CONF42

Session Title: Real-time earthquake alert system: Leveraging Serverless architecture with Confluent Kafka

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Who am I ?

- Cloud development & Cyber Security
  - projects in Data Science domain
  - multiple security researches for Romanian Banks
- AWS Community Builder in Serverless

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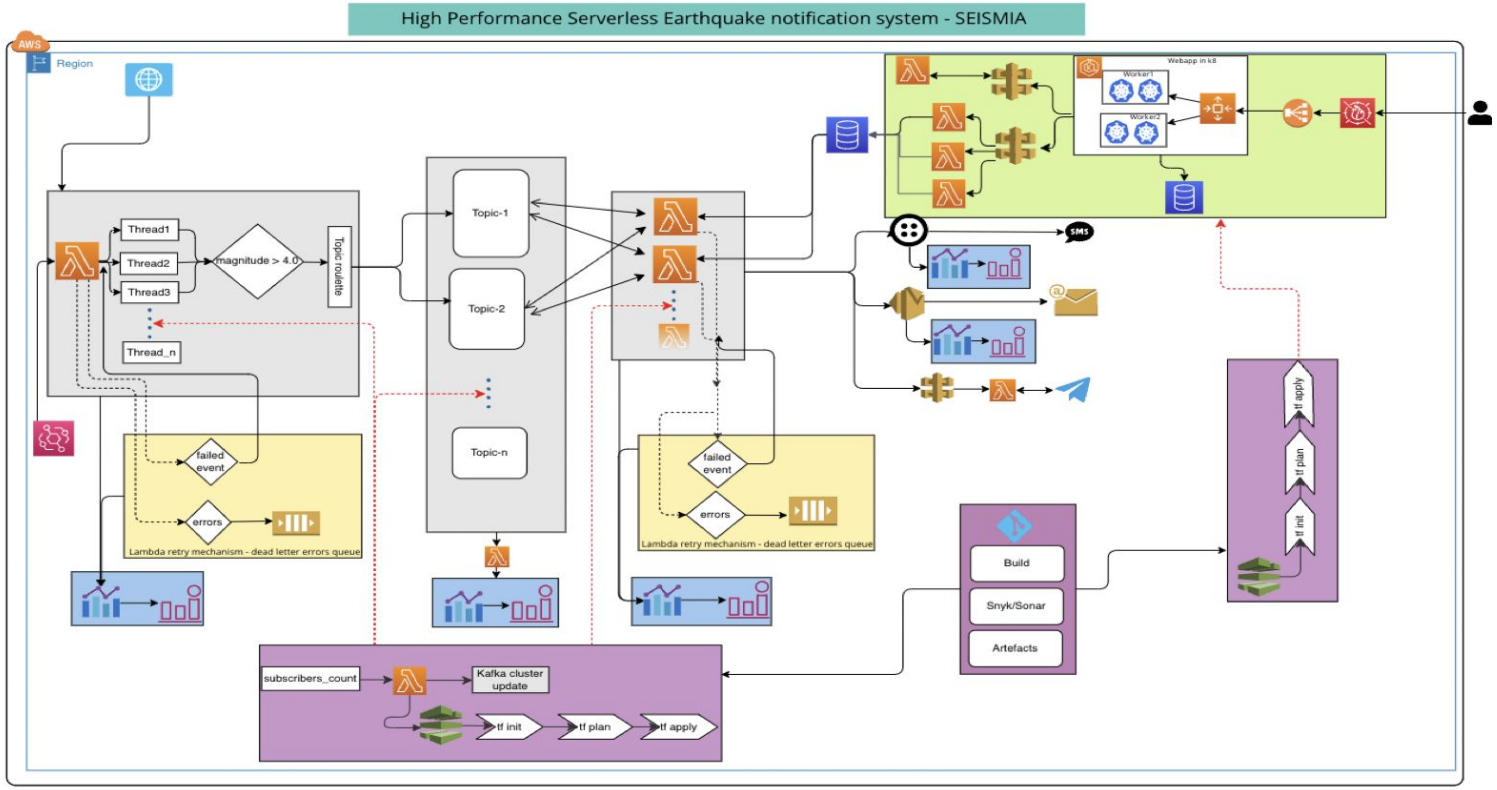
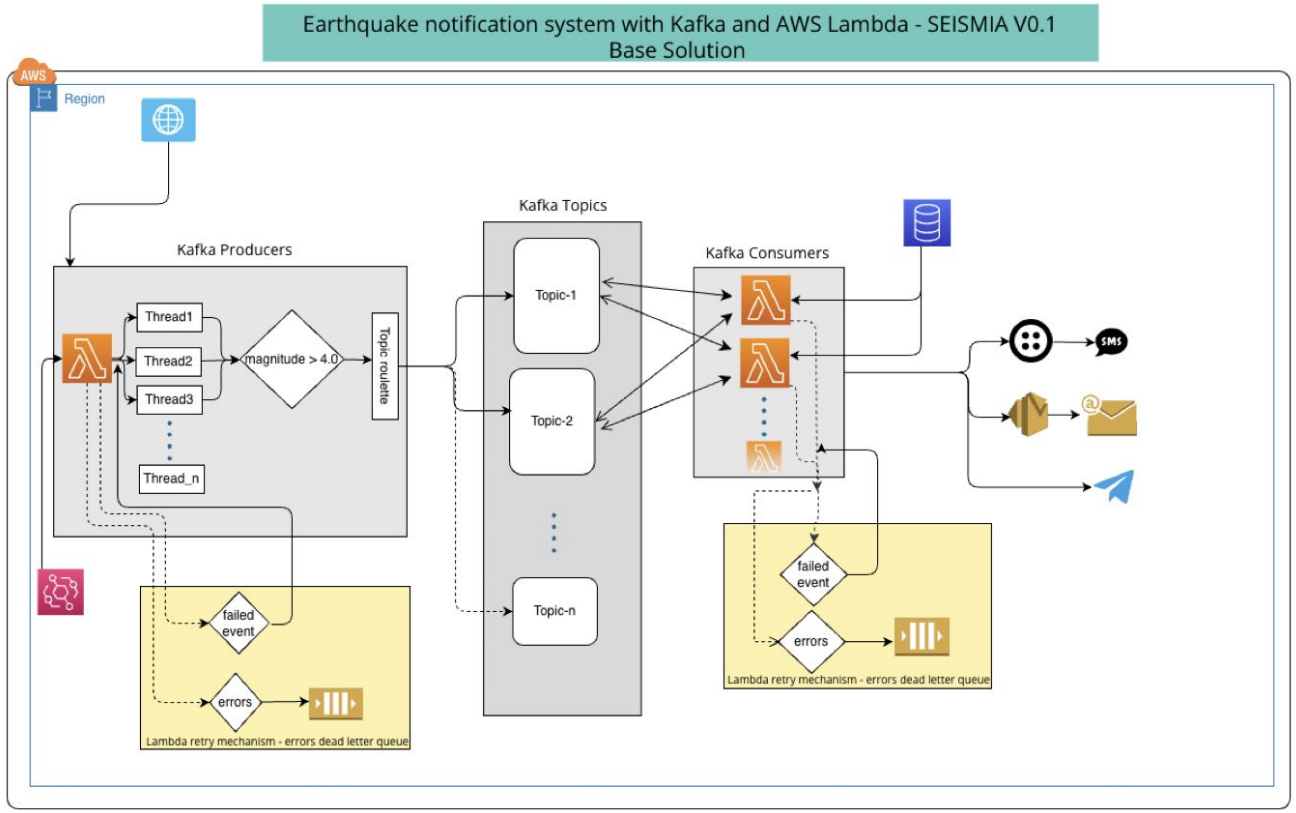
The story behind the research project

