Consumer Driven Contract Testing with Pact and Docker

By Harry Winser
@Hazz223

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OR... CONFIDENCE IN PRODUCTION

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In the beginning, there were monoliths...

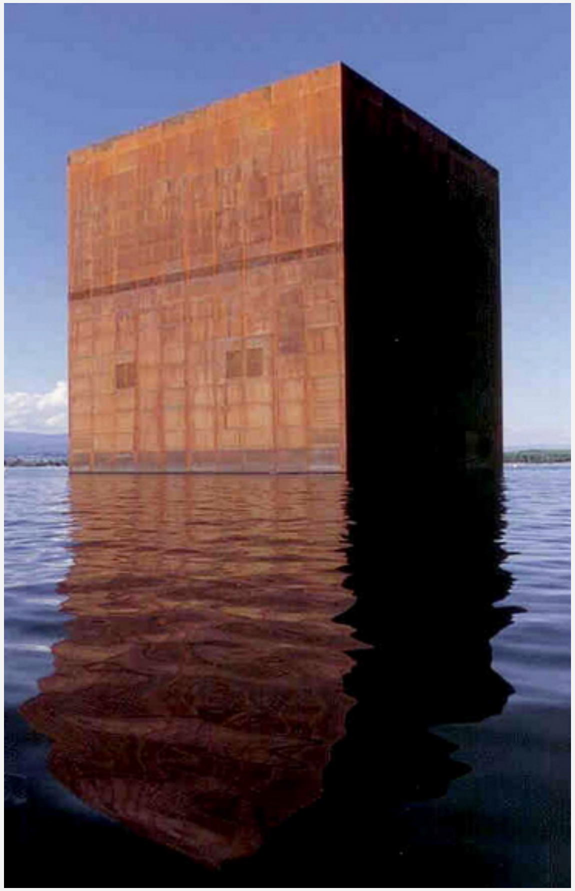


Image from: http://odino.org/on-monoliths-service-oriented-architectures-and-microservices/

… And then came Microservices…

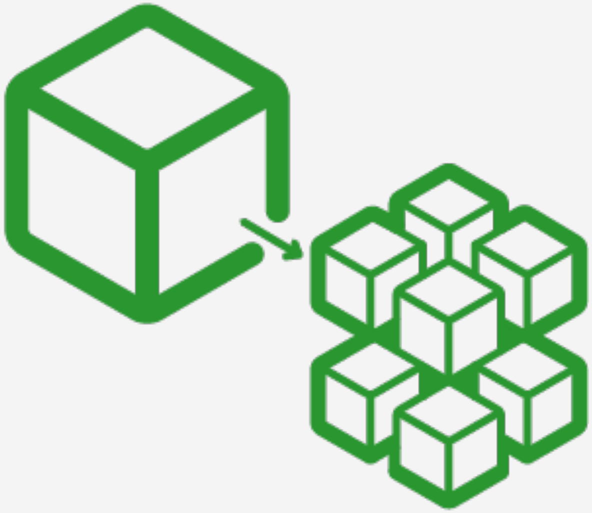
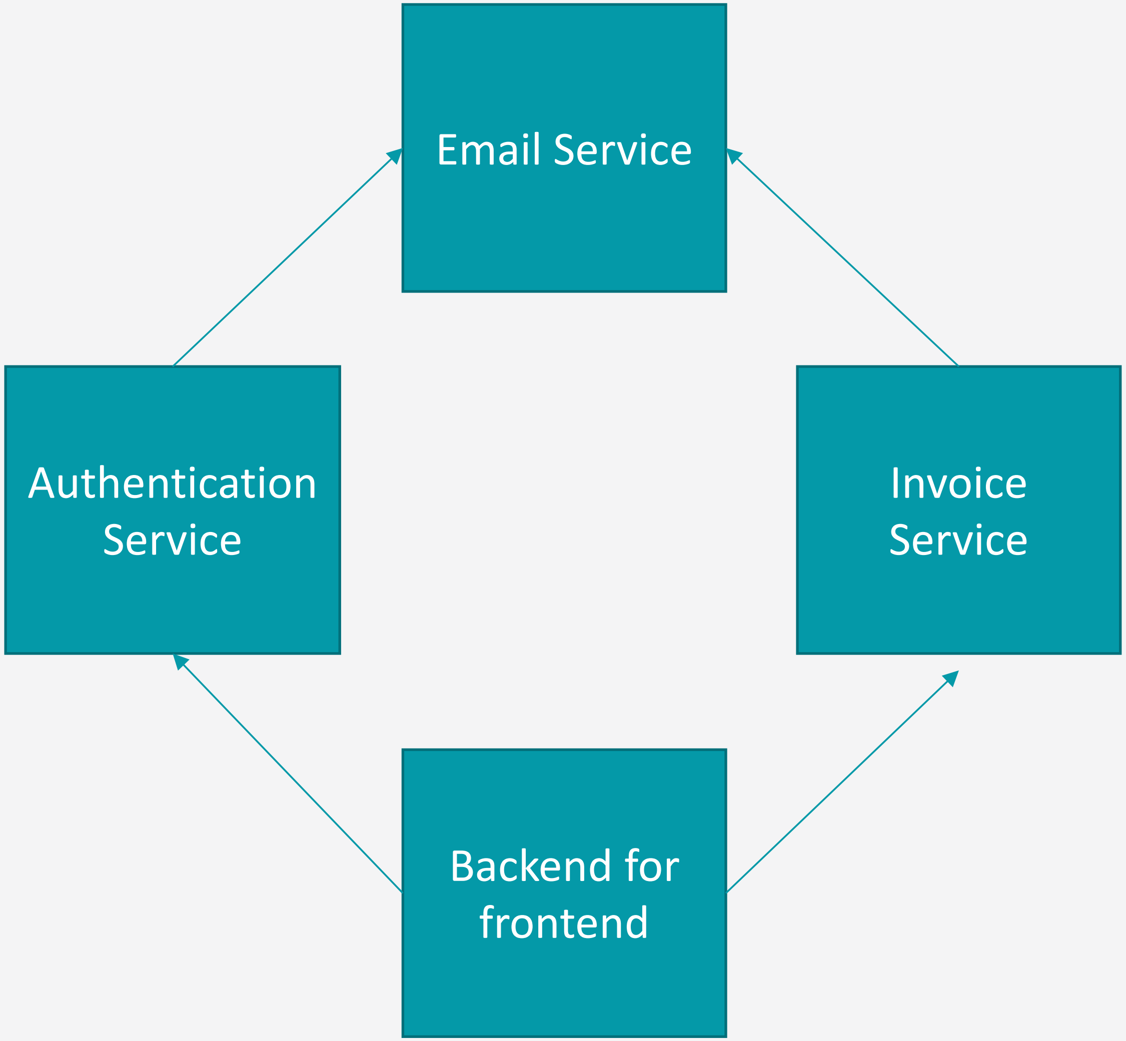


Image from: https://www.nginx.com/solutions/microservices/

... Which meant loads more communication...

