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API / MICROSERVICE

How to Extend Apache APISIX into a Service Mesh Sidecar

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Agenda

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- What is Apache APISIX?
- Problems have to be overcome when using Apache APISIX as the sidecar
- Pros of using Apache APISIX as the sidecar
- Future of APISIX Mesh

About Me

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- Apache APISIX PMC
- Tars Foundation Ambassador
- Open Source Enthusiast
- Focus on Service Mesh & API Gateway
- https://github.com/tokers

What is Apache APISIX?

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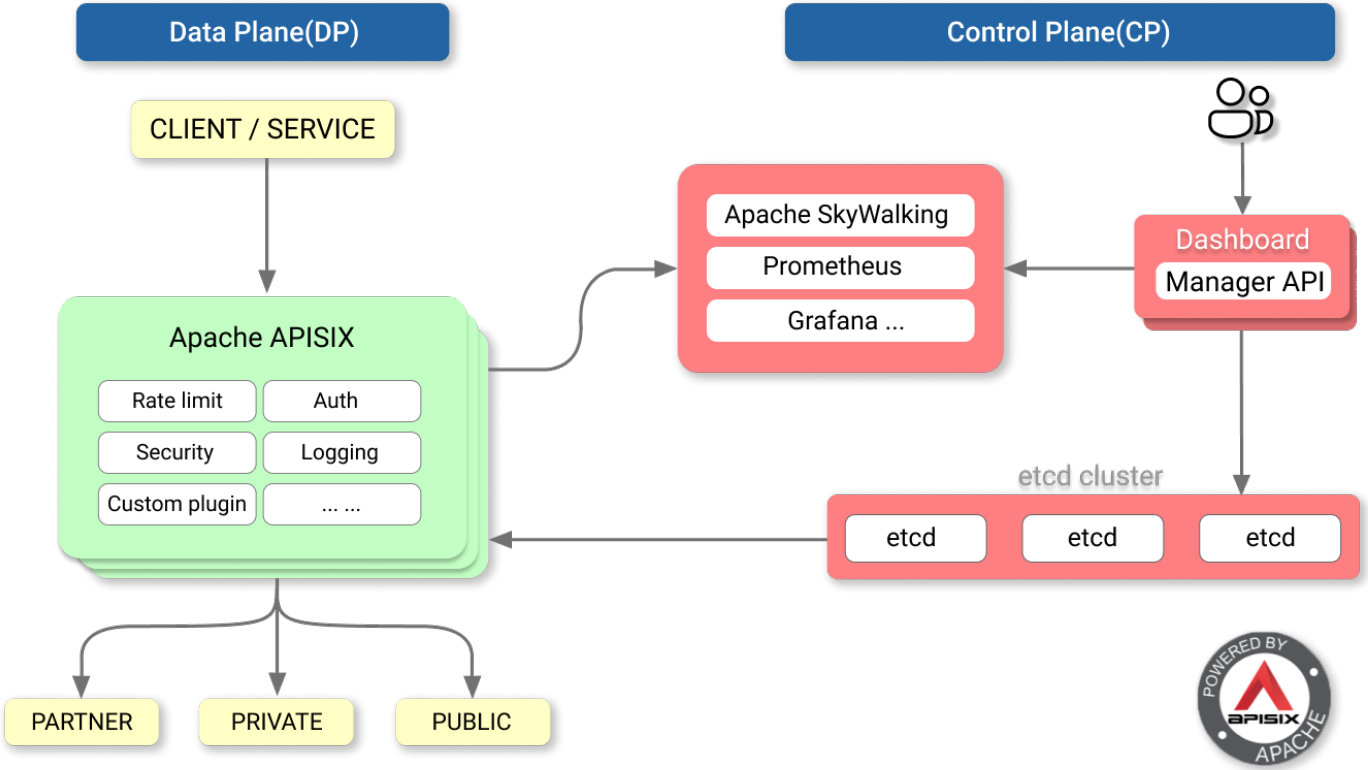
- High-performance, full-dynamic Cloud Native API Gateway
- Provides a lot of features like load balancing, service discovery, rate limiting and etc.
- Easy to extend.

The community is vibrant and healthy.

https://apisix.apache.org

What is Apache APISIX?



Thinking

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- What is the purpose of using API Gateway?
- What is the purpose of using Service Mesh?
- Similarities?

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Apache APISIX + Service Mesh?

Survey

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- Stage of Service Mesh (in China) is early
- Mainly focus on HTTP proxy & traffic splitting
- Observability

Is Apache APISIX enough?

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- HTTP & gRPC proxying
- TCP & UDP proxying
- Traffic Split (Canary Release & Blue Green Deployment)
- Load Balancing (WRR, Consistent Hash, EWMA and etc)
- Health Checking (Active & Passive)
- Authentication (mTLS, JWT Token, Key Auth and etc)
- Observability (Metrics, Logging and Tracing)

Problems have to be overcome

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- How to fetch configuration changes (in time)?
- The choice of Service Mesh Control Plane
- The ecosystem of Lua and OpenResty

How to fetch configuration changes in time?

