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Apache EventMesh in Huawei Cloud

Next Generation of Enterprise Cloud Native Event Centre: EventGrid

Alex Luo – Apache EventMesh PMC, Principal Engineer in Huawei Canada

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About Me

Alex Luo

- Principal Engineer at Huawei Canada Toronto Research Institute
- 10+ years in Enterprise Software Development
- Leading the R&D team at Huawei, working on next generation of cloud middleware technologies, including EDA and EiPaaS
- Contributed to Apache EventMesh since March 2021
- Became Apache EventMesh Committer in March 2022, PMC in December 2022

Apache EventMesh & WeBank

Huawei Canada Toronto Research Institute

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Part 01

Apache EventMesh Community

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Apache EventMesh Community

First Chinese FinTech-founded Project made into Apache Incubator

- September 2019, EventMesh Project created by WeBank, a private Chinese Digital Bank founded by Tencent
- February 2021, EventMesh entered into Apache Incubator
- August 2021, EventMesh is included by CNCF Cloud Native Interactive Landscape as Serverless Framework developer module
- March 2023, EventMesh graduated into Apache Top-level Project (TLP)
- July 2023, EventMesh is included into Forrester China Cloud Native Ecosystem Research Report
- GitHub Star 1.4k+, Fork 500+, PR 2000+
- Totally 11 Releases, Latest release is v1.9.0

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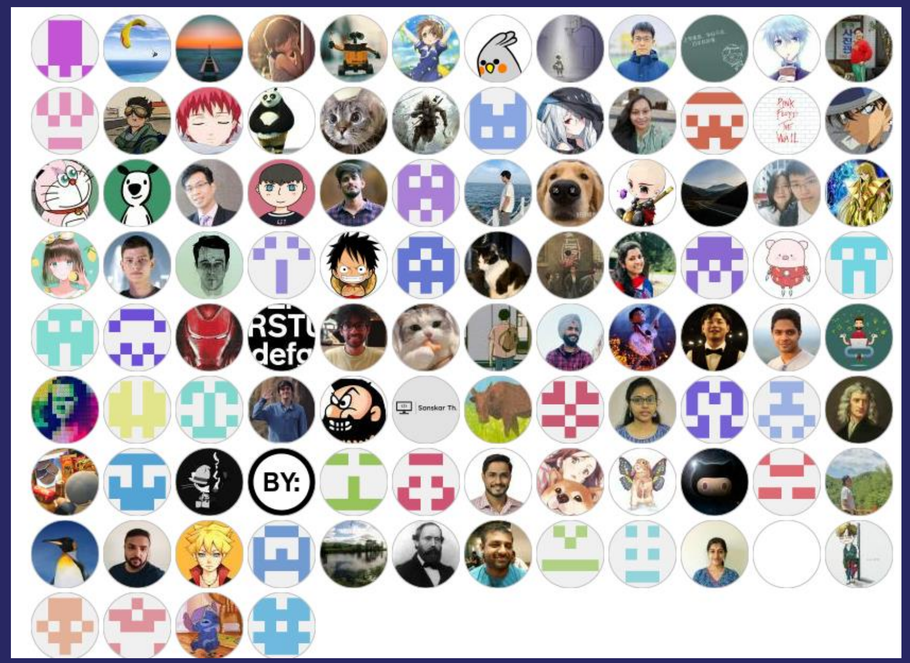
Apache EventMesh Community

Strong Industry & Community Supports

- WeBank uses EventMesh to support all core financial business scenarios
- EventMesh is used in multiple industries to support EDA service orchestrations, industries include: Internet companies, transportation, manufacture, Banking, Government
- EventMesh is used in production in major companies including Huawei Cloud, YongHui Superstores, Navimentum, and ZCY Gov. Many other companies are exploring more use cases.
- 300 contributors, 47 Committers, 15 PMCs

  from multiple companies: WeBank, Tencent, Huawei, eBay, Alibaba, Baidu

  from multiple countries: China, Canada, US and India



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Apache EventMesh Community

Recognitions & Awards

- SegmentFauLt 2022 Annual List of China's Technology Pioneers
- Member of Trusted Open Source Community of CAICT (China Academy of Information and Communications Technology)
- OSCHINA Annual Open Source Project List

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Part 02

EventMesh Architecture

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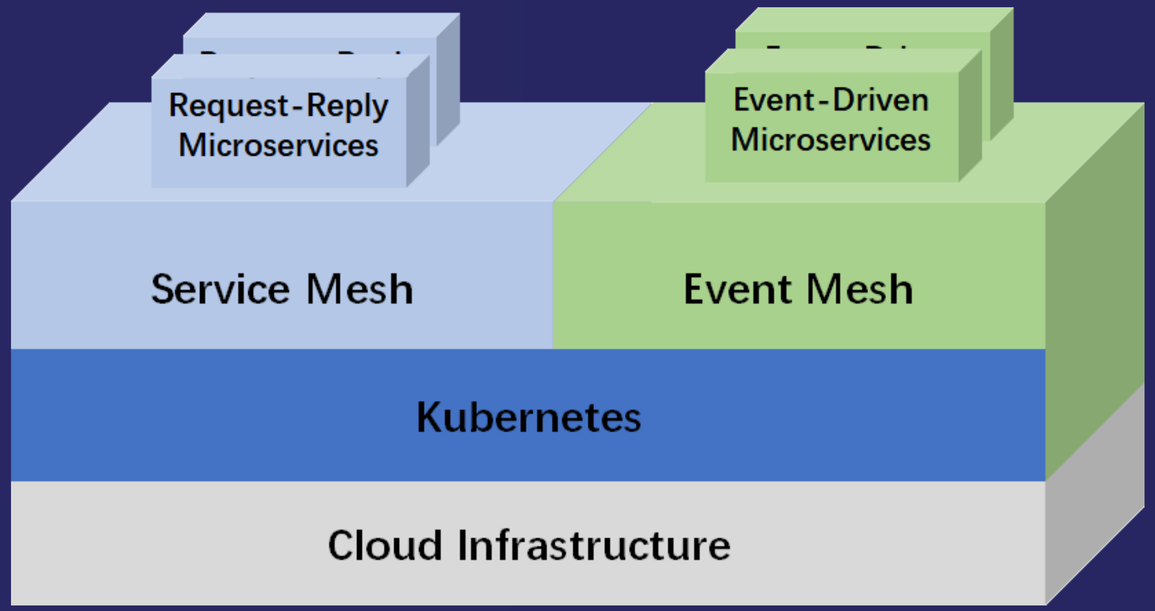
What is Apache EventMesh

Next Gen of Cloud native, Serverless, Event-Driven infrastructure and middleware

- Decouple the applications from event/message backend (such as Kafka, ActiveMQ etc),
- Building distributed Event-Driven applications
- Deploy and used in Public Cloud and Hybrid Cloud



