Lessons Learned Building and Operating a Serverless Data Pipeline

Will Norman

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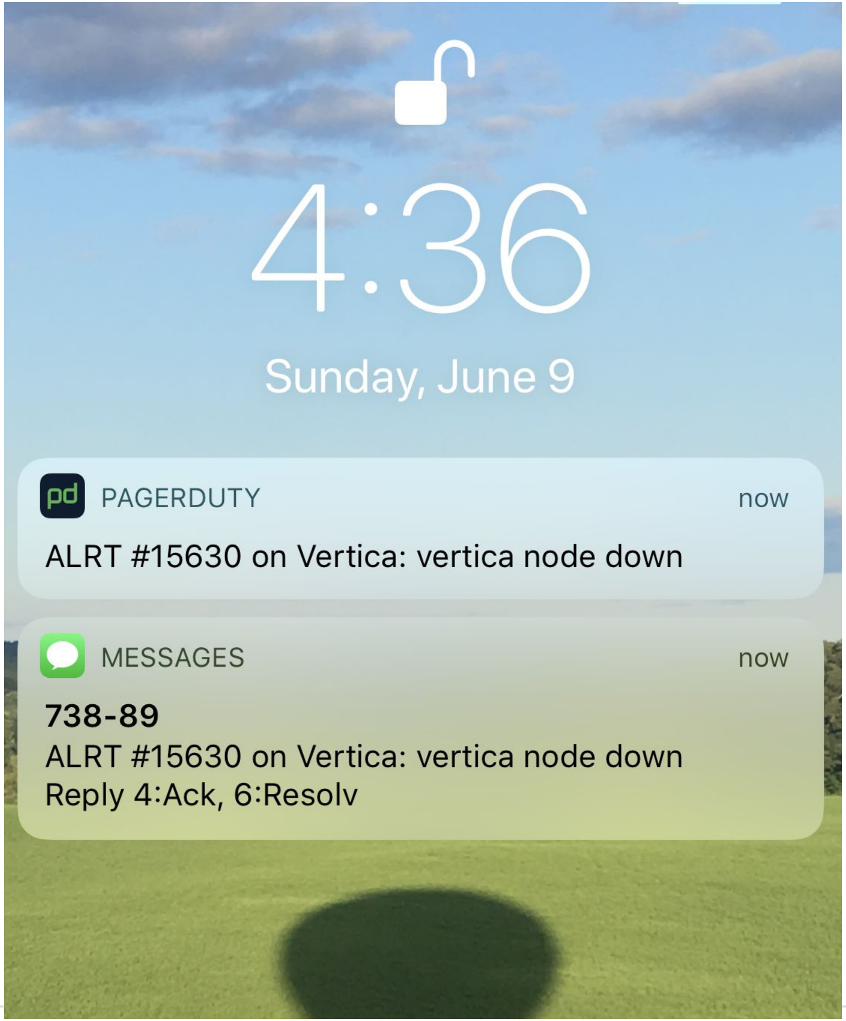

4:36

Sunday, June 9

PAGERDUTY now

ALRT #15630 on Vertica: vertica node down

MESSAGES now

738-89

ALRT #15630 on Vertica: vertica node down
Reply 4:Ack, 6:Resolv

Introduction

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- Will Norman - Director of Engineering @ Intent
    - FinTech and AdTech background

- Intent
    - Data Science company for commerce sites
    - Primary application is an ad network for travel sites

MOD Squad

- MOD owns data
- 4 Engineers
- 1 Product Manager

What we’ll be covering

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- What is Serverless?
- Intent Data Platform
- Lessons Learned

What is Serverless?

- More about managed services than lack servers
- Not just FaaS
- Scale on demand / pay for only what you use
- Empowers developers to own their platform

Intent Data Platform [Old World]

