Yet another event sourcing library

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/about-me

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  - Software Developer/DevOps/Architect at
  - Clojure developer
    - EventSourcing, CQRS, REST, and CI/CD pipeline, integrating testing, business analysis
- Co-Founder of AlloraIT

- https://github.com/alpha-prosoft/edd-core
- https://github.com/alpha-prosoft/edd-core-web

- https://github.com/rpofuk
- https://github.com/raiffeisenbankinternational

Agenda

- History
- Serverless and AWS lambda
- CQRS
- Event Sourcing
- Architecture
- Why open source?
- Conclusion

History

- Started project in 2019
  - Wanted to use Serverless
  - Wanted to utilize managed infrastructure as much as possible
- We also wanted to keep business logic vendor independent
  - We want to be able to move (It is also regulatory requirements to be movable)
- Simple API
  - No discussion about path, query parameters, headers….
- Data must be open
  - No hidden binary stored messages in queues, or custom formats

Serverless and AWS lambda

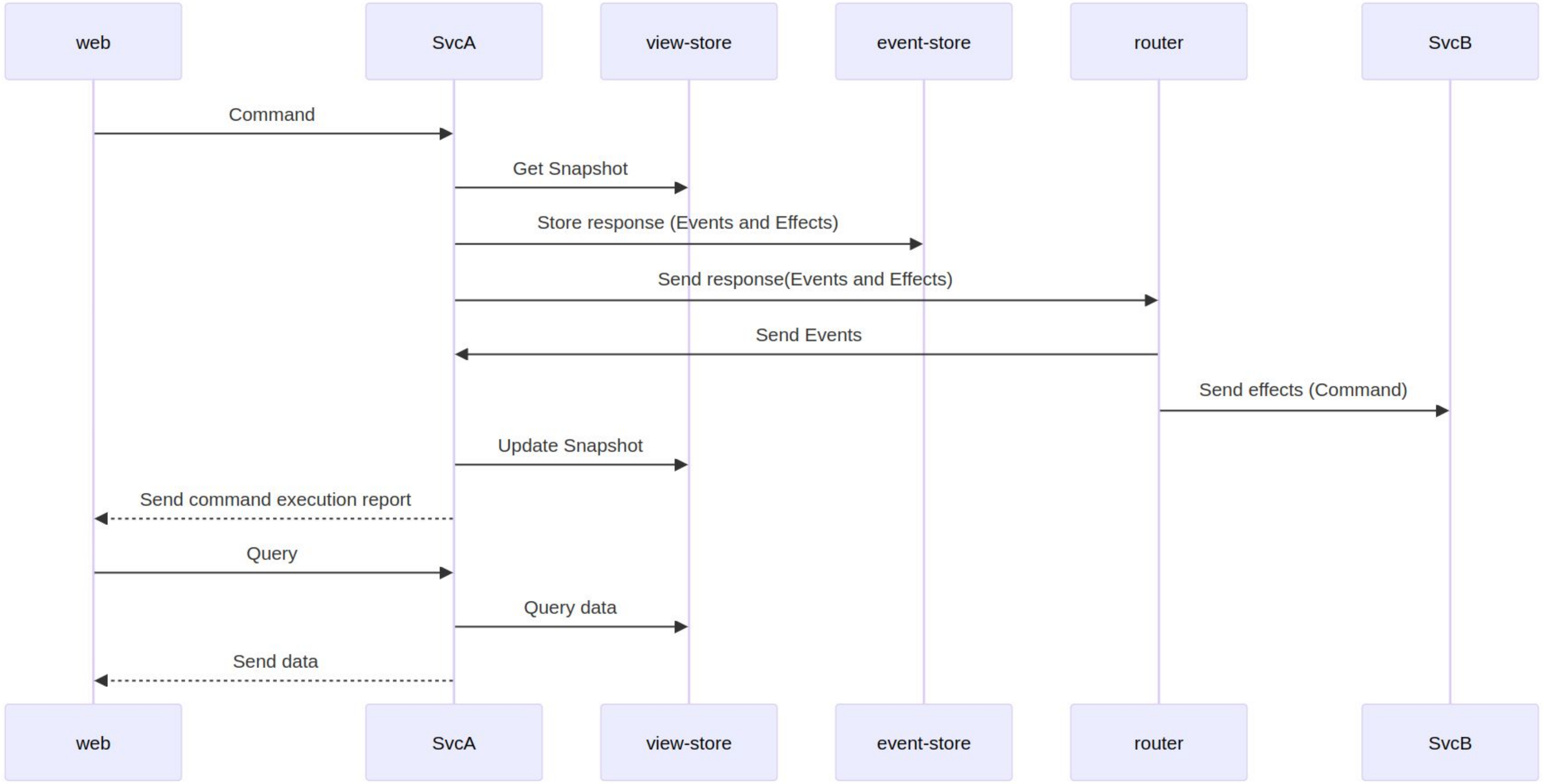
- Startup problem
  - Each lambda instance is new VM
  - JAVA takes time to start (Clojure much more)
- Most of libs did not compile to GraalVM
  - Created AWS SDK
    - Whatever AWS does in SDK in the end is just POST request
    - Very high inconsistency in signing
  - Forked hikaricp
  - Lots of exceptions for LogBack

