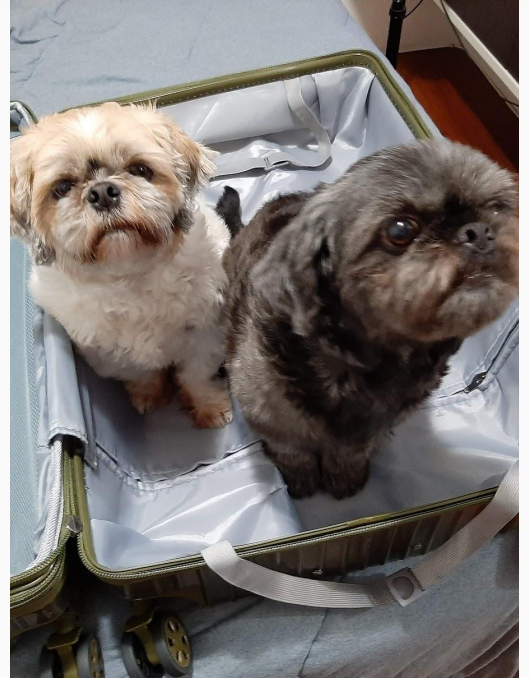


Accelerating Java Cloud Development with Testcontainers and Localstack

Andrews Reis



Myself



WALS

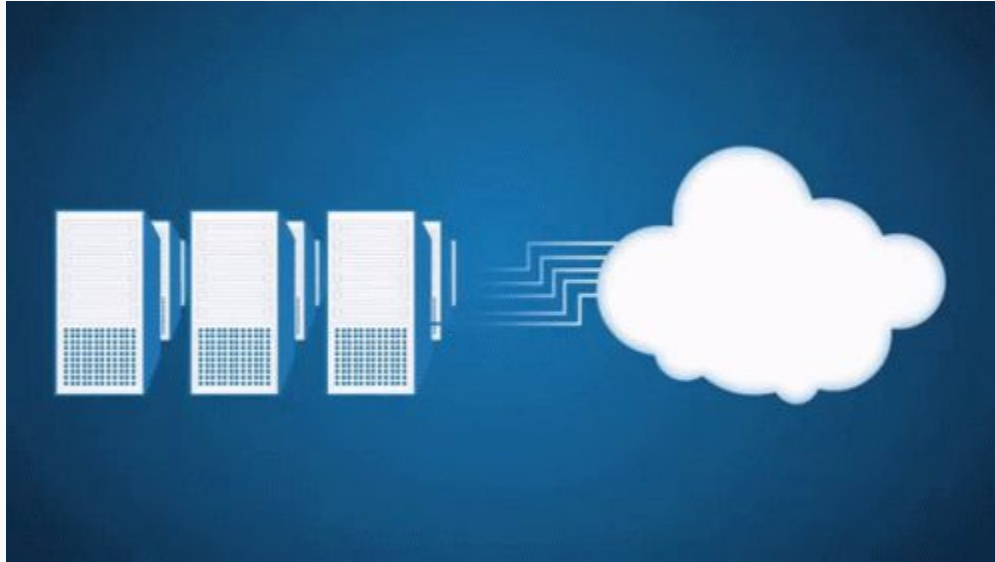
The logo for WALS is a bold, black, sans-serif font. The letter 'A' is stylized with a bright blue diagonal stripe running from the bottom-left to the top-right. The letter 'S' also features a similar blue stripe. The background of the letters is black, and the overall design is modern and tech-oriented, with faint binary code (0s and 1s) visible in the background.

