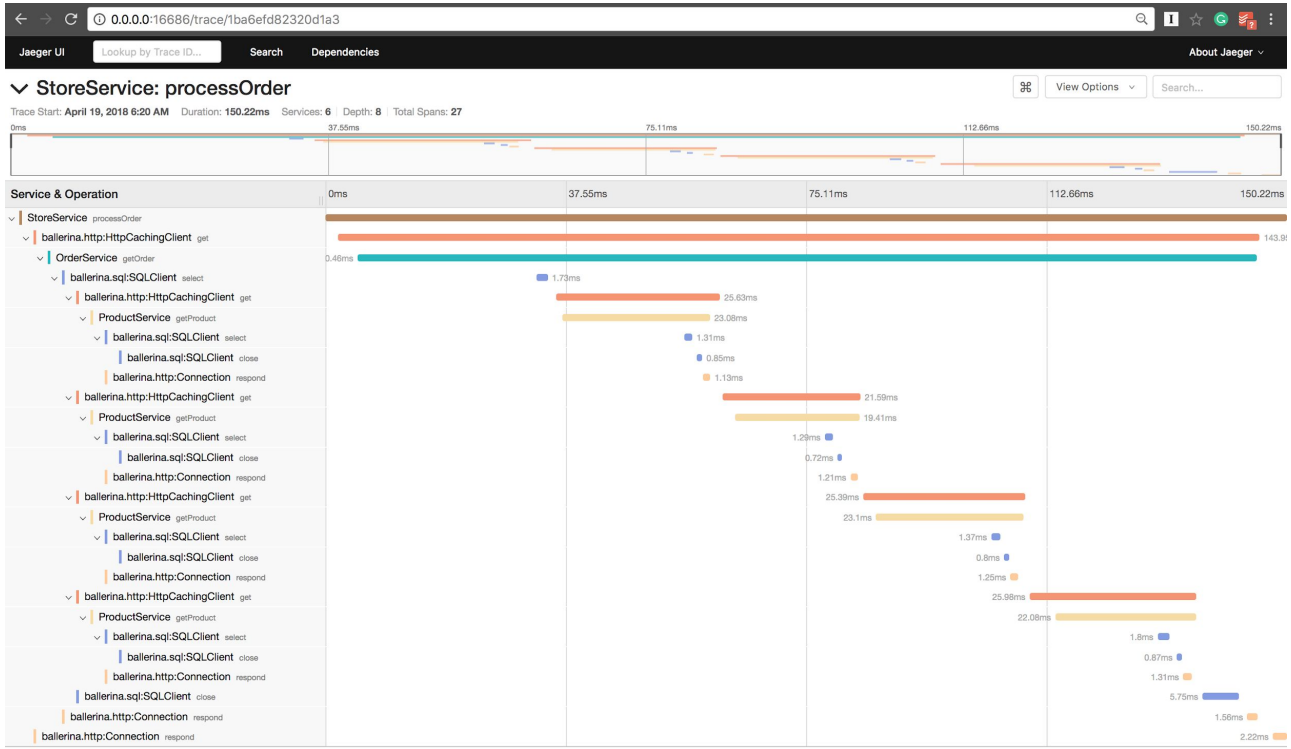
Circuit Breaker


caller
hello
Simpson quotes
twitter
GET
quote
tweet (quote)
response
response


caller
hello
Simpson quotes
twitter
Open
Circuit Breaker
logic
tweet
response
response

