

# Unlocking Scalable Microservices - A Deep Dive into Cilium and Dapr integration

@codecentric



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**Solution Architect**

- Traefik Maintainer
- Proud dad
- A bit too much into Handball
- Rejoined Codecentric back in March
- Previously: Traefik Labs, Solo.io

## Skills & Tools

Kubernetes

Cloud Native  
Development

API Gateways

Service Meshes

Architecture



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- **What is Dapr?**
- **Service Mesh 101**
- **Sidecar vs Sidecarless**
- **Dapr vs Service Mesh**
- **What is Dapr Shared?**
- **Cilium in da house**
- **Demo**





# Distributed Application Runtime

dapr.io



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## APIs for Building **Secure** and **Reliable** Microservices

Dapr provides integrated APIs for communication, state, and workflow. Dapr leverages industry best practices for security, resiliency, and observability, so you can focus on your code.

[Get Started](#)

[API Reference](#)



Handling millions of transactions efficiently with Dapr.

[Read the article](#)



How DeFacto migrated to an event-driven architecture with Dapr.

[Read the article](#)



How At-Bay improved operations with Dapr.

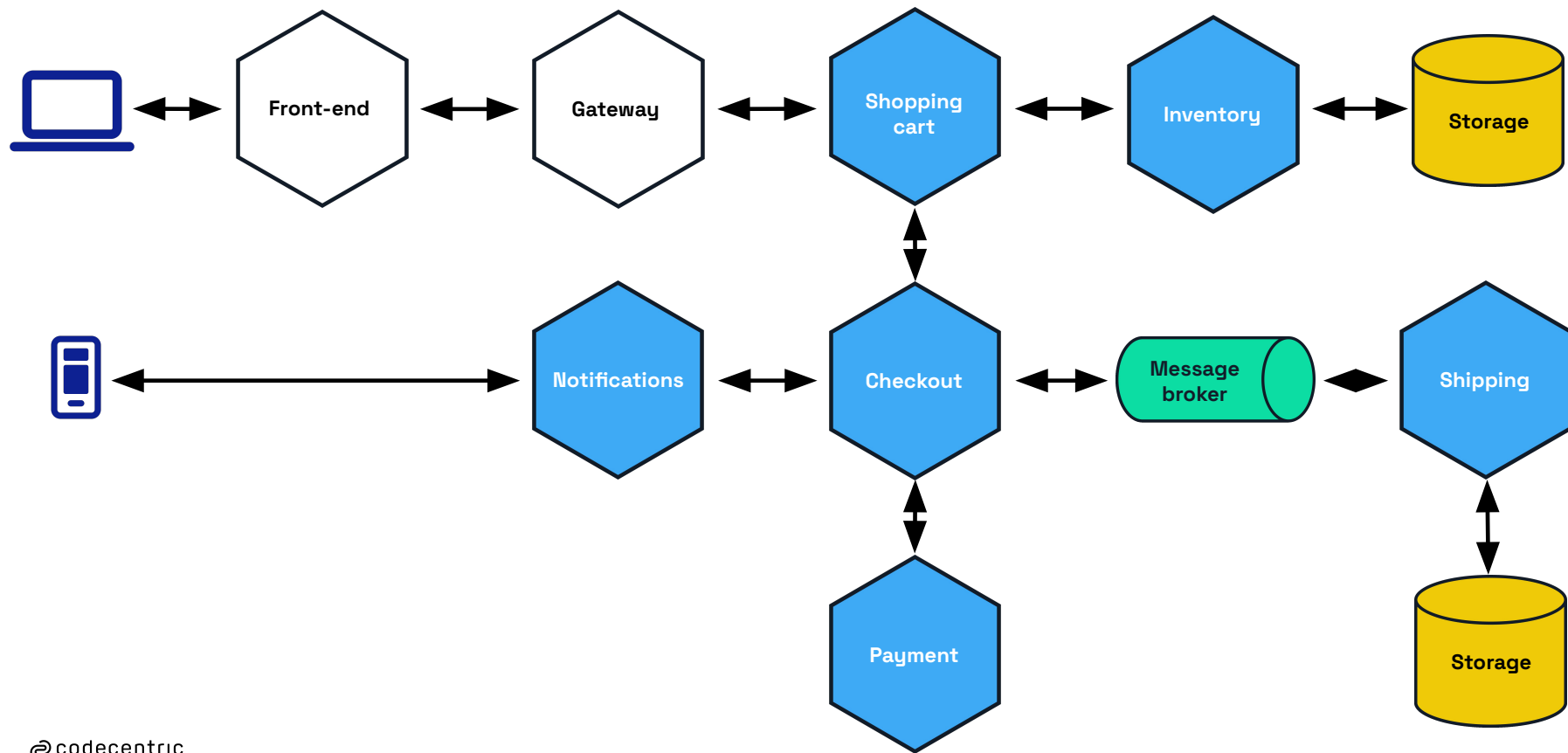
[Read the article](#)



Bosch's Residential IoT Services GmbH (RIoT) uses Dapr actors and Java SDK to build a large scale smart home IoT solution.