Agenda

1. Using Cloud Resources in Local development
2. Common alternatives
3. Cloud Emulator
4. AWS Localstack
5. Testcontainers
6. The Dunder Mifflin Problem
7. Demo Time
8. Questions



Cloud Computing



The data center of my former company:



Me and the team:



Using Cloud Resources in Local Development

Connecting to **STAGE** or **TEST** cloud environment

- Pros:
 - Use the "real world" setup
- Cons:
 - Complexity
 - Cost
 - Accessibility issues



Common alternatives

- Mocking services
- Skipping tests



Introducing a Different Approach: Emulators



Cloud Emulators

- Tools that mimic cloud services locally
- Provide a **local environment** that behaves like **real cloud services**
- **Pros:**
 - Cloud cost reduction
 - Simplified setup
 - Faster development cycle
 - Offline accessibility
- **Cons:**
 - Not all resources available
 - Not all features are free
 - Demands cloud/devops knowledge










AWS Localstack

- It's a "fully" functional **local AWS** cloud stack
- Enable developers to run/test cloud applications locally without connecting to real **AWS** environment







AWS Localstack







App Integration

-  API Gateway
-  SQS
-  SNS
-  Step Functions
-  EventBridge
-  Application Auto Scaling Pro
-  MWAA Pro
-  MQ Pro
-  EventBridge Pipes Pro

Compute

-  EC2
-  Lambda
-  ECS Pro
-  ECR Pro
-  EKS Pro


Management/Governance

-  CloudFormation
-  CloudWatch Logs
-  CloudWatch
-  Simple Systems Manager (SSM)
-  CloudTrail Pro
-  Account Pro

Business Applications

-  SES

Developer Tools

-  AppConfig Pro
-  CodeCommit Pro






Front-end Web & Mobile

-  AppSync Pro
-  Amplify Pro

Migration and transfer

-  Database Migration Service Enterprise

Security Identity Compliance

-  Cognito Pro
-  Secrets Manager
-  KMS
-  IAM
-  Certificate Manager


Storage

-  S3
-  Backup Pro








Machine Learning

-  SageMaker Pro
-  Transcribe Service








Cloud Financial Management

-  Cost Explorer Pro

Database

-  DynamoDB
-  RDS Pro
-  ElastiCache Pro
-  Timestream Pro
-  QLDB Pro
-  DocumentDB Pro
-  Neptune Pro

Analytics

-  Athena Pro
-  Kinesis
-  Kafka Pro
-  Glue Pro
-  Route 53
-  CloudFront Pro
-  Open Search Service

What about other Cloud Providers?

- Google Cloud Provider Emulator
- Azure Localstack

Testcontainers

- Provides **lightweight**, disposable **Docker containers** for **testing**
- Enables integration testing with **real external resources**
- Benefits:
 - Isolation
 - Ease of setup
 - Consistency
 - Flexibility



