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China 2024





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What Is the Future of Service Mesh? Sidecar or Sidecarless

Zhonghu Xu, Huawei
Jianpeng He, Tetrate



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Zhonghu Xu
Huawei Cloud



- CNCF TAG Network Tech Lead
- Istio Steering Committee Member
- Istio Maintainer
- Kubernetes Member



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Open Source GenAI & ML Summit



Jianpeng He
Tetrate.io



- Istio Maintainer
- Envoy Member

Agenda

Looking Back

Looking Forward

Call to Action

- Project Health
- Releases
- Graduation



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Project Health



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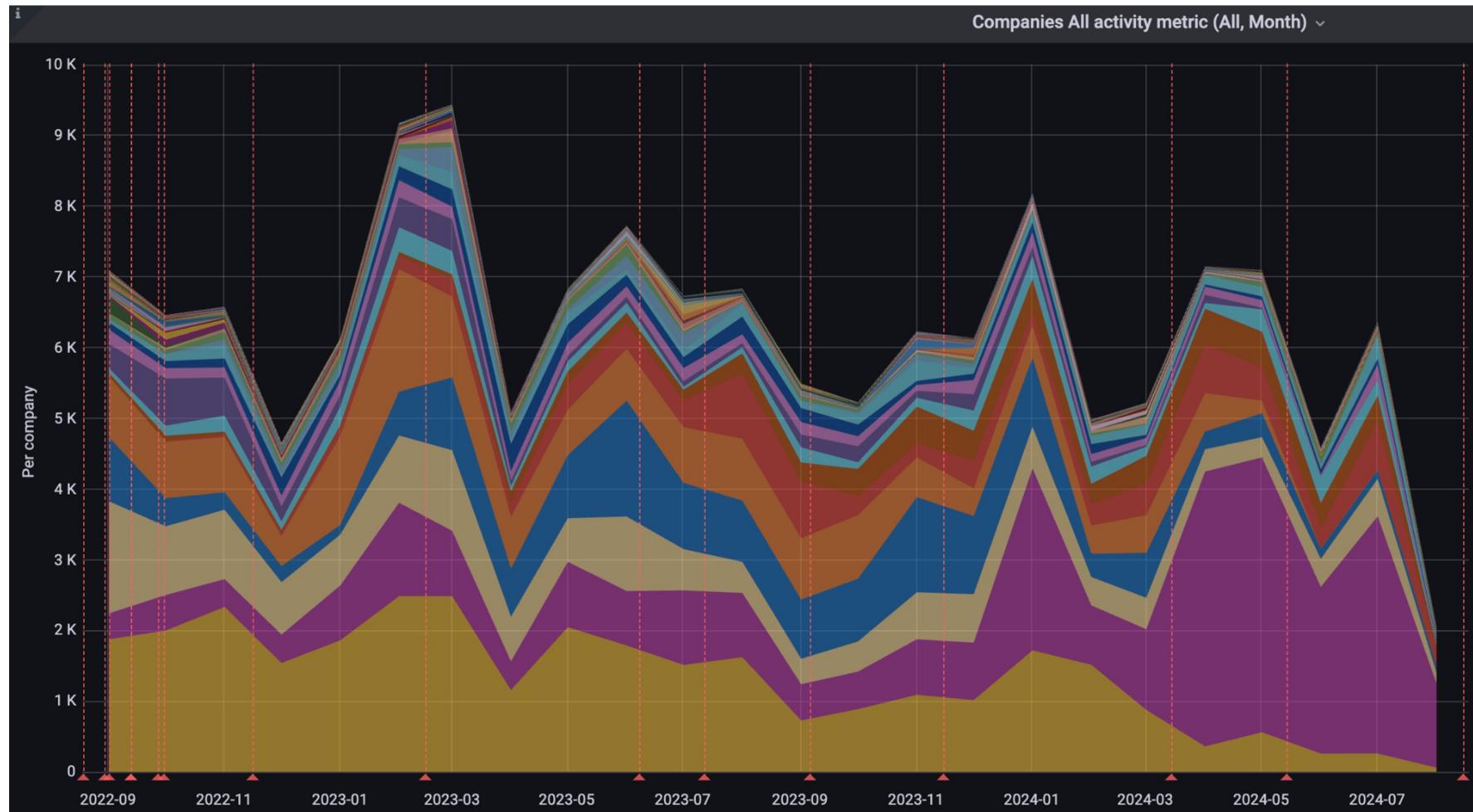
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Project Health



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Companies All activity metric (All, Month) ▾

