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CloudNativeCon

Europe 2019

Deep Dive: CNCF Serverless WG/ CloudEvents

Agenda



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- CloudEvents demo
 - Deployment pipeline
- CloudEvents best practices



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Demo

Vlad Ionescu, Independent

Ownzones



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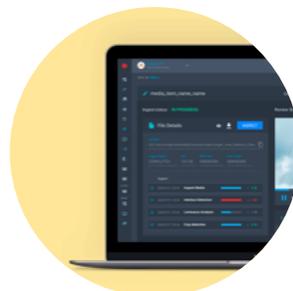


75 cloud engineers
with 100+ years of accumulated experience

ABOUT OWNZONES



Cloud-based video supply chain solutions
provided with disruptive “pay-as-you-go” model



Component-based
video-workflow system

OWNZONES
PARTNERS

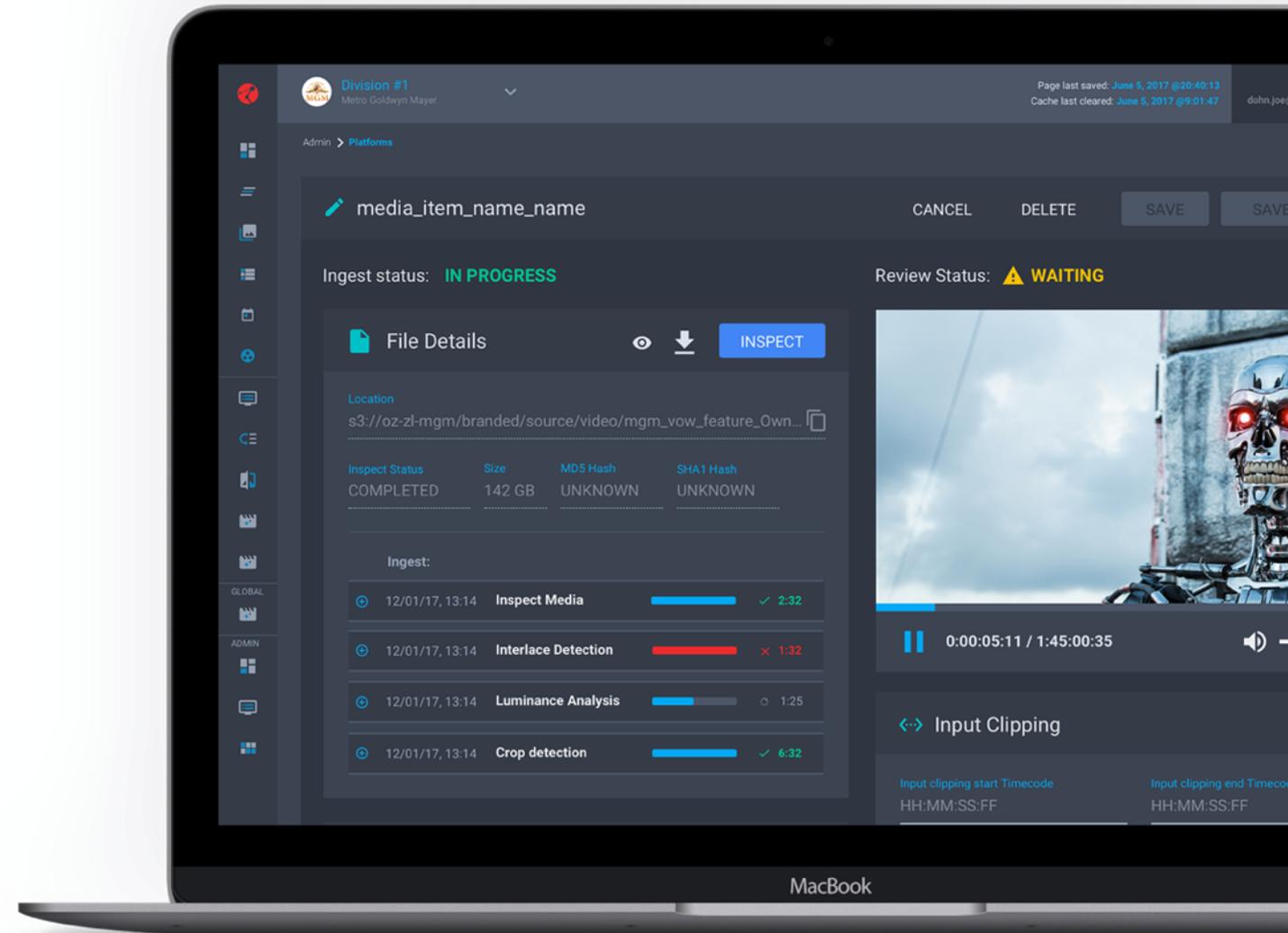


PRODUCTS
DIGITAL SUPPLY CHAIN SOLUTION

OWNZONES CONNECT

Get full control of your digital supply chain.

