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Cloud Events: A Step Towards Serverless Interop



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CNCF Technical Oversight Committee initiated Serverless WG (mid-2017)

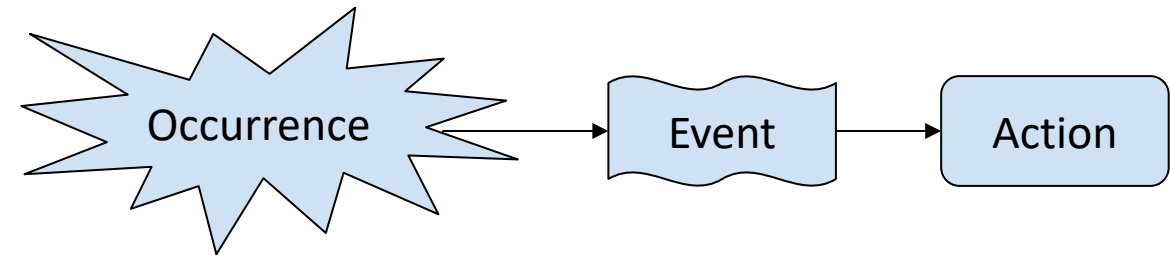
- Whitepaper
 - Overview of technology
 - State of ecosystem
 - Recommendations for possible CNCF next steps
- Landscape

CloudEvents

- Project started Dec 2017
- CNCF Sandbox project approved May 2018

What are Events?

- An **occurrence** is the capture of a statement of fact during the operation of a software system
- An **event** is a data record expressing an occurrence and its context
- An **action** is executed, when it is notified about the occurrence by receiving the event



The occurrence is decoupled from the action

CloudEvents: Why?

Problem

- We live in a multi-cloud and multi-service world
- Events within a cloud are well known but going across clouds need more standardization on the messages

Use cases

- How do you transit events between clouds and services?
- Be able to route events efficiently without knowing the actual payload
- Well known format for transmitting metadata about events

CloudEvents: Goals

- **Interoperability** : Facilitate integrations across platforms
- First step towards portability and interop of functions

How?

- Define **minimal** common metadata across events
- Leave the event business logic format & processing to the application
 - **No sensitive data within the CloudEvents metadata**
- Define mapping for popular serializations and transports

CloudEvents: Overview



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Specification - minimal/consistent metadata

- **ID**
- **Source**
- **SpecVersion**
- **Type**

- DataContentEncoding of the payload
- DataContentType of the payload
- Schema URL of the payload
- Subject
- Time

Transport bindings - how to serialize in JSON, HTTP, MQTT, ...

Just enough to help route to the consuming business processing logic

CloudEvents: Example



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HTTP - Binary

```
POST /event HTTP/1.0
Host: example.com
Content-Type: application/json
ce-specversion: 0.3
ce-type: com.bigco.newItem
ce-source: http://bigco.com/repo
ce-id: 610b6dd4-c85d-417b-b58f-3771e532

{
  "action": "newItem",
  "itemID": "93"
}
```

HTTP - Structured

```
POST /event HTTP/1.0
Host: example.com
Content-Type: application/cloudevents+json

{
  "specversion": "0.3",
  "type": "com.bigco.newItem",
  "source": "http://bigco.com/repo",
  "id": "610b6dd4-c85d-417b-b58f-3771e532",
  "datacontenttype": "application/json",
  "data": {
    "action": "newItem",
    "itemID": "93"
  }
}
```

CloudEvents: New in v0.3

- V0.3 - released June 13, 2019
- New attribute: **subject**
- **contenttype** is renamed **datacontenttype**
- New extensions
 - **dataref** (claim check pattern)
- **Batching**
 - Is handled by transports
 - Added specification for batching with HTTP+JSON

CloudEvents: Deliverables



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[CloudEvents Specification](#) – define the metadata

