Cloud Events:
A Step Towards Serverless Interop

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CloudEvents: History

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.
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

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

**HTTP - Binary**

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

```plaintext
ce-specversion: 0.3
ce-type: com.bigco.newItem
ce-source: http://bigco.com/repo
cce-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

```plaintext
{
  "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

**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

**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!

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.
“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

http://srcdog.com/airport
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?