KubeCon CloudNativeCon

THE LINUX FOUNDATION

OPEN SOURCE SUMMIT

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Open Source GenAI & ML Summit

China 2024


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Open Source GenAI & ML Summit
China 2024
xRegistry – Looking Beyond CloudEvents
Leo Li - Red Hat

👋 Hello!

Leo Li

软件工程实习生 @ 红帽

Knative Eventing 维护者

日程

CloudEvents(**CE**):介绍&社区最新动态分享

1. 理解什么是 CE: 物流包裹运输的小故事
2. 社区最新动态分享
3. CloudEvents社区下一步发展的侧重方向

xRegistry: 事件驱动架构中如何发现事件

1. 现在有什么问题: 通过延展包裹运输的小故事了解痛点
2. xRegistry怎么来解决提到的这些问题?
3. xRegistry 实战
4. xRegistry CLI - 终端工具介绍

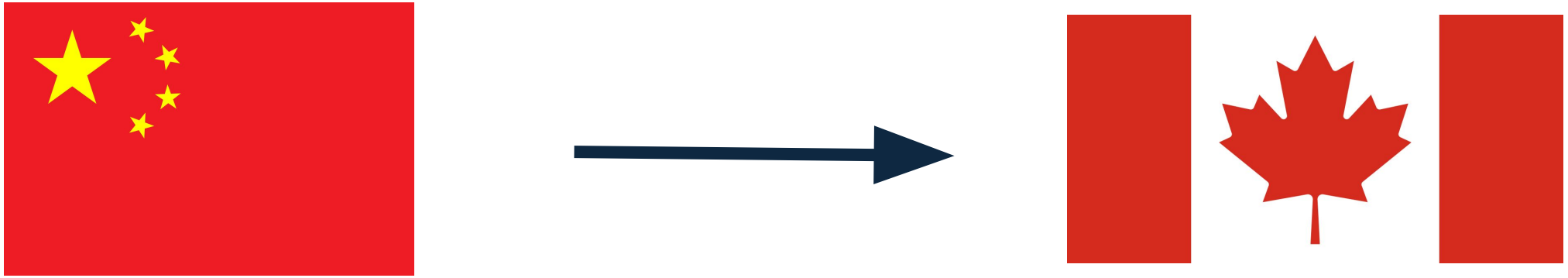
提问时间

CloudEvents

一个以通用格式来描述事件**元数据**的规范

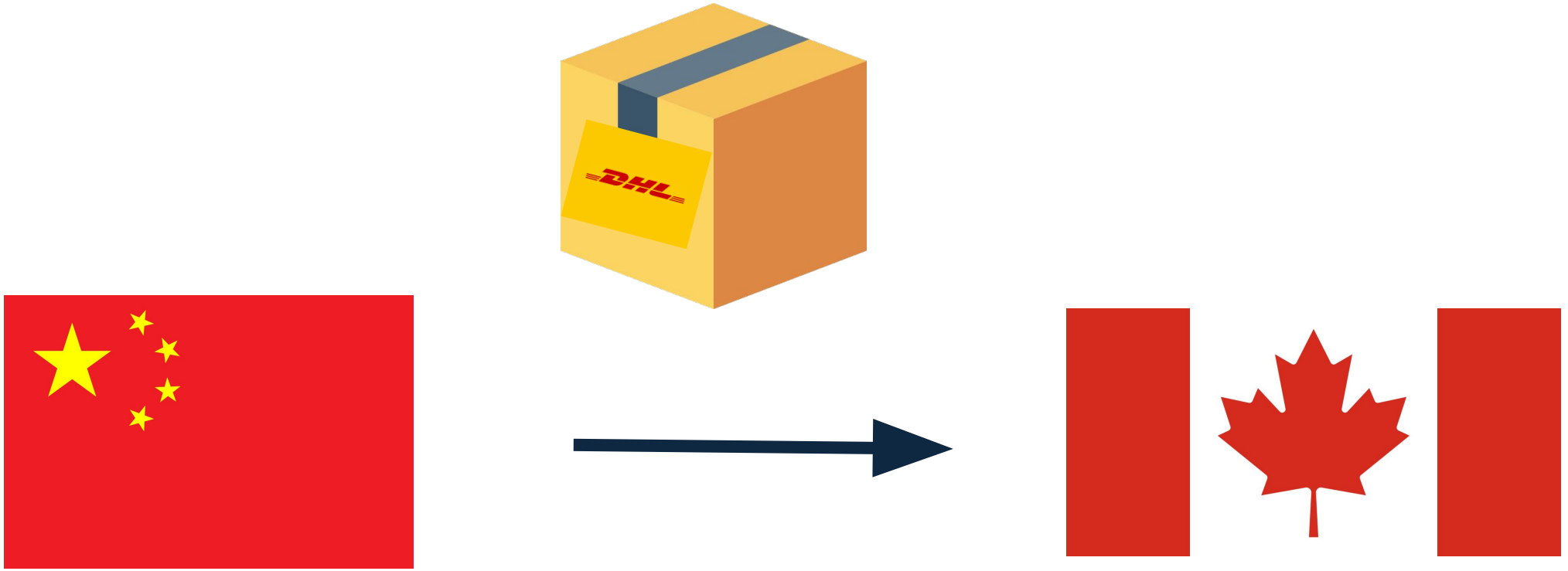
CloudEvents 事例

不同的国家/地区有不同的快递公司提供境内运输的服务

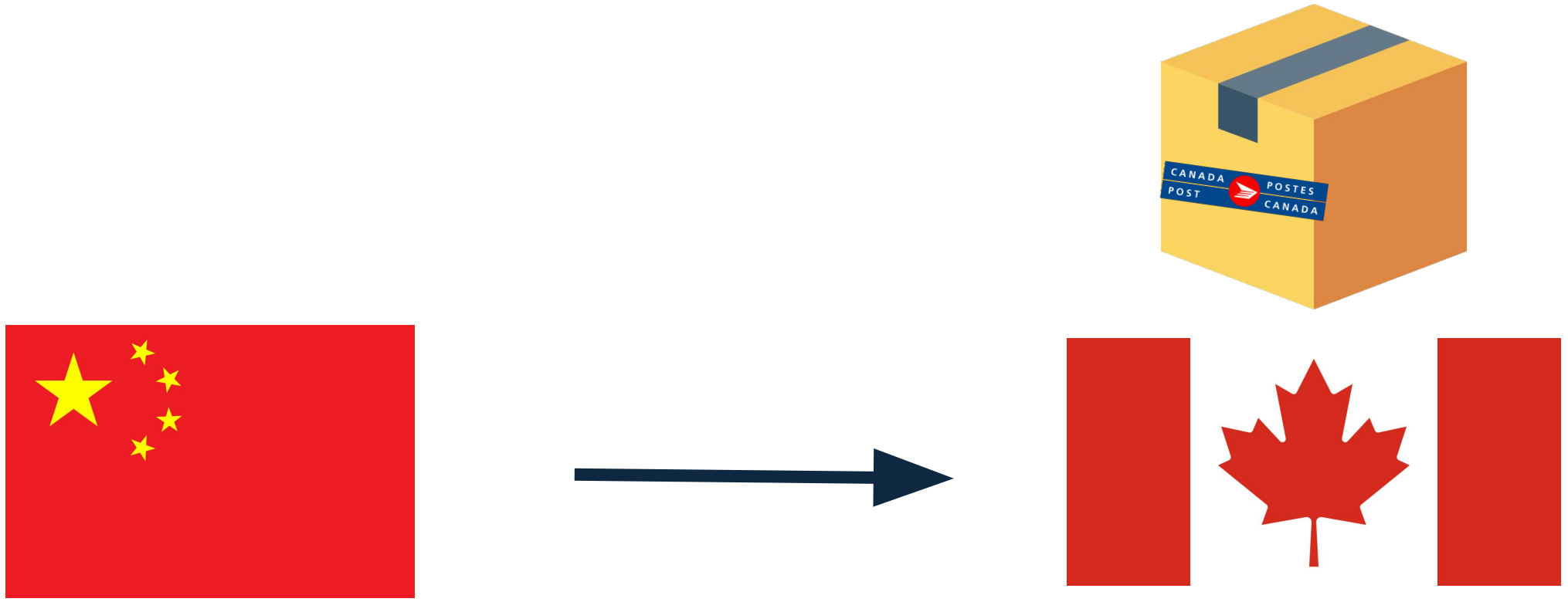


假设我们想从中国寄出一个包裹到加拿大

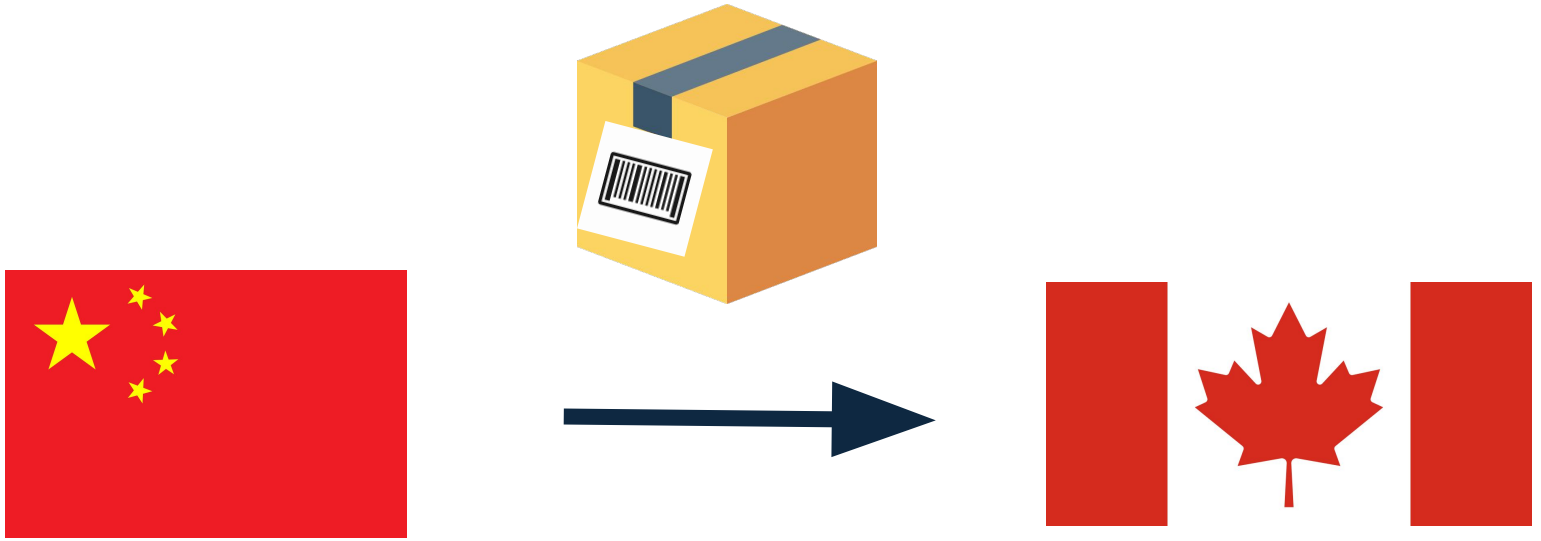
在中国境内的运输，是由国内的快递公司提供服务
包裹上贴的是国内的快递公司标签



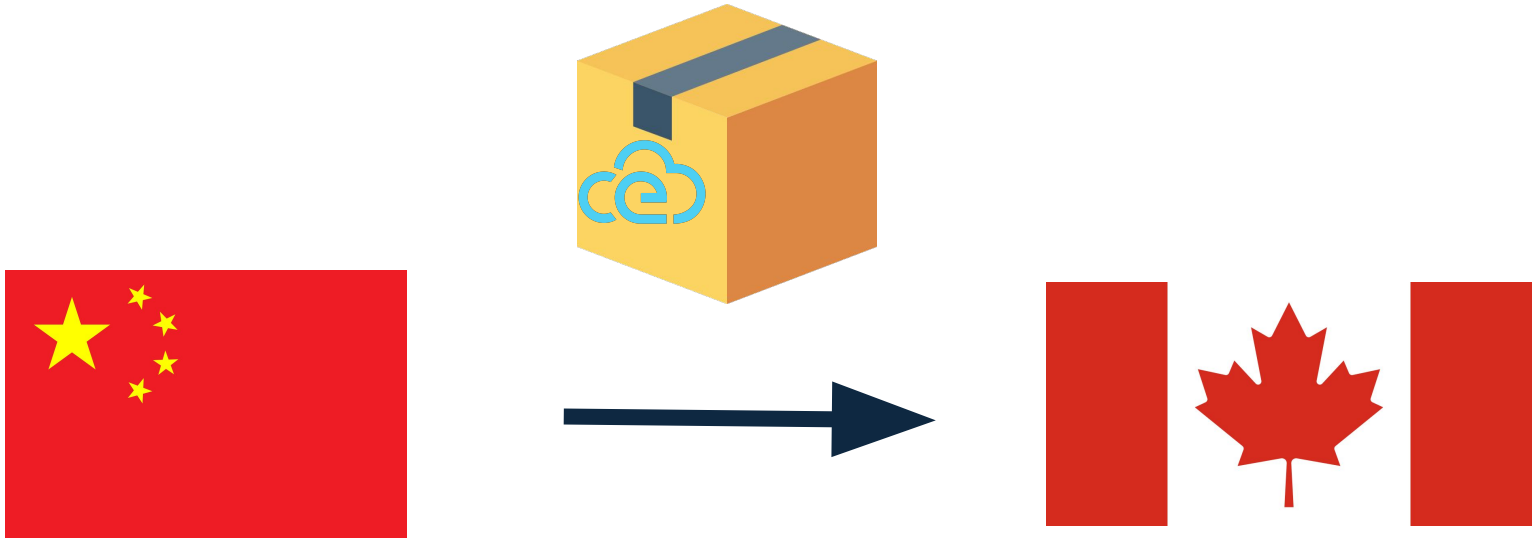
当包裹离开中国，开启国际段的运输，快递标签换成了国际运输段的快递公司



当包裹抵达加拿大，标签自然也需要换成了加拿大境内的快递公司

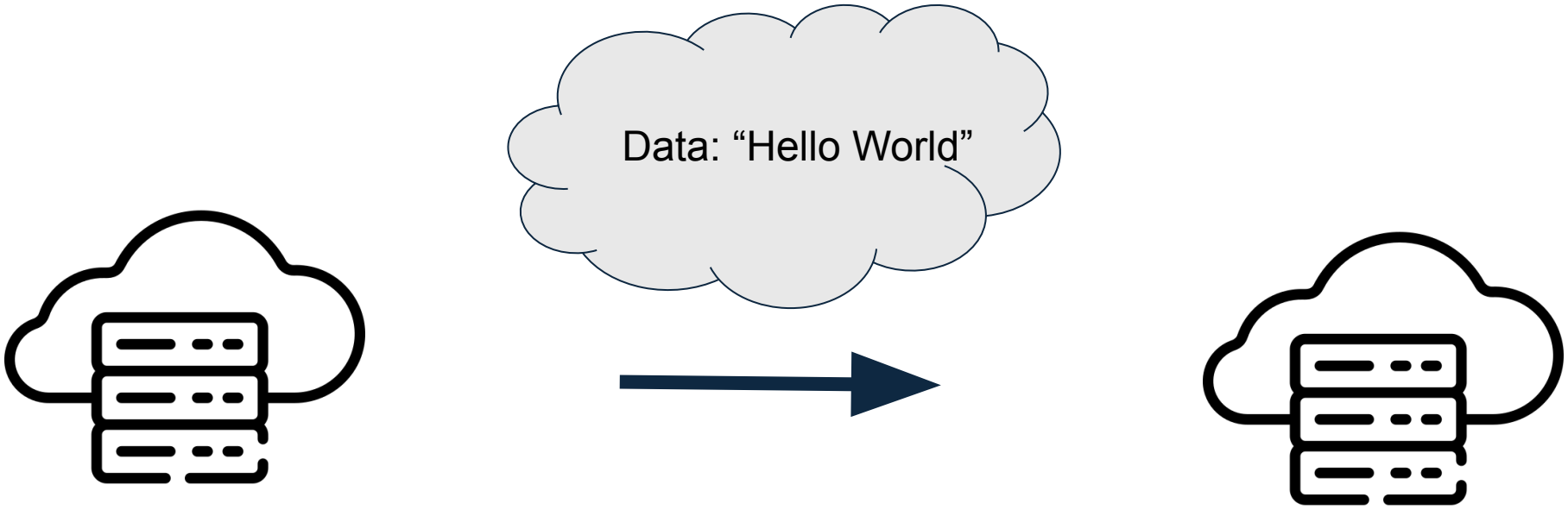


如果有一个国际通用的标签，所有的快递公司都能读得懂
那么我们就不需要每次都给包裹换一个标签了



这就是为什么CloudEvents 就是那个神奇的国际通用标签

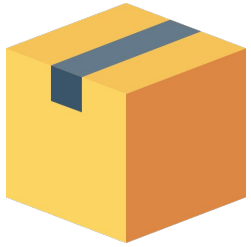
CloudEvents 示例

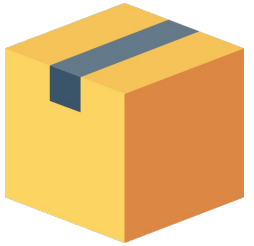


同理，换到云原生的世界，事件(events)在不同服务之间穿梭

事件随处可见

MQTT





kafka

```
{
   “data”:“Hello World 1”
}
```

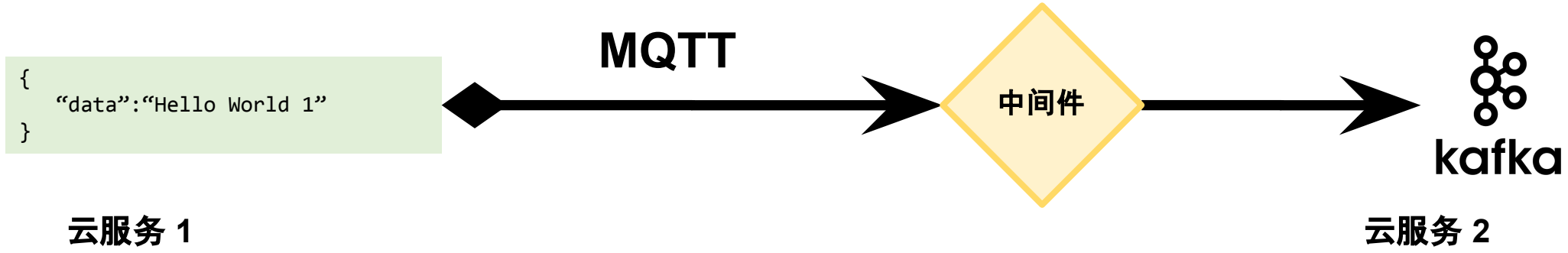
```
{
   “data”:“Hello World 1”
}
```

云服务 1

云服务 2

不同的云服务使用不同的通信协议

事件随处可见



事件随处可见

Cloud Service 1

```
{
   “data”:“I love HK!”
}
```

MQTT

Cloud Service 2

```
{
   “data”:“I’m at KubeCon China!”
}
```

HTTP

Cloud Service 3

```
{
   “data”:“Hello World!”
}
```

NATS

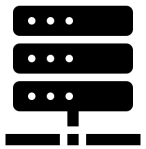
Varying:
Format 格式
Schemas 模式
Business Logic 业务逻辑