- Why the need for a high performance earthquake notification system
- Where to find good real time earthquake data
- Why choosing the Serverless ecosystem

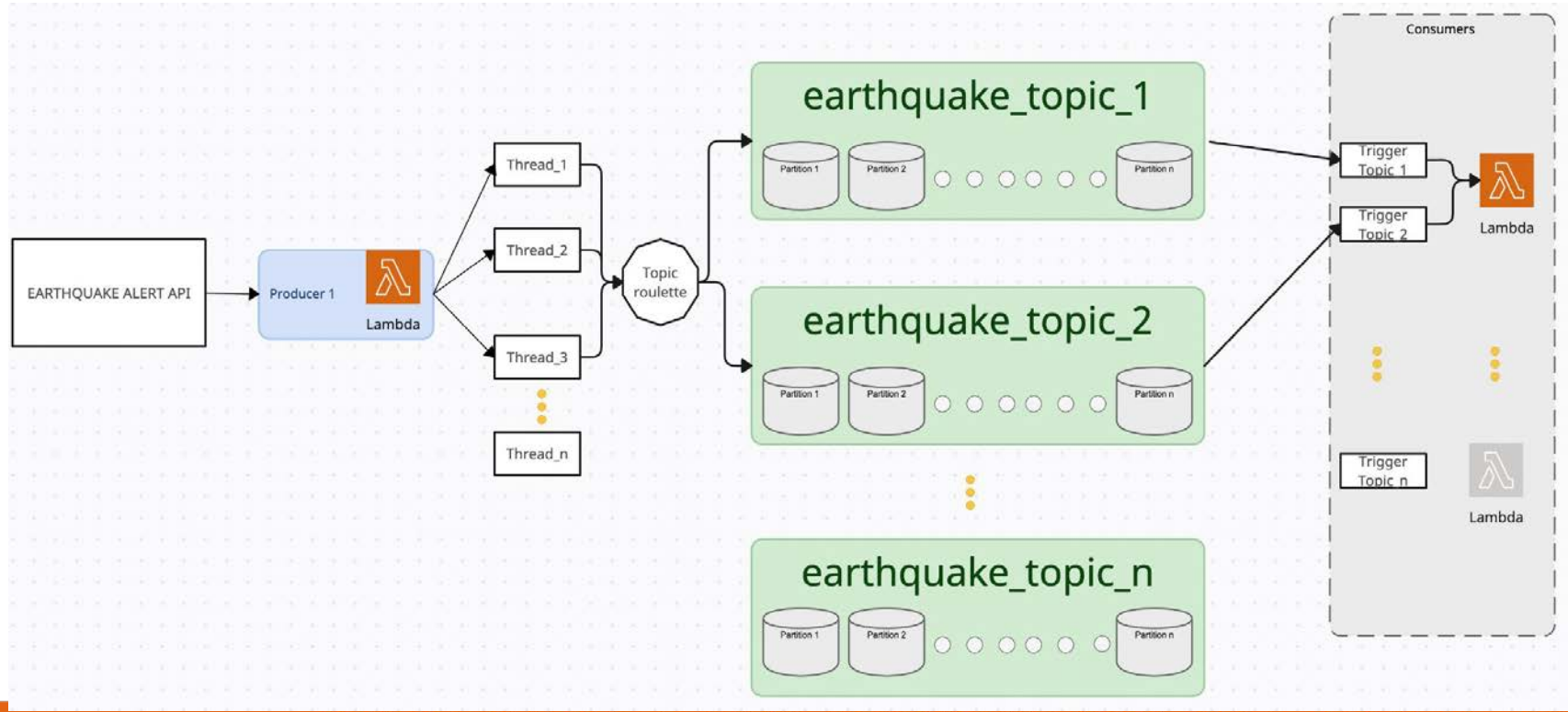
Architecture of the Serverless notification system