58 Companies



Project Health



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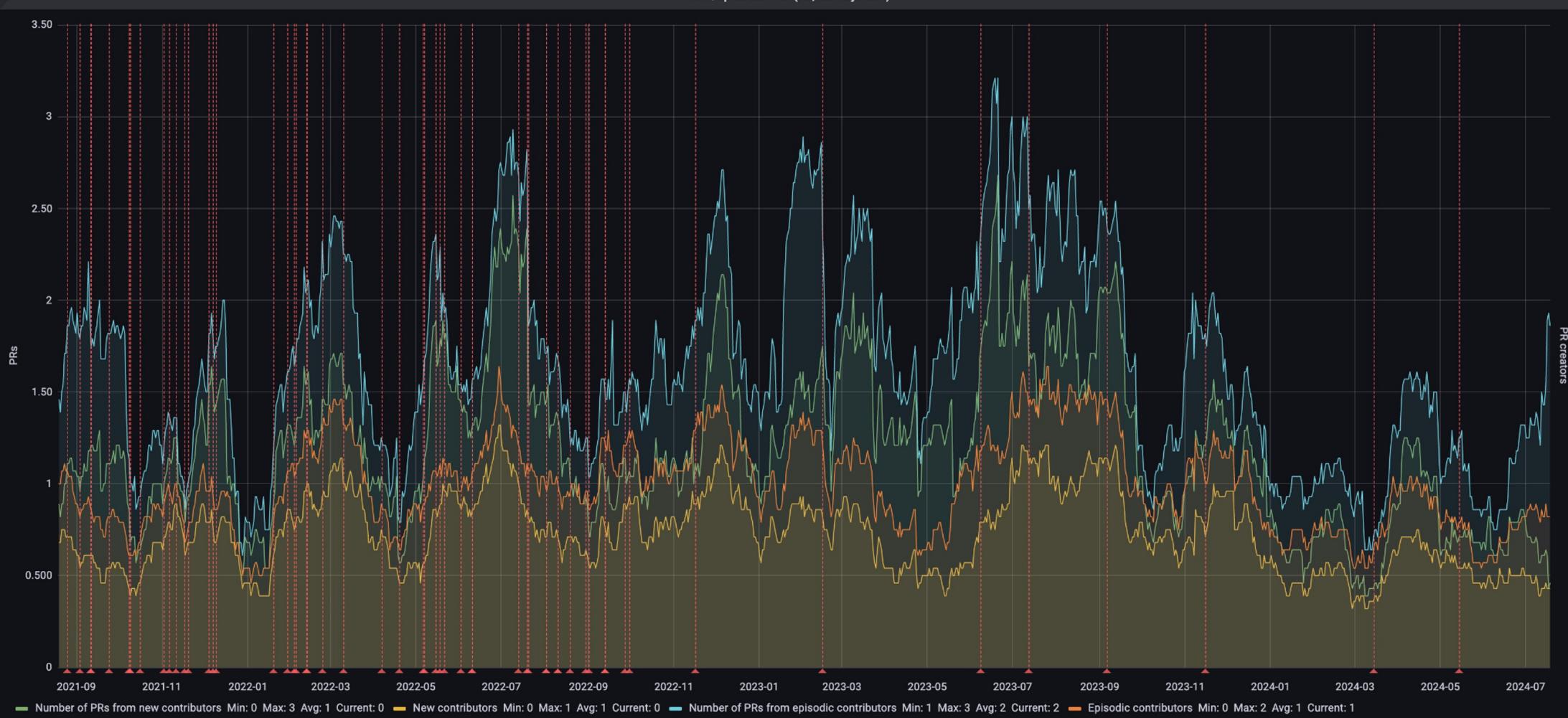


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New/episodic PRs (All, 28 Days MA) ▾