中间件
Middleware

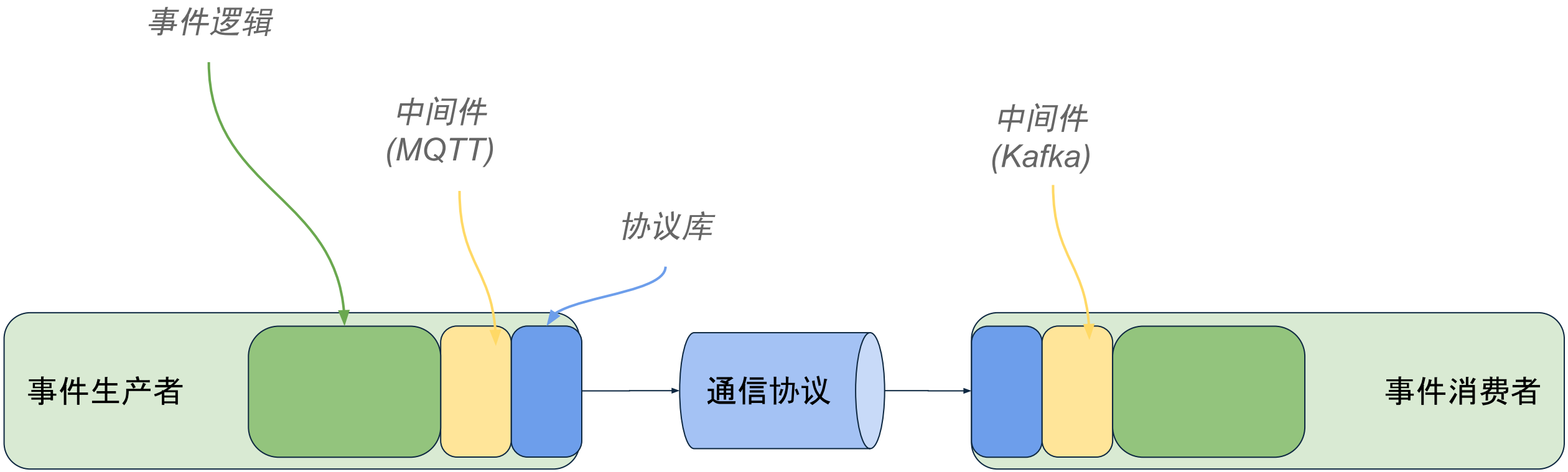
kafka

Cloud Service 4

Cloud Service 5

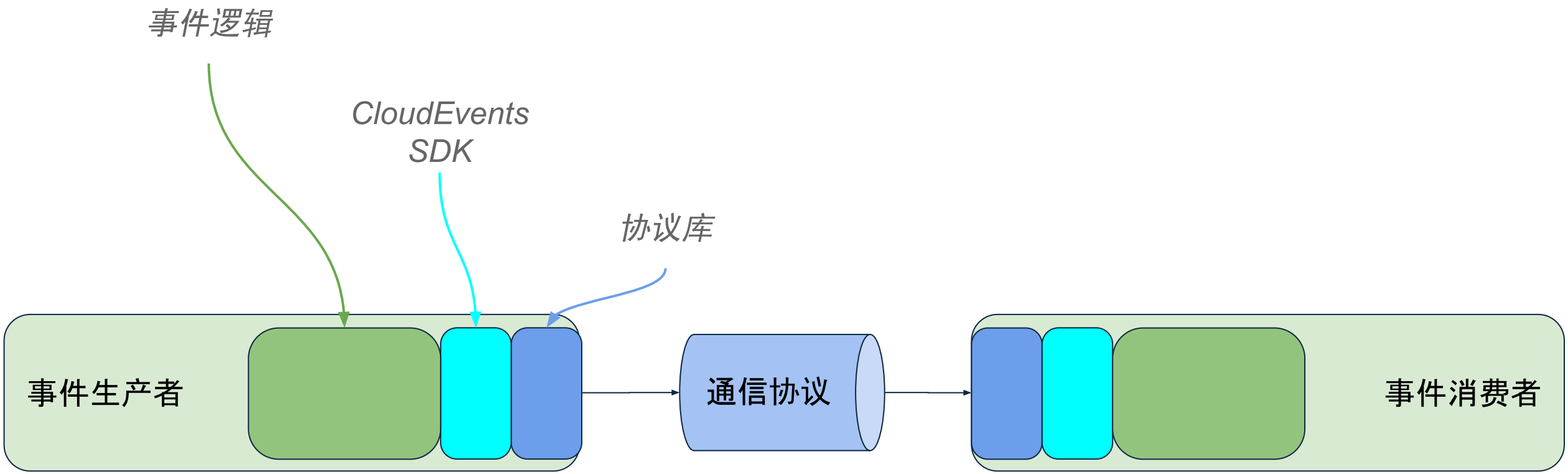


CloudEvents 之前



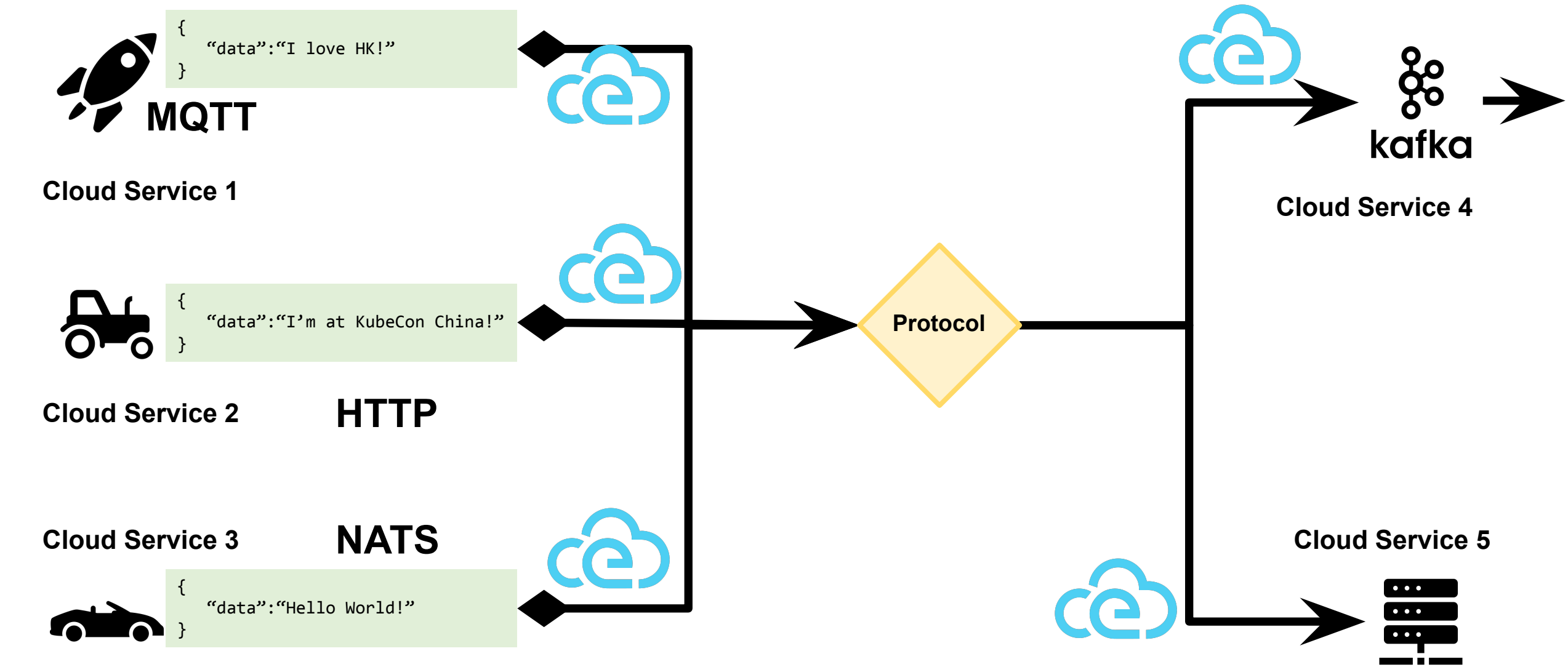
Source: Thinking Cloud Native, CloudEvents Future - Scott Nichols, Chainguard, Inc. - KubeCon EU 2022

事件随处可见



Source: Thinking Cloud Native, CloudEvents Future - Scott Nichols, Chainguard, Inc. - KubeCon EU 2022

事件随处可见

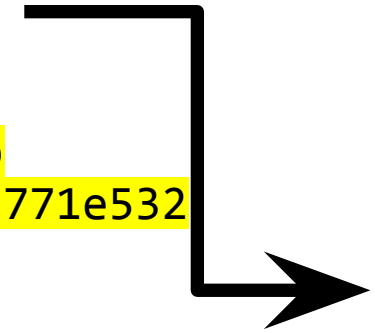


Source with some modification: CloudEvents - Don't call us, we'll call you- Klaus Deissner, SAP - KubeCon EU 2024

