4th UCAAT User Conference on Advanced Automated Testing

ETSI World Class Standards

CONTRACT TESTING IN THE CLOUD IN GEHC

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ABOUT CONTRACTS

What is a contract? Why do we test it?

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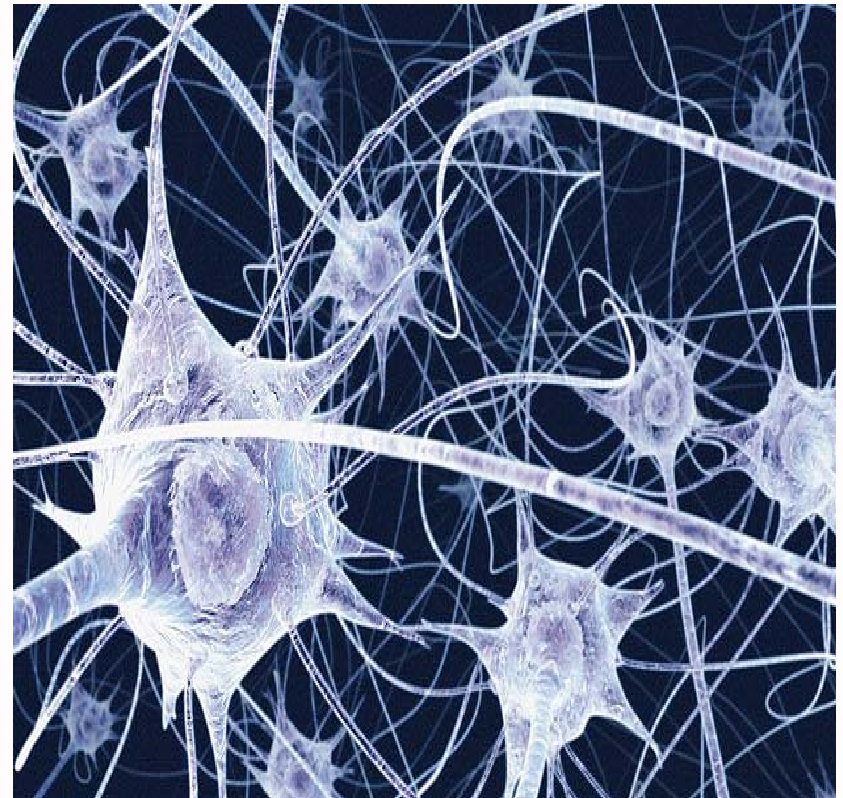
Microservice Architecture

- The system is decomposed into small components with narrow scope
- Communication between the components is done over the network
- The individual components have their own independent lifecycle and they are independent deployment units



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Relationships in Microservice Architecture

- Are asymmetric, they follow the server-client model
- Server is called provider, as it provides a service and the client is called consumer for similar reasons
- Usually they use HTTP (RESTful)
- Or some kind of messaging protocol, like AMQP

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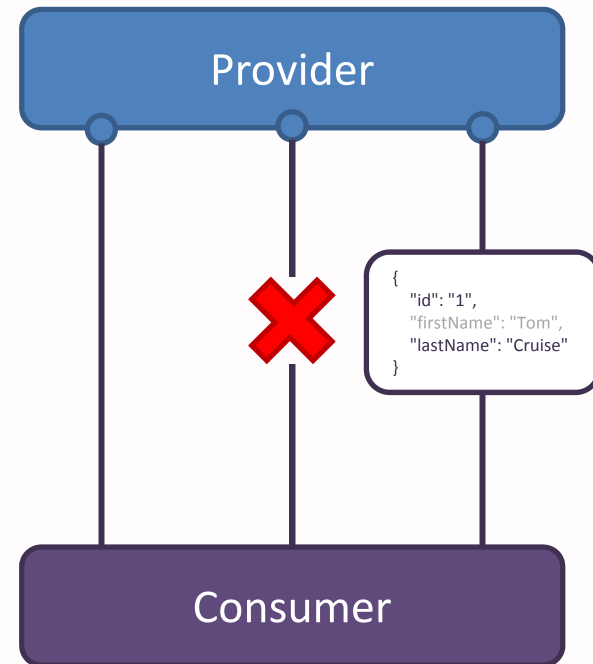
Contract

- A contract is formed when a component becomes the consumer of another
- It describes how the service is consumed by the consumer
- It contains the consumer's expectations about
  - Input-output data structures
  - Performance
  - Concurrency characteristics