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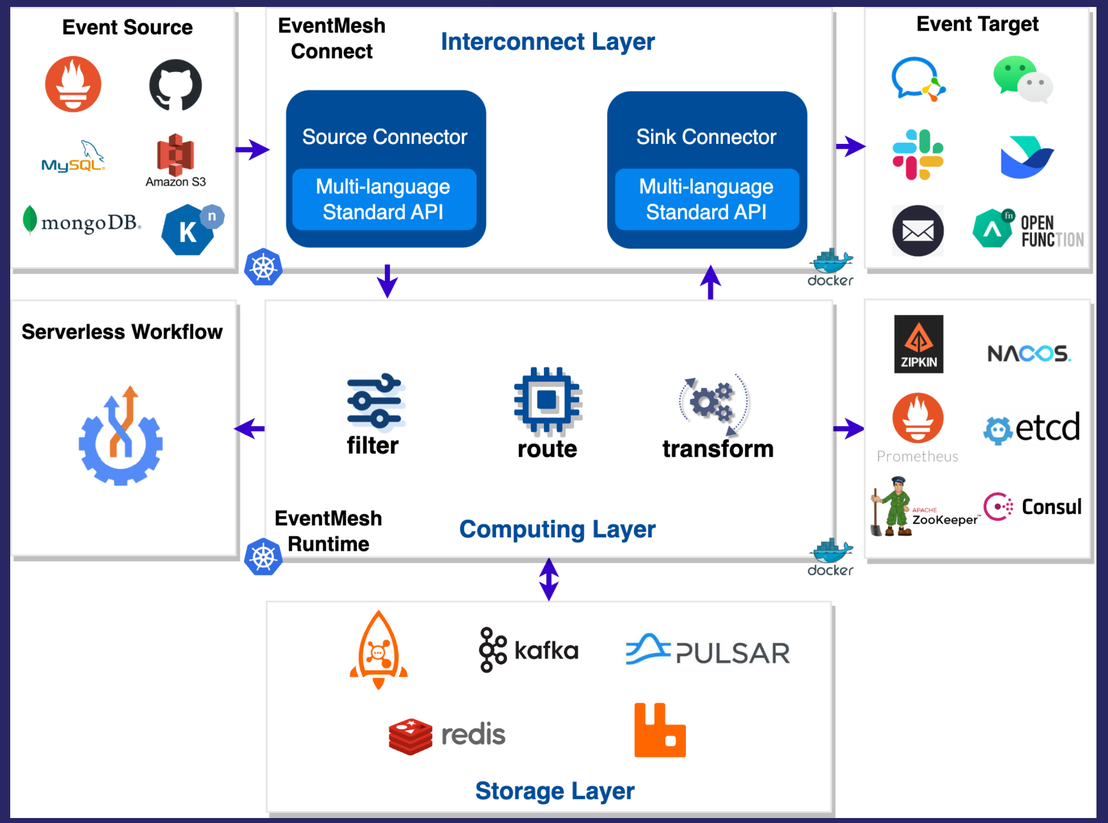
EventMesh Architecture

- Separation of Event Compute and Storage
- Build on micro kernel SPI Plug-in based architecture
- Rich set of out-of-box event source & sink connectors
- Support Http/TCP/gRPC Transport Protocols
- Support Java, Rust, Golang Client SDKs



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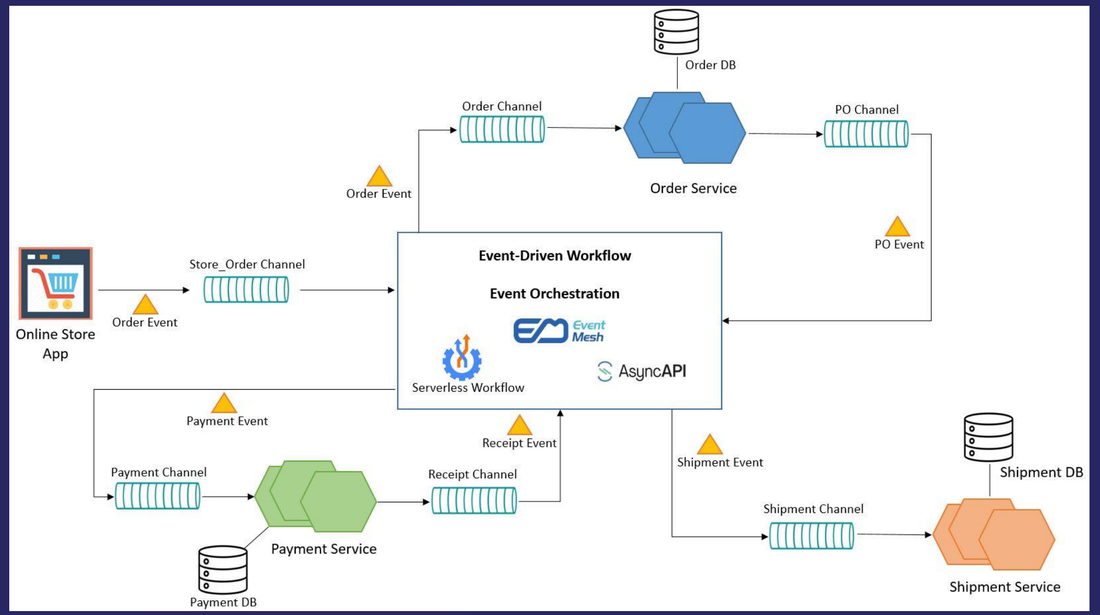
EventMesh Workflow

- Provide high performance, and high throughput EDA workflow solution
- CNCF Serverless Workflow DSL to describe the EDA workflow
- Support CNCF CloudEvents Spec for Event modeling
- Eventmesh-Catalog for register the microservice AsyncAPI
- Eventmesh-Workflow for handling different workflow states:
  Operation, Event, Switch, Parallel and ForEach states