CloudEvents

HTTP - Binary

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

{
  "specversion": "1.0",
  "type": "com.bigco.newItem",
  "source": "http://bigco.com/repo",
  "id": "610b6dd4-c85d-417b-b58f-3771e532",
  "datacontenttype": "application/json",
  "data": {
    "action": "newItem",
    "itemID": "93"
  }
}
```

Source with some highlight: CloudEvents - Don’t call us, we’ll call you- Klaus Deissner, SAP - KubeCon EU 2024

CloudEvents - Binary

当事件在不同的服 务之间穿梭时...

HTTP - Binary

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

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

Metadata 元数据 帮助做事件的筛选过滤
从而确保事件能顺利抵达目的地

Event payload内容 是事件内包含的数据

Conclusion

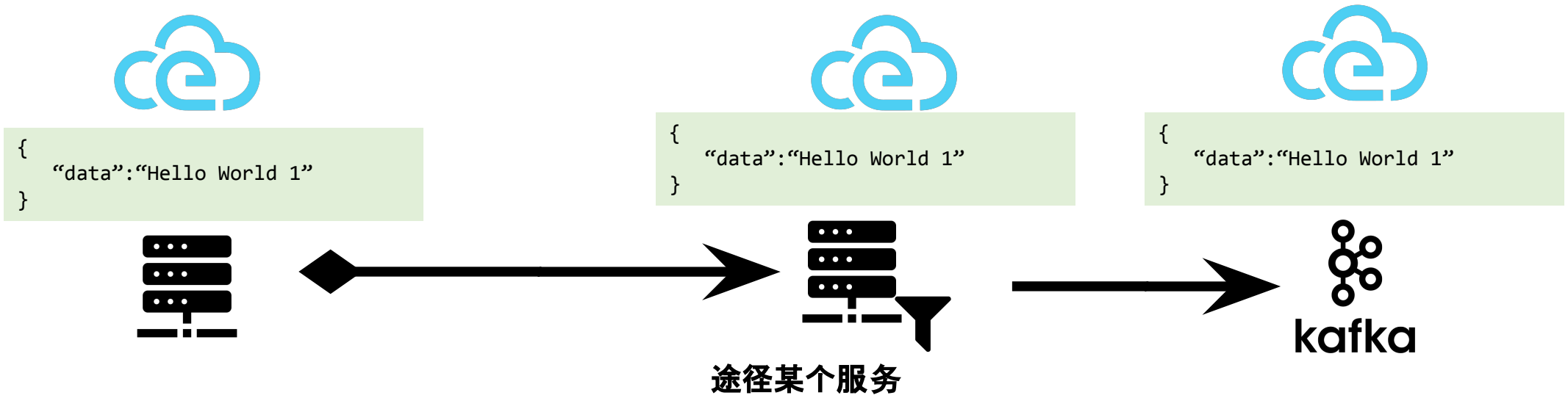
当事件在不同的服 务之间穿梭时...

HTTP - Binary

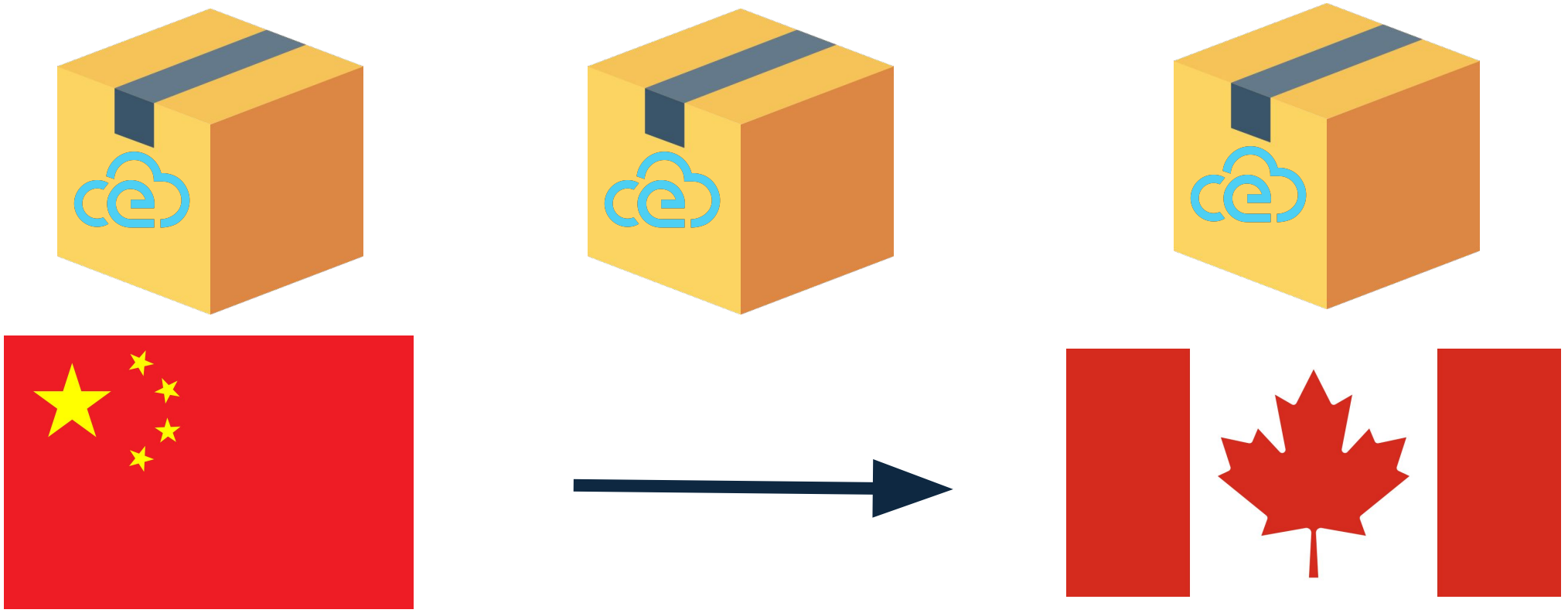
```
POST /events HTTP/1.0
Host: example.com
Content-Type: application/json
ce-specversion: 1.0
ce-type: com.bigco.newItem
ce-source: http://bigco.com/repo
ce-id: 610b6dd4-c85d-417b-b58f-3771e532