Architecture of the base notification system



Architecture of Kafka integration in Serverless context



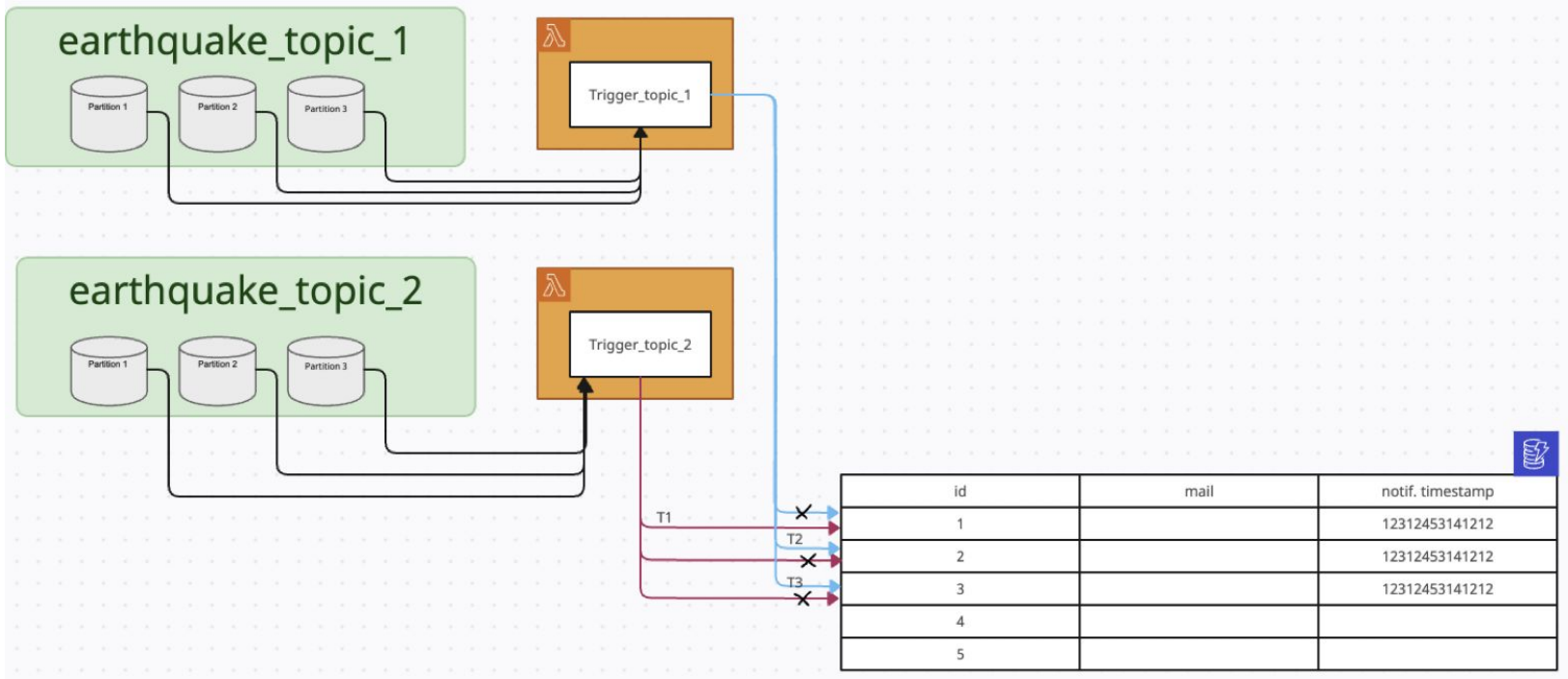
Lambda Kafka Producer key elements

- Multithreading in the Kafka Producer
- Using thread lock to not write to same topics from separate threads
- Using partition number to not overwrite data in partitions
- Using Lambda retry and SQS Dead Letter for errors