EventMesh Workflow

Available in v1.7.0+

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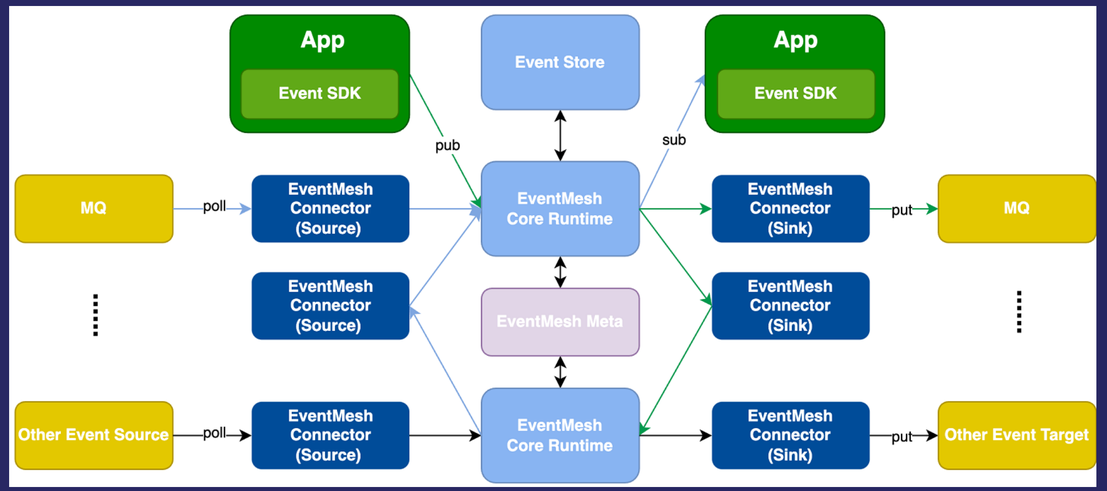
EventMesh Connectors

- Provide Source & Sink Connectors to connect to external services or data sources
- A source connector obtains data from an underlying data producer, and delivers it to targets as CloudEvents
- Source Connector can active polling events (MQ) or passive listening to events (Http Server / Webhook)
- A sink connector receives CloudEvents and write to the targets according to the business logics
- EventMesh Meta is the Registry for storing the EventMesh metadata for cross-instance communication.



EventMesh Connectors

Available in v1.9.0+

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Part 03

EventMesh in Huawei Cloud: EventGrid

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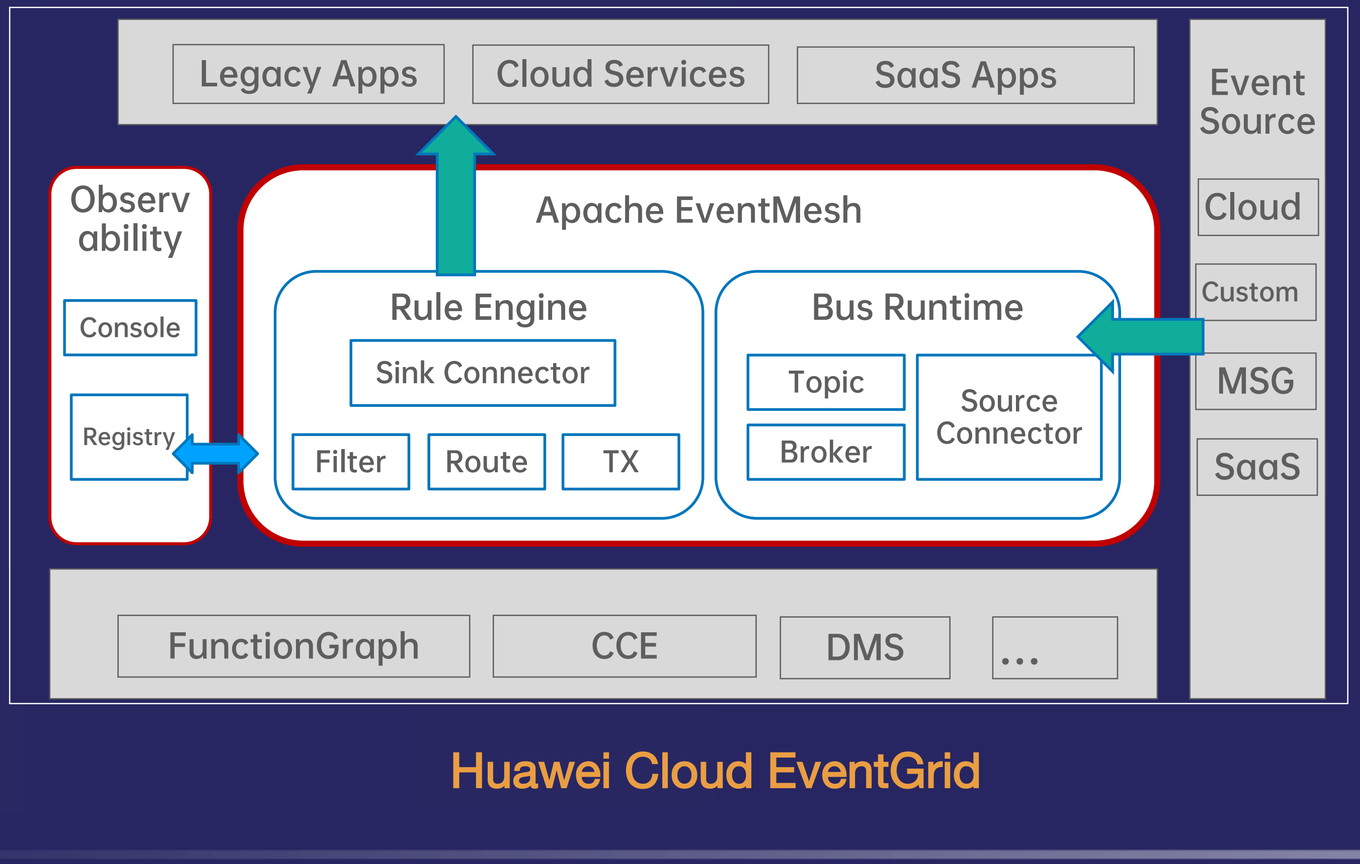
Huawei Cloud EventGrid

EventGrid is the serverless event hub service in Huawei Cloud, connecting Cloud services and applications through EDA

- Apache EventMesh as EventGrid Runtime
- Adding Observability: Console and Event Tracing
- EG runtime HA deployment as Cloud containers
- Event Connector deployment as Functions