{
  "data":“Hello World 1”
}
```

Metadata 元数据 帮助做事件的筛选过滤
从而确保事件能顺利抵达目的地

途中的Service **不需要** 理解事件的内容！



CloudEvents



回顾：CloudEvents就是那个神奇的全局标签

CloudEvents 毕业啦!

开始于
2017年末

毕业于
1月 25日, 2024

了解更多，尽在 cloudevent.io

社区动态分享

7月 15日, 2024

CESQL V1.0 spec 已经发布!

English 英文

同时发布的还有 GoLang & Java SDK

筛选 CloudEvents 更轻松: 一个全新的似SQL的语言，能帮助中间件开发者更轻松的设定事件筛选的条件！

https://bit.ly/**cesql-v1**

社区动态分享

2月9日, 2024

English 英文

AWS 亚马逊云 EventBridge现已支持 CloudEvents

https://bit.ly/**awscloudevents**

社区动态分享

At **KubeCon CloudNativeCon 2019 in 美国圣地亚哥**

⇒ 决定选择 **event discovery 事件发现 and subscriptions 作为下一步**

XREGISTRY

1. 现在有什么问题: 通过延展包裹运输的小故事了解痛点
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3. xRegistry 实战
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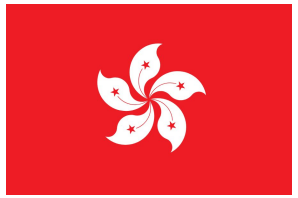
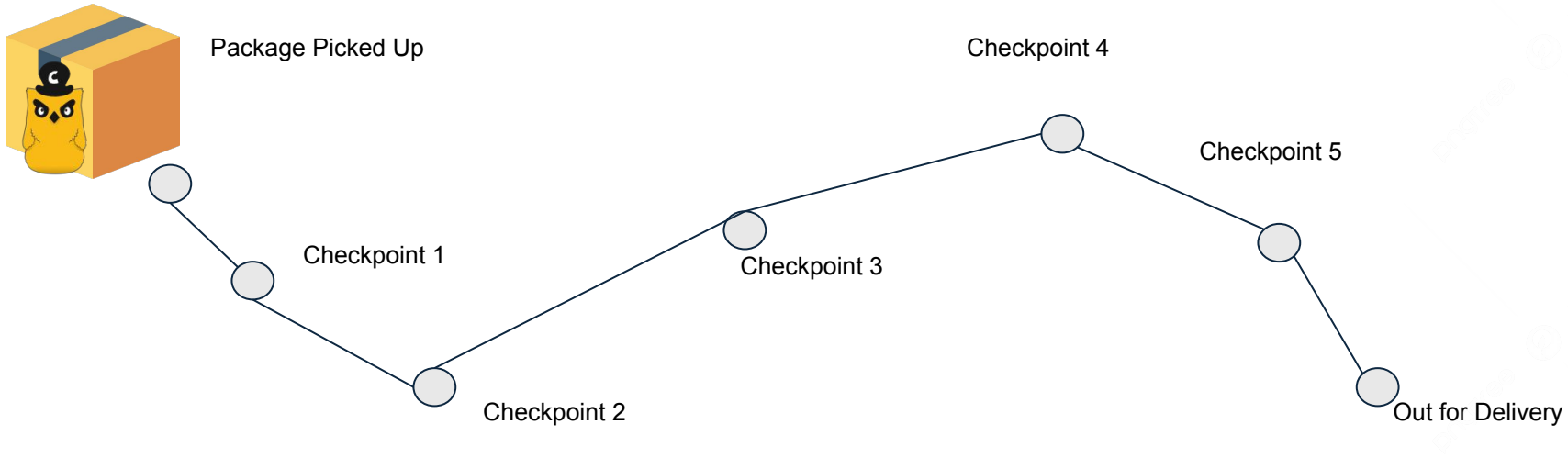
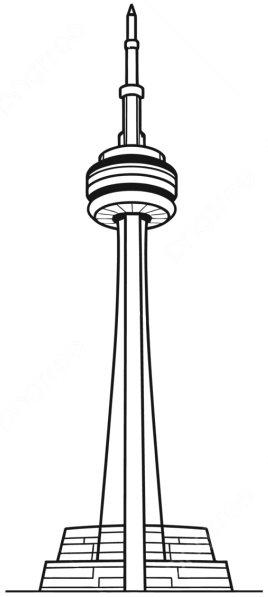
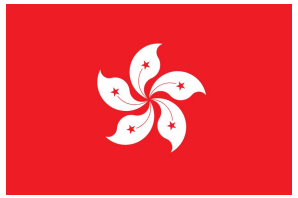
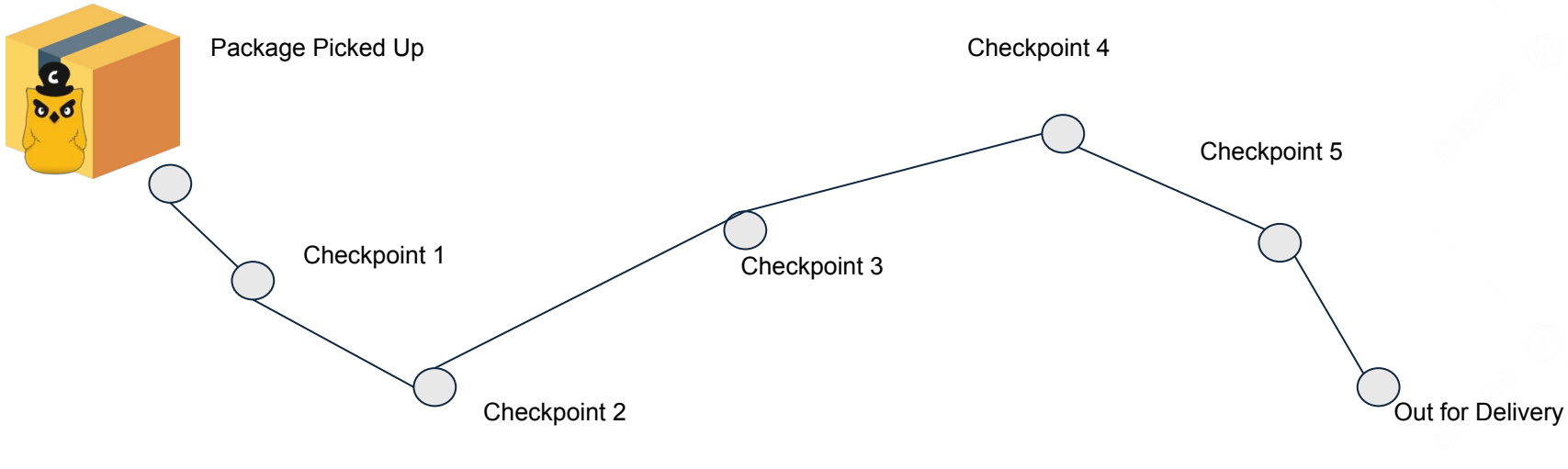


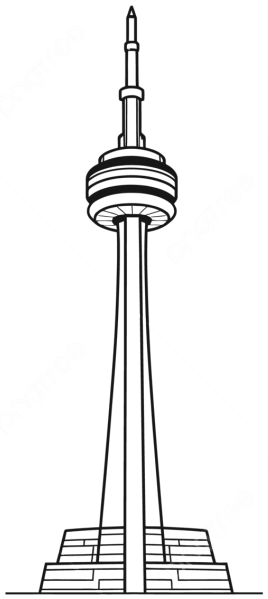




一个包裹准备从香港寄到多伦多







包裹需要经过不同的 checkpoints/scan points (检查点)

顺丰速运

已签收 05-11 17:22

派送成功

派送中 05-11 16:10

快件交给 ，正在派送途中（联系电话: 顺丰已开启“安全呼叫”保护您的电话隐私,请放心接听！）（主单总件数：1件）

运输中 05-11 15:59

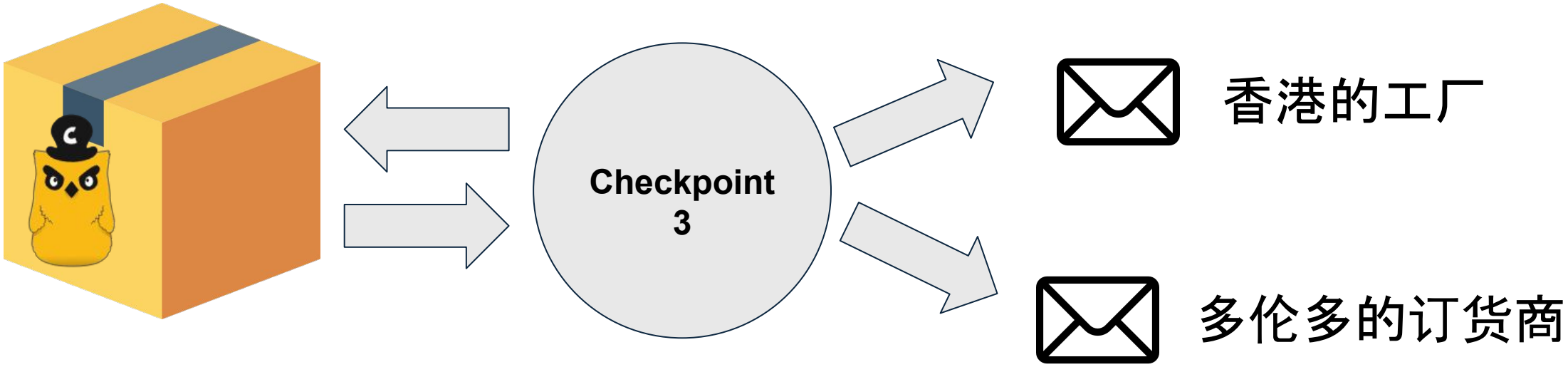
快件到达 【北京大兴宝善街店】

05-11 15:12

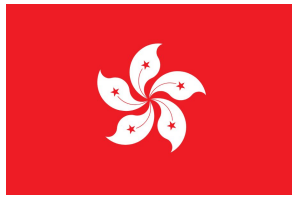
快件在【北京马驹桥中转场】完成分拣，准备发往 【北京大兴宝善街店】

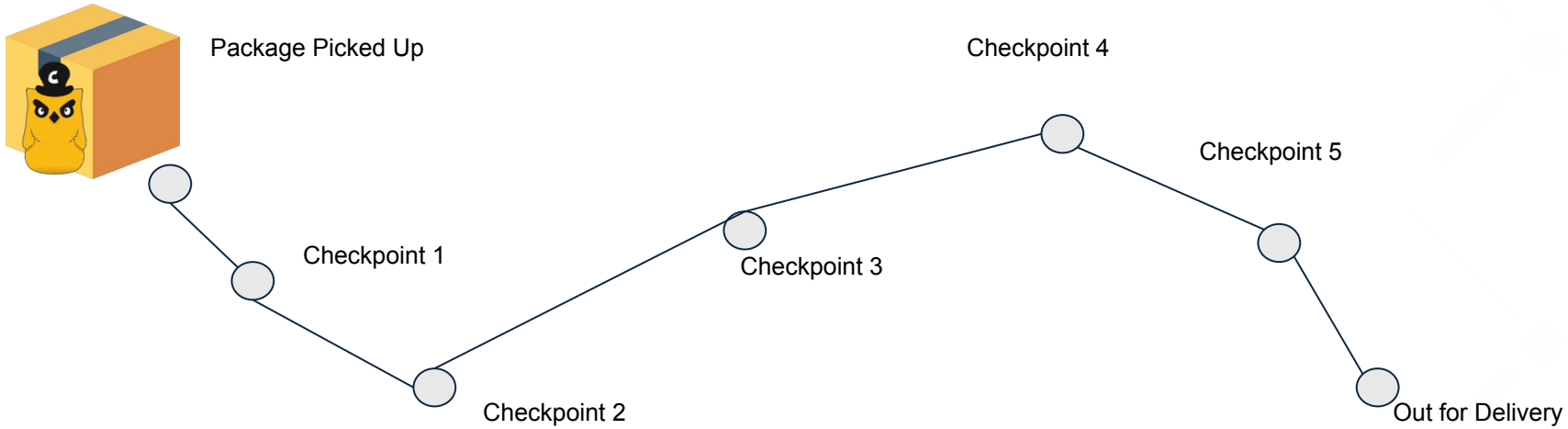
05-11 13:34

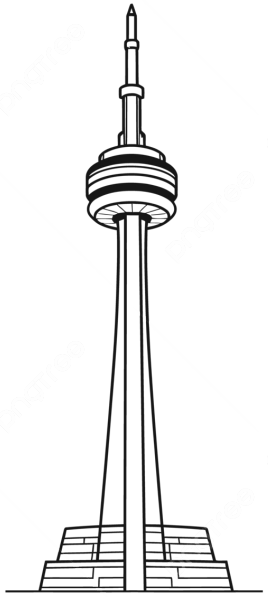
快件到达 【北京马驹桥中转场】



每当包裹到达/离开检查点的时候, 会触发一个通知事件





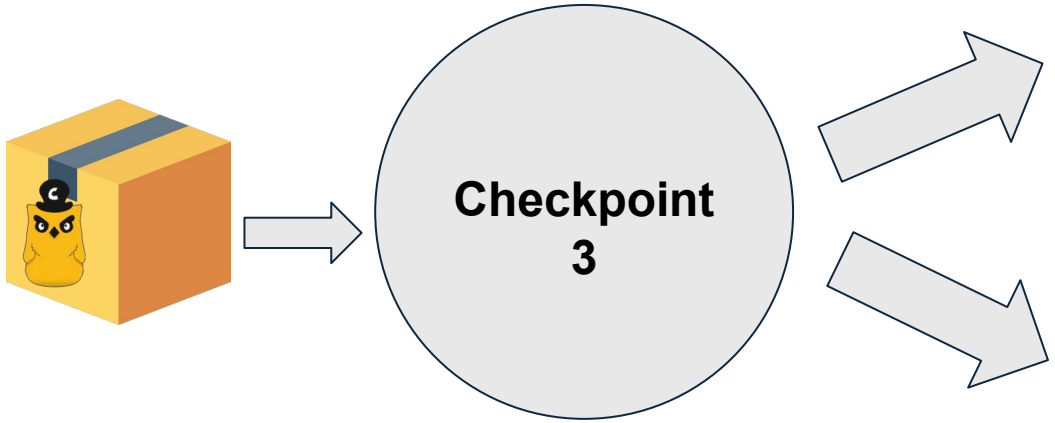


每个checkpoint检查点都**独立运营**，互不干扰，互不合作

每当有包裹到达一个新的检查点的时候，检查点该如何让香港工厂和多伦多商店知道呢？

发什么，发给谁呢？

发给谁？



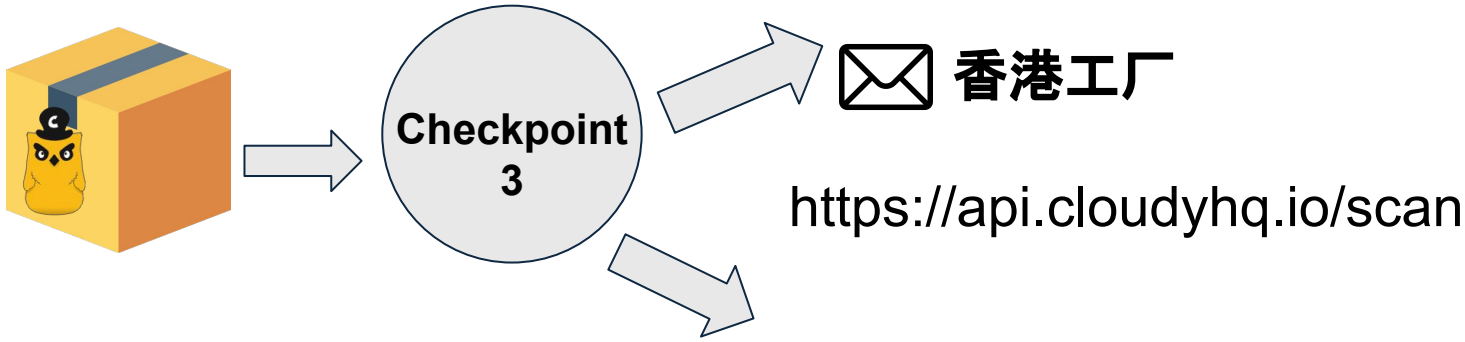
香港工厂

https://api.cloudyhq.io/scan

多伦多商店

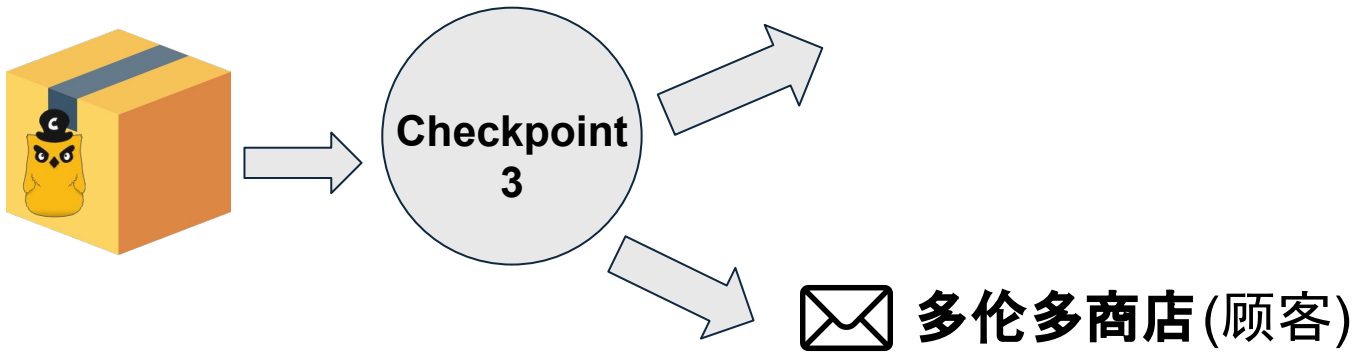
https://api.cloudyhq.io/notify-store

发什么？



1. 这个检查点的id是？
2. 包裹的id是？
3. 扫描时间
4. 种类：到达件还是出发件？

发什么？

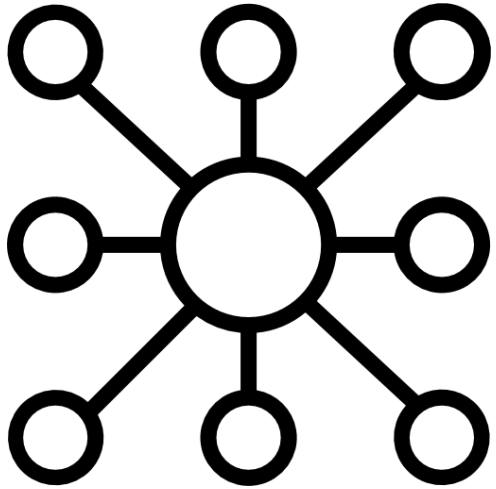


https://api.cloudyhq.io/notify-store