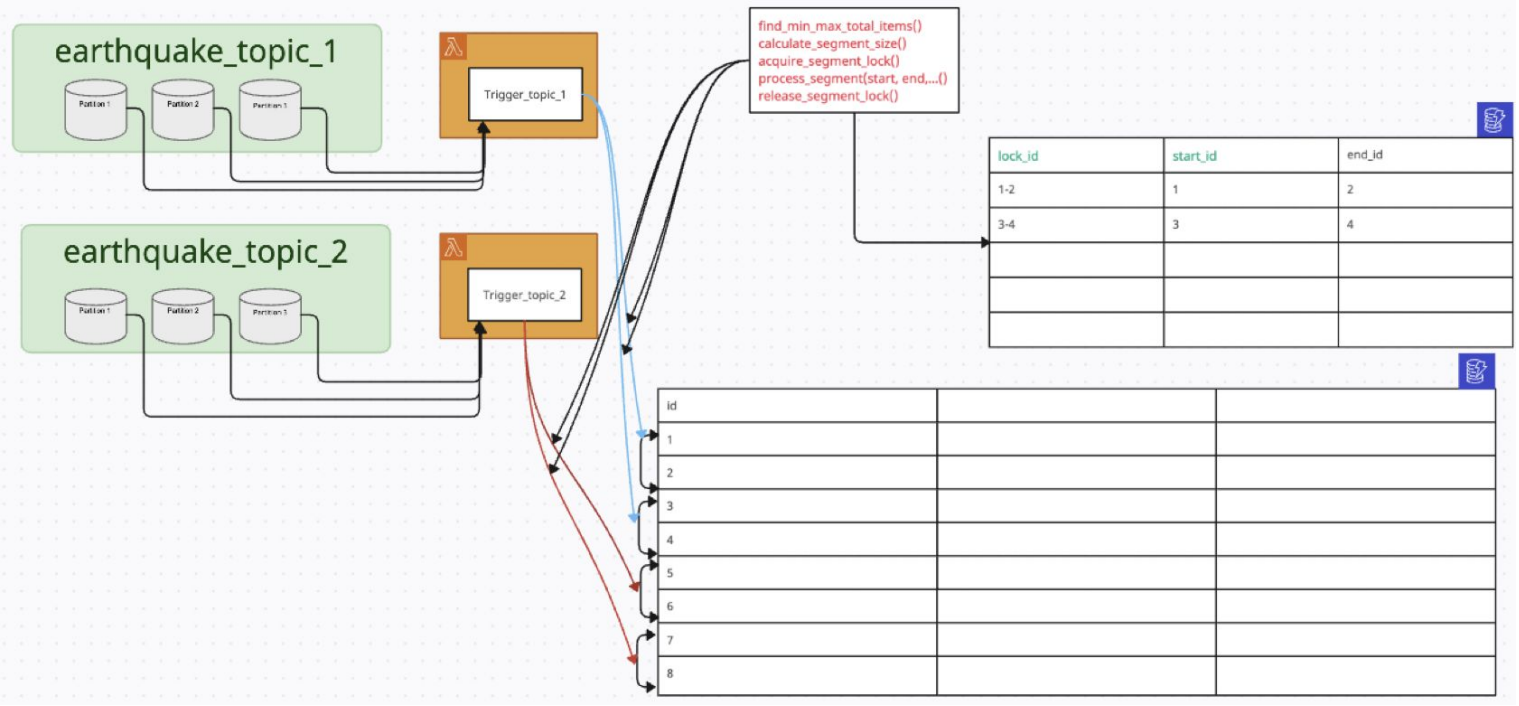
Lambda Kafka Consumer key elements

- Custom timestamp lock mechanism for parallel Dynamo item update
- Optimistic Locking in the custom Dynamo concurrency control
- Using Lambda retry and SQS Dead Letter for errors
- Lambda consumers using cold start / warm start