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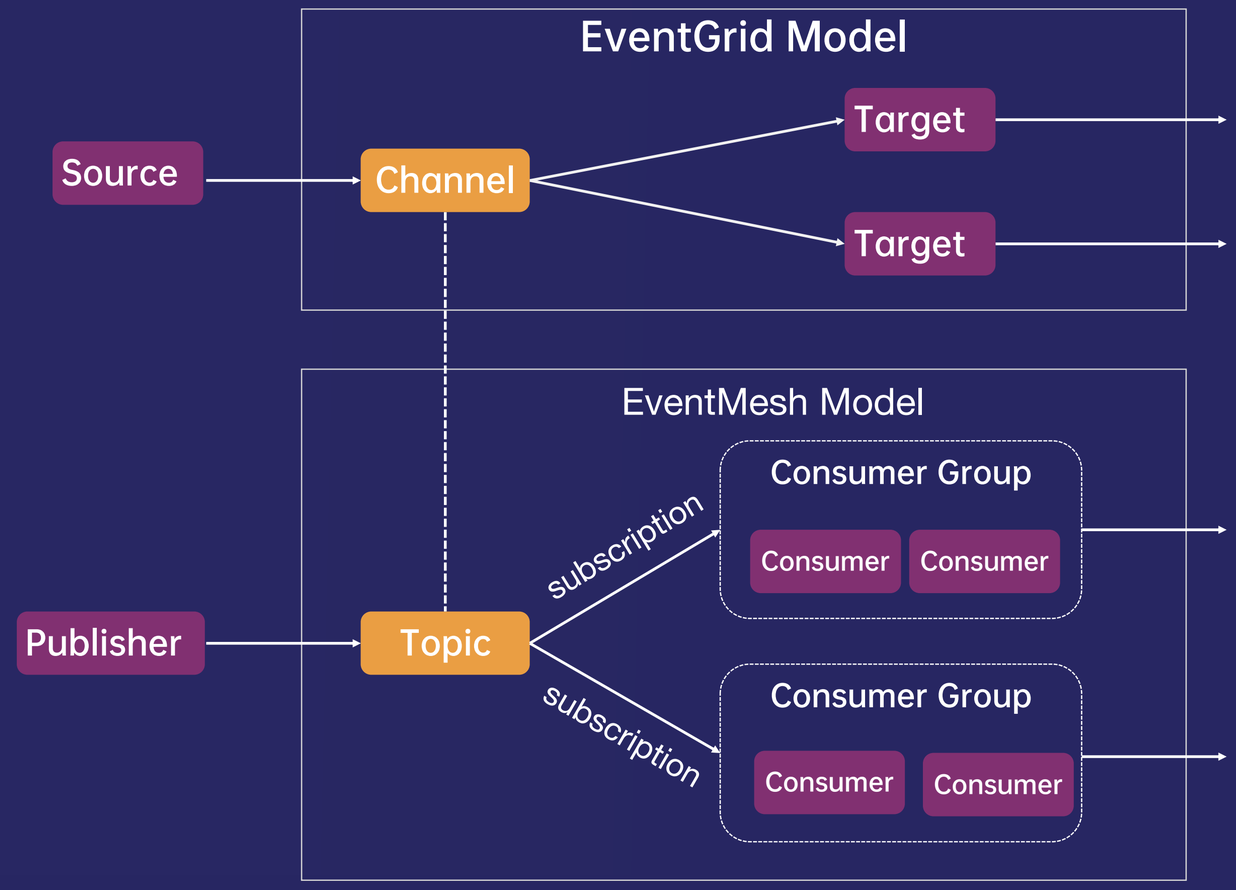
EventGrid Data Models

- EventGrid Business Model mapping to EventMesh Runtime Model
- Separation of concerns
- Data Model decoupling



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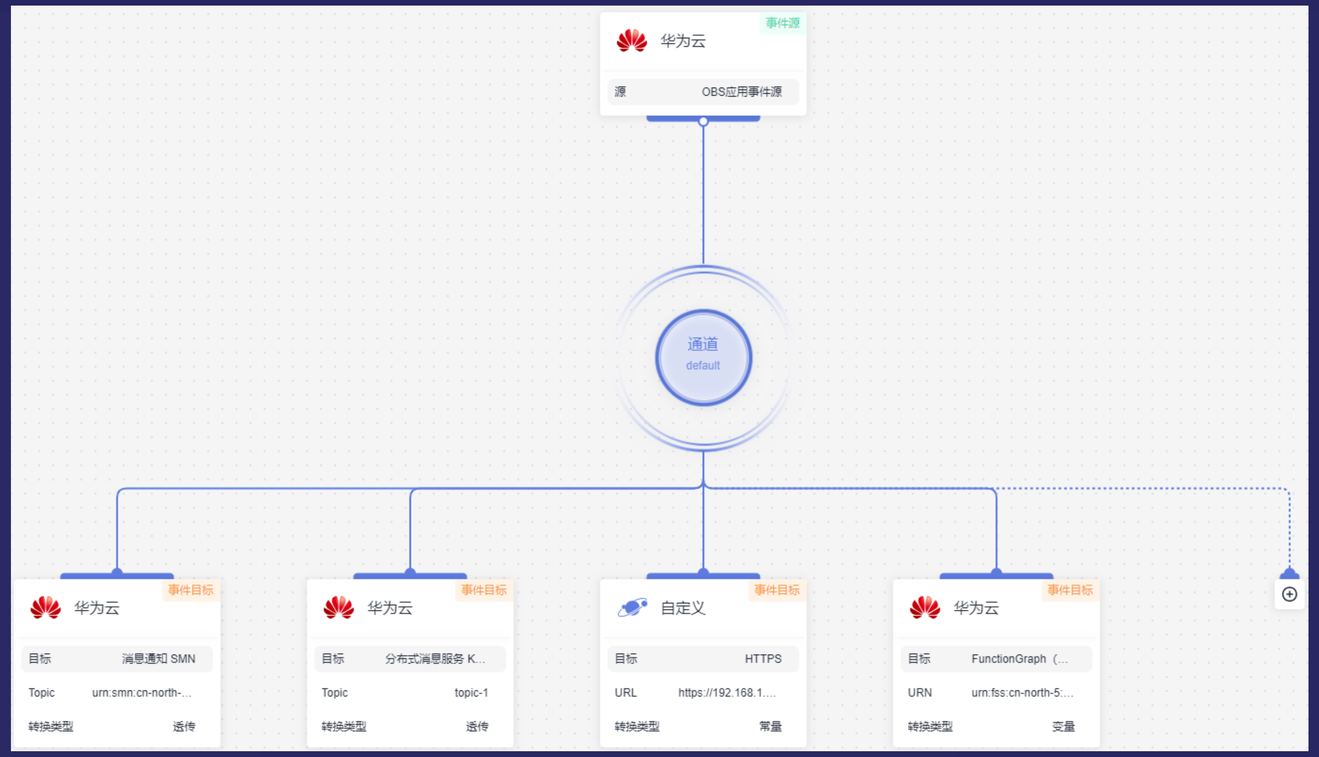
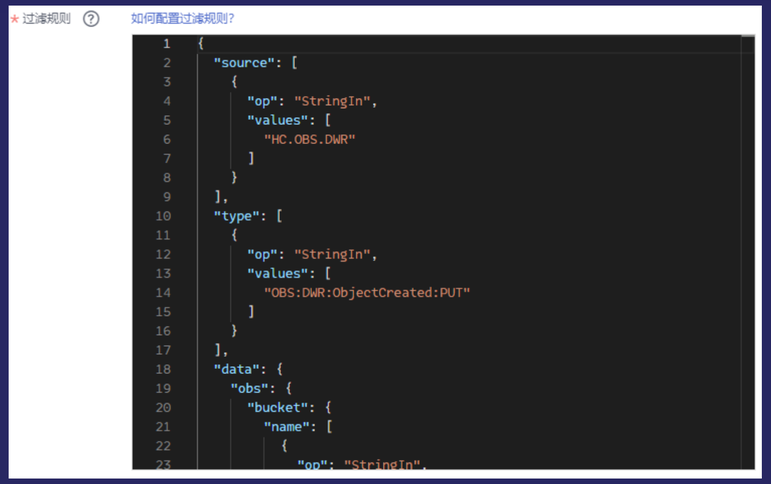
EventGrid Console