1. 这个检查点的id是？
2. 包裹的id是？
3. 扫描时间
4. 种类：到达件还是出发件？
5. 检查站的地址？
6. 扫描人？

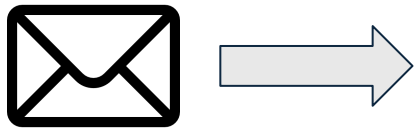
好的，我们需要知道这些信息：

- **What**：事件里要包含哪些信息？
- **Where**：事件发到哪里去？
- What **types**：有哪些不同种类事件可以发？
  - 发给工厂的？还是发给顾客的？



我们需要一个包含所有这些信息的中心
这样每一个检查点都可以从这里拉取信息了

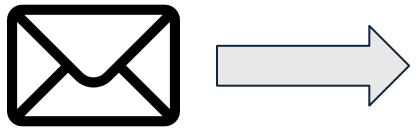
CloudyFactory



https://api.cloudyhq.io/scan

事件类型Event Type:
CloudyHQ.Factory.Arrive
CloudyHQ.Factory.Depart

Toronto Store



https://api.cloudyhq.io/notify-store

事件类型 Event Type:
CloudyHQ.Store.Arrive
CloudyHQ.Store.Depart

什么是事件 发现?

在什么场合下用什么事件种类？

⇒ ***事件定义登记处 Event definition registry***

这些事件里面长啥样？

⇒ ***结构描述登记处 Schema registry***

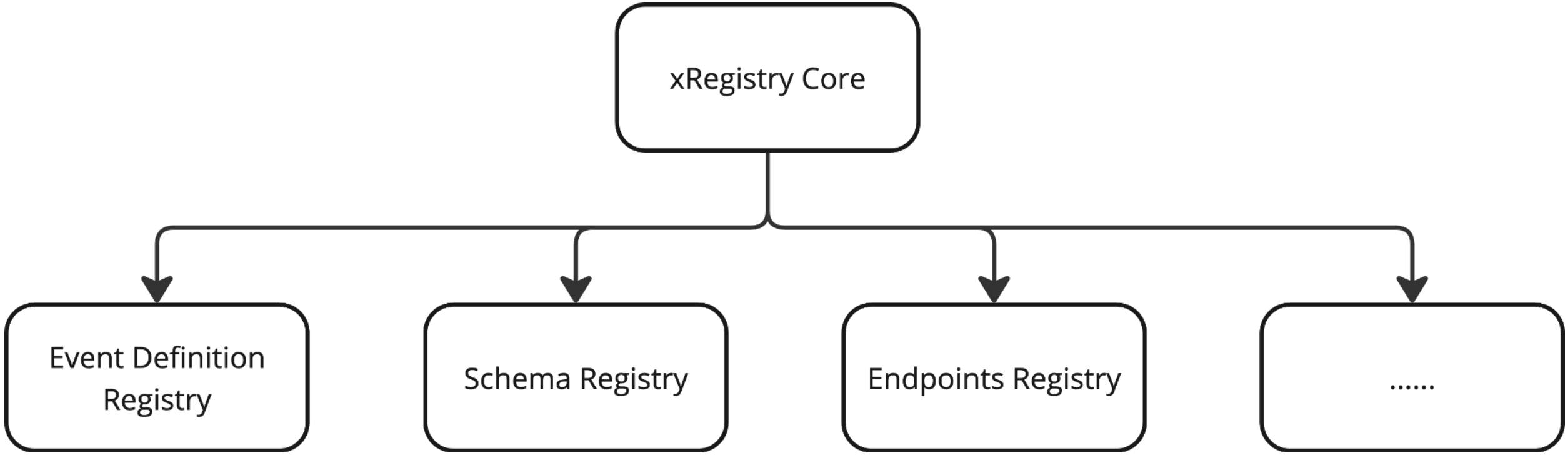
哪里可以处理这些事件呢？

⇒ ***端点登记处 Endpoint registry***

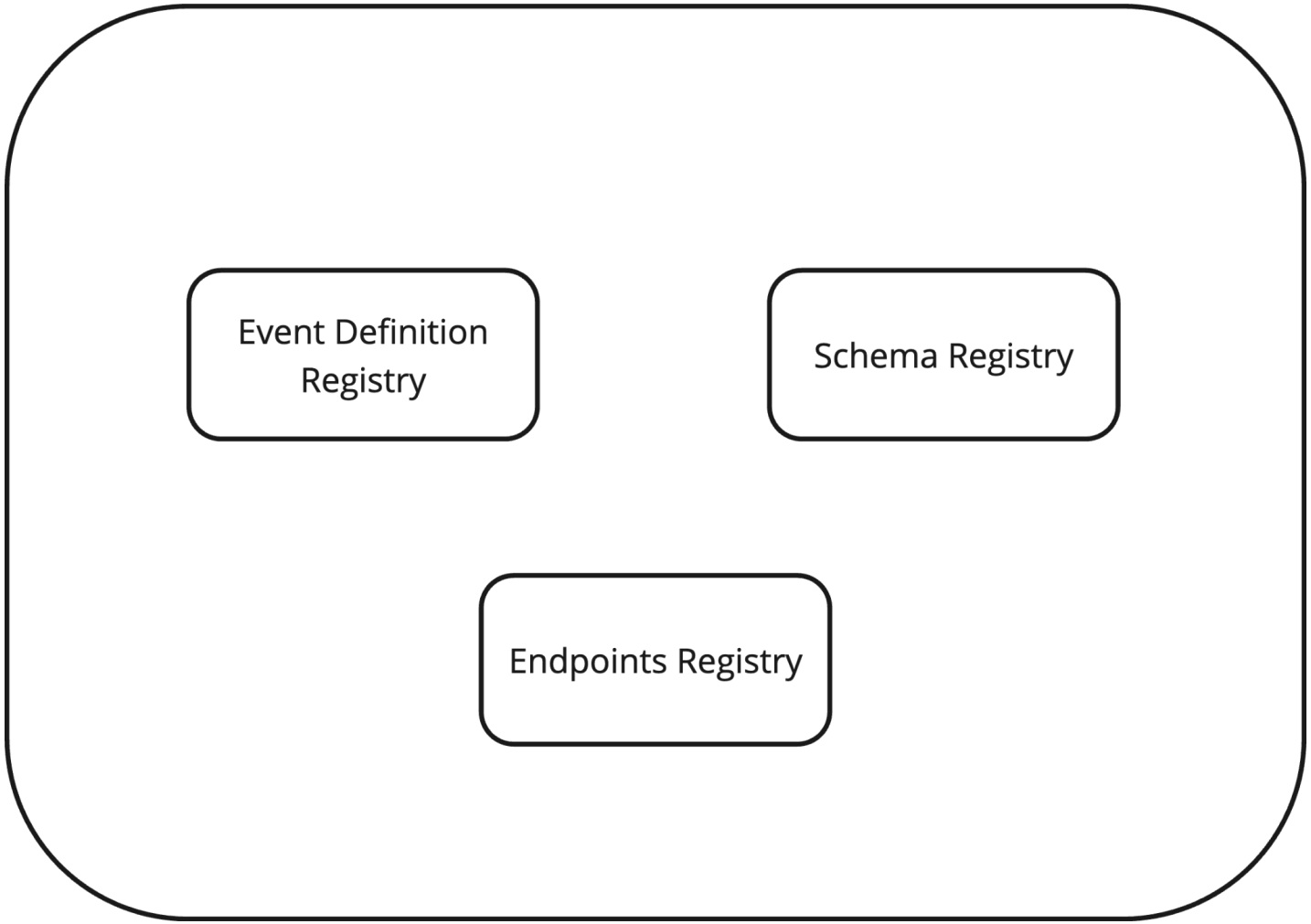
Source: Introducing CloudEvents Discovery - Clemens Vasters & Klaus Deissner - KubeCon EU 2023

xRegistry 闪亮登场

xREGISTRY

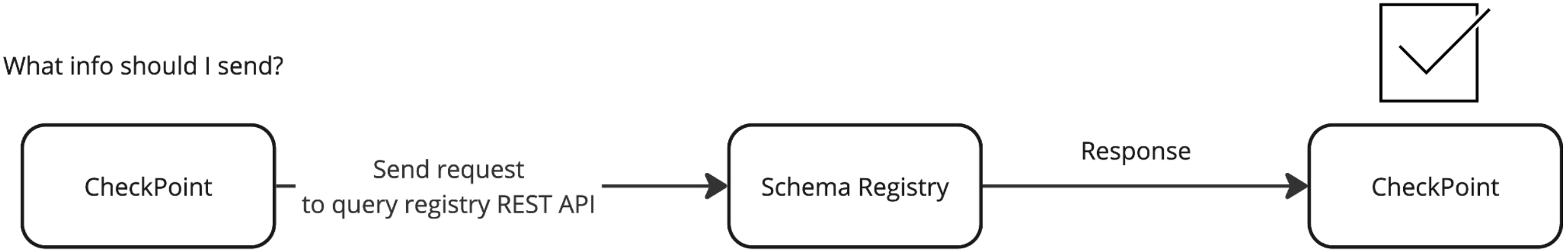


CloudyHQ - Registry System



xREGISTRY

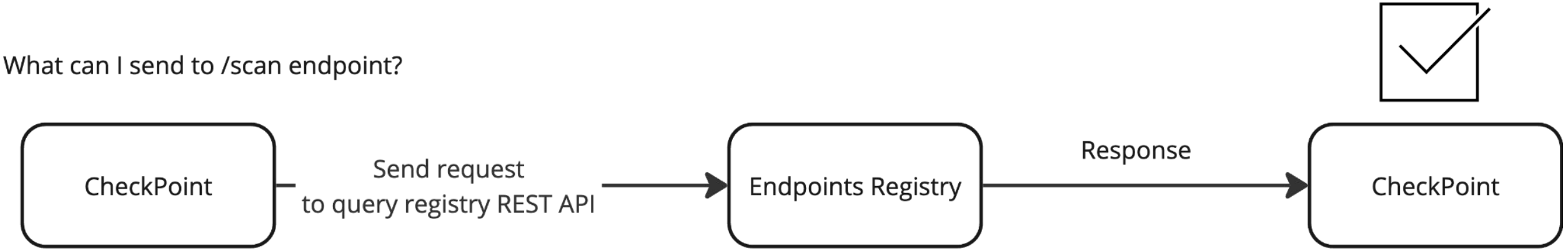
What info should I send?



You need to send package id, timestamp....

xREGISTRY

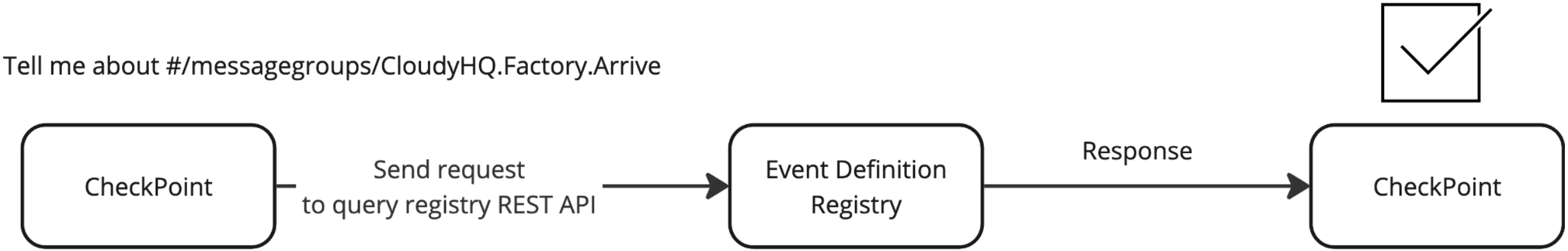
What can I send to /scan endpoint?



You can:

- Send these types of event
  - #/messagegroups/CloudyHQ.Factory.Arrive
  - #/messagegroups/CloudyHQ.Factory.Depart
- Format should be CloudEvents
- Full URL is: https://api.cloudyhq.io/scan
- Protocol should be HTTP

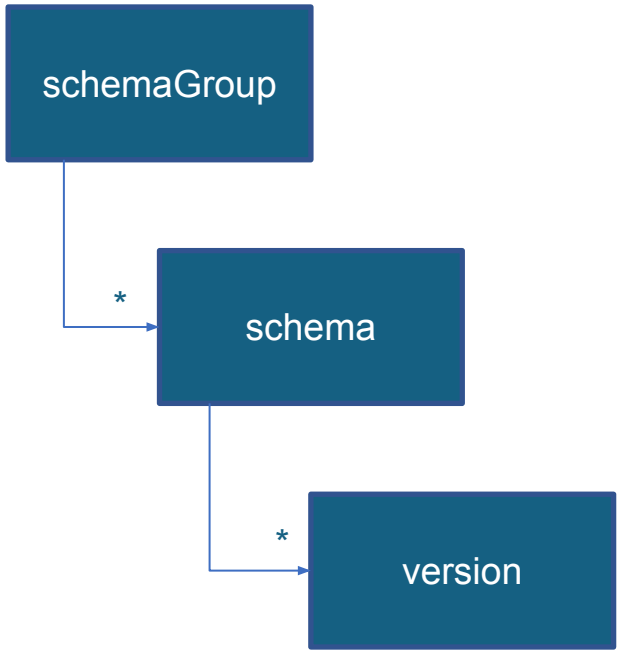
xREGISTRY



Sure:

- Schema URL is:
  #/schemagroups/CloudyHQ.Factory.Arrive/schemas/ArriveData
- Format should be JSONSchema/draft-07
- Event type should be: CloudyHQ.Factory.Arrive
- ...

结构内容登记处 registry



- 包含了不同组内的事件的数据结构(schema)设计
- 储存了多个不同的数据结构设计版本
- 数据结构设计版本不止用于事件
- 与不同的数据结构语言相互独立

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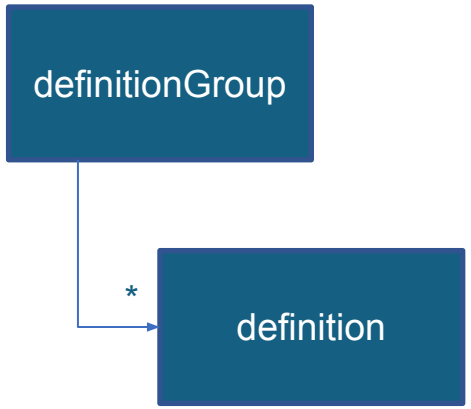
事件定义



Groups of event definitions

Other message formats possible:

- AMQP
- MQTT
- Protobuf
- HTTP
- …