Project Health



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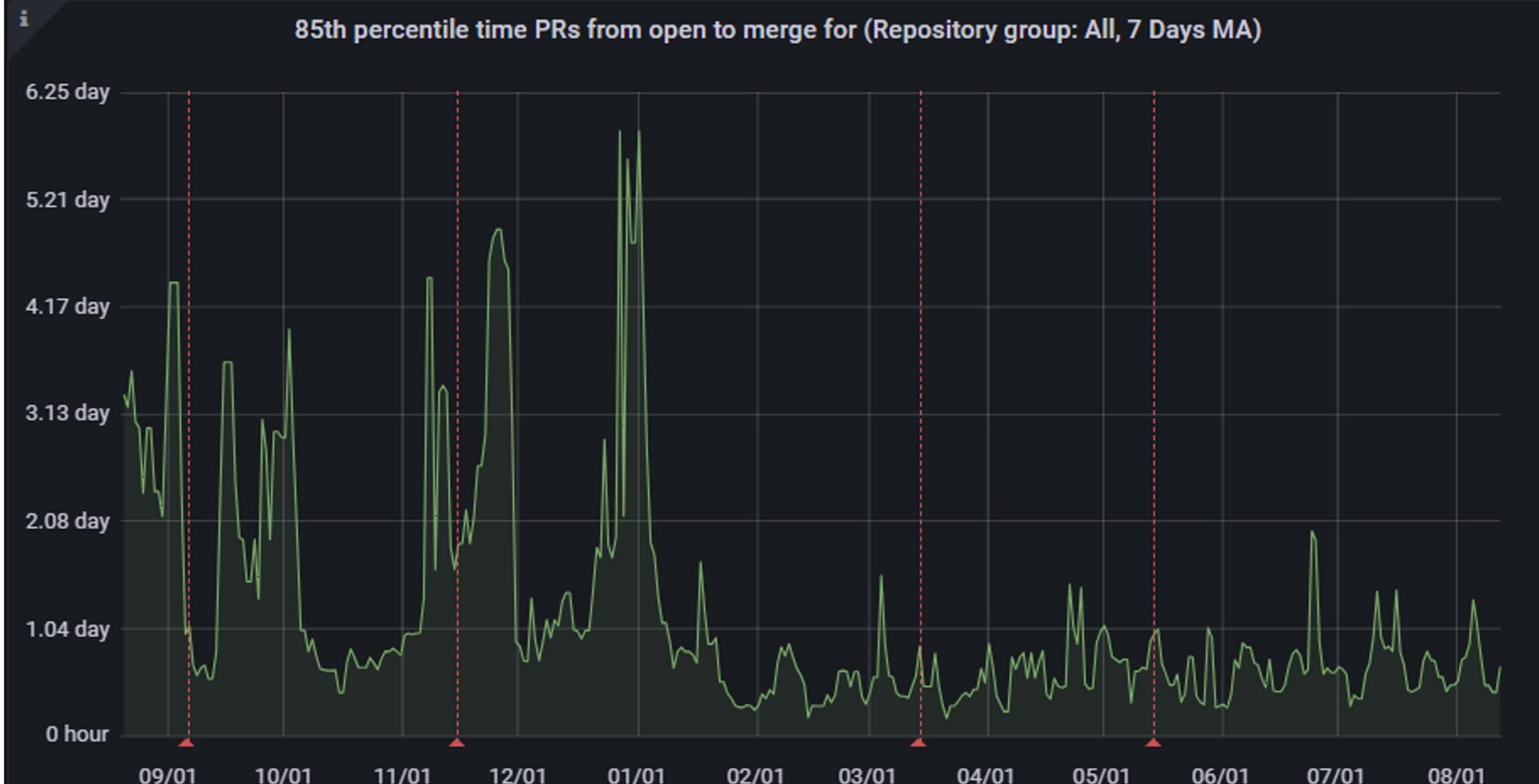
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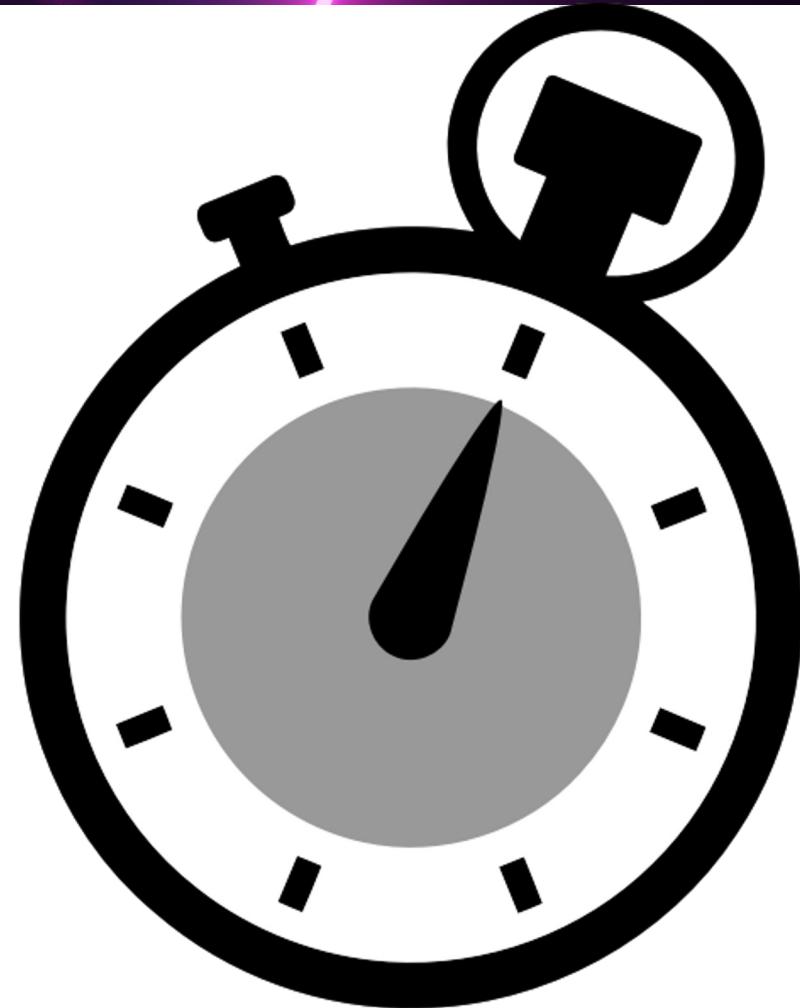