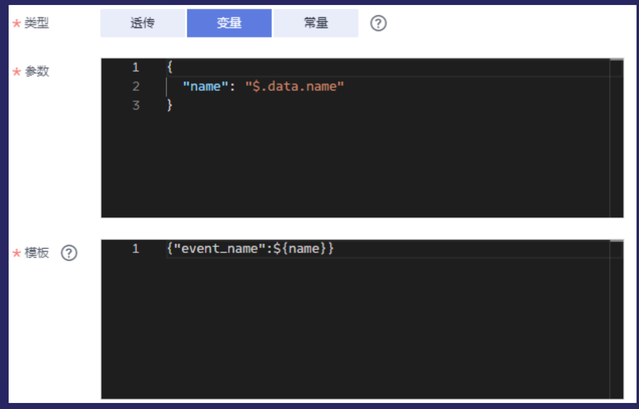


One to many subscription

One to one Subscription



Event Filter



Event Transform

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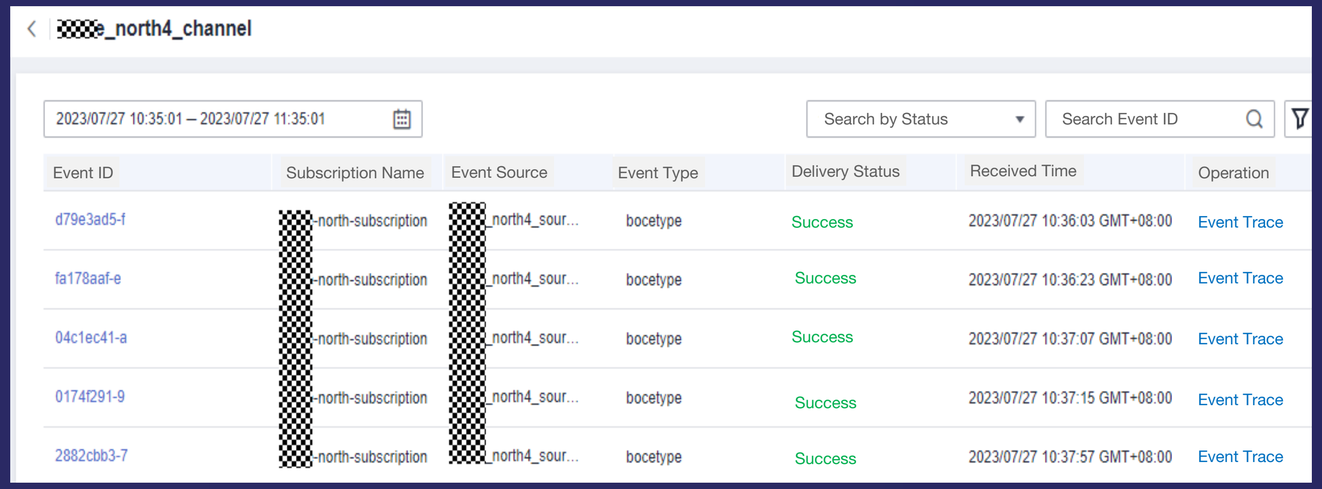
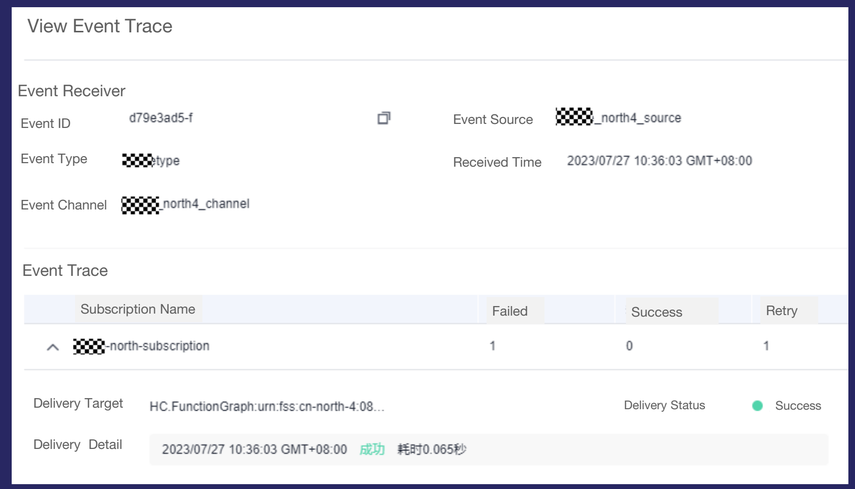
EventGrid Event Monitor

Event Channels



Event Query & Search



End to End Event Tracing

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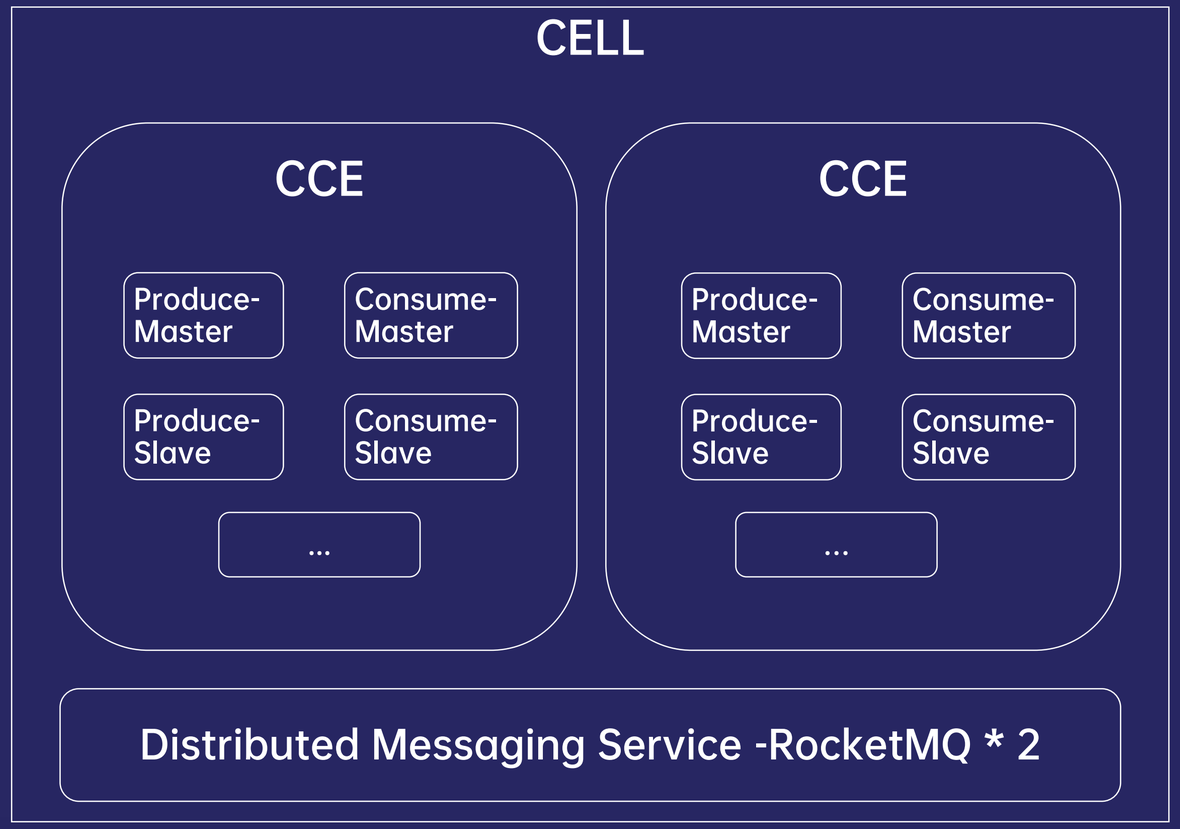
EventGrid HA Deployment