Image from: https://www.shutterstock.com/

Example



Email Service

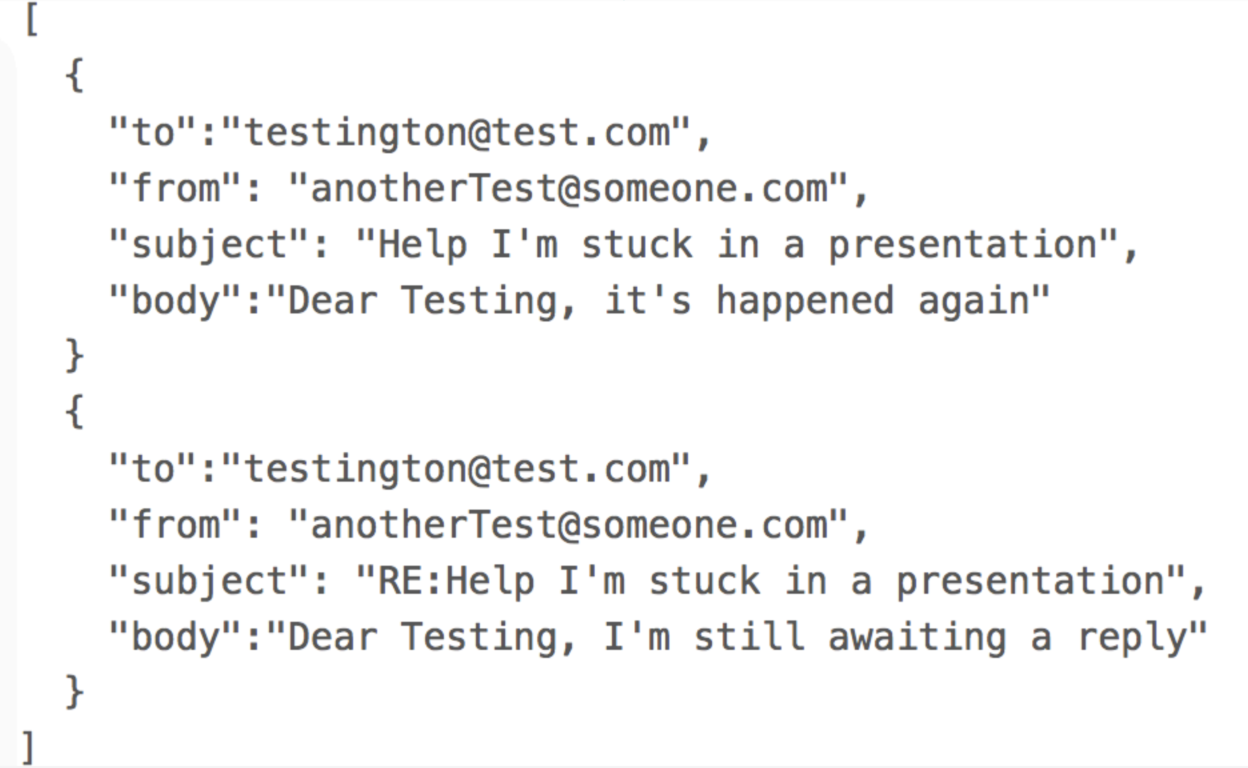
Authentication Service

Invoice Service

Backend for frontend

Example API

http://email.service.com/user/125635



```
[
  {
    "to":"testington@test.com",
    "from": "anotherTest@someone.com",
    "subject": "Help I'm stuck in a presentation",
    "body":"Dear Testing, it's happened again"
  }
  {
    "to":"testington@test.com",
    "from": "anotherTest@someone.com",
    "subject": "RE:Help I'm stuck in a presentation",
    "body":"Dear Testing, I'm still awaiting a reply"
  }
]
```

….And so chaos ensued

Image from: http://lrhsslaughterhouse5.weebly.com/chaos.html

Consumer Driven Contracts

What are Consumer Driven Contracts (CDCs)?

"A contract between a consuming service and a providing service, stating what the consumer wants from a providing service, in a defined format"

Benefits of Consumer Driven Contracts

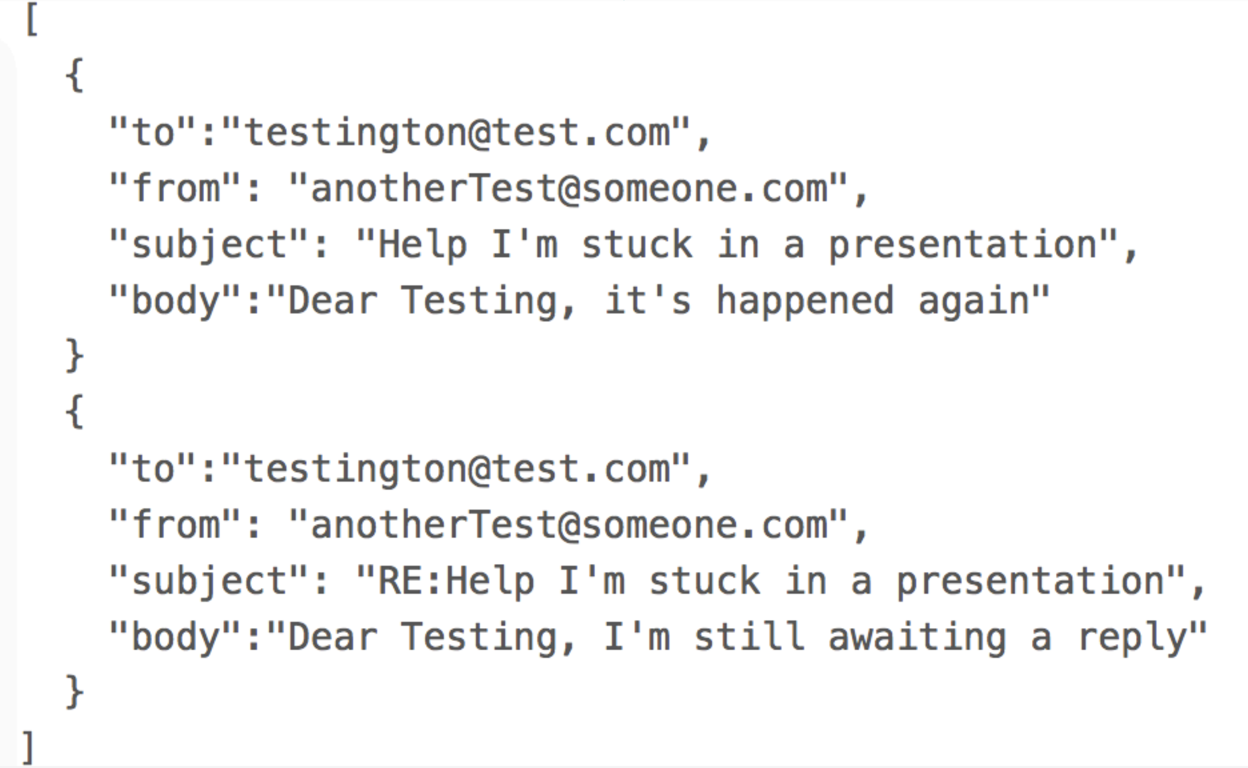
- Enable services to be deployed independently
- Enables teams to work independently from each other
- Enables verification of external endpoints – am I building what is wanted?