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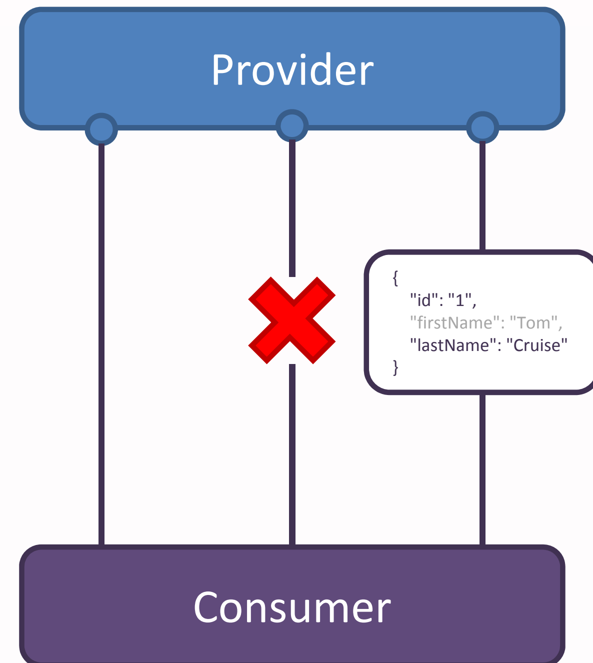
Contract Testing

- Contract testing aims to ensure that a consumer's dependency on a provider is continuously fulfilled
- Therefore
  - It is done on the provider
  - from the consumer's point of view
  - Focus is on the behaviour on the interface (not on the domain logic)



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CONCEPTS USED

The building blocks

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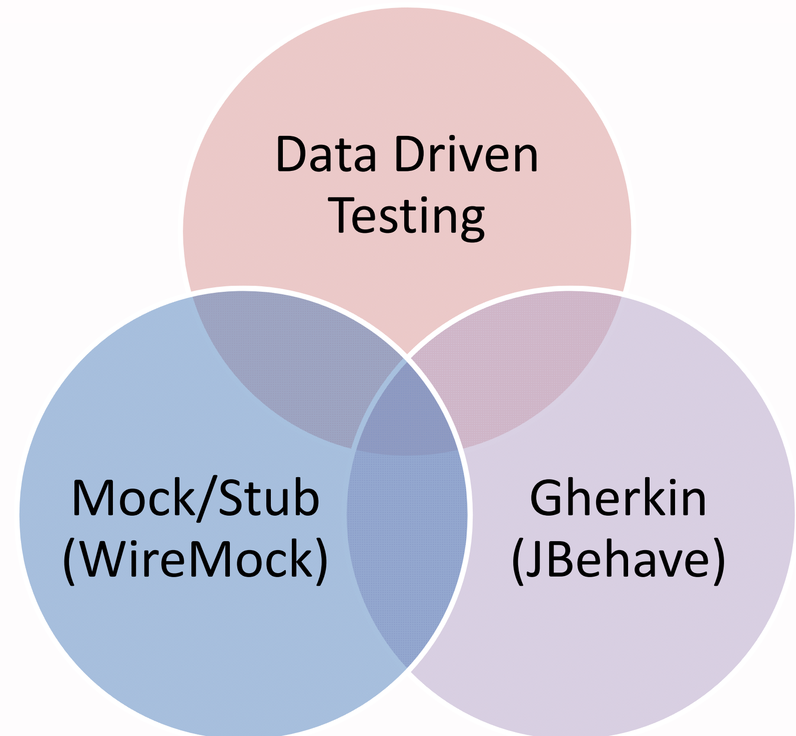
Concepts used

- Data Driven Testing
  - only the data is needed from the user, everything else is there
- Gherkin (JBehave)
  - Self-documenting
  - Automatic translation of data into test
- Mock/Stub (WireMock)
  - Helps the isolation of the tested microservice



