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LocalStack

An AWS cloud stack for testing your apps locally

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Agenda

- How do we currently test AWS cloud services?
- What is LocalStack?
- What does LocalStack provide ?
- Advantages and disadvantages
- Integrating LocalStack with JUnit
- Demo
- Things to be aware of
- Links

How do we currently test AWS cloud services?

All our existing patterns for testing AWS services have drawbacks

- Mock interactions with the AWS client
  - Problems:
    - Completely fake implementation based on observed behaviour at the time of writing the test
    - Useful only as a regression test

How do we currently test AWS cloud services?

All our existing patterns for testing AWS services have drawbacks

- Running integration tests against a "test area" in a real AWS account
  - Problems:
    - Tests depend on externally provisioned infrastructure
    - Build machine needs access to that account
    - Concurrent tests against the same resource may fail

How do we currently test AWS cloud services?

All our existing patterns for testing AWS services have drawbacks

- Minimize the AWS code behind an interface and only test up to that interface
  - Problems
    - May still be bugs behind that interface
    - Adds needless complexity and abstraction

What is LocalStack?

- Test/mock framework for testing apps that work with AWS Cloud services locally
- Open-source
- Supports a wide variety of AWS Services
- Compatible with
  - AWS CLI tools
  - Java SDK libraries
  - Python Boto libraries

What does LocalStack provide?

- Provides a way to test many of the services used in KD, such as:
  - Lambda
  - S3
  - SNS
  - SQS
  - And many others
- Some of them are less likely to be representative of the real environment, such as:
  - IAM

Advantages and disadvantages

Advantages

- No dependency on cloud
- Simulates AWS service behaviour
- Can simulate errors with AWS services to test error handling
- Works with existing AWS code and tools with very few changes

Disadvantages

- Some services may be less accurate simulations (e.g., IAM)
- Updated regularly, but may lag slightly behind new AWS releases

Integrating LocalStack with JUnit

Making LocalStack services available to JUnit

- Java library that supports JUnit tests
- Use Testcontainers to handle launch and shutdown of services for tests
  - Provides interfaces to launch and shutdown containers per test or for all tests
  - Provides mechanisms to expose ports to the tests
  - Works well with docker-compose for multi-container systems

Demo

https://github.com/LigiaStefanaStan/localstack-tests

Things to be aware of

- LocalStack will create files with the privileges of the Docker process
  - LocalStack can store data outside the container to make it easier to run tests
  - These files will be created by the Docker process, which may be running as root
  - This caused us issues on our build machine
    - Moving the files under /tmp resolved the issue

Links

- Demo
  - https://github.com/LigiaStefanaStan/localstack-tests
- LocalStack:
  - https://github.com/localstack/localstack
  - Python Client :https://github.com/localstack/localstack-python-client

Links

- Testcontainers:
  - Scala: https://github.com/testcontainers/testcontainers-scala
  - Java: https://github.com/testcontainers/testcontainers-java
  - Python: https://github.com/testcontainers/testcontainers-python

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Thank you

Any questions?