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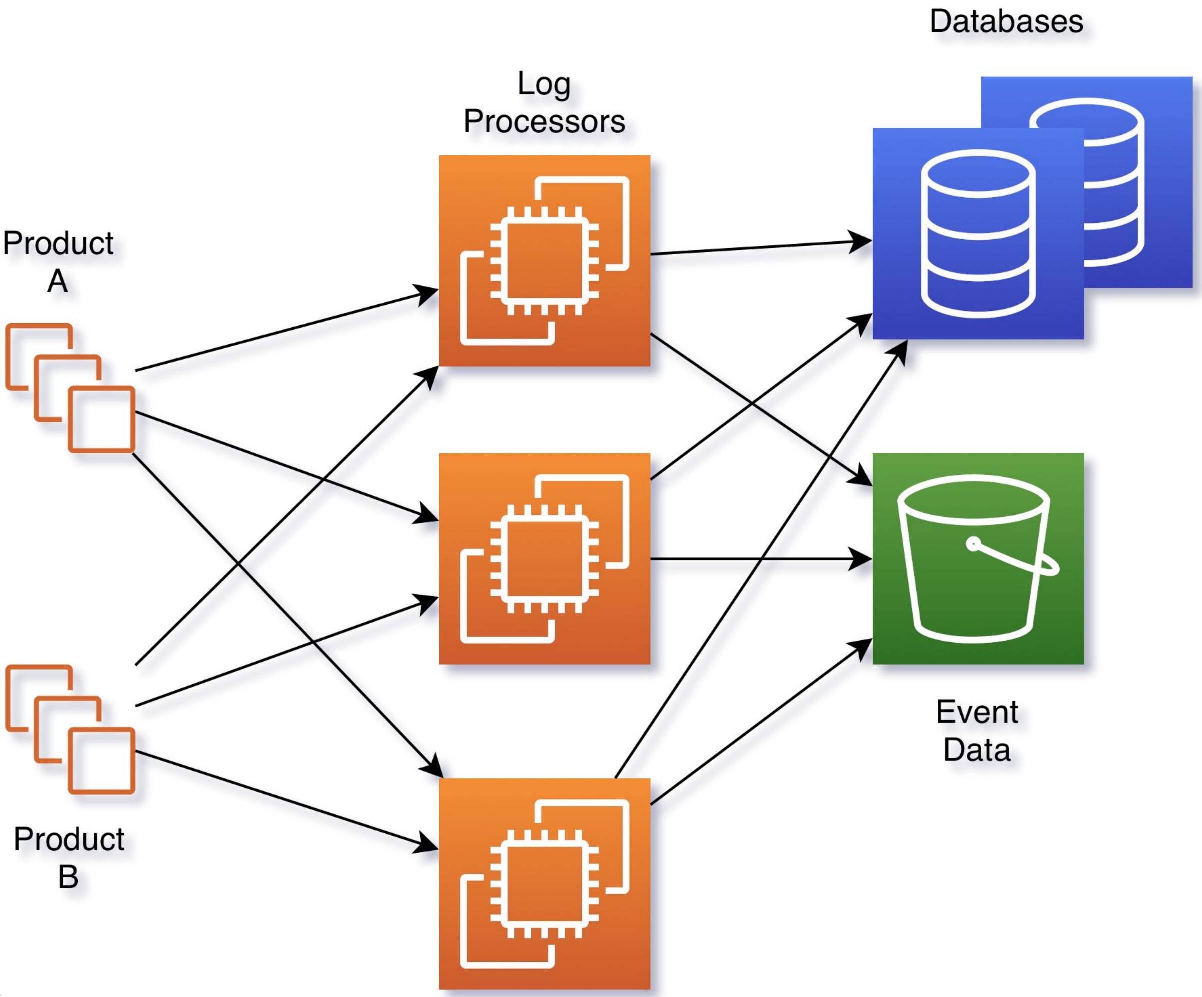
- Active MQ
- Log Processors
  - Java applications
  - Kept state locally
  - Cron scheduled tasks to roll files to S3
  - Ran on dedicated EC2 instances
- S3


Databases
Log Processors
Product A
Product B
Event Data

Intent Data Platform [New World]