```
{
  "id": "Contoso.CRM.Events.CustomerNoteAdded",
  "description": "A note has been added to a customer",
  "format": "CloudEvents/1.0",
  "metadata": {
    "attributes": {…}
  },
  "schemaurl":"#/schemaGroups/Contoso.CRM.Events/schemas/customerNoteAddedEventData"
}
```

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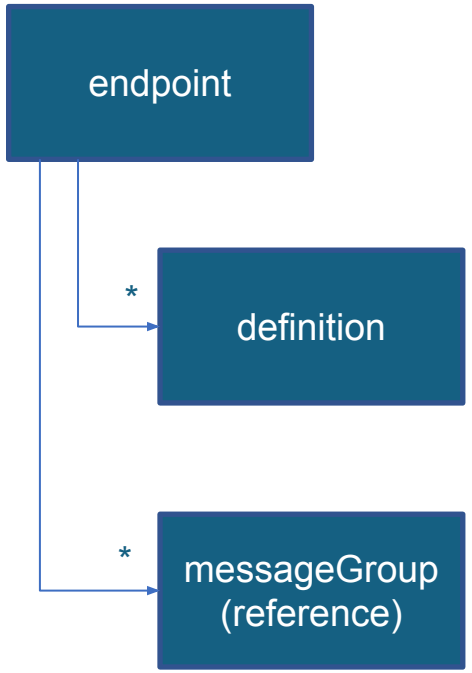
端点