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Minor Releases

- 1.18
 - Ambient Alpha
 - Gateway API v1beta1
- 1.19
 - GAMMA Support Beta
- 1.20
 - ExternalName/DNS improvements
- 1.21
 - Compatibility Mode
 - CNI support for Ambient
- 1.22
 - Ambient Beta
 - Delta xDS on by default
- 1.23
 - Ambient L7 Support DR, DNS SE
 - DNS Address Auto-allocation



Istio Graduates!



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Cloud Native Computing Foundation Reaffirms Istio Maturity with Project Graduation

Fast-growing service mesh has added end users, events, features, and maintainers to reach Foundation's top maturity level

SAN FRANCISCO, Calif. – July 12, 2023 – The [Cloud Native Computing Foundation®](#) (CNCF®), which builds sustainable ecosystems for cloud native software, today announced the graduation of [Istio](#). Istio is an open source [service mesh](#) that provides a uniform and efficient way to secure, connect, and monitor services in cloud native applications.

Istio provides zero-trust networking, policy enforcement, traffic management, load balancing, and monitoring without requiring applications to be rewritten. It pioneered the modern service mesh pattern — security, traffic routing and observability using sidecar containers — when it launched in 2017. In 2022, the project continued to drive innovation in the space by introducing a complementary architecture, [ambient mesh](#) — offering the same benefits without needing sidecars.

Today, the Istio project takes its place alongside the projects that enable it and other critical CNCF initiatives.



Agenda

Looking Back

Looking Forward

Call to Action

- Ambient Beta
- Operator Deprecation
- Ambient: Beyond Istio
- Dual Wheel
- API Graduations