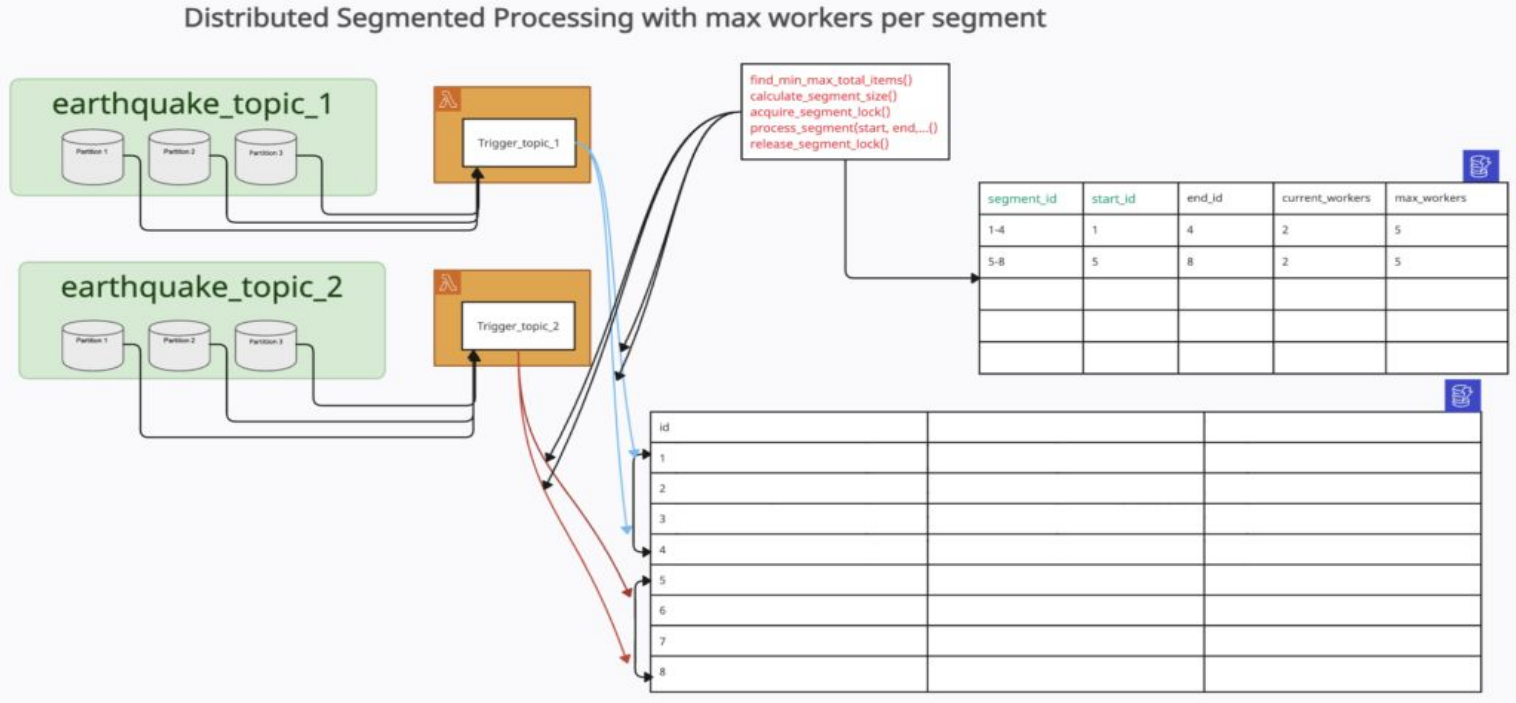
Lambda Kafka consumer integration with Database - Custom Dynamo locking - first version