Observability

Jaeger / Zipkin



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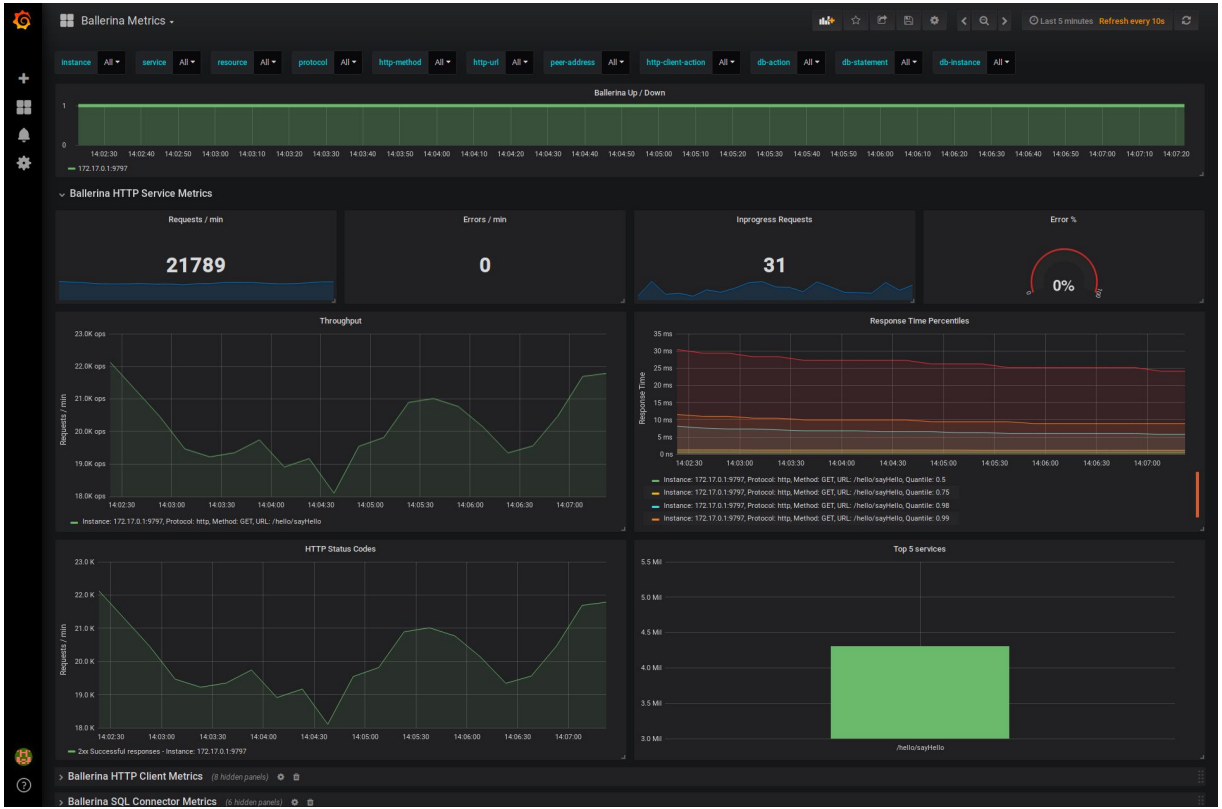
Prometheus + Grafana