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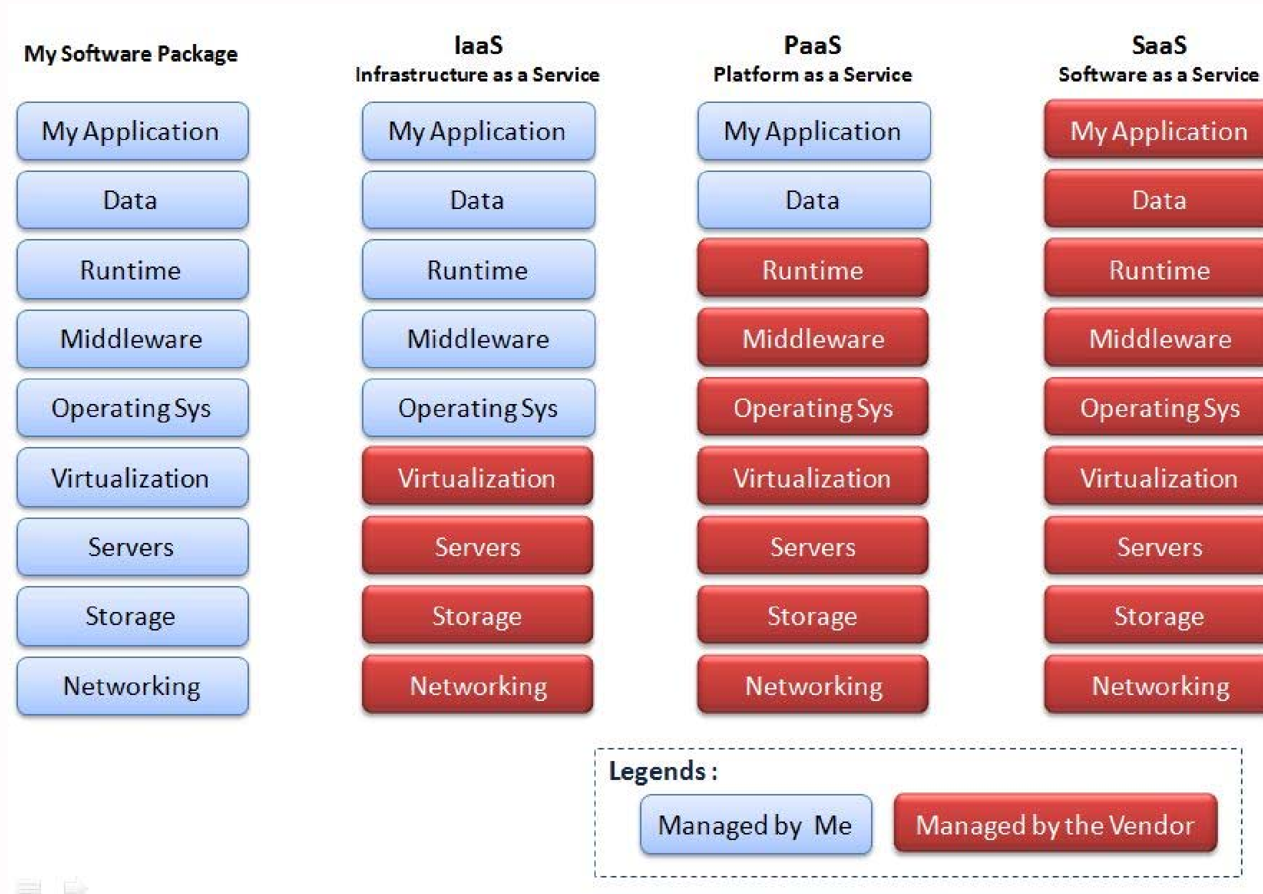
Cloud services



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Testing as a Software as a Service

- MyApplication
  - Is a data driven test tool
  - Sitting in the cloud
  - Listening on HTTP for test execution requests

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WHAT WE DID

Contract Test Executor Service

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We defined our MVP

- Support HTTP contracts
- 100% data driven
- Software as a Service
- Support Oauth 2.0
- Automatic mocking for HTTP based dependencies
- Load binary/JSON data from file

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First we needed a data format

1. Credentials
2. DataRecords
   - Operation
   - HTTP method
   - Parameters
   - Response

```yaml
---
credentials:
  clientId: some-client-id
  clientSecret: the-client-secret
  username: some.user@some.domain
  password: some password
dataRecords:
- operation: https://some.domain/another/path
  httpMethod: POST
  parameters:
  - in: body
    name: content
    type: octet-stream
    reference: /temp/some/file.bin
  - in: header
    name: content-type
    type: string
    value: application/octet-stream
  response:
    code: 200
    type: string
    reference: Successful operation!
    headers:
    - name: content-type
      value: text/plain
```


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Then we needed a way to convert data to test

```
Scenario: 0b865200-f87b-4329-9a87-00abd8b44390
Given the following HTTP request
| httpMethod | httpAddress                       |
| POST       | https://some.domain/another/path |
And the following parameters for the request
| in     | name         | type         | value                    | reference          |
| body   | content      | octet-stream | null                     | /temp/some/file.bin |
| header | content-type | string       | application/octet-stream | null               |
And the following credentials
| client_id      | client_secret     | username              | password      |
| some-client-id | the-client-secret | some.user@some.domain | some_password |
When I send the request
Then I receive a response with status code 200
And the response body is
| type | value | reference                  |
| json | null  | /temp/some/json-file.json |
And the response headers are
| name         | value            |
| content-type | application/json |
```