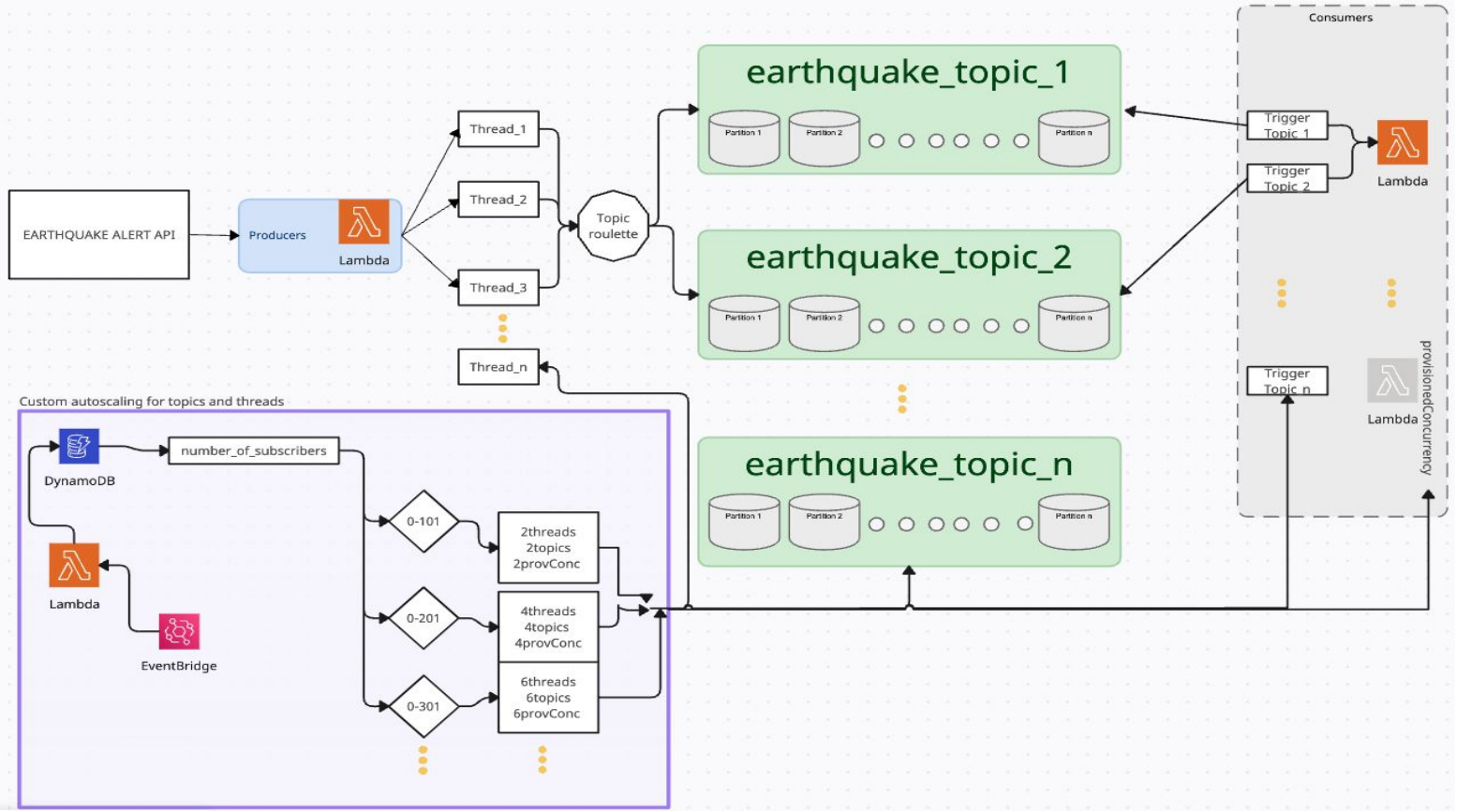
Custom Dynamic Segmented Subscriber Processing| Lambda Kafka Consumer - Domino style