Cell-based Deployment architecture, build on Huawei Cloud Container Service and Messaging Service

- EventGrid Deploy on Huawei Cloud CCE and DMS
  - CCE – K8S container infrastructure
  - DMS – RocketMQ Engine for Message Storage
- Each Cell deployment contains two instances of CCE and DMS
- Cell deployment to achieve resource isolation



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EventGrid HA Deployment

Optimize Event Storage Plugin for HA and Performance

HA Deployment

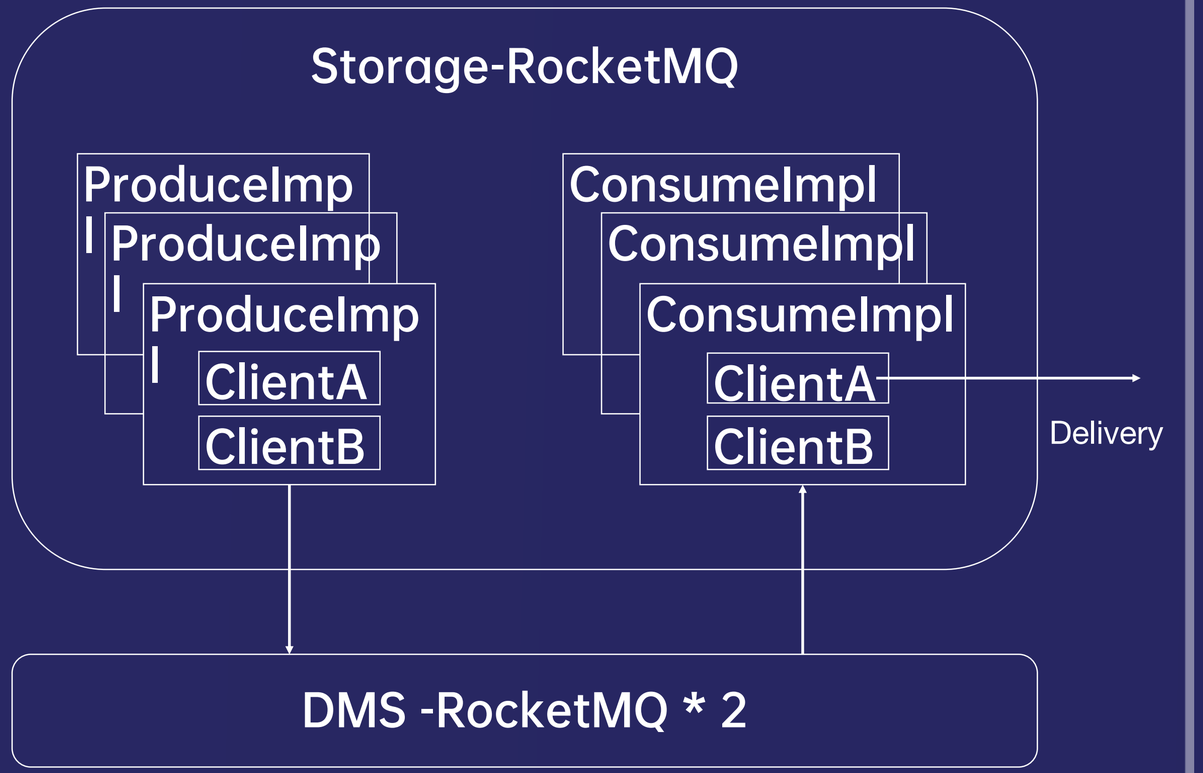
- ❑ RocketMQ dual instances deployment
- ❑ Support Storage Active-Active / Active-Passsive mode

Reliable Event Delivery

- ❑ Multi-thread event process and delivery
- ❑ Use RocketMQ Retry-Topic for event delivery retries

Performance Optimization

- ❑ Runtime Auto-scale on demand;
- ❑ Monitor Event Target workload, dynamic adjust thread pool
- ❑ Dynamic adjust event consumer thread pool