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Look back: Ambient Mesh



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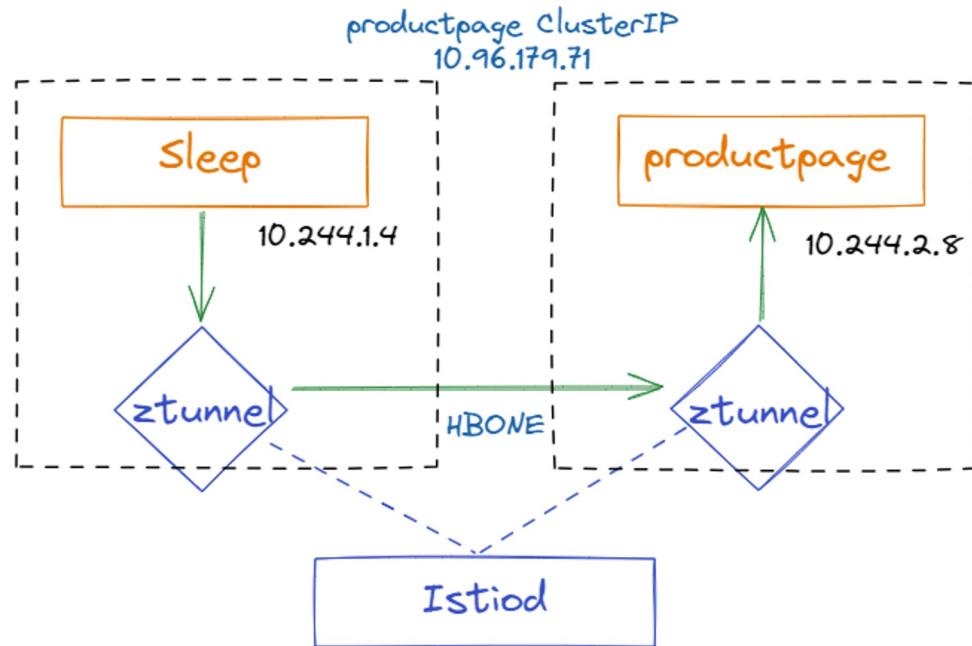
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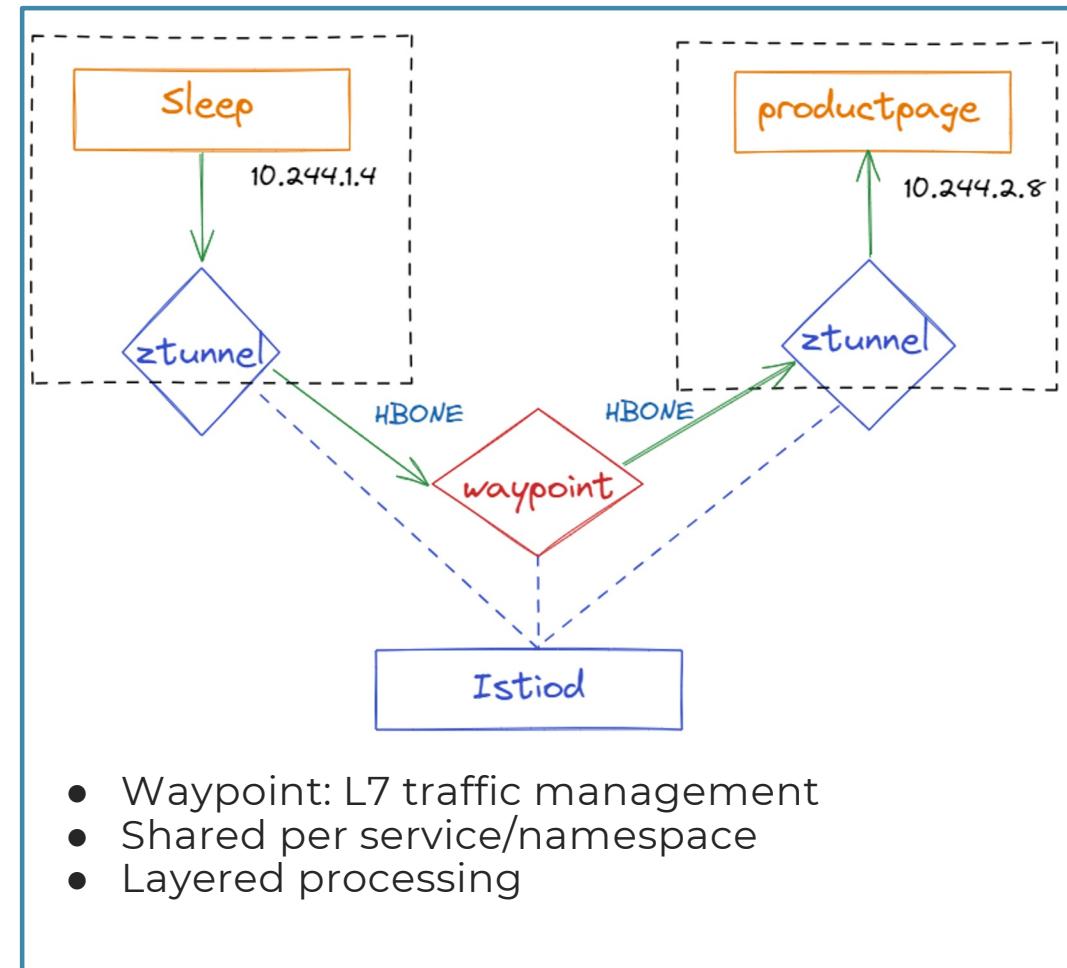
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- Sidecarless, lightweight L4
- Simplify operations
- Cost Saving
- Improve performance



- Waypoint: L7 traffic management
- Shared per service/namespace
- Layered processing

Look Back: Ambient L4 In-Pod Redirection

Ambient mode relies on transparent redirecting traffic between workloads and ztunnel