What they aren’t

- A test of business logic
- An SLA between services
- A way of validating / verifying external services

Back to the API

http://email.service.com/user/125635



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    "subject": "RE:Help I'm stuck in a presentation",
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  }
]
```

How Rightmove use CDCs

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CDC check list

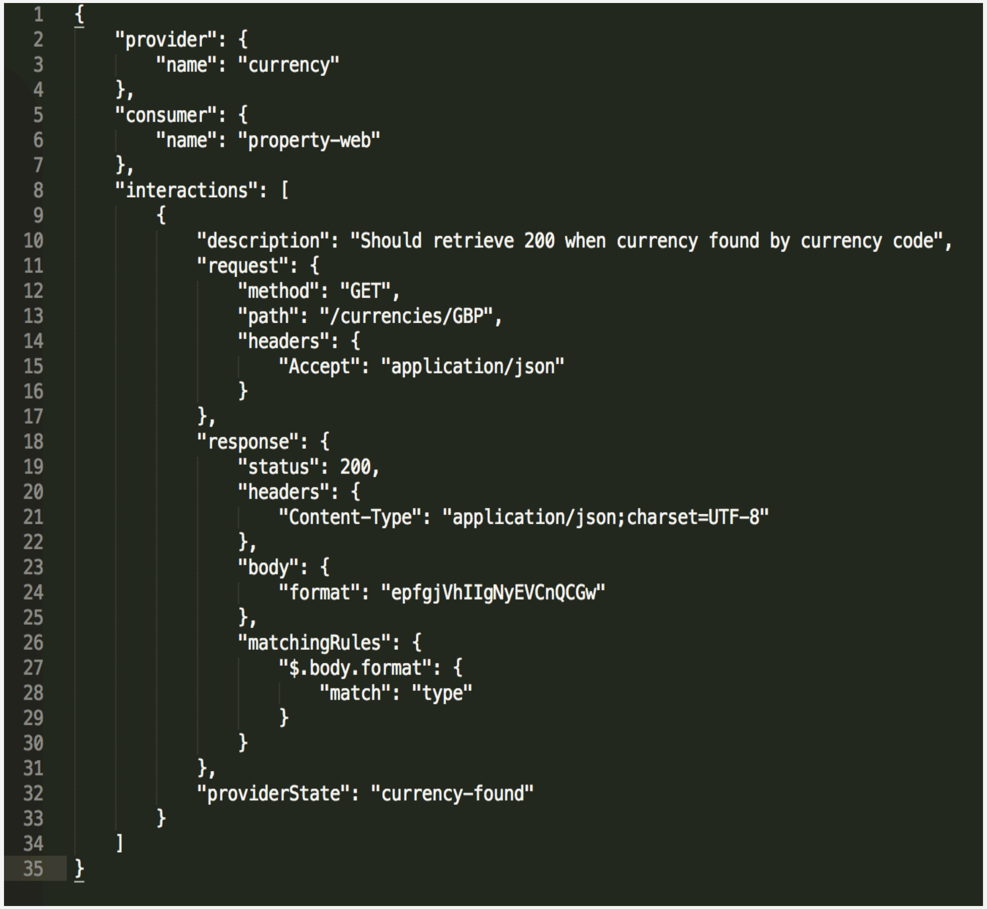
- A consistent format to describe Request/Responses
- An easy way to create Consumer Driven Contracts
- A way of storing these Contracts
- An easy way to test CDCs in our CD pipeline
- A way of enabling us to Rollback an application
- An easy way to run tests locally

A consistent format

PACT
FOUNDATION

Loads of languages available:

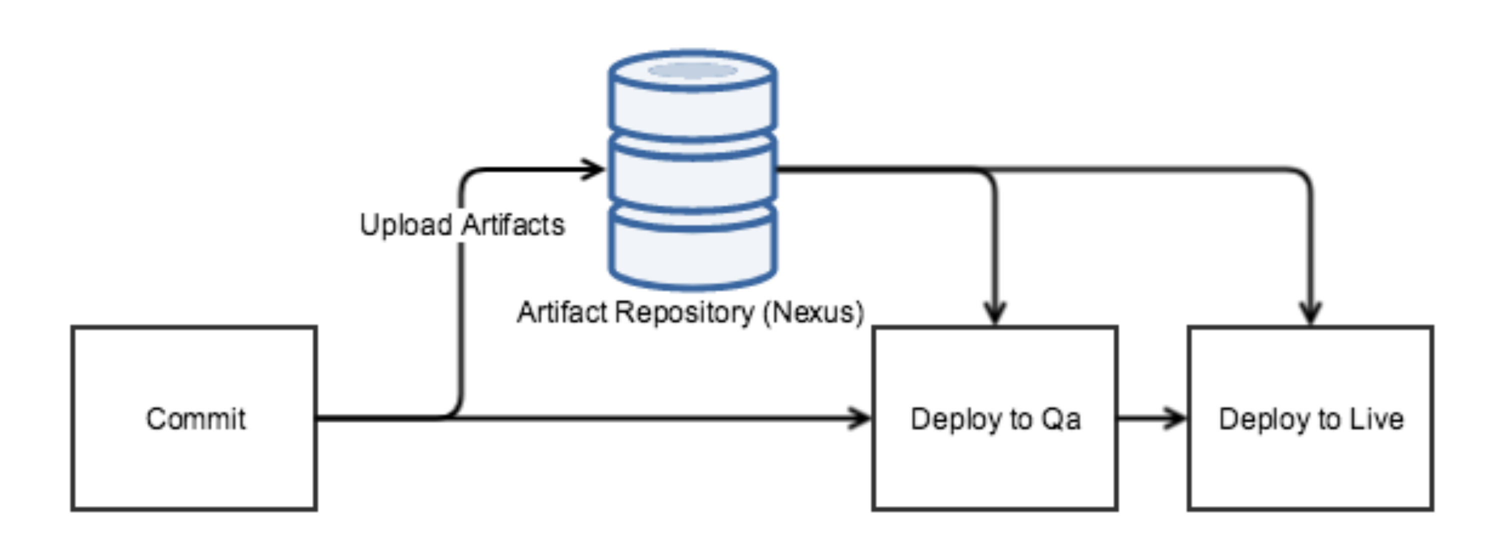
- Java
- C#
- Go
- Python
- Ruby
- PHP
- JavaScript
- Plus more