- Media logistics
- Workflow automation
- Studio in the cloud

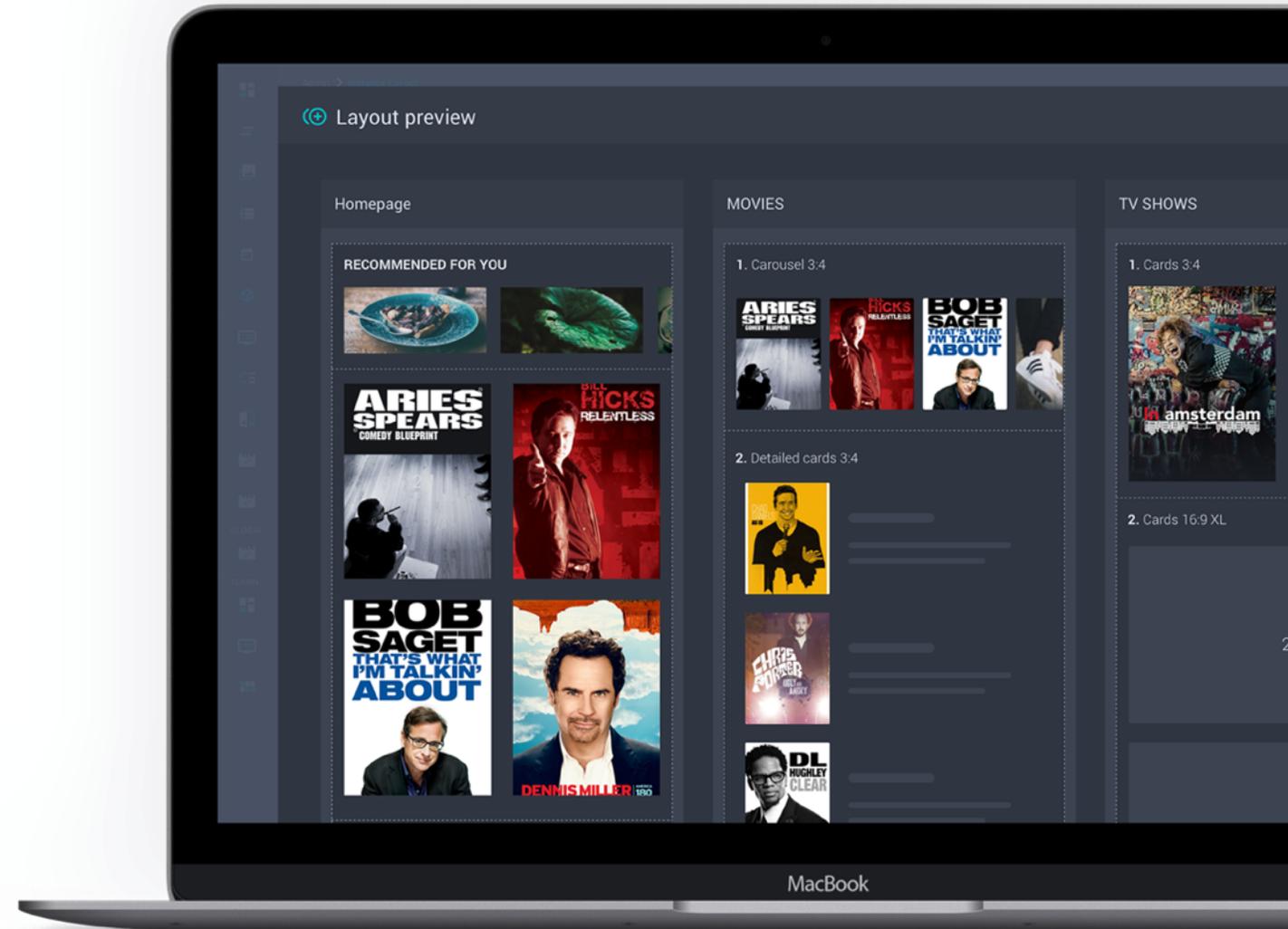


PRODUCTS
REACH AND MONETIZATION

OWNZONES DISCOVER

Customizable, scalable turnkey white label
OTT platform.

- Rich CMS
- Built-in customization tools
- “Click-to-deploy” rapid application deployment system



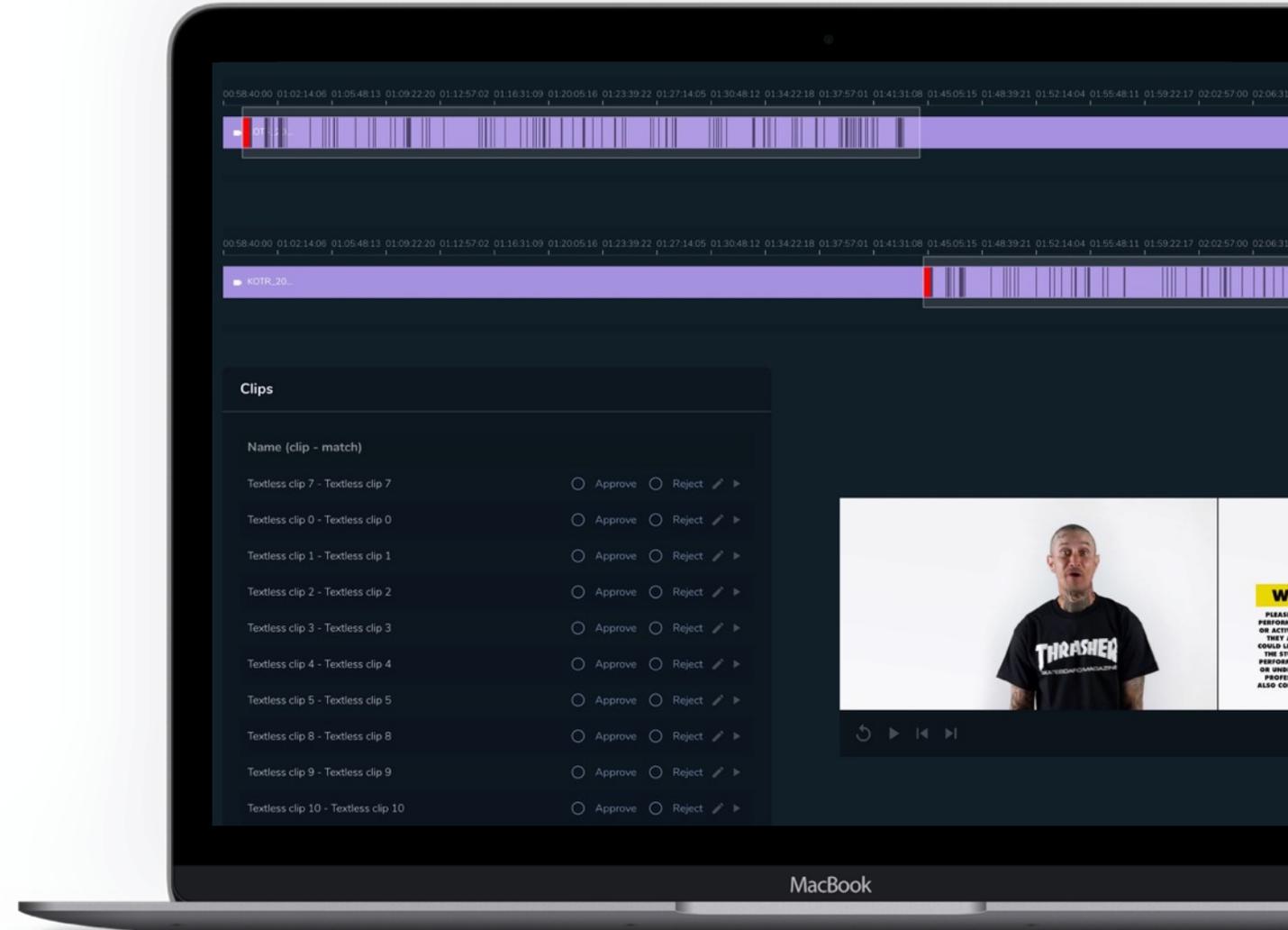
PRODUCTS

AI-POWERED DIGITAL SUPPLY CHAIN SOLUTION

OWNZONES FRAME DNA

Improve and automate your supply chain.