CQRS

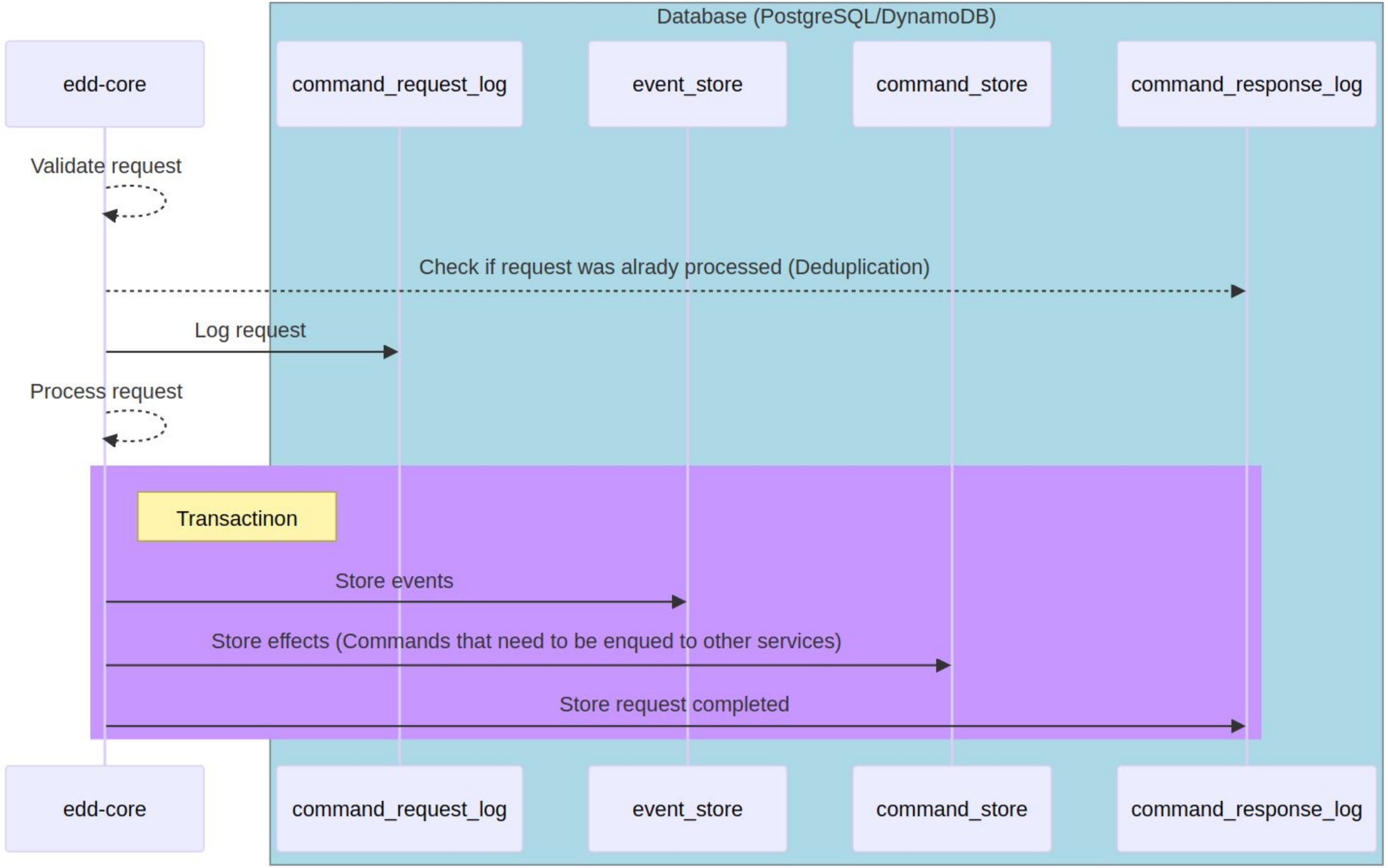
- Must see video
  - https://www.youtube.com/watch?v=qDNPQo9UmJA
- CQRS stands for Command and Query Responsibility Segregation
- **Our implementation:**
  - Commands
    - POST /commands
    - Commands-queue
    - Commands s3 bucket
  - Query
    - GET /query
  - Frontend client implementation is simple ~300 lines of code
    - Frontend mocking
    - Simple infrastructure

Event Sourcing

- Event Sourcing is a pattern for storing data as events in an append-only log
  - Store events that happened
  - Requires lots of resources for storage and processing
- Lots of critical systems requires proving current state
  - Plenty of audit log implementations
  - In event sourcing this comes naturally
- **Our implementation:**
  - PostgreSQL
    - Just simple table with metadata and one JSONB field
  - We collect all events per aggregate to be sequential (Optimistic Locking)
    - Unique constraint on event_sequence and aggregate_id
  - One command updates one aggregate


web
SvcA
view-store
event-store
router
SvcB
Command
Get Snapshot
Store response (Events and Effects)
Send response(Events and Effects)
Send Events
Send effects (Command)
Update Snapshot
Send command execution report
Query
Query data
Send data
web
SvcA
view-store
event-store
router
SvcB

Architecture



Why Open Source?

- As internal-only library:
  - Internal implementation was not meant as library
    - Very specific requirements
  - No open sourcing process existed before in company
  - Not alternative implementations
    - Only Postgres (event-store) and OpenSearch (view-store)
- As open source project:
  - Hobby projects
    - Using it for side projects
    - Implemented DynamoDB support
    - Alternative implementations help form propper abstractions and improvements
  - Contribute back all improvements to internal implementation
    - Lots of tests and quality improvements (i.e. integration tests and compatibility tests)

Conclusion

- Was very positive experience to deliver this solution to production
  - On daily basis it pays off that we store everything (request_log, command_store)
- Super easy to recover data
  - Unprocessed messages (DLQ) because of business error, or data quality is super easy
- Business is happy
  - System is eventually consistent but we can also eventually check if it actually is