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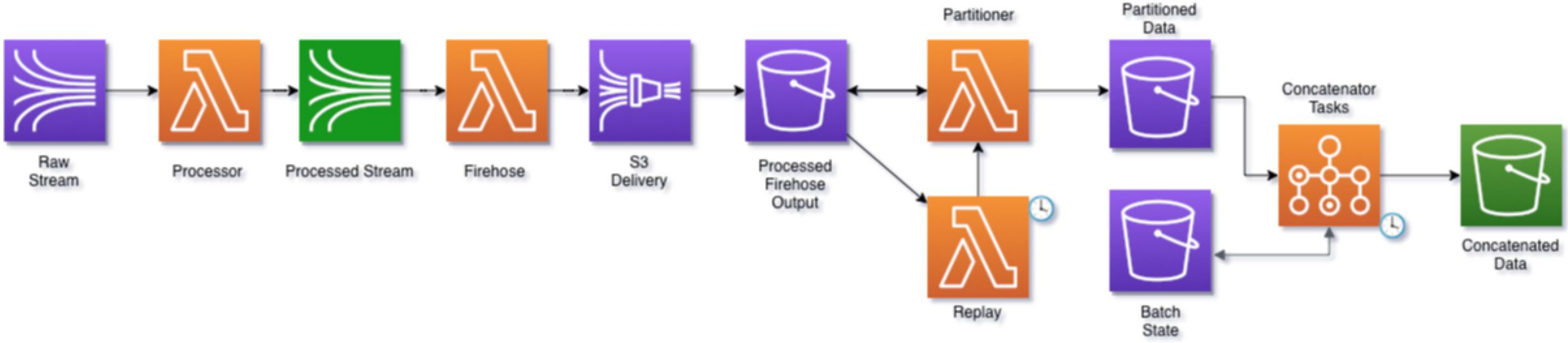
- Kinesis
- Lambda
- Kinesis Firehose
- SNS
- AWS Batch
- S3


Raw Stream
Processor
Processed Stream
Firehose
S3 Delivery
Processed Firehose Output
Partitioner
Replay
Partitioned Data
Batch State
Concatenator Tasks
Concatenated Data

Data Consumers

- Streaming Data Consumers
- Spark Jobs / Aggregations -> Redshift
- Snowflake Loader -> Snowflake
- Parqour -> Athena
  - EMR based jobs that convert AVRO -> Parquet

Worth the move?

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- Fewer production issues
- Separation of concerns
- Horizontally scalable
- Removed a lot of undifferentiated heavy lifting

Lessons Learned

1. Total Cost of Ownership
2. Think about data formats upfront
3. Design for Failure
4. Design for Scalability
5. Not NoOps just DiffOps
6. Build Components
7. CI / CD Strategies
8. Leverage the Community

Total Cost of Ownership

- On demand costs
- Hidden Costs / Tag All The Things!
- Enterprise Support
- Value of being able to focus on core business problems

Think about data formats up front

- What does the ecosystem support?
- Schema vs Schemaless (eg AVRO vs JSON)
- Data validation & Data evolution
- Data at rest vs data in flight
- JSON / CSV / AVRO / Parquet?