```
"CloudyHQ.Factory.Http": {
  "id": "CloudyHQ.Factory.Http",
  "usage": "producer",
  "config": {
    "protocol": "HTTP",
    "strict": false,
    "endpoints": [
      "https://api.cloudyhq.io/scan"
    ]
  },
  "channel":”my/topic",
  "messageGroups": [
    "http://localhost:8080/reg-Messages/CloudyHQ.Factory"
  ],
  "format": "CloudEvents/1.0"
}
```

Superset of **`messageGroup`**

Additional attributes

- **`usage`**: producer | consumer | subscriber
- **`channel`**: Correlate multiple endpoints of the same channel
- **`messageGroups`**: References to existing definition groups
- **`config:`** Connectivity configuration

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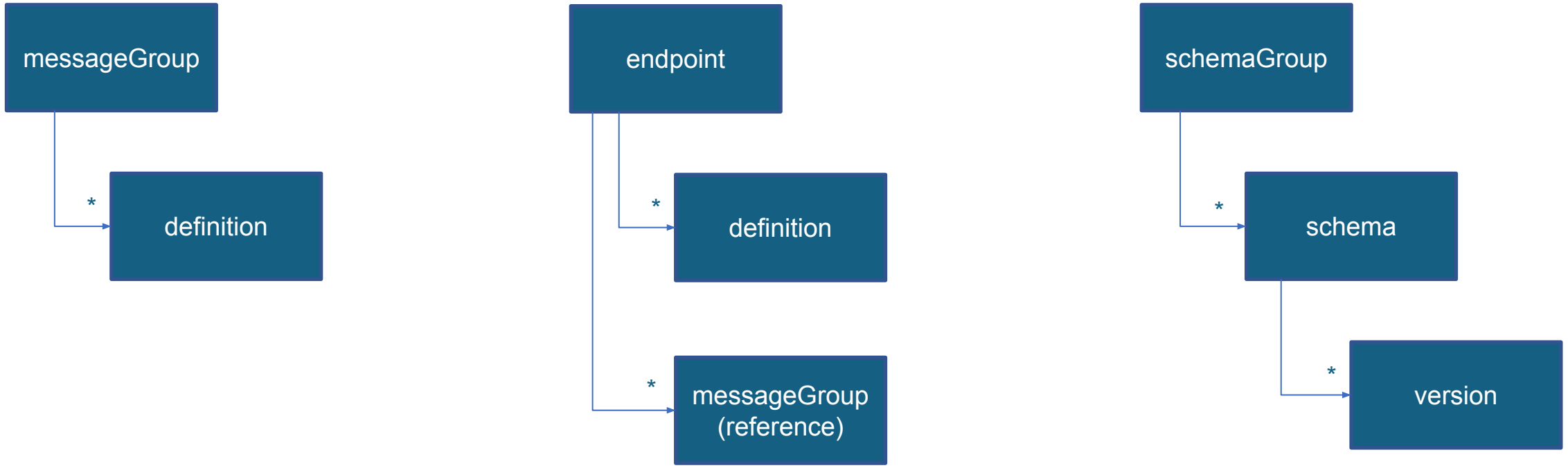
看看他们有什么相同点？



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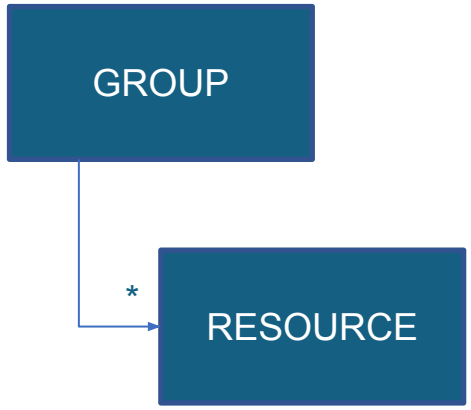
xRegistry核心



API Access