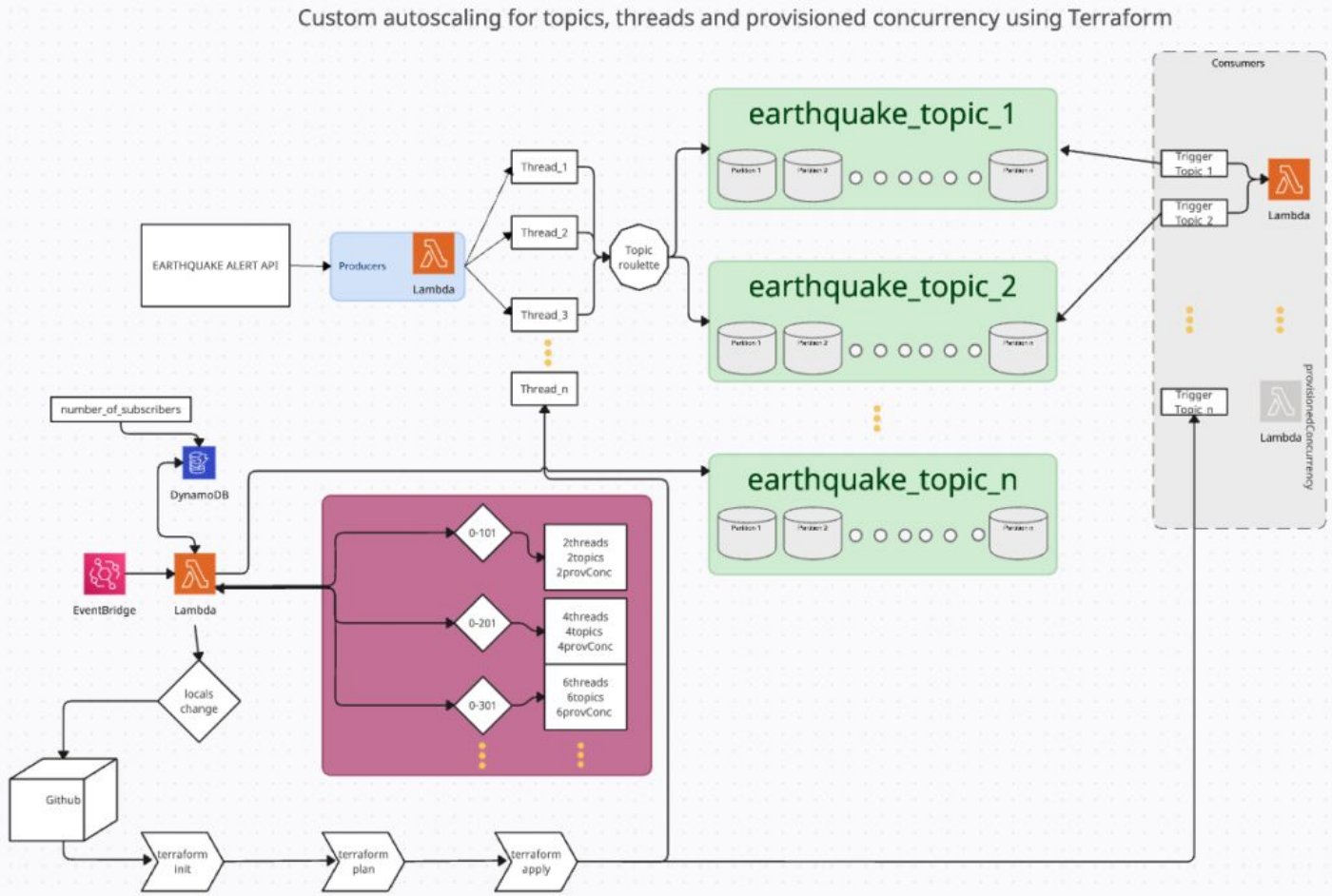
DynamoDB parallel distribution and segmentation in Lambda Kafka Consumer - max invocation/locks per segment - Domino style



Custom autoscaling in Serverless for Earthquake notification system



Custom autoscaling in Serverless using Terraform and Github Actions



Q & A