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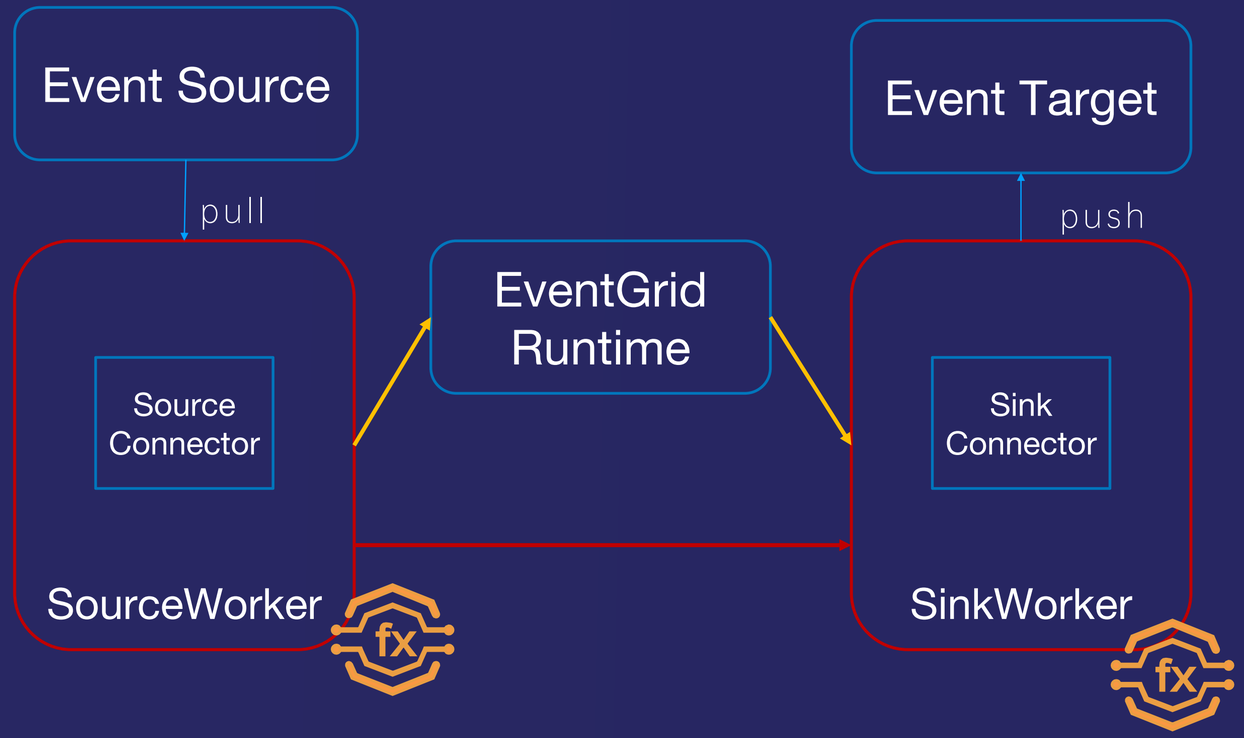
EventGrid FaaS Connectors

EventGrid Event Connectors as FaaS, auto-scale, save costs and deployment efforts

- Use FunctionGraph to deploy Source Connector and Sink Connector
- Each connector is single jar, upload & deploy
- FaaS provide auto-scale out-of-box, save compute cost
- Each source and target running in a function. Resource & process isolation



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Part 04

EventGrid Case Studies

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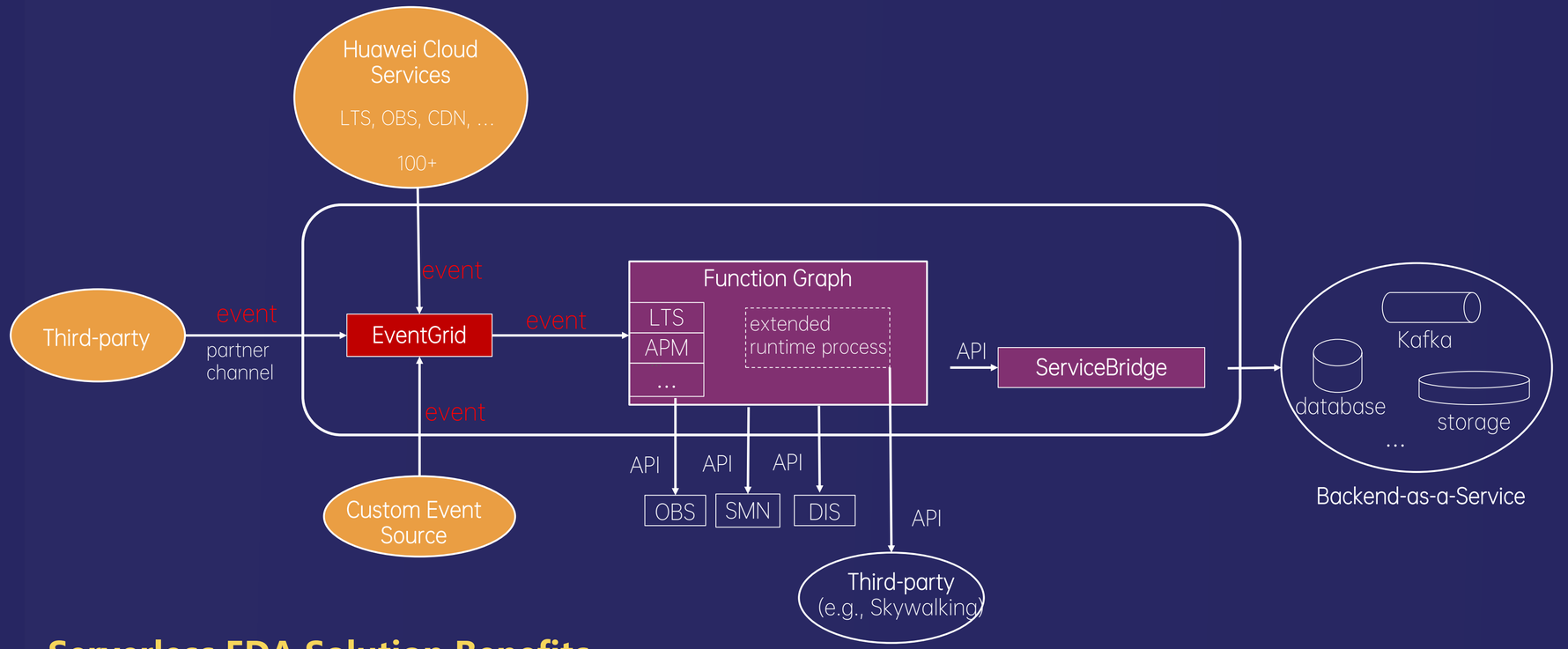
EventGrid + FunctionGraph Serverless EDA Solution

EventGrid + FunctionGraph provides decoupled, distributed Event-Driven Architecture. Integrating Cloud services using CloudEvents, building high performance cloud native serverless solution



- EventGrid as central Event hub.
- EventGrid provides Event orchestration
- FunctionGraph as serverless compute.
- FunctionGraph provides service orchestration.