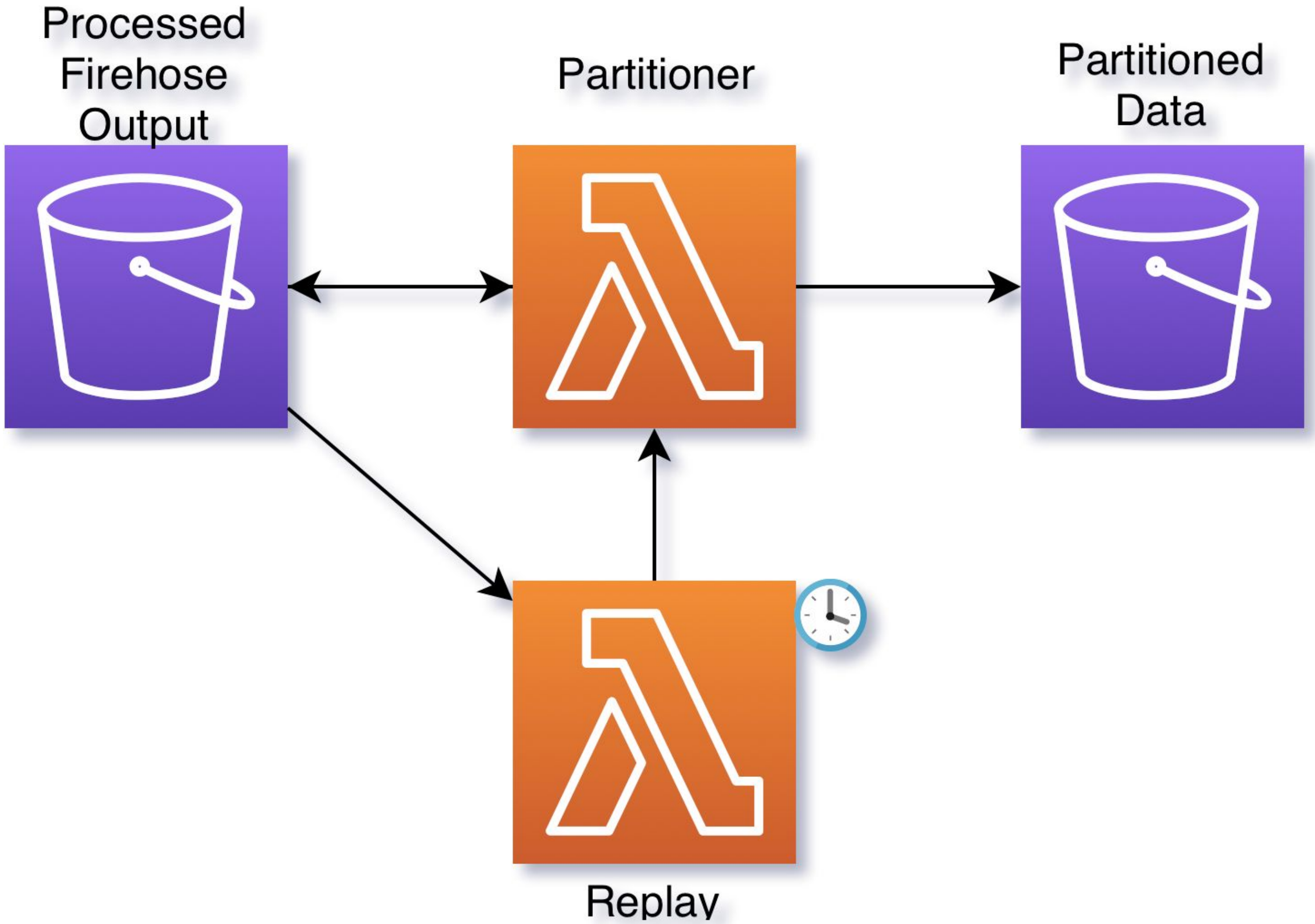
Schema Registry

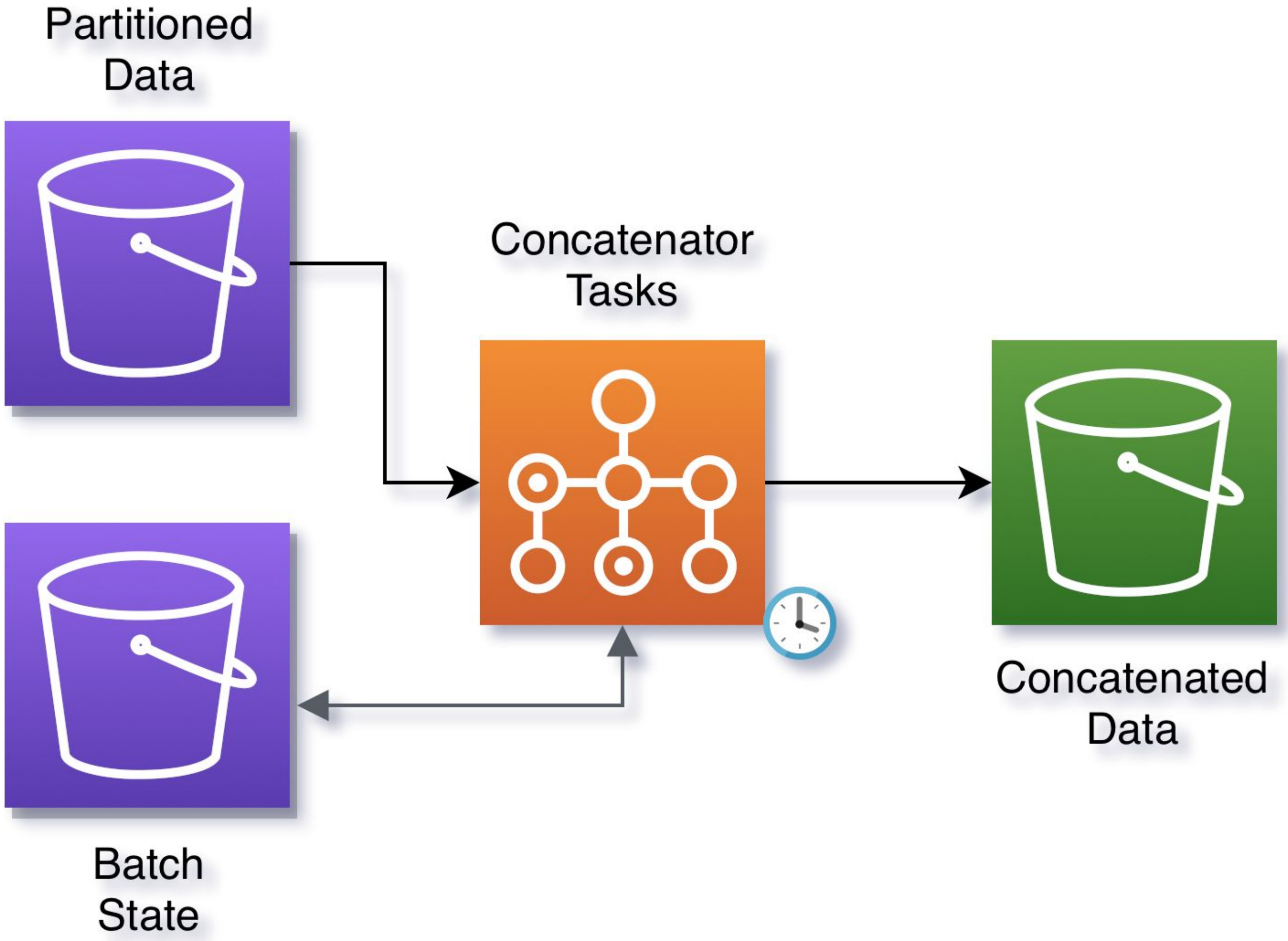
```
record DataWrapper {
   string dataType;
   long schemaFingerprint;
   bytes data;
 }
```