```
{
    "provider": {
        "name": "currency"
    },
    "consumer": {
        "name": "property-web"
    },
    "interactions": [
        {
            "description": "Should retrieve 200 when currency found by currency code",
            "request": {
                "method": "GET",
                "path": "/currencies/GBP",
                "headers": {
                    "Accept": "application/json"
                }
            },
            "response": {
                "status": 200,
                "headers": {
                    "Content-Type": "application/json;charset=UTF-8"
                },
                "body": {
                    "format": "epfgjVhIIgNyEVCnQCGw"
                },
                "matchingRules": {
                    "$.body.format": {
                        "match": "type"
                    }
                }
            },
            "providerState": "currency-found"
        }
    ]
}
```

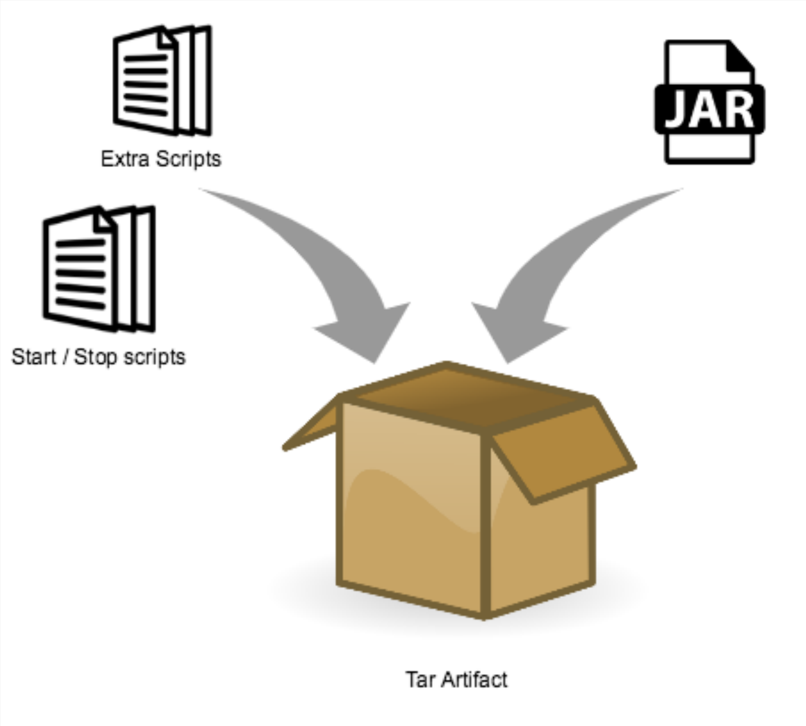