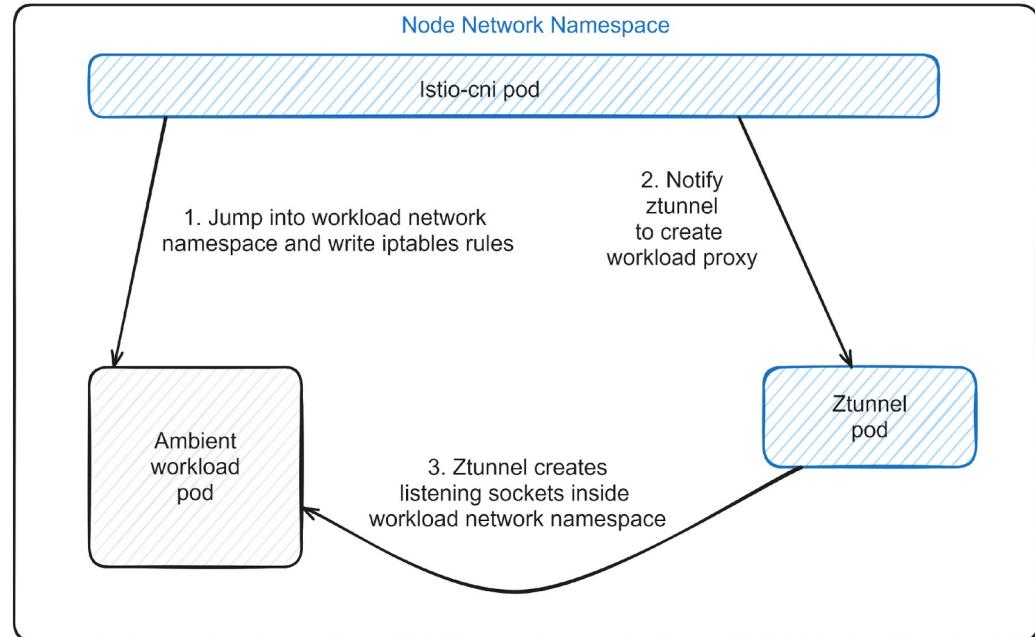
Motivations:

- Compatible with 3rd-party Container Networking Interface (CNI) implementations Cilium, Calico, etc.
- Compatible with CNI implementations like OpenShift and Amazon EKS.

In Pod Redirection:

- Innovatively enters pod's network namespace
- Setup iptables capturing and redirection rules in pod
- Do not interfere with host level rules, so have no influence on CNI implementation

Istio CNI Ambient Pod Configure Flow



Responsibilities:

- The istio-cni node agent watches for new pods labeled for ambient
- The istio-cni sets up in-Pod iptables redirection rules
- Ztunnel owns the sockets and subscribes to istio-cni agent events

Look Back: Ambient Mode Beta



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Released: Release 1.22

Compatibility:

- Compatible with any third-party CNI and kubernetes platform that has its own CNI
- Achieves sidecar mode compatibilities

Capabilities:

- Shared Node Proxies: ztunnel for L4 traffic loadbalancing, encrypting
- As secure as sidecar: mTLS between ztunnel
- Optional L7 proxy: per namespace, service, workload
- Support proxy protocol for outbound traffic
- Metrics

Look Forward: Ambient L7 Waypoint Capture

Waypoint capture for Services and Workloads

Simplify waypoint implement, allow waypoint customization for users and vendors

- **Redirection:**

- Annotation `istio.io/use-waypoint = [{namespace}]/[{gateway-name}]`
- Apply on service, pod or namespace, which indicates traffic targeted to service, pod or those within a namespace should be redirected to a waypoint

- **Waypoint Deployment**

- To provision a waypoint, user can create a `Gateway` object
- Unlike original waypoint, there will be associated service, service account other than waypoint instance provisioned.

- **Route and Policy Configuration with Gateway APIs**



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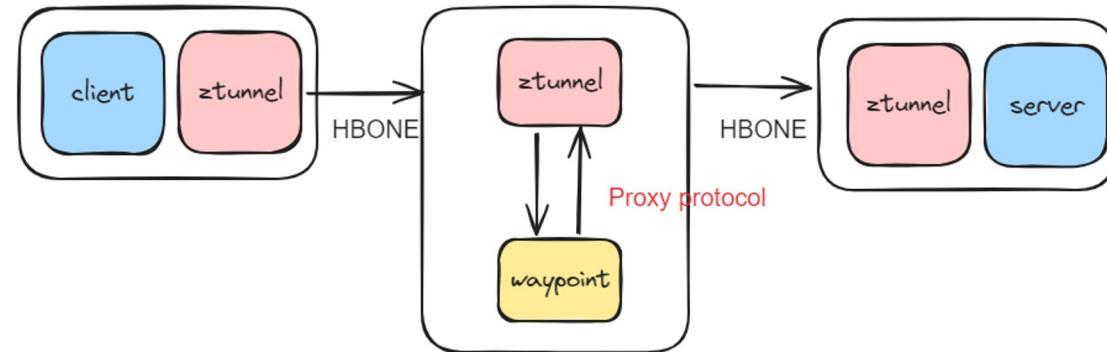