- Publish Schema in JSON format to S3
- Consumers lookup schemas, and calculate fingerprints

Design for failure

- System Guarantees?
- Idempotency
- Over process (data lookbacks)
- Dead Letter Queues


Processed Firehose Output
Partitioner
Partitioned Data
Replay


Partitioned Data
Concatenator Tasks
Concatenated Data
Batch State

Design for Scalability

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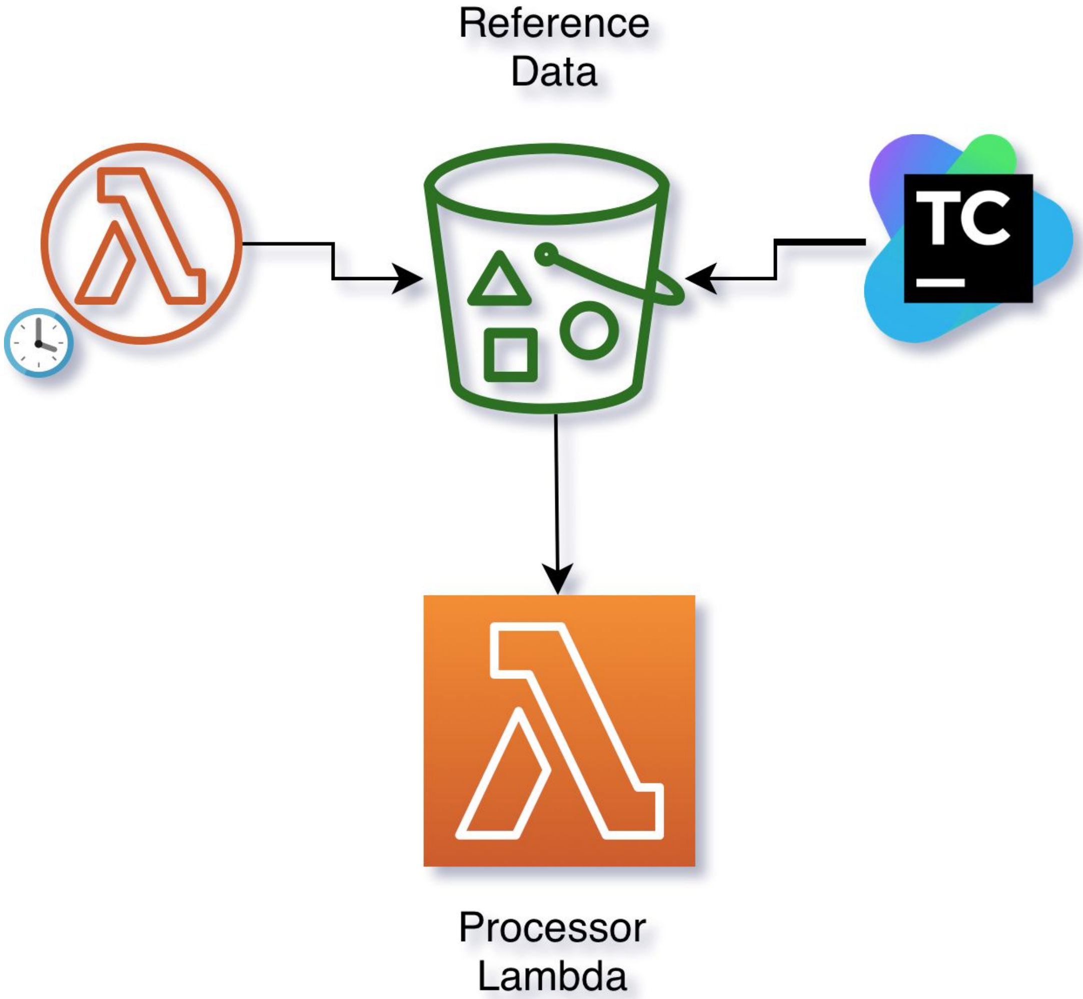
- Decouple from non-scalable systems
- Don’t run lambdas in VPC if you can help it
- Partition data at rest
- Shard events based on GUID / random id if ordering isn’t necessary
- Think about fan out patterns