Rightmove's CI and CD pipeline

Jenkins



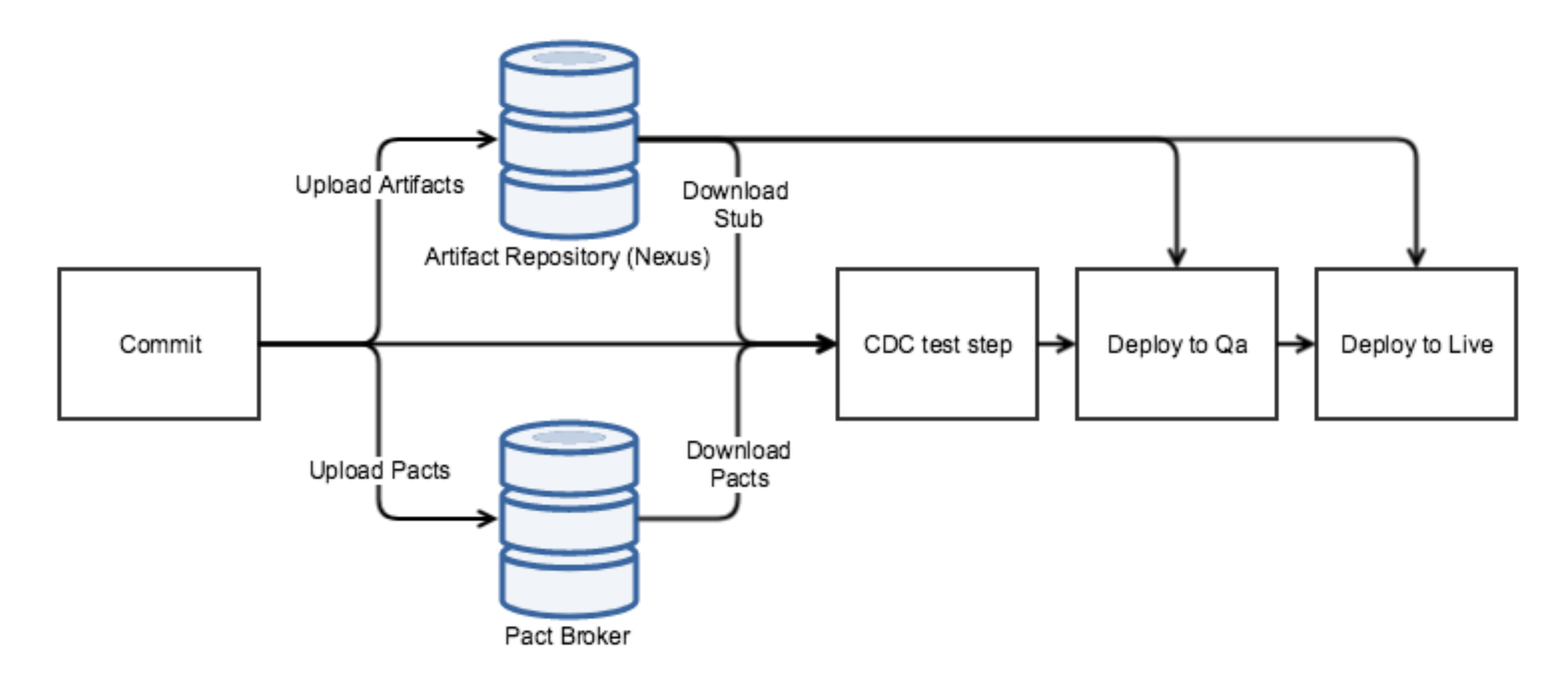
Images from: https://jenkins.io/

Rightmove's Artifacts

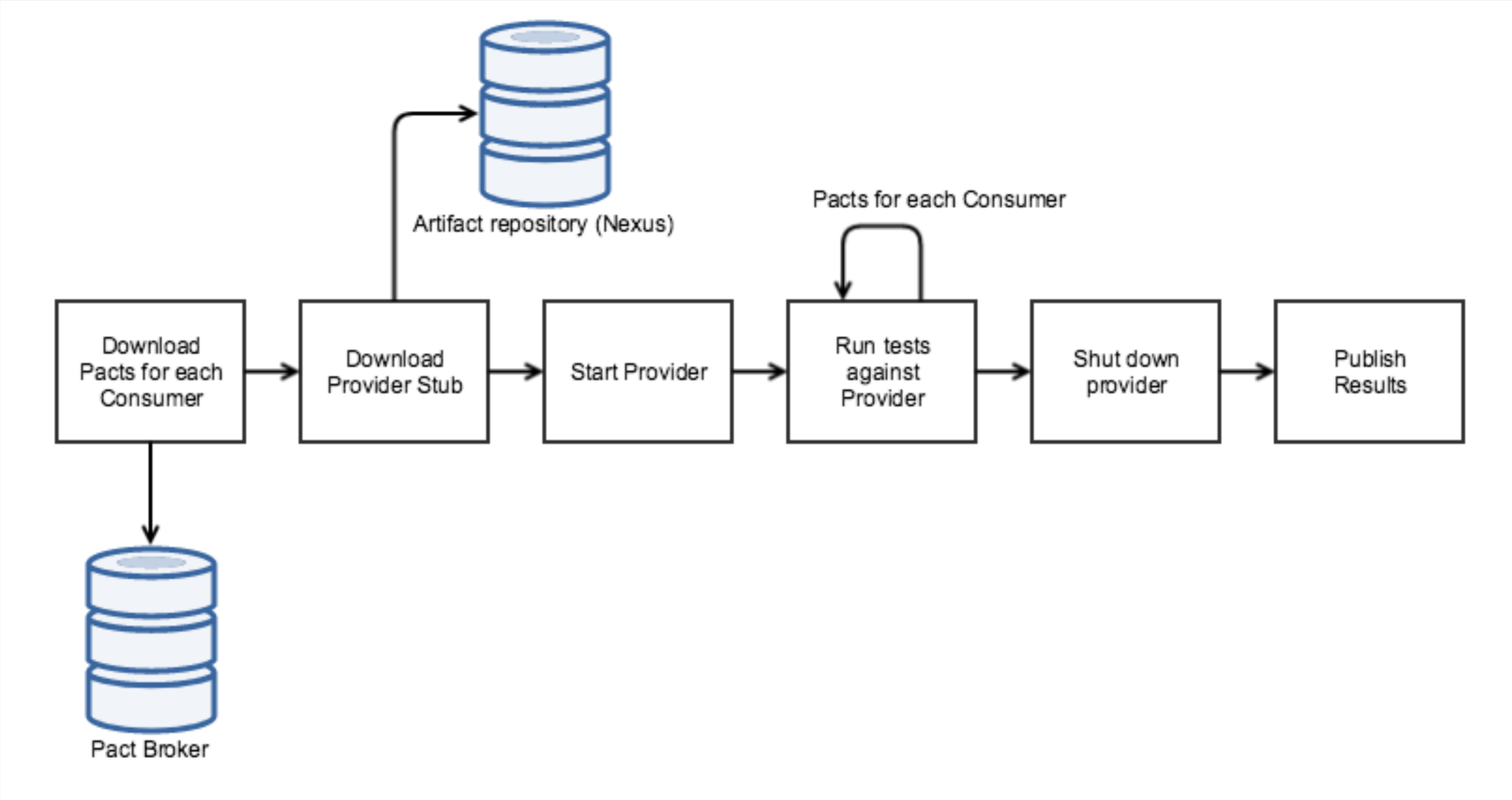


Images from: https://www.clker.com/clipart-16345.html , https://www.shareicon.net

Fitting CDC's into the pipeline

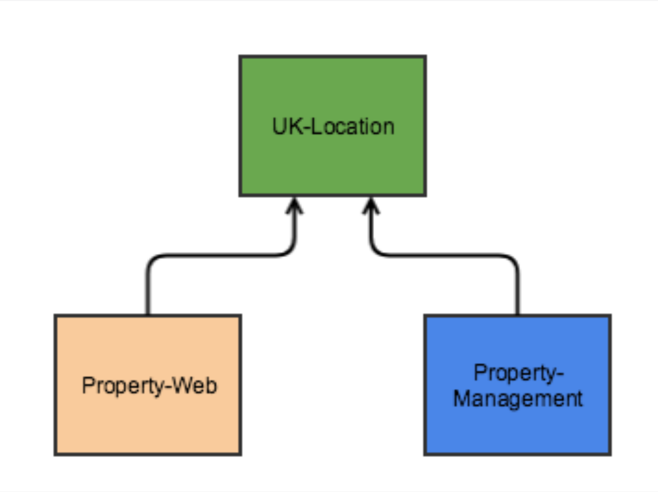


Running the Pact Tests for a provider

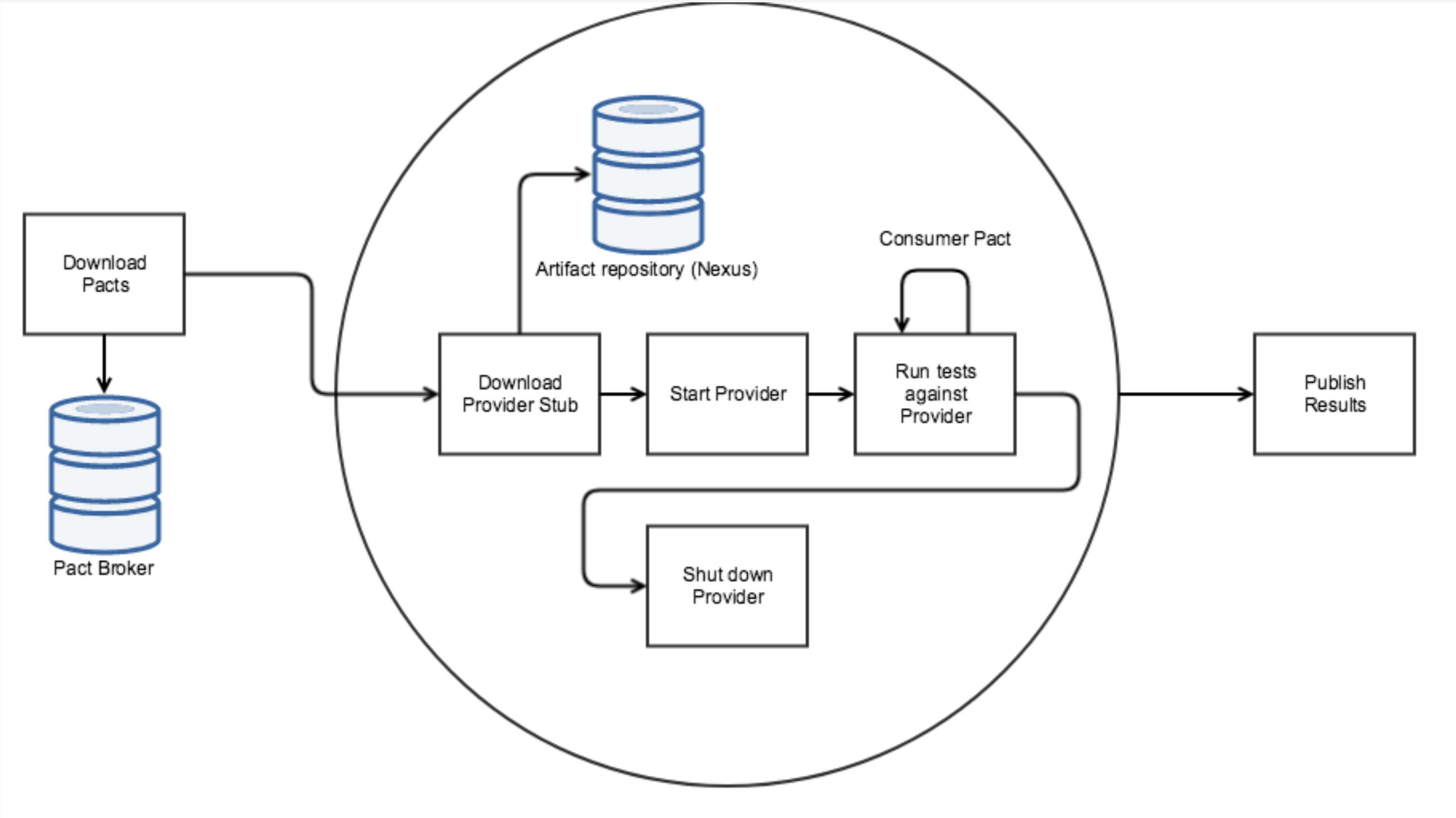


Example: UK-Location

1. Download latest Property Web/Property Management pacts for UK-Location
2. Download the stubbed UK-Location
3. Start the UK-Location
4. Gradle runner reads the Pacts, and sends requests and checks the response
5. Shut down the UK-Location
6. Publish the results

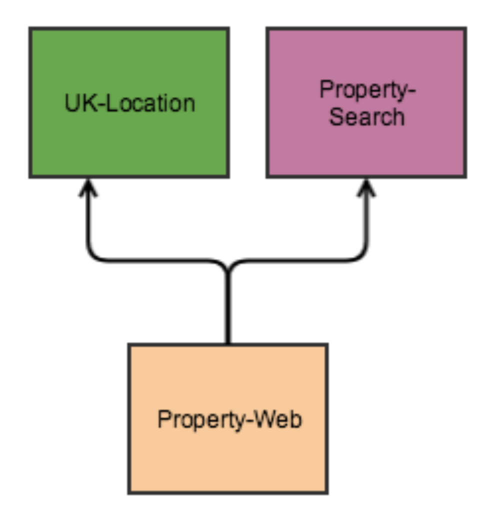


Consumer tests



Example – Property Web

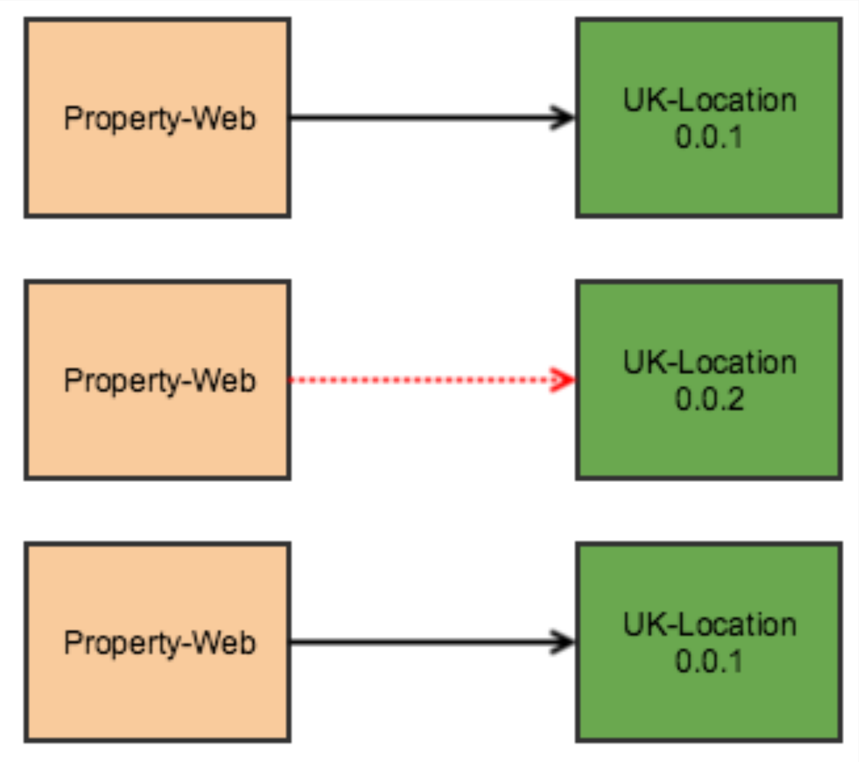
1. Download latest Pacts for a Property-Web, for UK-Location and Property-Search providers
2. For each provider
    a. Download stub