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Service capture to customized waypoint



Sandwich waypoint:

1. terminate HBONE
2. propagate dest address, source address, peer identity and workload metadata to waypoint
3. expand proxy protocol TLV, envoy already support extract any TLV
4. waypoint communicate with co-located ztunnel via UDS
5. encap HBONE

Ambient Beyond Istio

Waypoints don't have to be
Istio/Envoy!

With Gateway API and GAMMA,
any compliant implementation
can act as a waypoint

Waypoints don't need to
understand mTLS to contribute to
the fabric of your mesh



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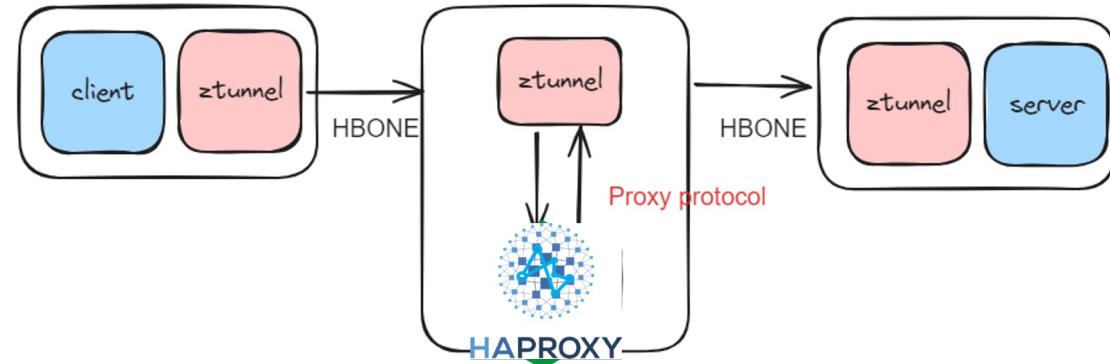


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Service capture to customized waypoint



Some Caveats:

1. Each Waypoint may need custom configuration
2. In order to enforce auth policy, Waypoint must read Istio-formatted authentication from ztunnel

Looking Forward: Istio Operator Deprecation



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Looking Forward: Istio Operator Deprecation



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Istio Deprecation Policy for GA:

Feature can be removed with 1 year of advanced notice, but there will usually be a supported upgrade path to a replacement feature

Istio Operator Deprecation - v1.23

NOT Removing Istio Operator for at least 1 year

Istioctl will support migration to Helm

Removal ETA v1.26 or later



```
istioctl manifest translate -f  
operator.yaml > values.yaml
```

```
helm install ./
```