- AI-based tool within Connect
- Reduction in manual work
- Massive cost savings



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- Startup
- Focus on reliability

Deployment pipeline



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- Observable
- Compliant

- Fast
- Scalable

Deployment pipeline

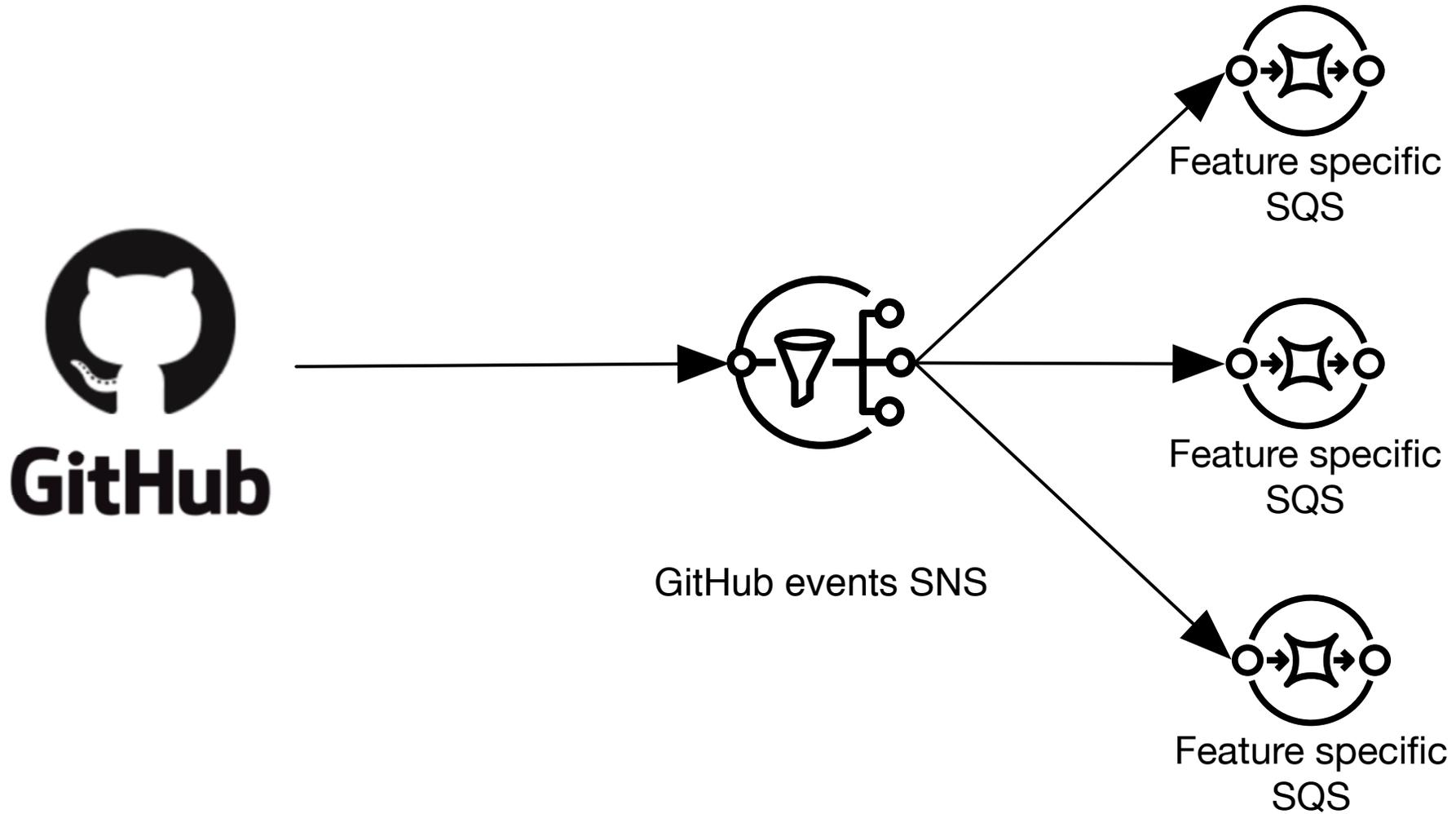


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Deployment pipeline