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ETCD was designed to use Raft protocol to assure the data consistency, which is not capable to accept too many client connections.

But there might have a lot of sidecars in a Service Mesh architecture…

How to fetch configuration changes in time?

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- Use another config center (modify Apache APISIX)?
- Use ETCD Proxy?

The choice of Service Mesh Control Plane

- xDS based - Istio, Kuma, OpenServiceMesh
- Linkerd
- Consul
- Create one from scratch

The ecosystem of Lua and OpenResty

- Lua is powerful but lacks supporting of many tools
- OpenResty community is inactive

So we may have to invent some wheels, and it’s tough.

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It’s not easy to only use Apache APISIX, unless we innovate it.

apisix-mesh-agent

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“All problems in computer science can be solved by another level of indirection”

https://github.com/api7/apisix-mesh-agent

What does it do?

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Middle layer between Apache APISIX and Service Mesh Control Plane.

- Fetch configuration changes from control plane
- Mimic ETCD
- Inject inbound and outbound traffic

Communicate with Control Plane

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- Implement xDS protocol
  - Istio
  - Kuma
  - OpenServiceMesh
- Convert data format (xDS to Apache APISIX)

Mimic ETCD

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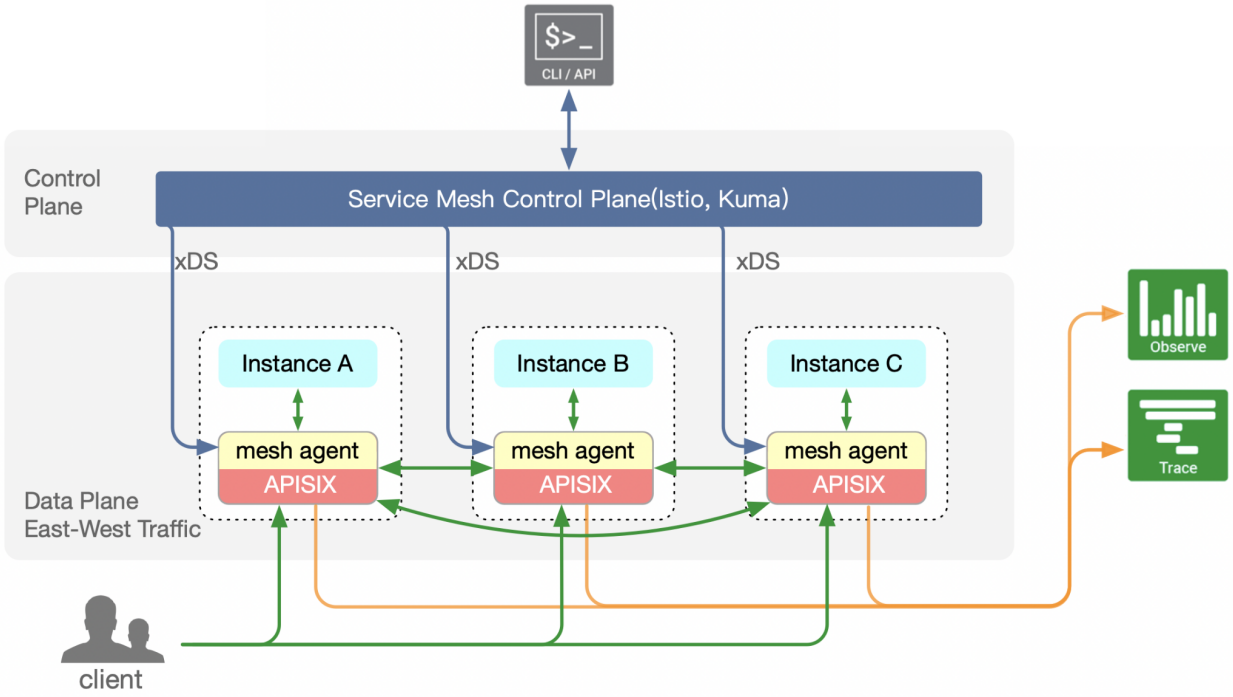
Implement ETCD V3 APIs and pretend to be an ETCD server, so that configurations can be delivered to Apache APISIX.

No changes are required for Apache APISIX.

Archietecture



Pros

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- High Performance
- Reuse all plugins in Apache APISIX
- Low cost to extend it (Lua is easy to learn)
- Use other languages to develop plugins for Apache APISIX
- Use the same infrastructure in API Gateway and Service Mesh

Future of APISIX Mesh

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- xDS conformant
  - Authentication
  - Request Transforming
  - Fault Injection
  - ……
- Observability
- Another control plane

THANK YOU

QUESTIONS?