    b. Gradle runner reads the Pact between the Property Web and provider, and sends requests / checks response
    c. Shut down provider
3. Publish results



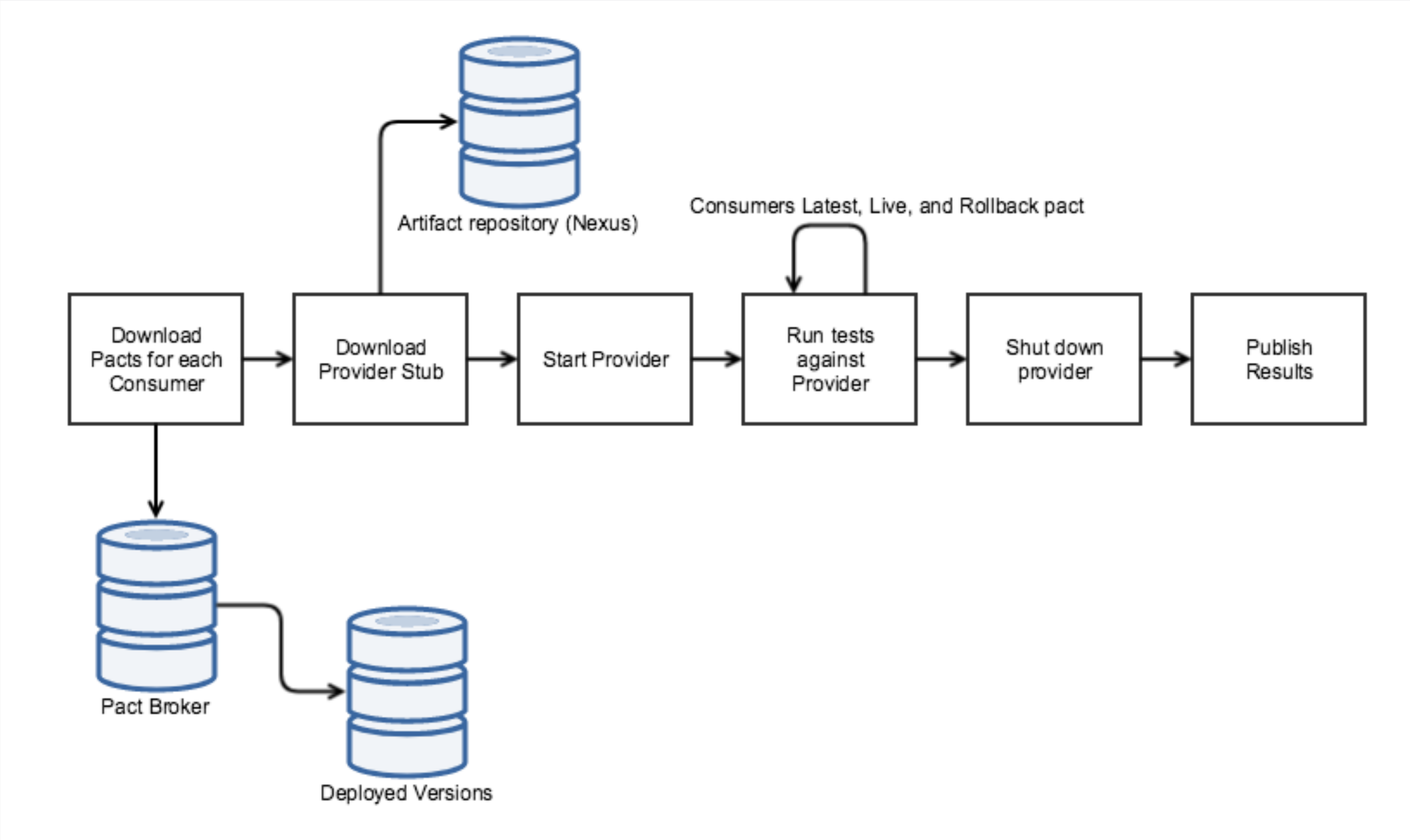
CDC check list

- A consistent format to describe request responses
- An easy way to create Consumer Driven Contracts
- An easy way to add these tests to our CI/CD pipelines
- A way of storing these contracts
- A way of enabling us to Rollback an application
- An easy way to run tests locally

Rollbacks


Property-Web
UK-Location 0.0.1
Property-Web
UK-Location 0.0.2
Property-Web
UK-Location 0.0.1

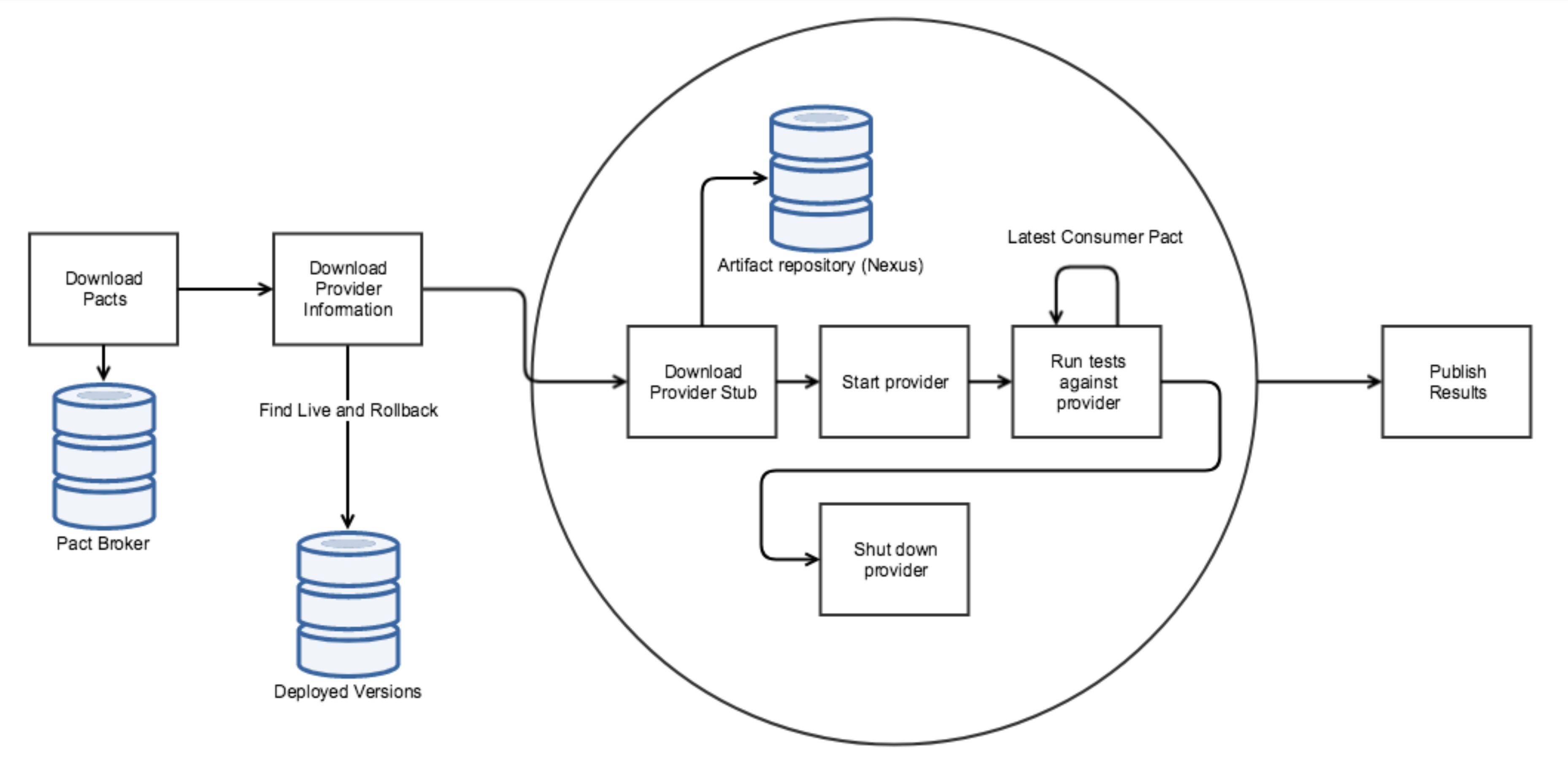
Provider tests – Latest, Live, Rollback


Artifact repository (Nexus)
Consumers Latest, Live, and Rollback pact
Download Pacts for each Consumer
Download Provider Stub
Start Provider
Run tests against Provider
Shut down provider
Publish Results
Pact Broker
Deployed Versions

Example: UK-Location