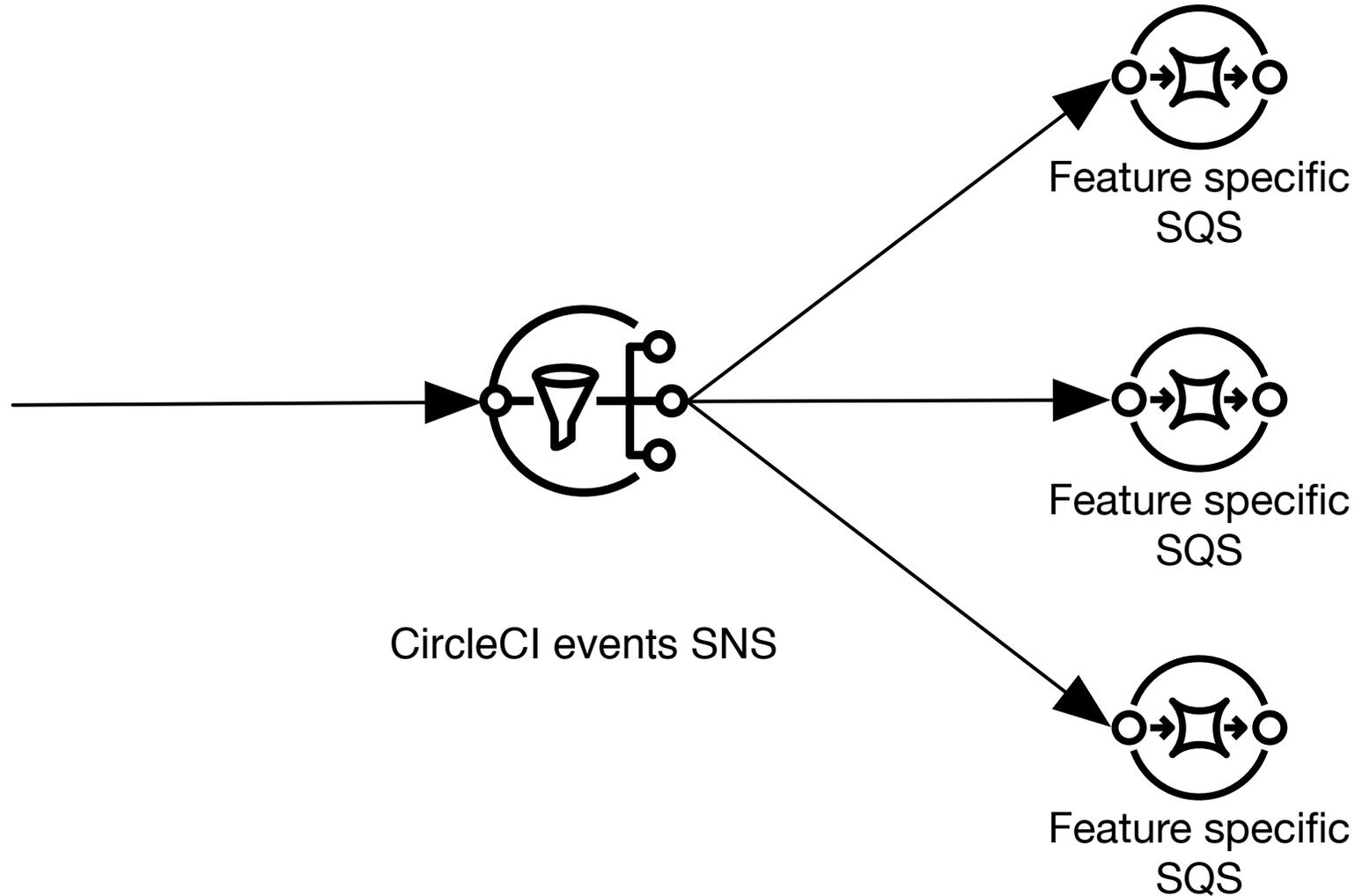


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Deployment pipeline

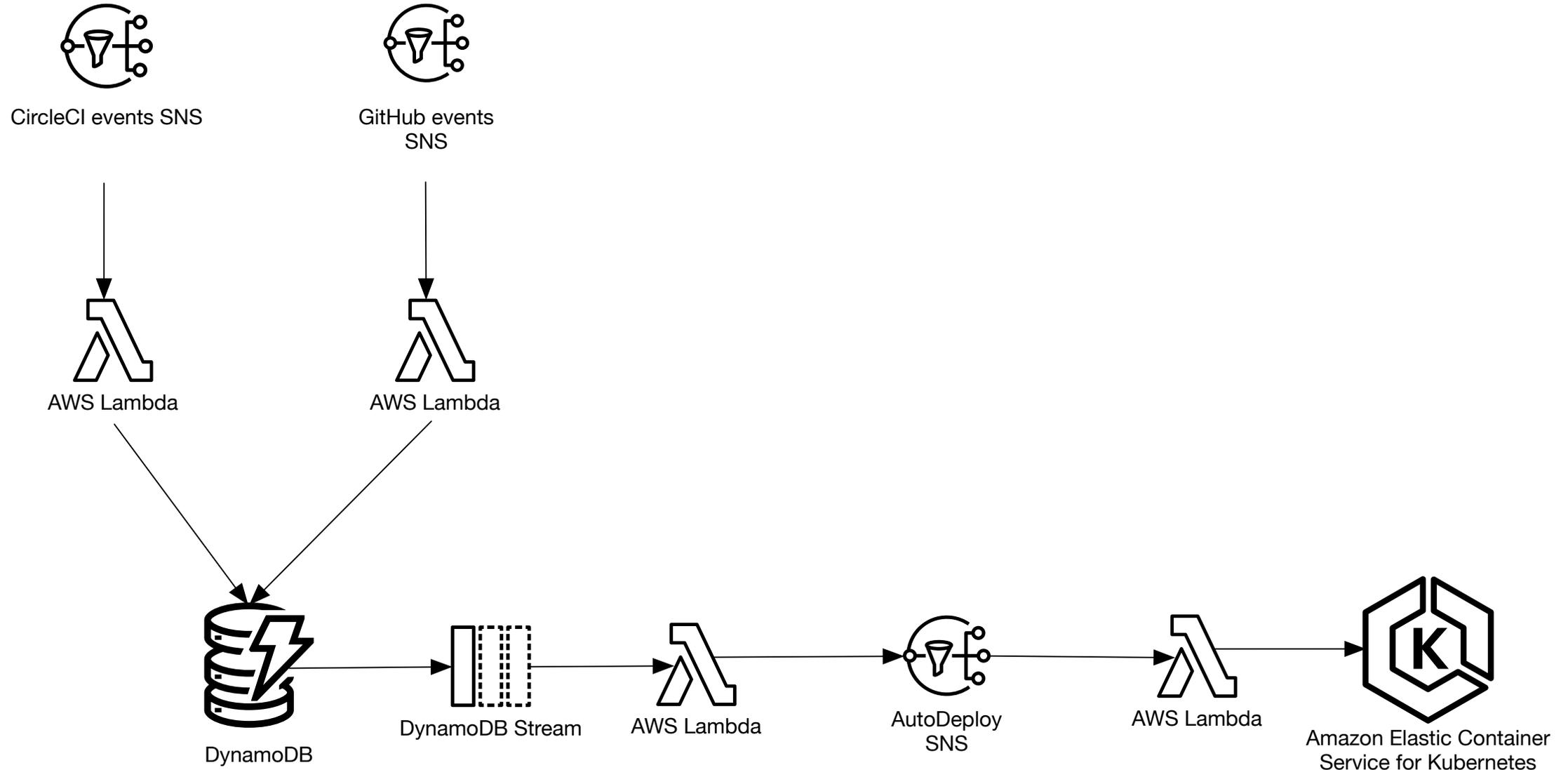


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Deployment pipeline - DynamoDB

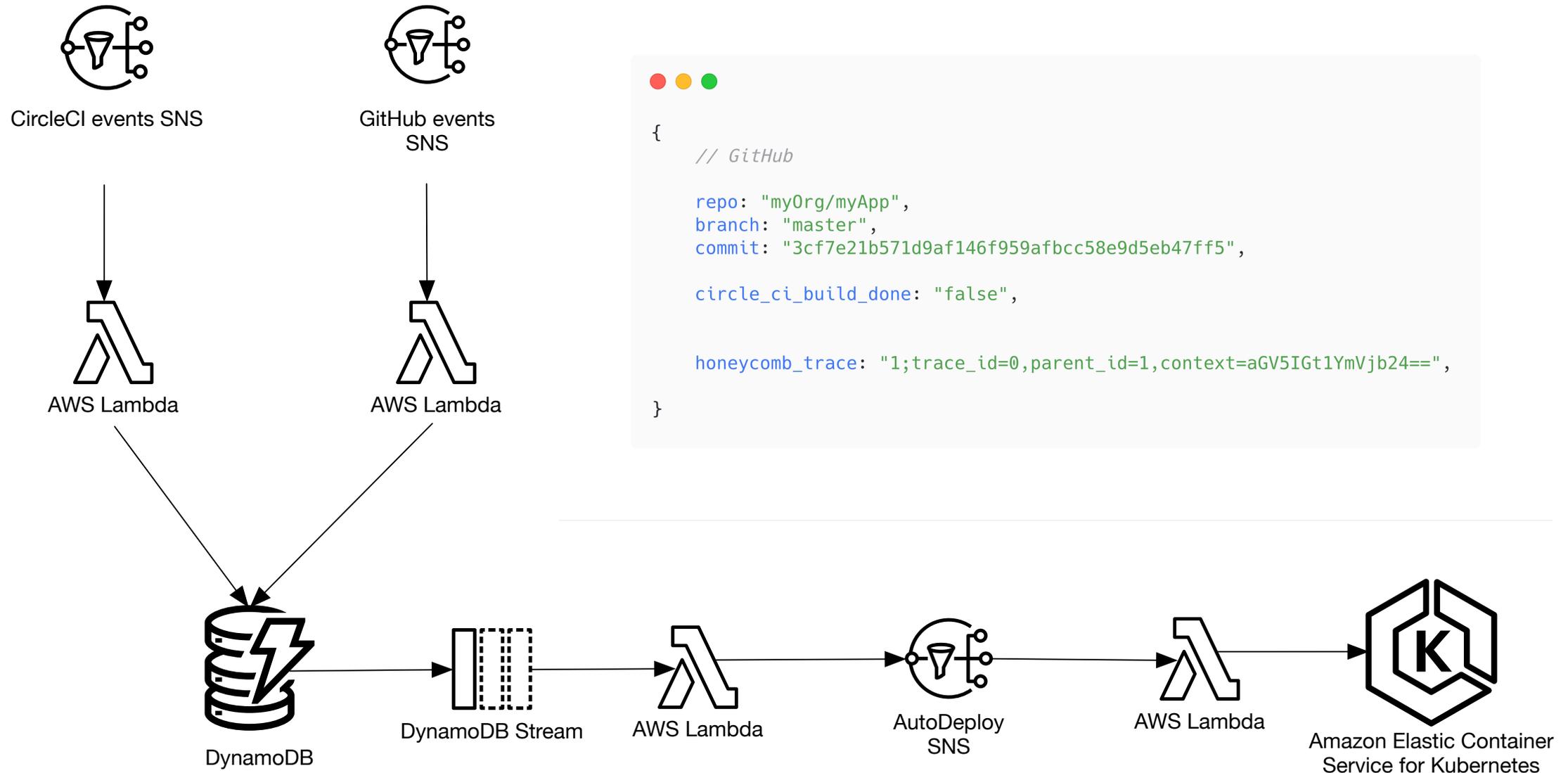


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Deployment pipeline - DynamoDB