Reference Data

Processor Lambda

Not NoOps, just DiffOps

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- Application problem or service problem
- Platform Limits
- Logs
- Metrics
- Dashboards
- Alerts

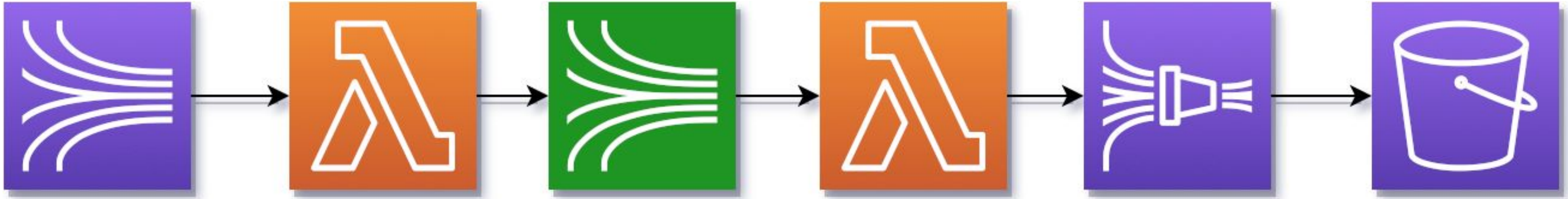
Some things remain the same

HAVE YOU TRIED
TURNING IT OFF AND ON AGAIN?
memegenerator.net

Build Components

- Help to reason about different parts of the system
- Make it easy to do the right thing
- Easier to extend
- Infrastructure as Code

```
module "conversion_event_processor" {
 source = "../modules/event_processor"
 data_type = "conversion"
 data_source = "ad_server"
 processor_lambda_handler = "com.intentmedia.data.stream.ConversionLambda::handler"
 environment = "${var.environment}"
 firehose_lambda_handler = "com.intentmedia.data.stream.ConversionFirehose::handler"
 processor_lambda_reserved_concurrent_executions = 3
 firehose_lambda_reserved_concurrent_executions = 2
}
```



Raw Stream

Processor

Processed Stream

Firehose

S3 Delivery

Processed Firehose Output

CI / CD

- Step backwards from being able to run stack locally
- Unit tests for business logic
- Integration Tests / End to End tests to ensure that everything is working as expected
- Use different AWS accounts to segregate staging and production

Leverage the Community

- Slack
  - Serverless Forum
  - og-aws
- Blogs
  - Symphonia https://www.symphonia.io/
  - Charity Majors https://charity.wtf/
  - Jeremy Daly https://www.jeremydaly.com/
- Twitter
- Meetup Events / Conferences

Questions?

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We're hiring!