Serialization Rules Specifications

- [JSON](#) event format
- [AMQP](#) event format
- [Protobuf](#) event format

Transport Bindings Specifications

- [HTTP](#) – binary and structured
- [MQTT](#), [AMQP](#), [NATS](#), [Web-hooks](#)
- Pointers to [proprietary transport bindings](#)

[Primer](#)

SDKs

- [Go-lang](#), [Javascript](#), [Python](#), [Java](#), [C-Sharp](#), [Ruby](#)

[Extensions](#)

CloudEvents: Status



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Releases

- v0.3 - Released on June 13, 2019
- Don't let the version number fool you... It's more like v0.9
- Hoping for v1.0 within weeks/month(s)
- Will be asking for CNCF "incubator" status soon

Adoption

- Microsoft, Serverless.com, SAP and others have support
- Knative - basis for eventing infrastructure
 - Transport/data agnostic filtering
- Other BIG cloud providers have plans


After v1.0

- Shift focus back to Serverless WG / Workflow / other possible areas of interop


CloudEvents: Demo Time!

ultimate serv

publishers mi

aws  aws lambda

aws s3 eve


 Azure

azure blob storage azure


CloudEvents Timeline

IBM Cloud - 10 hours ago

Watson thinks this is a picture





A vacation is when you take a trip to some drab place with your mysterious family. Usually you go to some place that is near a/an marketing or up an a/an power.




careful
putrid
product
thing

surplus
progressive
cash
cash







refined
important
marketing
television




tall
mysterious
science
power





round
muscular
office
television



drab
curved
freedom
art

Demo: ACRIS Semantic Model



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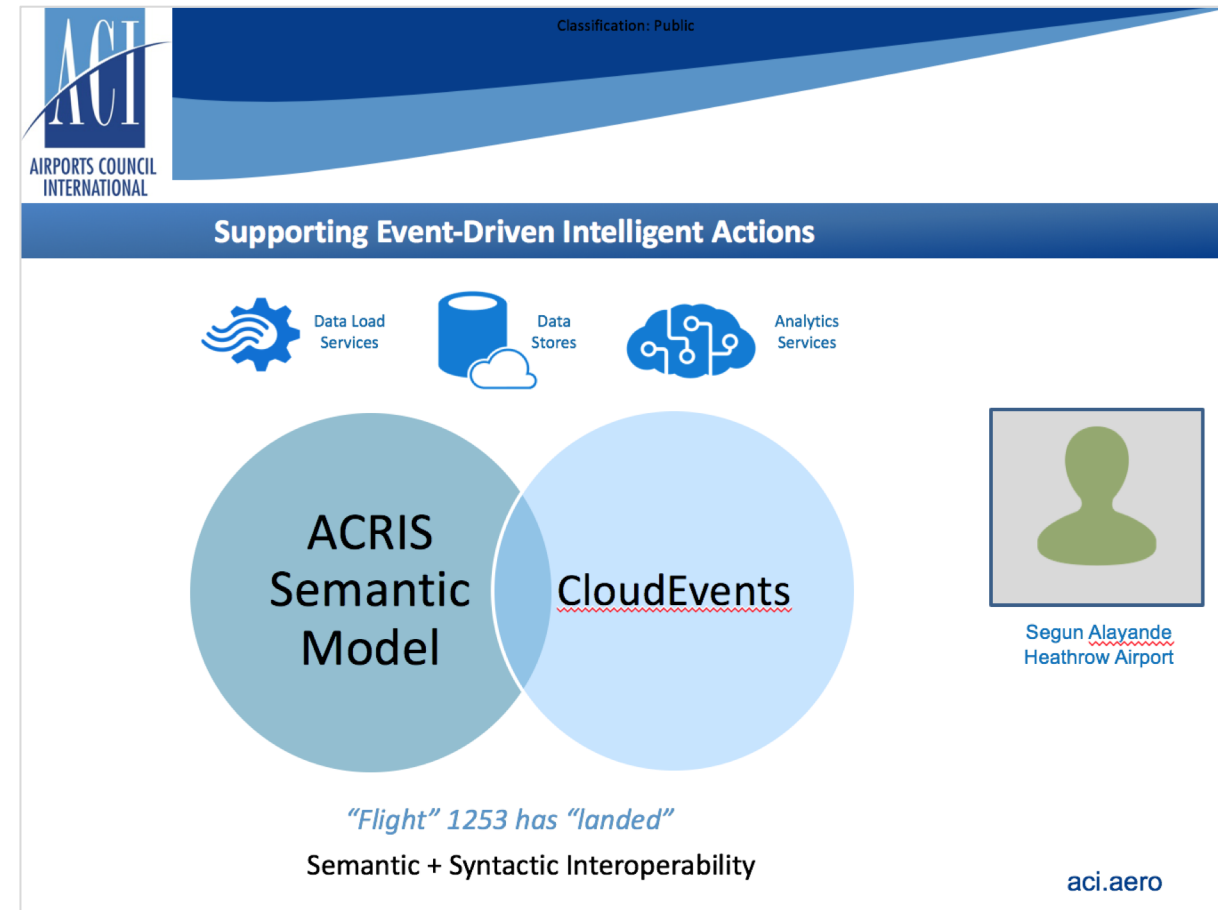