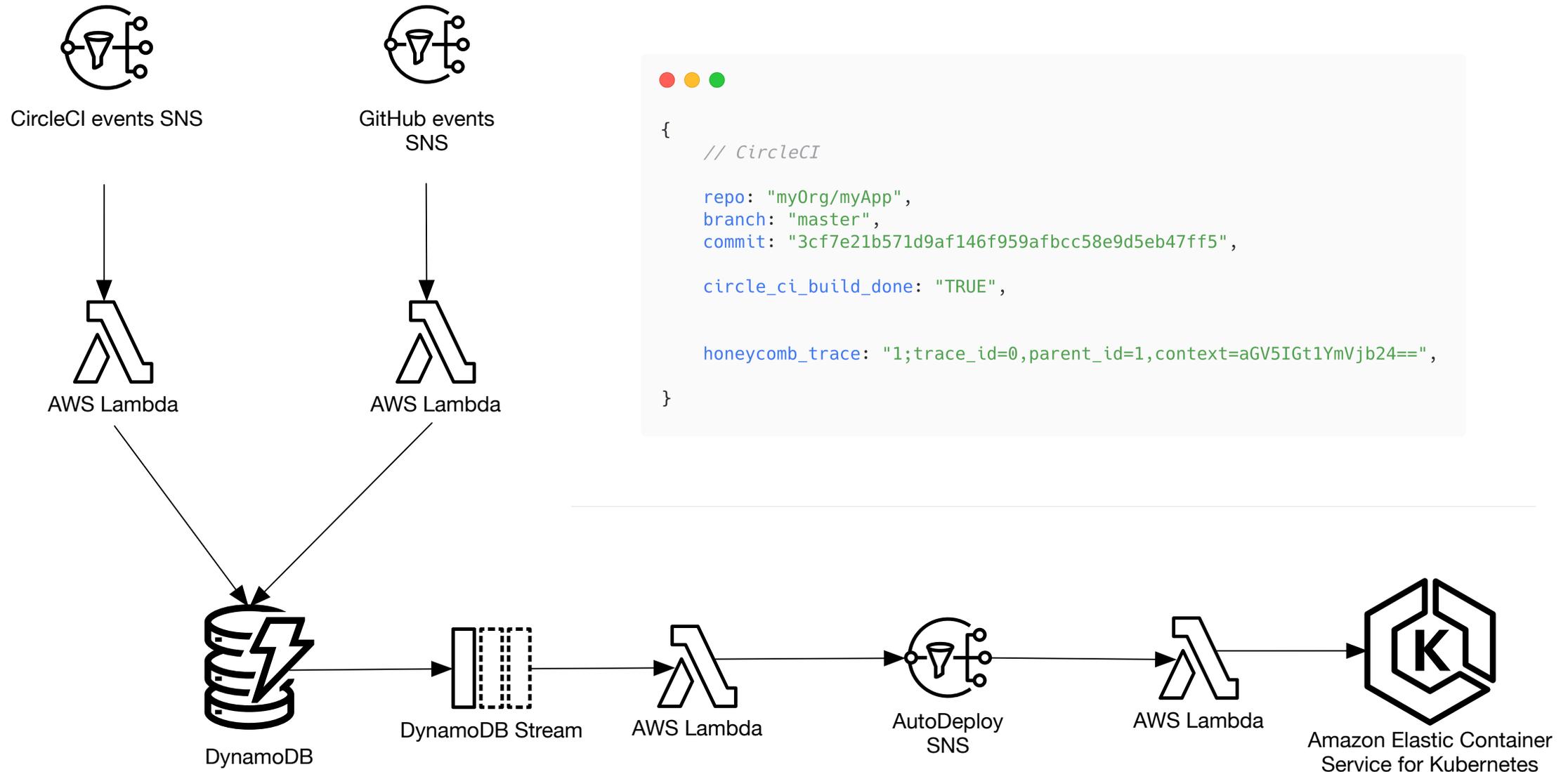


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Deployment pipeline - DynamoDB