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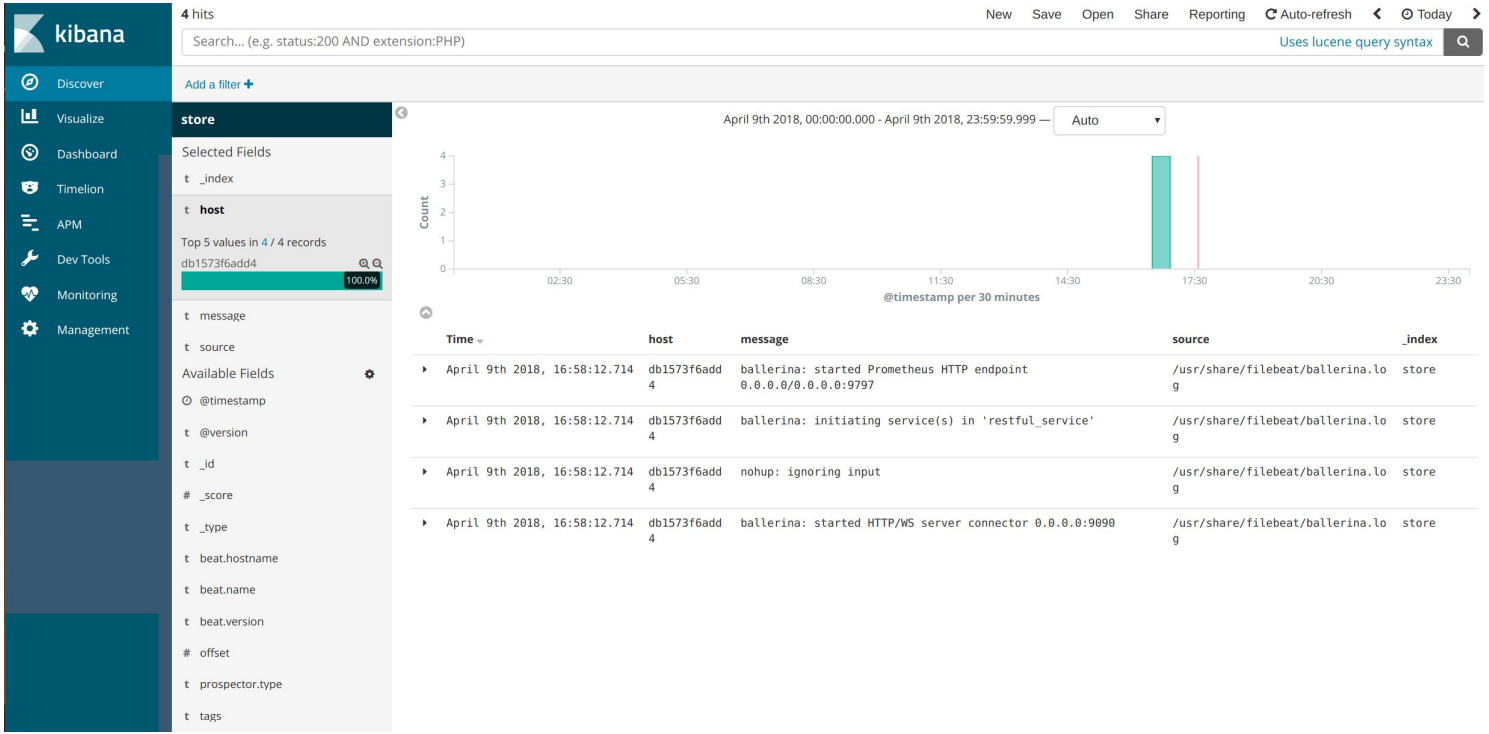
ElasticSearch / Kibana / Logstash (ELK)



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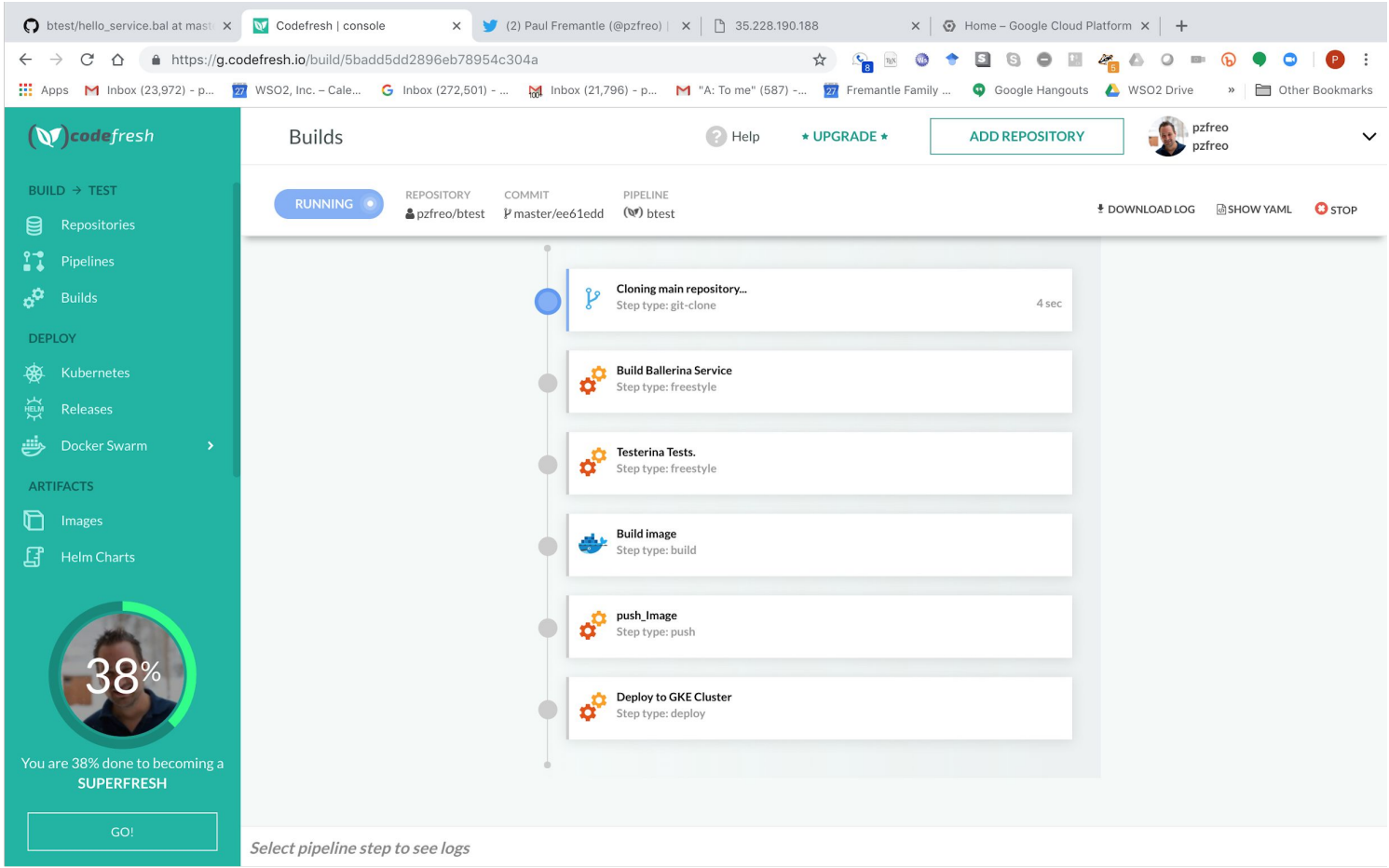
Agile