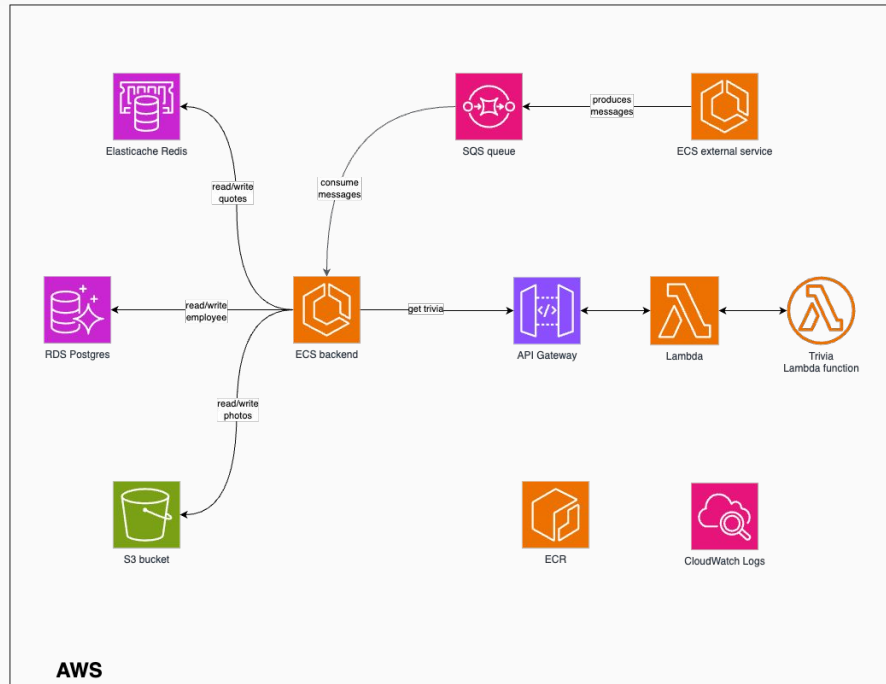
Testcontainers

The Dunder Mifflin Problem

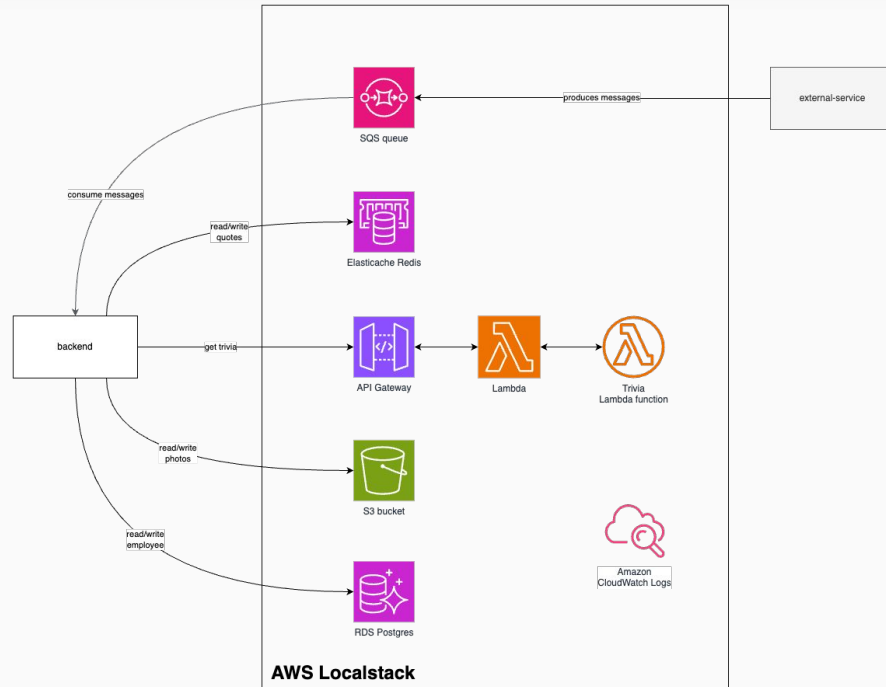
Dunder Mifflin, a paper company application must:

- Maintain employee's name, department and a nice photo
- Receive a streaming of employee's quotes and store them
- Search a Trivia about the employees in an external service

Production Environment



Local Environment



Demo Time

Wrapping up

Challenges:

- Simplified local development and testing of AWS applications
- Reduce complexities and costs associated with real cloud resources

Solution presented:

- AWS LocalStack
- Testcontainers



Wrapping up

Dunder Mifflin Application Demo:

- **RDS** for database
- **S3** for bucket
- **SQS** for message queue
- **ElastiCache** for caching
- **API Gateway & Lambda**: external API



Key benefits

- **Cost Reduction:**
 - No need for real AWS resources during development/testing
- **Enhanced Productivity:**
 - Faster development cycles with immediate feedback
 - Ability to work offline without internet dependency
- **Reliable Testing:**
 - Realistic integration tests using actual service interactions
 - Consistent environments across all developers and CI pipelines

References

<https://docs.localstack.cloud/overview/>

<https://docs.localstack.cloud/user-guide/integrations/testcontainers/>

<https://www.localstack.cloud/pricing>

<https://github.com/andrewsdosreis/dunder-mifflin-paper-company>







We are screwed.



No, it's up there! There's no road here!









"People will never be replaced by machines. In the end, life and business are about human connections. And computers are about trying to murder you in a lake. And to me the choice is easy."

Scott, Michael

Thank you

Questions ?