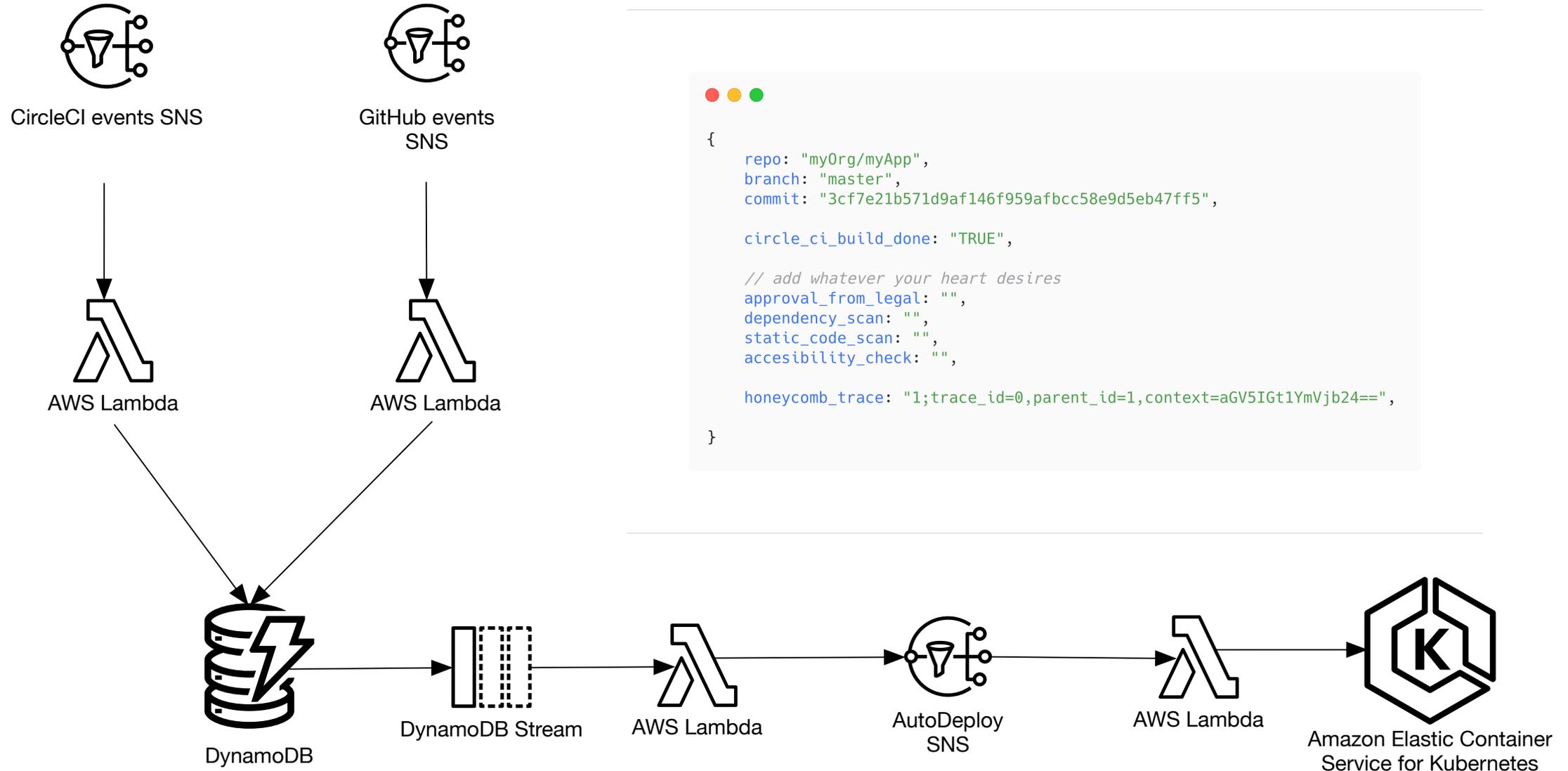


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```
{
  repo: "myOrg/myApp",
  branch: "master",
  commit: "3cf7e21b571d9af146f959afbcc58e9d5eb47ff5",

  circle_ci_build_done: "TRUE",

  // add whatever your heart desires
  approval_from_legal: "",
  dependency_scan: "",
  static_code_scan: "",
  accesibility_check: "",

  honeycomb_trace: "1;trace_id=0,parent_id=1,context=aGV5IGt1YmVjb24==",
}
```

Deployment pipeline - DynamoDB

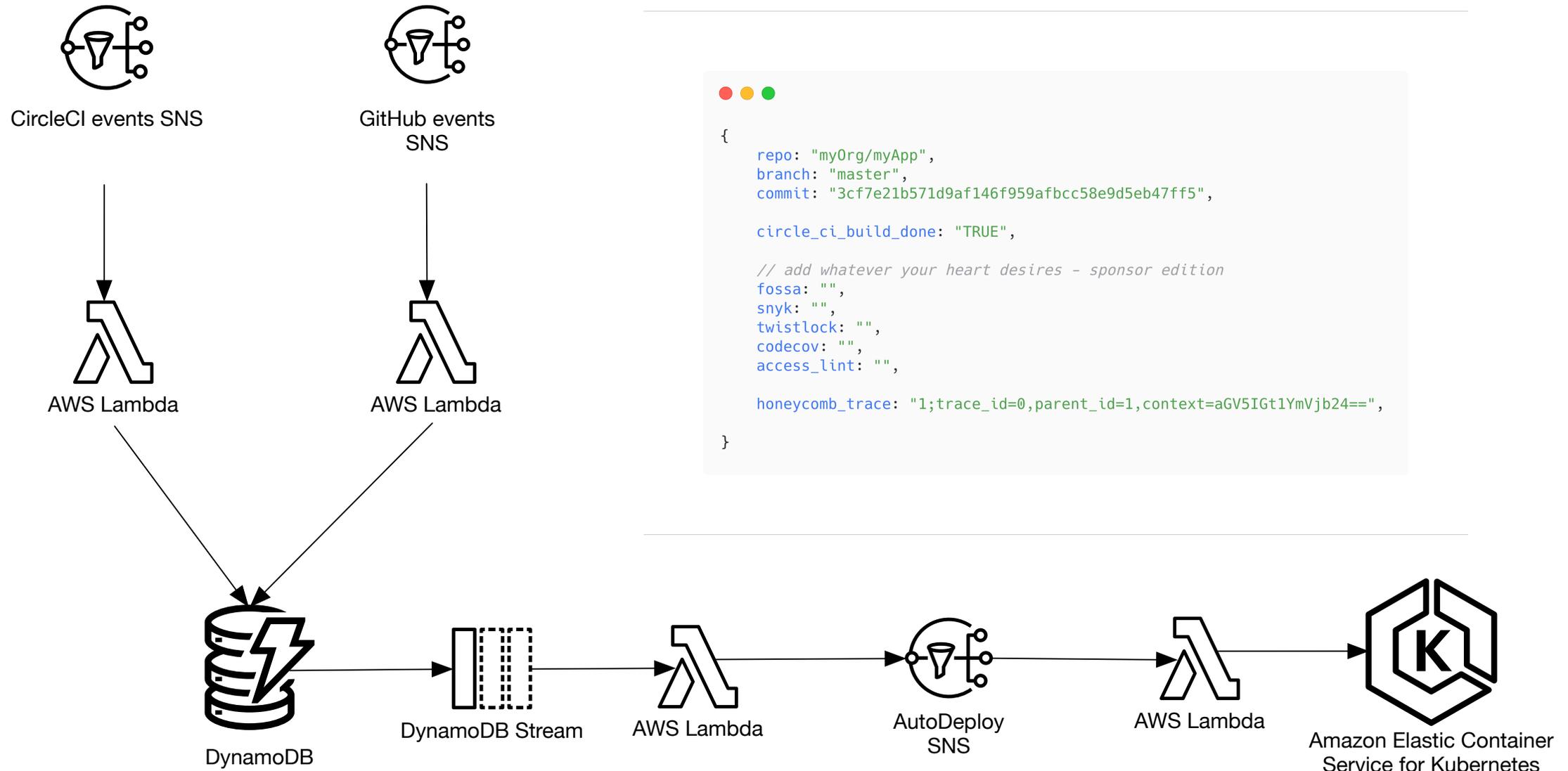


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Deployment pipeline

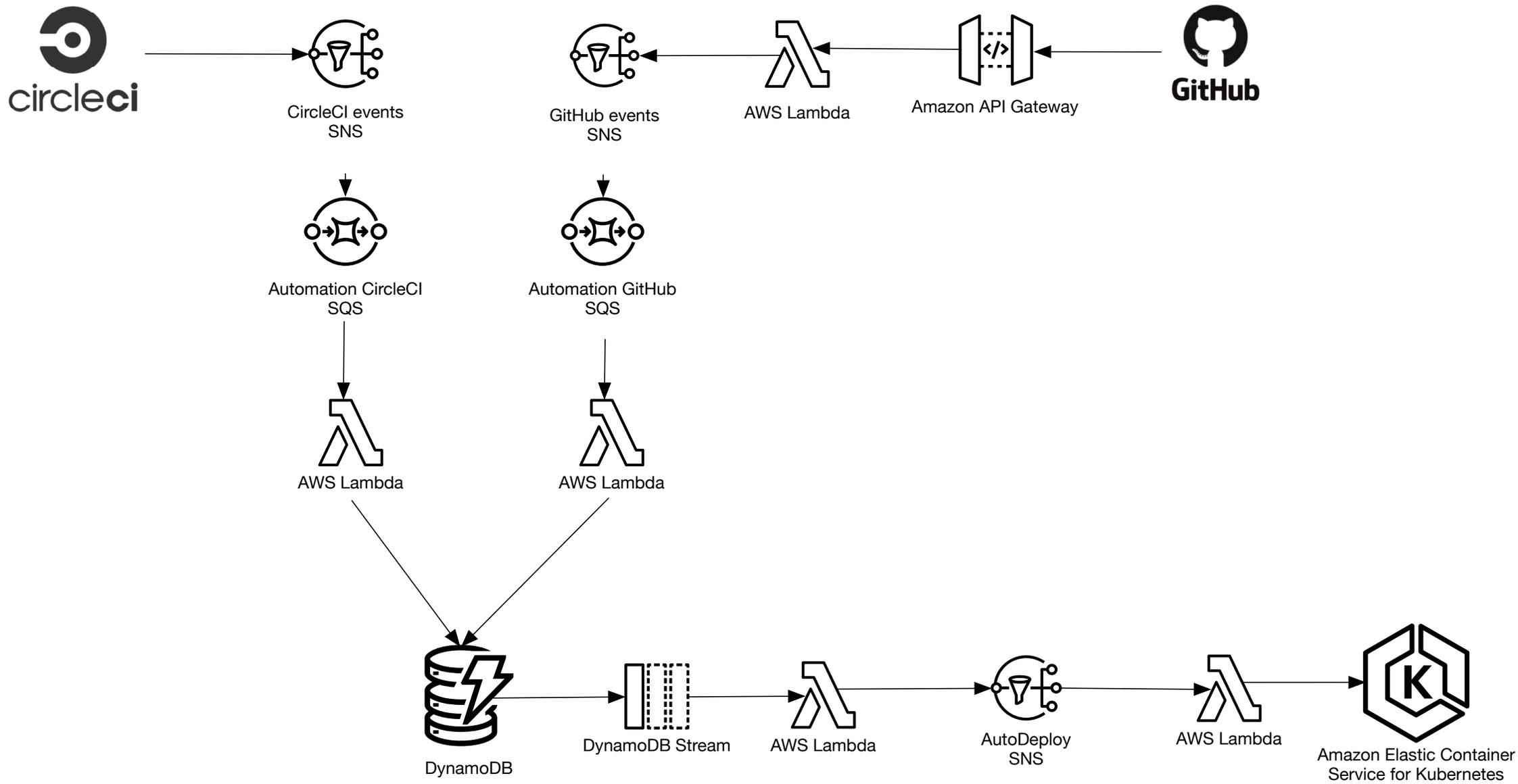


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Event design



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```
{
```

```
}
```