Continuous


btest/hello_service.bal at mast
Codefresh | console
(2) Paul Fremantle (@pzfreo)
35.228.190.188
Home – Google Cloud Platform
https://g.codefresh.io/build/5badd5dd2896eb78954c304a
Apps
Inbox (23,972) - p...
WSO2, Inc. – Cale...
Inbox (272,501) - ...
Inbox (21,796) - p...
"A: To me" (587) -...
Fremantle Family ...
Google Hangouts
WSO2 Drive
Other Bookmarks
codefresh
BUILD → TEST
Repositories
Pipelines
Builds
DEPLOY
Kubernetes
Releases
Docker Swarm
ARTIFACTS
Images
Helm Charts
38%
You are 38% done to becoming a SUPERFRESH
GO!
Builds
Help
* UPGRADE *
ADD REPOSITORY
pzfreo
pzfreo
RUNNING
REPOSITORY
pzfreo/btest
COMMIT
master/ee61edd
PIPELINE
btest
DOWNLOAD LOG
SHOW YAML
STOP
Cloning main repository...
Step type: git-clone
4 sec
Build Ballerina Service
Step type: freestyle
Testerina Tests.
Step type: freestyle
Build image
Step type: build
push_Image
Step type: push
Deploy to GKE Cluster
Step type: deploy
Select pipeline step to see logs

Ballerina

gRPC and ProtoBuf

Ballerina syntax

```
type birthday record {
    int day;
    int month;
    int year;
};

endpoint grpc:Listener listener {
    host: "localhost",
    port:  config:getAsInt("GRPC_PORT")
};

@grpc:ServiceConfig
service<grpc:Service> grpcService bind listener {
    calculateAge(endpoint caller, birthday req) {
        time:Time bday = time:createTime(req.year, req.month, req.day,
        time:Time now = time:currentTime();
        int ageyears = (now.time - bday.time)/(24*365*60*60*1000);
        _ = caller -> send(ageyears, headers = ());
        _ = caller -> complete();
    }
}
```

Automatically creates this .proto

```
syntax = "proto3";
import "google/protobuf/wrappers.proto";
service grpcService {
    rpc calculateAge(birthday)
        returns (google.protobuf.Int64Value);
}
message birthday {
    int64 day = 1;
    int64 month = 2;
    int64 year = 3;
}
```