```
/model                                  # Manage the registry model
/                                       # Show all Groups
/GROUPs                                 # Manage a Group Type
/GROUPs/gID                             # Manage a Group
/GROUPs/gID/RESOURCEs                   # Manage a Resource Type
/GROUPs/gID/RESOURCEs/rID               # Manage the latest Resource version
/GROUPs/gID/RESOURCEs/rID?meta          # Metadata about the latest Resource version
/GROUPs/gID/RESOURCEs/rID/versions      # Show version strings for a Resource
/GROUPs/gID/RESOURCEs/rID/versions/vID          # Manage a Resource version
/GROUPs/gID/RESOURCEs/rID/versions/vID$meta     # Metadata about a version
```

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从小开始

All in one `.cereg` file

Managed with your source code

显示所有你需要的

- 数据结构(schema)在事件定义(event definition)内
- 事件定义(event definition) 在端点(endpoint)内

With infrastructure support

- Just schemas and event definitions
- Let infrastructure create endpoint definition

Source: Introducing CloudEvents Discovery - Clemens Vasters & Klaus Deissner - KubeCon EU 2023

或者用xReg做点更厉害的事

为你的组织搭建一个中央登记处

提高复用率

- 更好地监管
- 版本

和其他组织的互通

- 公司不同部门
- 第三方公司
- 顾客

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xRegistry CLI

xRegistry 有一个终端CLI工具，帮助开发者提高效率

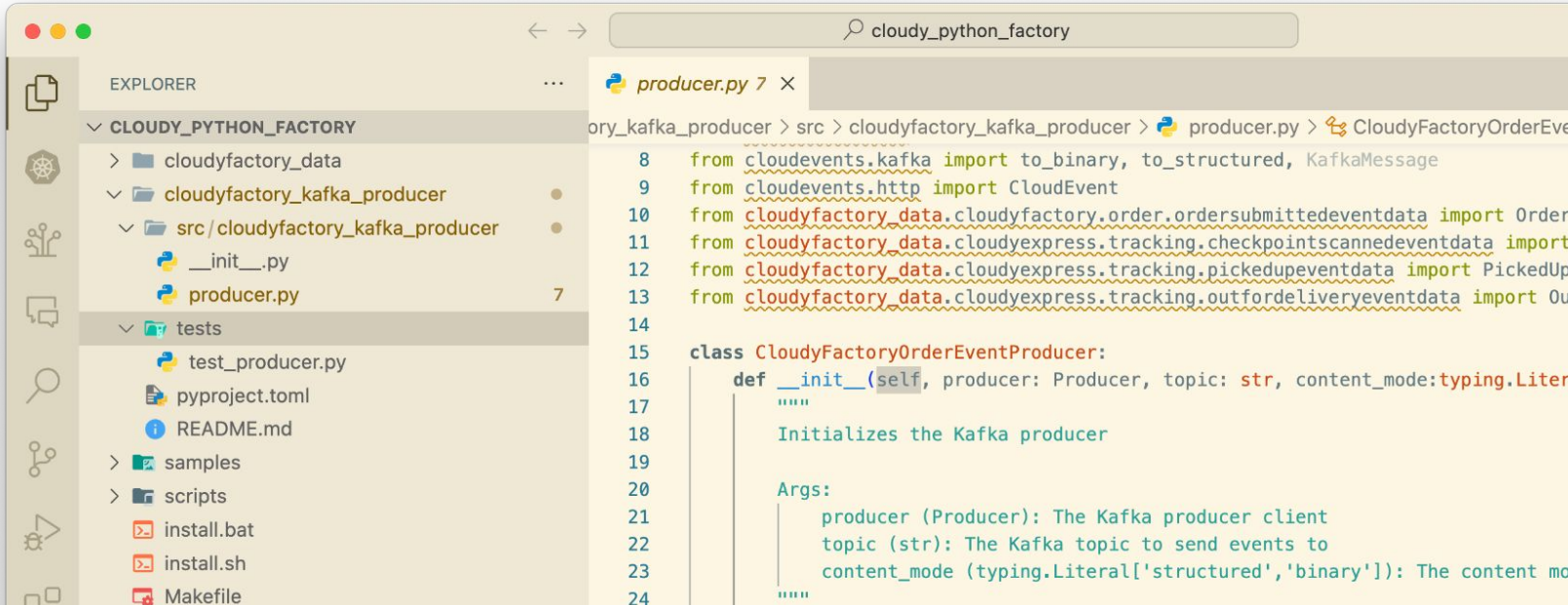
可以根据xRegistry的内容自动生成库

xRegistry CLI

xRegistry 有一个终端CLI工具，帮助开发者提高效率

可以根据xRegistry的内容自动生成库

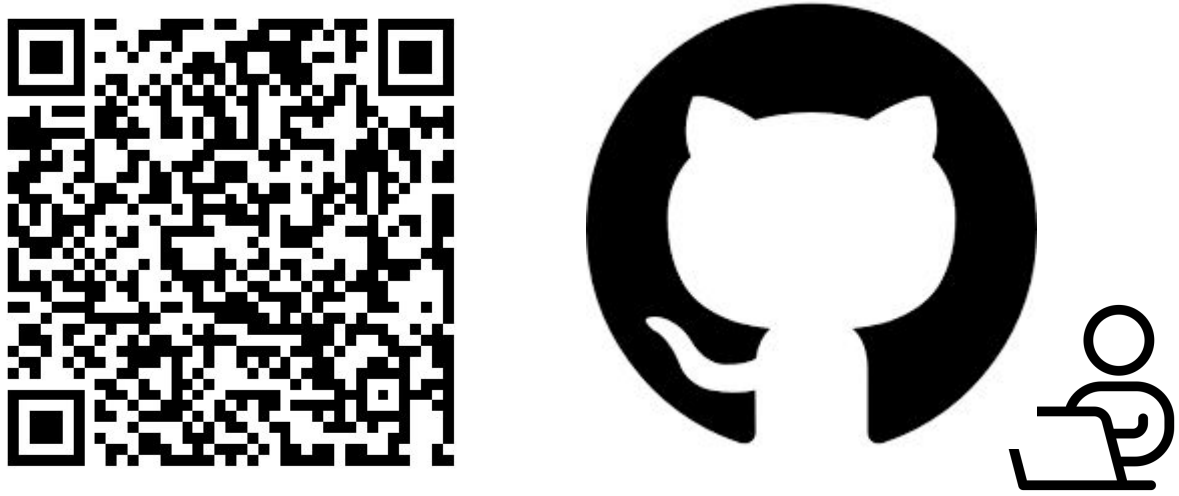
```
xregistry generate
--language=openapi
--style=producer
--projectname=MyProjectProducer
--definitions=definitions.json
--output=MyProjectProducer
```



CLI 视频 Demo

https://drive.google.com/file/d/1sPDkJ3RzrylorBVsyPR77mXnadQIlPIV/view?usp=sharing

Try yourself!



自己去看看xRegistry代码实操吧！代码都在这儿了！

https://github.com/Leo6Leo/xreg-github/pull/1/files

日程

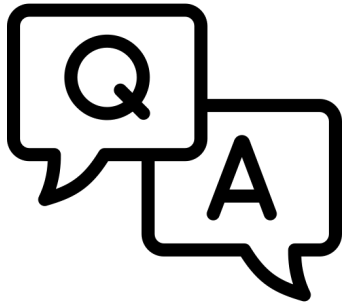
CloudEvents(**CE**):介绍&社区最新动态分享

1. 理解什么是 CE: 物流包裹运输的小故事
2. 社区最新动态分享
3. CloudEvents社区下一步发展的侧重方向

xRegistry: 事件驱动架构中如何发现事件

1. 现在有什么问题: 通过延展包裹运输的小故事了解痛点
2. xRegistry怎么来解决提到的这些问题?
3. xRegistry 实战
4. xRegistry CLI - 终端工具介绍

提问时间



Q&A

问答时间

保持联系

CLOUD NATIVE COMPUTING FOUNDATION

slack

#cloudevents

#xregistry

Thank you

KubeCon

CloudNativeCon

China 2024

THE LINUX FOUNDATION

OPEN SOURCE SUMMIT

AI_dev

Open Source GenAI & ML Summit

多谢！