Event design



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```
{
```

```
  Type  
  Source
```

```
  Branch  
  SHA
```

```
}
```

Event design



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```
{
```

```
  Type  
  Source
```

```
  Branch  
  SHA
```

```
  Trace Header
```

```
}
```

Event design



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```
{
```

```
  Type  
  Source
```

```
  Branch  
  SHA
```

```
  Trace Header 👤
```

```
}
```

Event design



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```
● ● ●  
{  
  "specversion": "0.2",  
  "id": "D7D7C8B1-44AA-4CD5-9F1B-61A1AFB484C1",  
  "time": "2019-05-16T14:51:07+03:00",  
  "type": "com.circleci.buildsuccess",  
  "source": "myOrg/myRepo",  
  "contenttype": "application/json",  
  
  "honeycomb-trace": "1;trace_id=0,parent_id=1,context=aGV5IGt1YmVjb24==",  
  
  "data": {  
    "branch": "master",  
    "sha": "3cf7e21b571d9af146f959afbcc58e9d5eb47ff5"  
  }  
}
```

Demo time?



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- Special thanks:
 - Ileana Andreea Preda

- Queue for demo

← Trace 6d27bb81-aebb-4980-9829-dbbdf1d03a16

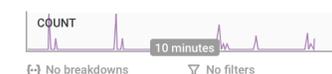
Search spans ⏪ ⏩

Fields

name	service_name	0s	20s	40s	60s	80s	100s	114.3s
3 HoneycombMiddleware	automation-github	560.1ms						
├─ github-automation	automation-github	59.90ms						
├─ GitHub signature validation	automation-github	33.4µs						
└─ 1 CloudEvent generation	automation-github	0.2387ms						
├─ 3 handle-github-event	automation-deploys	151.5ms						
│ ─ read CloudEvent	automation-deploys	84.0µs						
│ ─ create DyanmoDB message	automation-deploys	16.0µs						
│ ─ 3 write to DynamoDB	automation-deploys	150.9ms						
│ ─ 1 automation-promoter	automation-deploys	1.001s						
│ │ ─ check for promotion	automation-deploys	73.0µs						
│ ─ 3 automation-promoter	automation-deploys					1.079s		
│ │ ─ check for promotion	automation-deploys					23.0µs		
│ │ ─ create CloudEvent	automation-deploys					67.0µs		
│ │ ─ send CloudEvent	automation-deploys					77.11ms		
└─ 5 automation-install-helm-chart	automation-deploys						17.417s	
│ ─ read CloudEvent	automation-deploys					2.002s		
│ ─ 4 prepare	automation-deploys						5.606s	
│ │ ─ 1 cleanup	automation-deploys					8.384ms		
│ │ │ ─ exec	automation-deploys					7.887ms		
│ │ ─ 4 kubeconfig creation	automation-deploys					243.6ms		
│ │ │ ─ exec	automation-deploys					21.15ms		
│ │ │ ─ get data from AWS	automation-deploys					216.0ms		
│ │ │ ─ generate kubeconfig	automation-deploys					12.0µs		
│ │ │ ─ write kubeconfig	automation-deploys					5.342ms		
│ │ ─ 2 checks	automation-deploys					925.5ms		
│ │ │ ─ 1 aws-iam-authenticator	automation-deploys					257.2ms		
│ │ │ │ ─ exec	automation-deploys					256.4ms		
│ │ │ │ ─ 1 kubectll	automation-deploys					667.8ms		
│ │ │ │ │ ─ exec	automation-deploys					667.1ms		
│ │ │ ─ 1 prepare helm	automation-deploys					4.414s		
│ │ │ │ ─ exec	automation-deploys					4.414s		
│ │ ─ 1 helm plugin install	automation-deploys						6.698s	
│ │ │ ─ exec	automation-deploys						6.697s	
│ │ ─ 1 helm repo add	automation-deploys						559.5ms	
│ │ │ ─ exec	automation-deploys						559.0ms	
│ │ ─ 1 helm install	automation-deploys						1.550s	
│ │ │ ─ exec	automation-deploys						1.549s	