Swagger

Asynchronous

```
service<http:Service> asyncTweeter bind listener {
    @http:ResourceConfig {
        path : "/",
        methods : ["POST"]
    }
    tweetAsync (endpoint caller, http:Request request) {
        future<int> v = start doTweet();
        // this won't wait for the response
        http:Response res;
        _ = caller->respond(res);
    }
}

function doTweet() returns int {
    http:Response hResp = check homer->get("/quote");
    string status = check hResp.getTextPayload();
    status = "Homer Simpson says: "+ status + " #ballerina #async";
    _ = twitter->tweet(status);
    return 0;
}
```

Why Create a New Programming Language?
Developer productivity happens when coding is simple.

The Ballerina programming language is a type-safe, Turing complete language so we can provide:

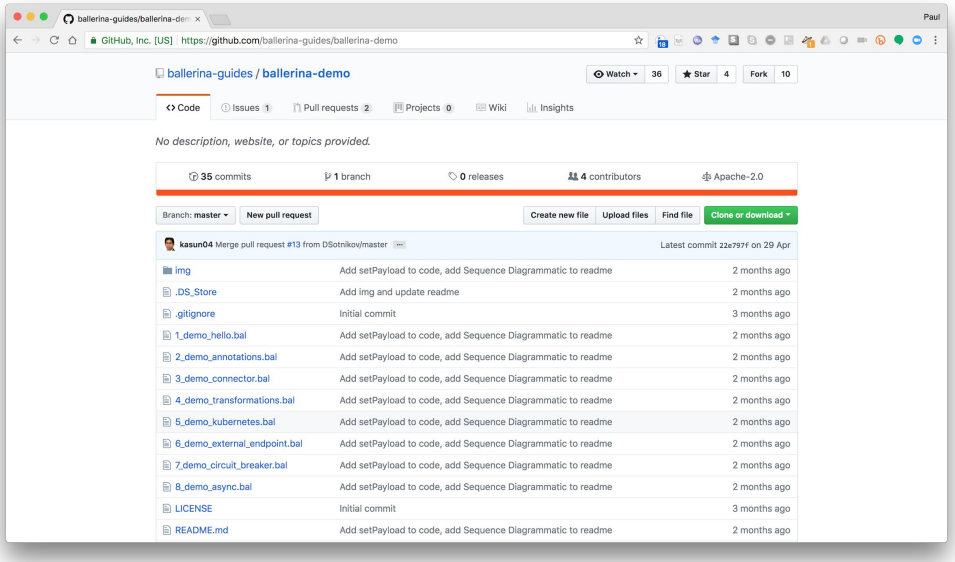
1. Incremental build and test
2. Type checking data during compilation
3. Verification of workflow and orchestration
4. A language server with intellisense in any IDE
5. An included GUI IDE for orchestrating interactions
6. Testerina for build-time unit testing integrations
7. Binaries with low footprint, high performance for cloud native optimized execution
8. Composite app construction of polyglot services
9. Package mgmt, like maven, for simple code-level sharing of integrations
10. Build-time instrumentation to enable debuggable observability from your APM

```
// Built-In package mgmt, sharing, and unit testing

$ tree
  .ballerina/             # Dependencies downloaded and cached locally
  Ballerina.toml          # Defines project build intent
  my.package/             # Any folder is a package
    RouterService.bal
    tests/
      RouterTests.bal


$ ballerina build
Pulling dependencies…
  ballerinax/http     [central.ballerina.io -> home repo] [====>] 56/56
  ballerinax/rpc      [central.ballerina.io -> home repo] [====>] 98/98
  ballerinax/twitter  [central.ballerina.io -> home repo] [====>] 79/79

Building binaries…
  something.bal ⇒ target/something.balo
  something.bal ⇒ target/something.balo
  something.bal ⇒ target/something.balo

Running tests…
  Test <mytest> ⇒ RUNNING … SUCCESS
  Test <mytest> ⇒ RUNNING … SUCCESS
  Test <mytest> ⇒ RUNNING … SUCCESS

Generating deployment artifacts…
  @docker                 - complete 1/1
  @kubernetes:ingress     - complete 3/3
  @kubernetes:svc         - complete 3/3
  @kubernetes:deployment  - complete 1/1

SUCCESS

$ ballerina run
Service ready at http://192.168.1.101/customer

$ ballerina run kubernetes
```