Serverless EDA Solution Benefits

- Decouple of compute and orchestrate
- Async Execution
- Auto-scale & Extensible
- Agile & Low Code

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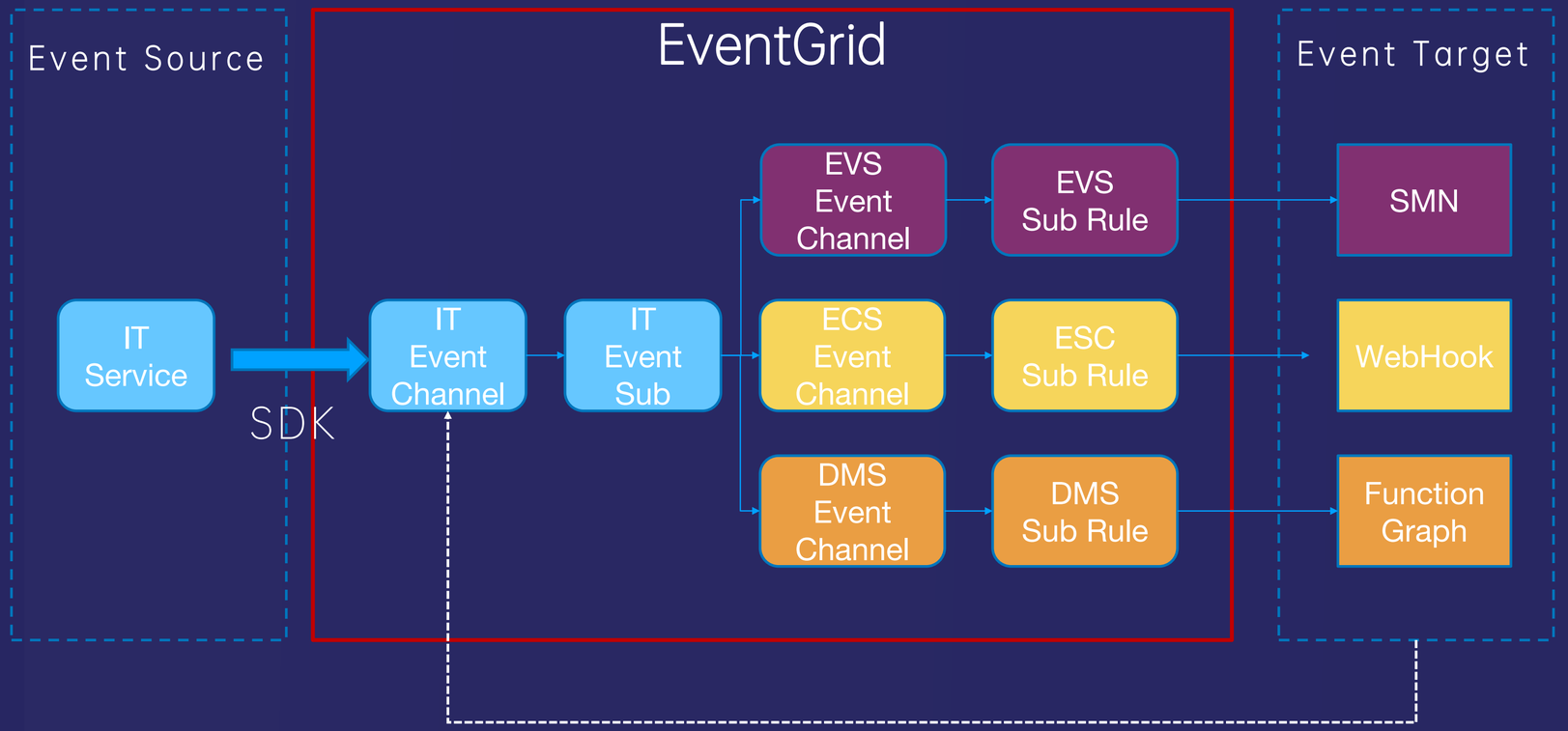
Case 1: EDA Cloud App & Service Integration



- Cloud Service Decoupling
- Async Event delivery
- One to many event delivery
- Standard Cloud Events
- Low-Code configuration: subscription, filter, router

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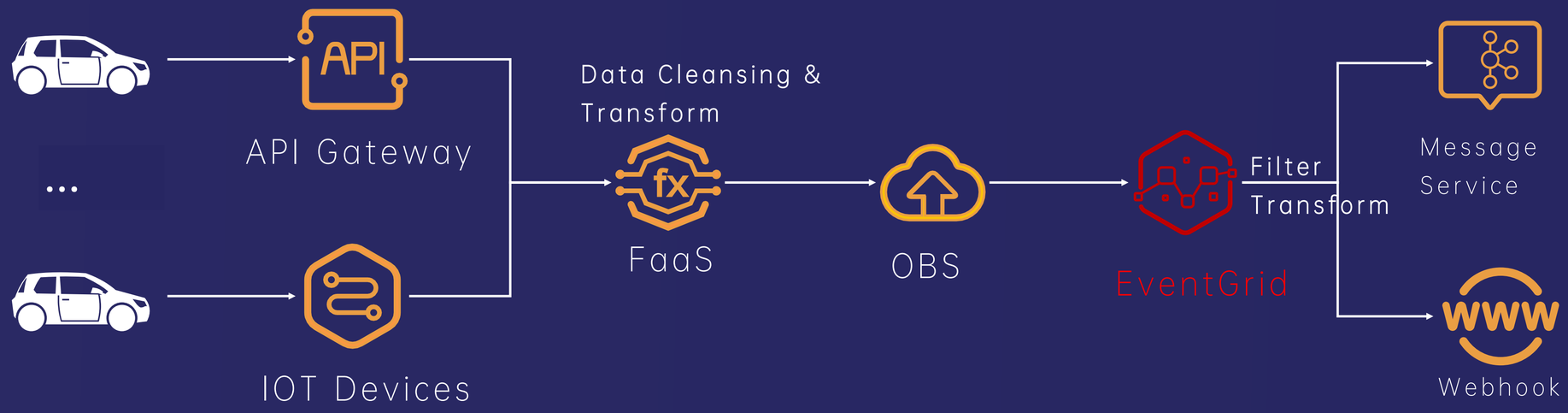
Case 2: Car IOT Serverless EDA Solution



Customer Pain Points

- Time sensitive, high volume & workload
- Feature development with agility and high Time-to-market demand

Customer Values

- Serverless architecture, auto-scale on demand
- Managed Cloud Services, reduce the DevOps complexity
- FaaS Pay-per-use, save the operation cost
- EDA routing, event distributed to the right business units

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EventGrid Roadmap

2022

- First GA in Huawei Cloud
- Support Custom Event Source
- Support Webhook as Event Target

2023

- Integrate 100+Huawei Cloud Services and Partner Cloud services
- Deploy in 10+Regions (China and Overseas)
- Support Dead letter Event delivery
- Support Event Tracing and Monitor

2024

- Explore Serverless EDA use cases
- Expand ecosystem, support more cloud services and SaaS partner Event Connectors
- Event Archive and Replay
- Continue to contribute and lead Apache EventMesh community

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Thanks

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Contact Us

Apache EventMesh Project
https://eventmesh.apache.org/

Apache EventMesh Github
https://github.com/apache/eventmesh

Huawei Cloud EventGrid Service
https://www.huaweicloud.com/eu/product/eg.html

Huawei Cloud EventGrid Documentation
https://support.huaweicloud.com/eu/eg/index.html

EventMesh Community

Speaker: Alex Luo

https://www.linkedin.com/in/jinrong-alex-luo/

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