Query

12:40 am



Selected Span

Filter fields and values in span

```
cmd
["/opt/helm","--home","/tmp/.helm","upgrade","--install","my-demo-app","kubeccon-demo/demo-simple-app","--reuse-values"--set,"image.tag=1492f5aef19370fa705cd8ca9a5718c03479404f"]
```

duration_ms
1549.218

meta.beeline_version
2.4.5

meta.local_hostname
169.254.243.133

name
exec

output
Release "my-demo-app" has been upgraded. Happy Helming! LAST DEPLOYED: Tue May 21 22:39:21 2019 NAMESPACE: default STATUS: DEPLOYED RESOURCES: ==> v1/Deployment NAME READY UP-TO-DATE AVAILABLE AGE my-demo-app-demo-simple-app 3/3 1 3 12m ==> v1/Pod(related) NAME READY STATUS RESTARTS AGE my-demo-app-demo-simple-app-5976688f9-b9l2m 1/1 Running 0 2m33s my-demo-app-demo-simple-app-5976688f9-l2w5h 1/1 Running 0 2m26s my-demo-app-demo-simple-app-5976688f9-xrzmb 1/1 Running 0 2m46s my-demo-app-demo-simple-app-8487865c79-bz2d7 0/1 ContainerCreating 0 0s ==> v1/Service NAME TYPE CLUSTER-IP EXTERNAL-IP PORT(S) AGE my-demo-app-demo-simple-app ClusterIP 10.100.99.141 <none> 80/TCP 12m ==> v1beta1/Ingress NAME HOSTS ADDRESS PORTS AGE my-demo-app-demo-simple-app demo-app.kubeccon.2019.demo.vladiouescu.me ab886caf-defa... 80, 443 12m NOTES: Done!

service_name
automation-deploys

timers.cmd.run_ms
1549.134

trace.parent_id
d828ab03-90a6-40ab-a4f5-94fd12815d52

trace.span_id
a92a21c4-b679-43f1-9651-9f4cb46d79f7

trace.trace_id
6d27bb81-aebb-4980-9829-dbbdf1d03a16

Timestamp
2019-05-21T22:39:20.641246Z

CloudEvents experience



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- Simplified design process
- Encoding/ decoding are taken care of
- SDKs
- Sane defaults

- Does not restrict *data* in any way!

CloudEvents experience



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CloudEvents

They're here, they're boring, use them!

CloudEvents experience



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But...



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Architectural considerations

Clemens Vasters, Microsoft

CloudEvents is Eventing



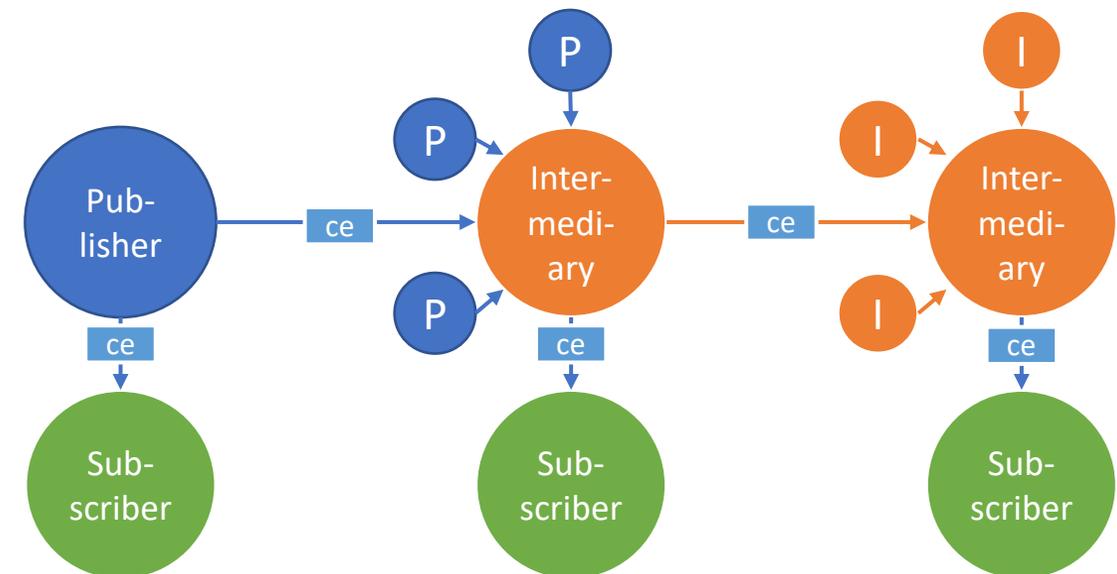
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- Carry facts: “Something happened”
- Publish/subscribe distribution
 - Subscribe at source or distributor
- Some publish/subscribe principles:
 - Publishers don't know/care who will subscribe or is currently subscribed
 - Subscribers might tap into single-sourced or consolidated event streams
 - Event flow is unidirectional
 - network or disk
 - one or more routing intermediaries
 - radio broadcast
 - ...



Eventing vs. Messaging



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- Events and messages are both mailing envelopes for data, decorated by metadata – but they are different.
 - Events carry facts. They report things that have happened.
 - State transitions, observed conditions, objects having been created, ...
 - Messages carry intents. The sender expects something to happen.
 - Command execution, job handling, workflow progress, ...
- Events are published as an information option for interested subscribers. Audience size may be zero or many.
- Messages are directed to handlers. There may be delivery and handling status feedback, replies, conversations, or complex control flows like Workflows and Sagas. Audience size is often one handler per message.

Attributes CloudEvents does not define



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- “to”
 - There’s no “to” attribute because events aren’t aimed at and routed to a specific consumer. Subscribers get to decide which events they pick.
- “reply-to”
 - There’s no “reply-to” attribute because events aren’t job assignments that ought to require a reply *and* because a subscriber can’t be expected to be capable of reaching any given reply destination
- “topic” / “queue”
 - CloudEvents defines the origin context as “source”, but does not include the name of any specific intermediary construct in the event metadata because events might travel through multiple intermediary hops

Things that are harder than they appear



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Signatures

Symmetric: Who holds the signing keys?

Asymmetric: Who distributes the verification keys?

Whose directory/directories/vaults is the subscriber trusting?

Which subscribers does a directory/vault grant access?

How/when does who rotate signing keys? How do subscribers know?

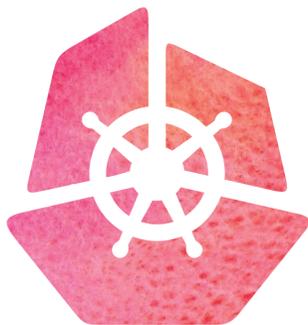
How to keep track of key history (archived events, events in logs)?

End-to-End Encryption

Same as above but with encryption keys

Encrypting/signing multicast datagrams doesn't allow for peer-to-peer session keys, which means that "master" keys must be rotated far more frequently than when those are only used for session-key exchange

Hardest: Agree on **ONE WAY OF DOING ALL THIS**: APIs, Algos, Hints, Versioning



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