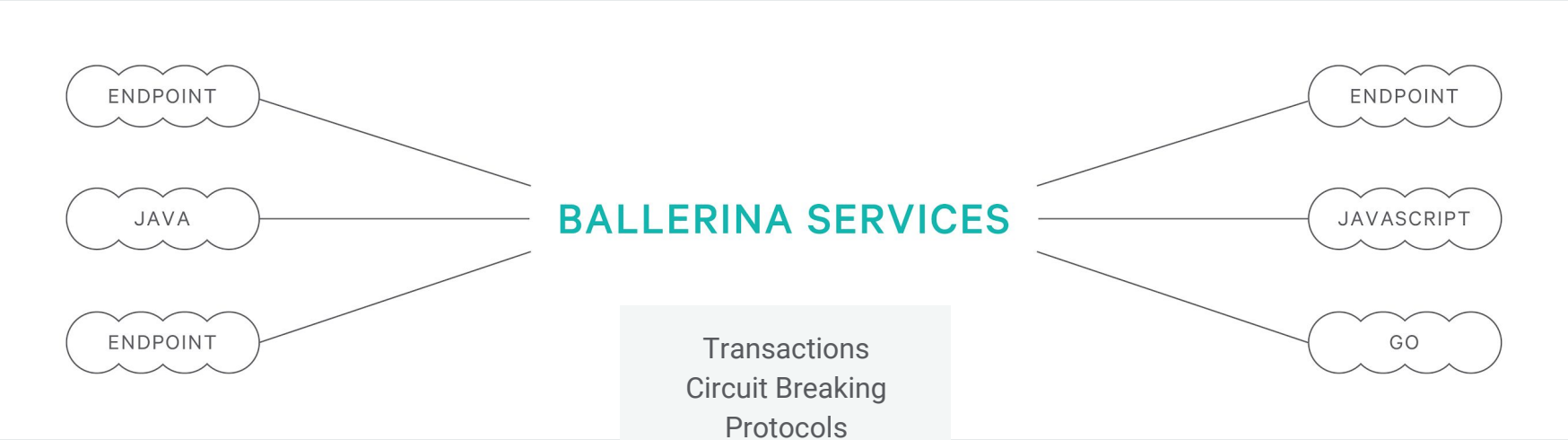
Everything demoed is in the Ballerina By Guide repo

My setup

- Ballerina 0.982.0
- Docker
  - 2.0.0.0-beta1-mac75
  - Kubernetes: v1.10.3
- Visual Studio Code Version 1.28.1
- Ballerina vscode plugin (0.982.0)



Ballerina is the glue between microservices



Transactions
Circuit Breaking
Protocols
Payloads
Events
Security
Workflow
Streams
Compensation

Ballerina bridges the Integration Gap

	Agile		Integration Simple	
In the demo	Edit / Build / Run	Package management	Services	Transformations
	Language server	Ballerina Central	Endpoints	JSON primitive
	IDE plugins	Type safety	Resources	Annotations
	Projects	Union types	Connectors	Circuit breaker
	Docker and K8S	Flow control	–>	Async
Discover at ballerina.io	Debugger	Observability	Workers, fork/join	gRPC
	Testerina: unit tests	CI/CD	Message broker	Protobuf
	Doc generation	Table, vector, map	Versioning	XML type
	CLI extensions	Struct	Bridge	Streams
	Dev tracing	Lambda	Swagger	CSV
	I/O	Tasks, scheduling	Databases	Session mgmt
	Projects	Dependency mgmt		

Save the Date!

Ballerina Day London

Thursday November 15th 2018

https://ballerina.io/learn/events/ballerina-day-london-2018/

How to get involved

Learn more	http://ballerina.io
Open source	https://github.com/ballerina-platform/ballerina-lang
Get support	Stack Overflow #ballerina tag

Thank you!