1. Download Latest, Live, and Rollback Property Web/Property Management pacts for the latest UK-Location
2. Download the latest stubbed UK-Location
3. Start the latest UK-Location
4. Gradle runner reads the Pacts, and sends requests and checks the response
5. Shut down the UK-Location
6. Publish the results

Consumer tests – Latest, Live, Rollback



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Example: Property-Web

1. Download latest Pacts for Property Web, for UK-Location and Property-Search
1. For each provider (latest, live, and rollback)
   2. Download
   3. Gradle runner reads the Pact between the consumer and provider, and sends requests / checks response
   4. Shut down provider
2. Publish results

Are we there yet?

- A consistent format to describe request responses
- An easy way to create Consumer Driven Contracts
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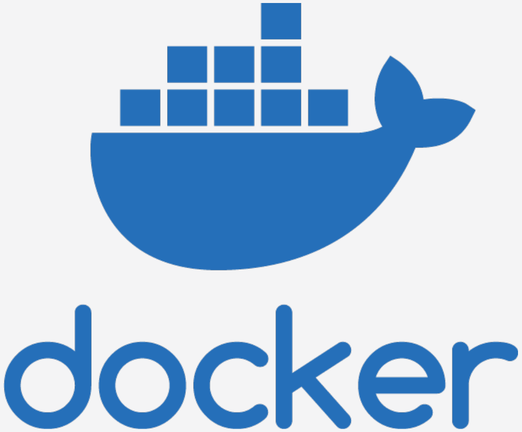
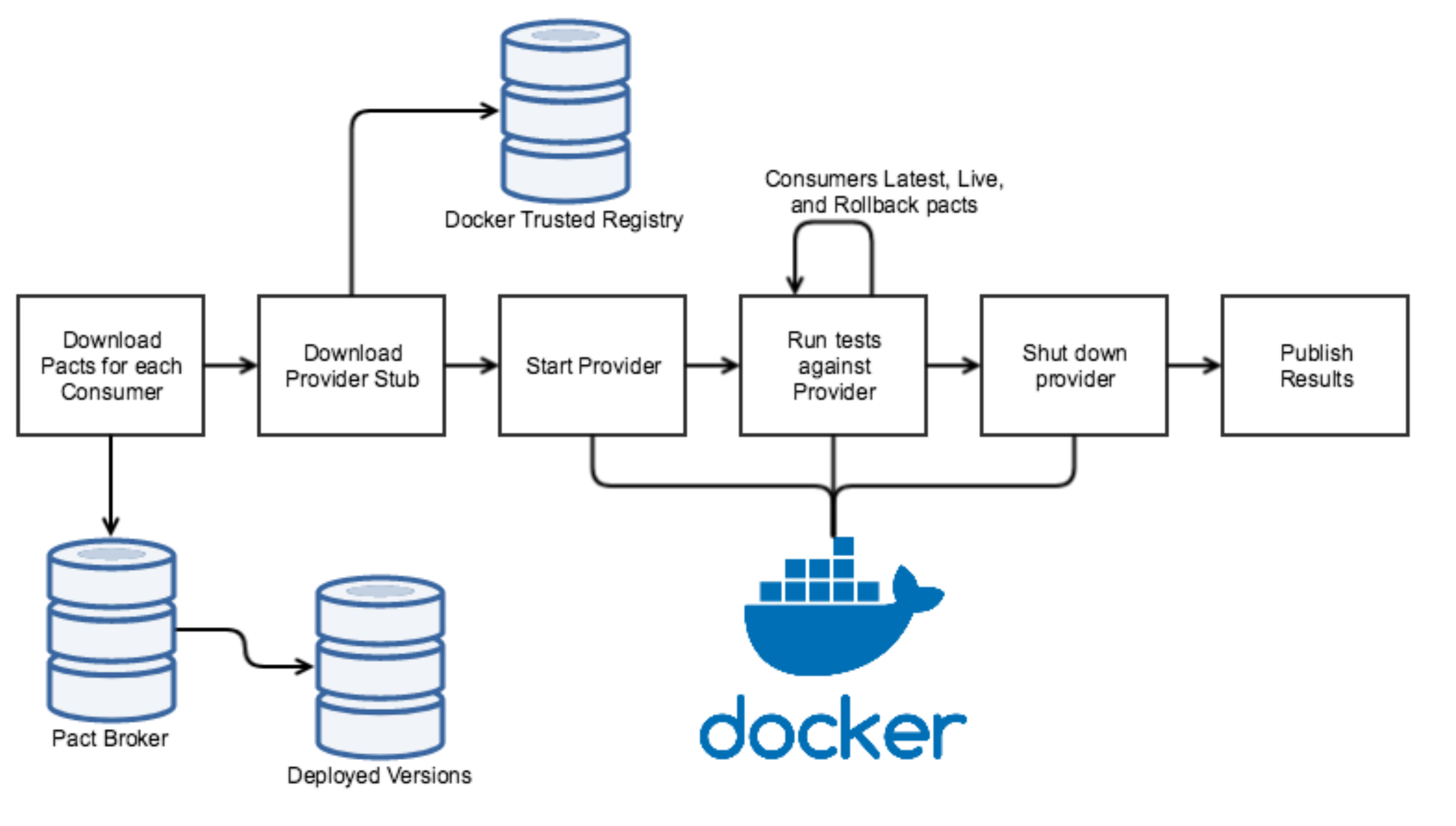
Testing Locally

- Faster to spin up and use