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And a way to convert data to mock


```
{
  "request": {
    "method": "POST",
    "url": "/another/path",
    "headers": {
      "Content-Type": "application/octet-stream"
    }
  },
  "response": {
    "status": 200,
    "body": "The content of /temp/some/json-file.json",
    "headers": {
      "Content-Type": "application/json"
    }
  }
}
```


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The rest was just implementation detail

We used 3rd party libs for

- Oauth 2.0 support
- Binary data conversion
- JSON data conversion

Relied on

- Spring
- jackson

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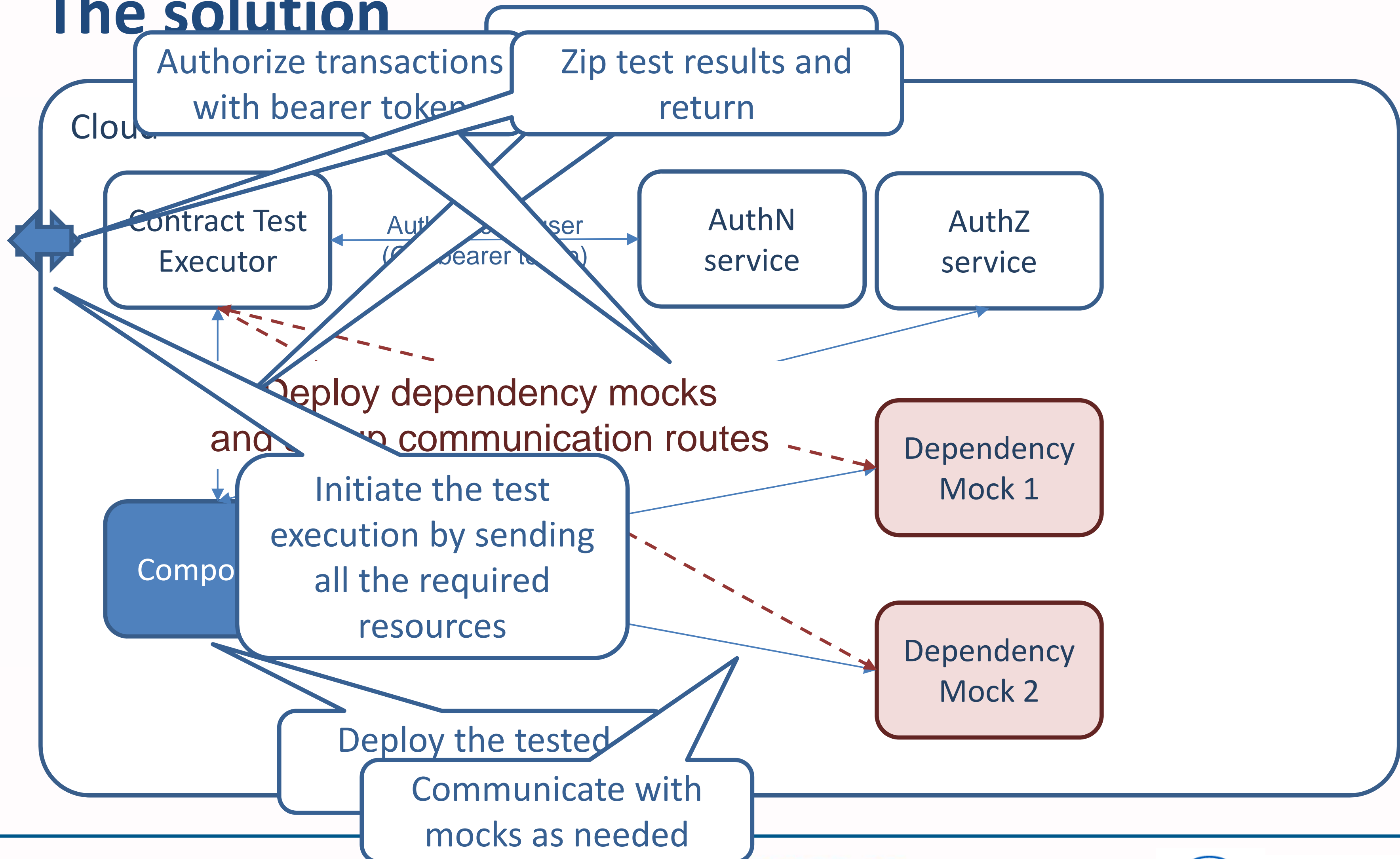
The solution



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Highlights, achievements

- Uses the same data structure for test input and mock data
- Isolates the tested component automatically
- It is self contained
- Hides the implementation details of the test environment completely (you don't have to write code to do automated testing)
- It is really a service in the cloud, that anyone can access

Thank You for your attention!

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