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“The Semantic Model, coupled with the CloudEvents format, can support interoperable, event-driven systems that can re-act intelligently to real-time state changes such as an aircraft landing or fulfilled order. With the use of event brokers, edge-to-cloud computing and AI, these events can be detected faster and analyzed in greater detail.”

Segun Alayande
Heathrow Airport



CloudEvents: Airport Coffee



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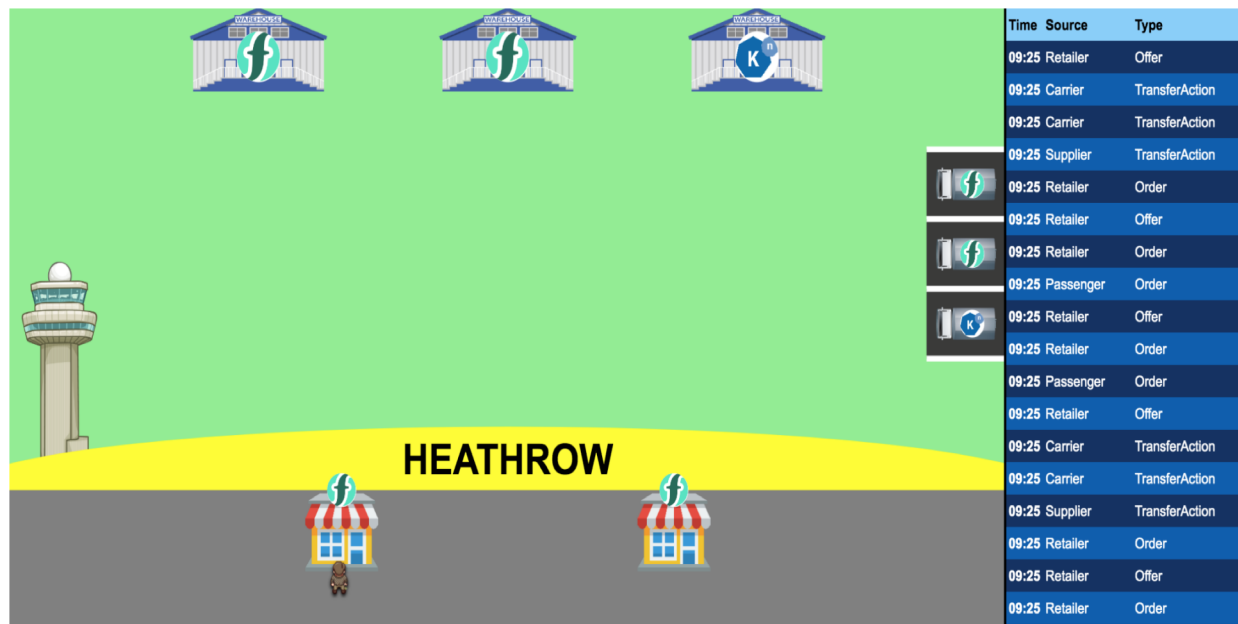