API Graduations



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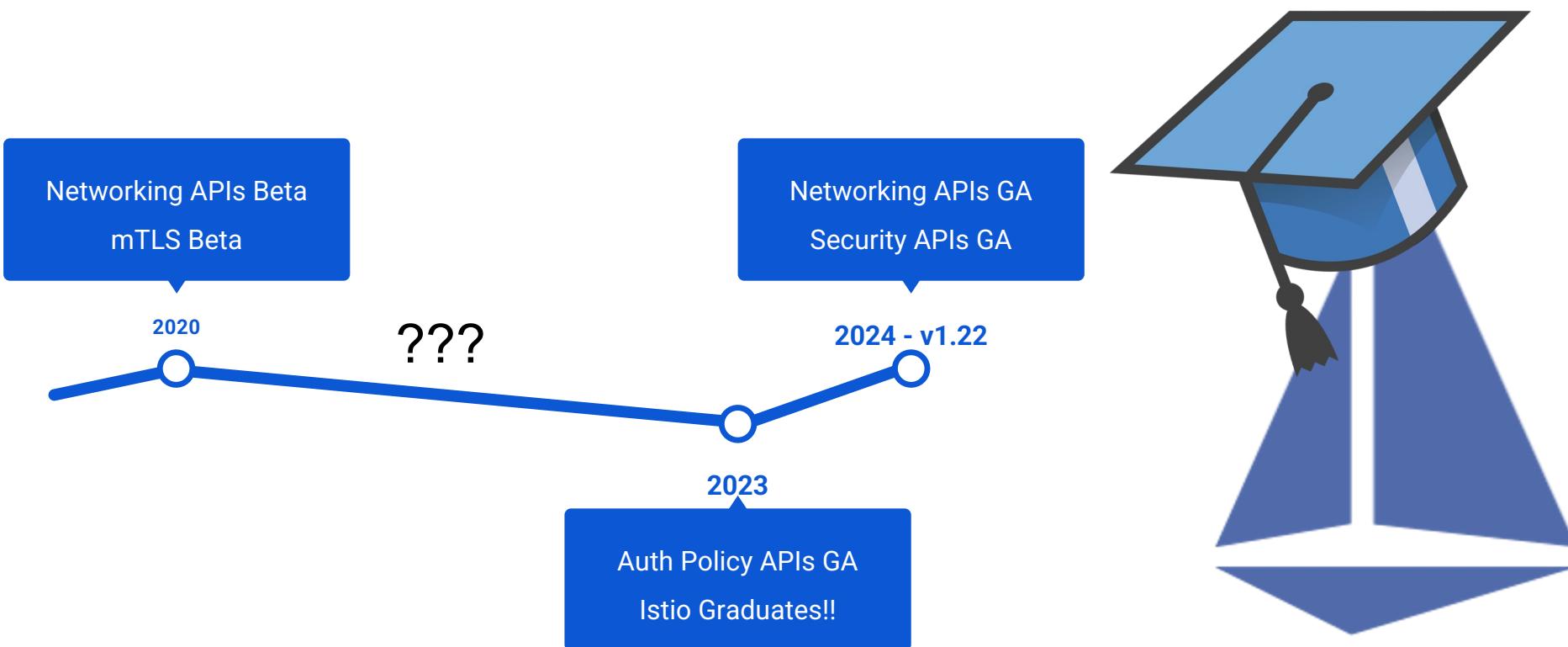
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Dual Wheel Evolve: Sidecar & Ambient



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From features view, sidecar is a superset of Ambient mode

Ambient is suitable for people pursuing performance and resources cost

Sidecar will be long supported even after Ambient GA

Agenda

Looking Back

Looking Forward

Call to Action

- Join the Community
- Become a Contributor
- Visit Our Booth



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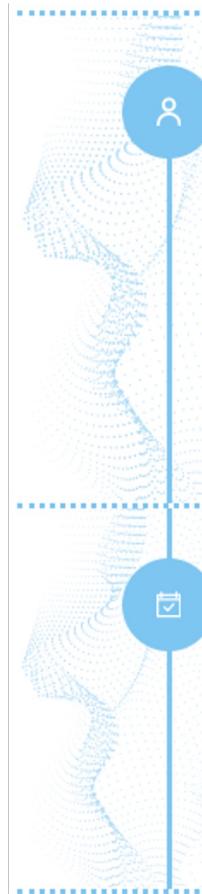


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Get Involved !

<https://istio.io/latest/get-involved/>



Ask questions

There are a variety of ways to reach out to the community for input.

- 1 Bring your particular Istio questions to the gamified wizards of [Stack Overflow](#).
- 2 The [Istio discussion board](#) hosts conversations with other Istio users. Join in to ask questions and discuss Istio.
- 3 Join our [Slack](#) and interact live with other members of the Istio community.

Join the community

There is so much to talk about around Istio. We welcome your voice!

- 1 Attend an event! [Follow our calendar](#) to see what is coming up!
- 2 Follow us on [Twitter - @IstioMesh](#)

Get Involved !



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<https://istio.io/latest/get-involved/>

Call for maintainers on Docs and User Experience

Become a contributor

Code, documentation, community: Istio welcomes your contribution! Use these links as your entry point.

- ① Familiarize yourself with the Istio [code of conduct](#) and [contribution guidelines](#).
- ② The [Istio Community README](#) is the starting point for contributors who want to work on code, docs or other parts of Istio.
- ③ You can access our [trove of technical content and working documents](#) by joining the [istio-team-drive-access@ Google Group](#).
- ④ You can participate in the [working.groups](#) which focus on particular areas of interest, such as docs, security, and networking.
- ⑤ Interested in helping with Chinese language documentation? Join the [Cloud Native Community\(China\)](#).

Visit Istio booth



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- Welcome to ask anything !

Istio	Graduated	T2	Wednesday - Friday Full Showcase Hours
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- At the booth, we have Steering Committee, Maintainer, Contributors take turns

Thank You!



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