- Way less custom code / logic
- Easier to run different project types – not just java
- Platform-agnostic



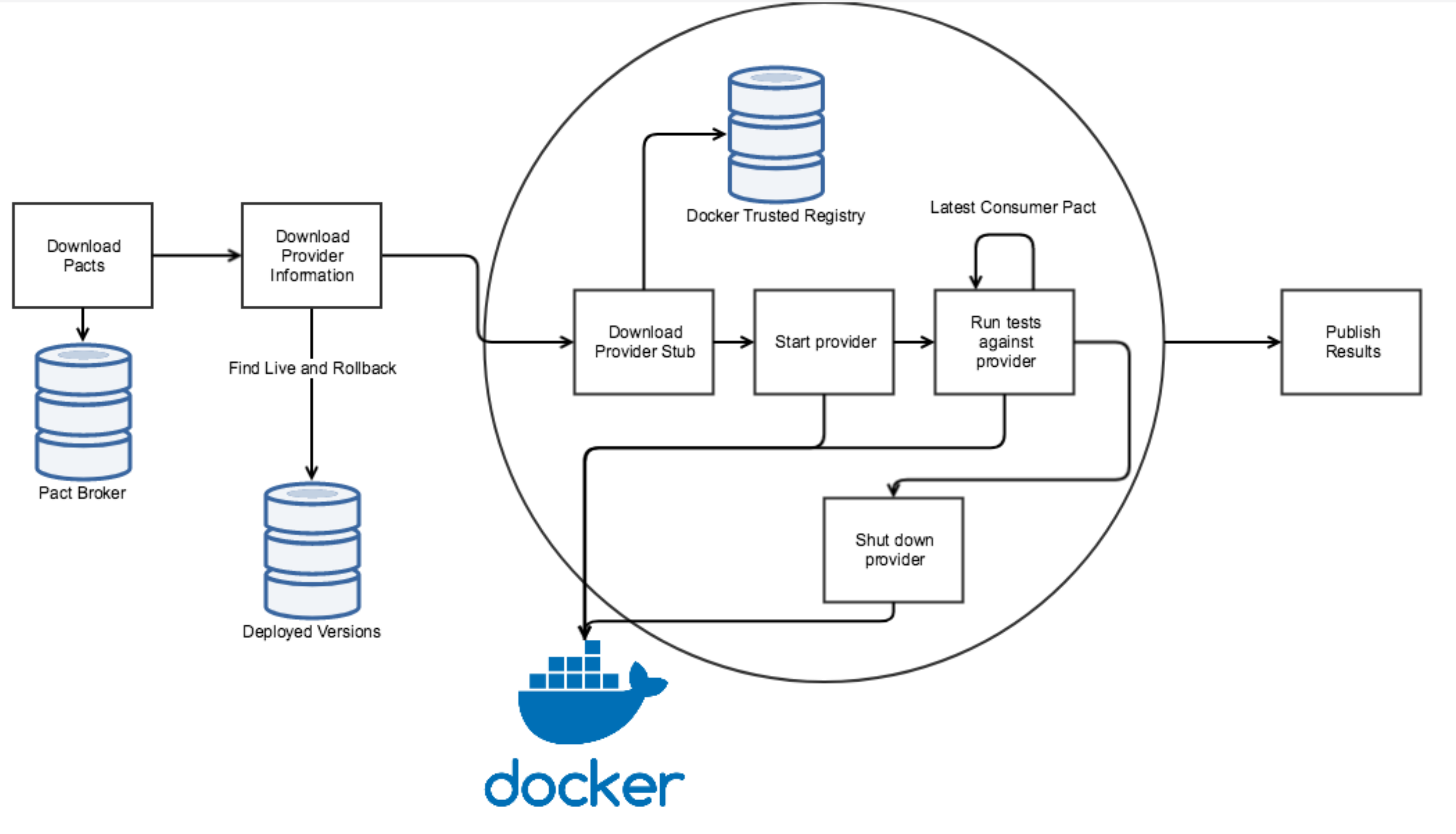
Images from: docker.com

Provider Tests



Images from: docker.com

Consumer Tests



Images from: docker.com

Are we there yet?

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The Future

- Parallel Tests
- Greater insights into our services, using Pacts
- Easier Pact version upgrading
- Open sourcing what we've done

Questions?

Feed back and comments:

@Hazz223

We're also hiring.

Come speak to me after!
Or email me:
harry.winser@rightmove.co.uk
Or head here:
http://plc.rightmove.co.uk/careers/current-vacancies.aspx

References

- Consumer Driven Contracts: A Service Evolution Pattern https://martinfowler.com/articles/consumerDrivenContracts.html
- The Pact Foundation: https://github.com/pact-foundation
- Pact JVM library: https://github.com/DiUS/pact-jvm
- Docker: https://www.docker.com/what-docker