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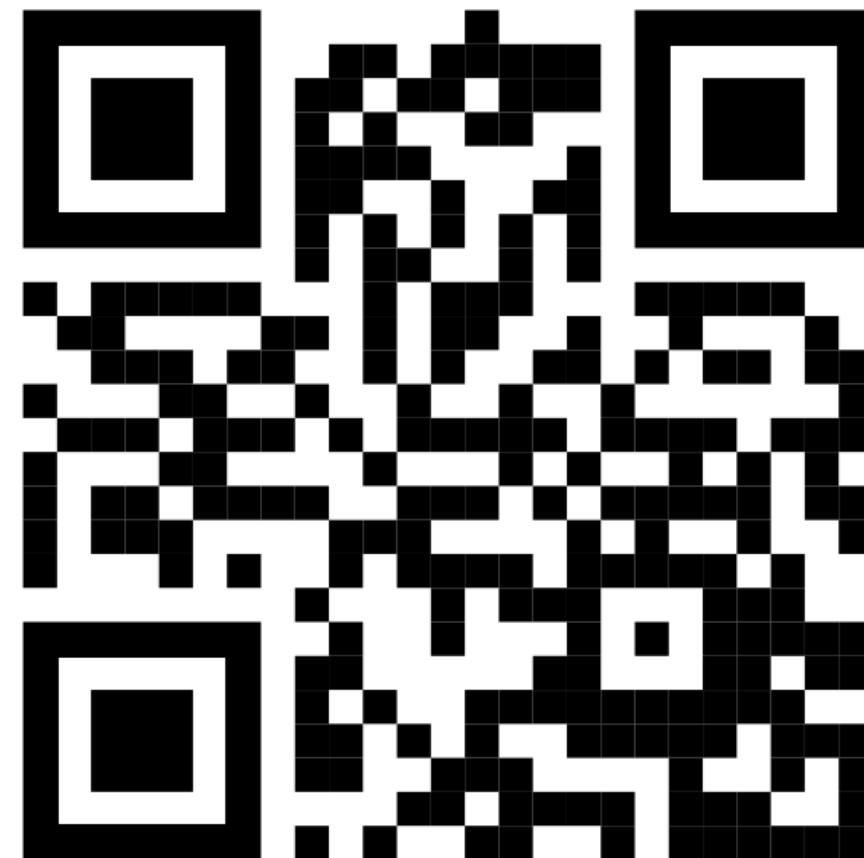
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The simulation interface for 'Airport Coffee' shows a stylized airport scene with a control tower on the left and two coffee shops at the bottom. The background is green, and the ground is yellow. The word 'HEATHROW' is prominently displayed in the center. On the right, a table lists events occurring at 09:25.

Time	Source	Type
09:25	Retailer	Offer
09:25	Carrier	TransferAction
09:25	Carrier	TransferAction
09:25	Supplier	TransferAction
09:25	Retailer	Order
09:25	Retailer	Offer
09:25	Retailer	Order
09:25	Passenger	Order
09:25	Retailer	Offer
09:25	Retailer	Order
09:25	Passenger	Order
09:25	Retailer	Offer
09:25	Carrier	TransferAction
09:25	Carrier	TransferAction
09:25	Supplier	TransferAction
09:25	Retailer	Order
09:25	Retailer	Offer
09:25	Retailer	Order



<http://srcdog.com/airport>

Thank You!



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Serverless WG : <https://github.com/cncf/wg-serverless>

CloudEvents : <https://cloudevents.io/>

- Org : <https://github.com/cloudevents>
- Spec repo : <https://github.com/cloudevents/spec>
- SDKs : <https://github.com/cloudevents/sdk-...>
- [Weekly calls](#) (Thursdays at 12pm ET)

CNCF Serverless WG Session: Today 16:00 - 16:35 - this room

Questions?



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