[Read the article](#)

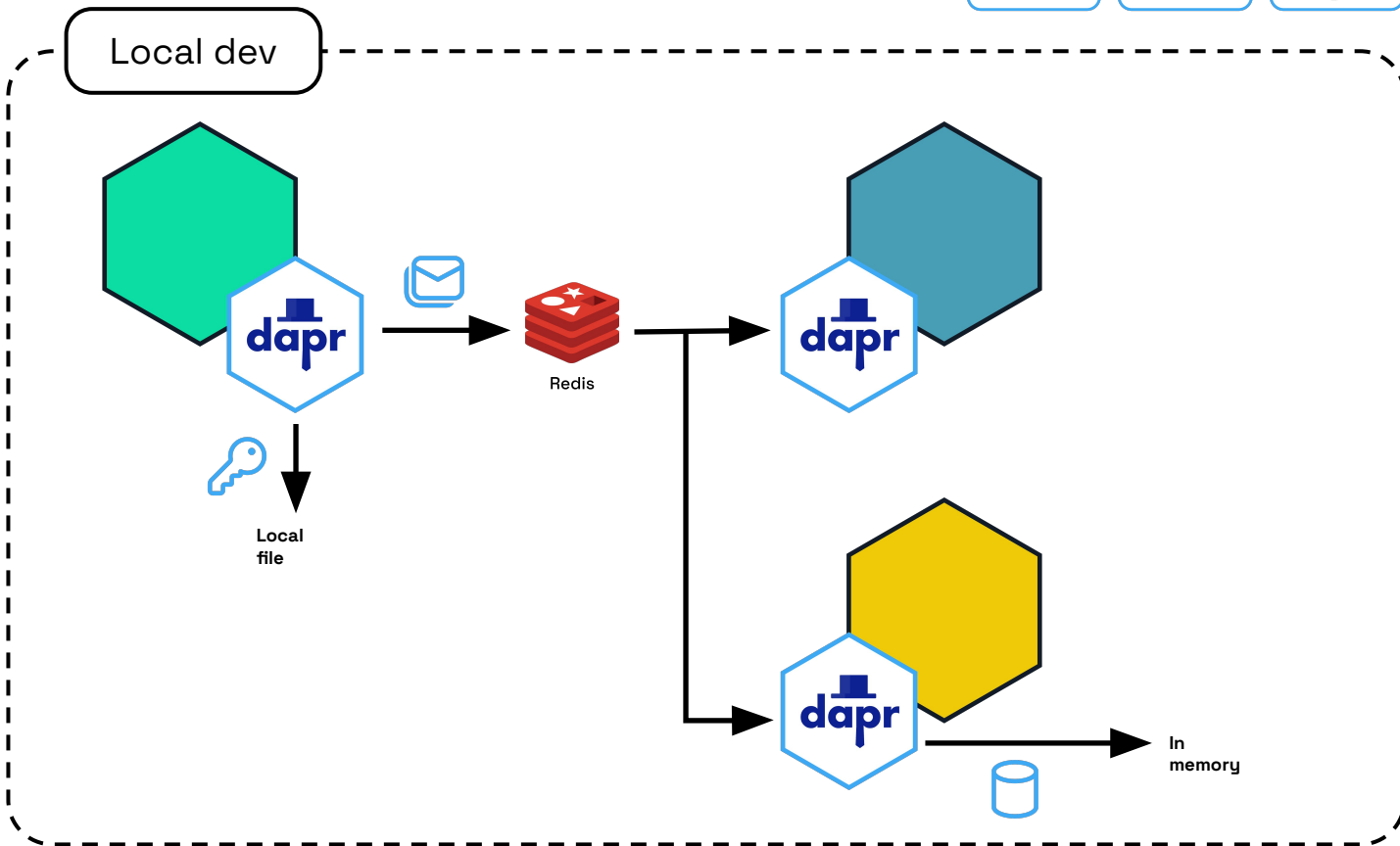
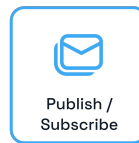
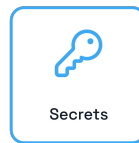
# Distributed applications



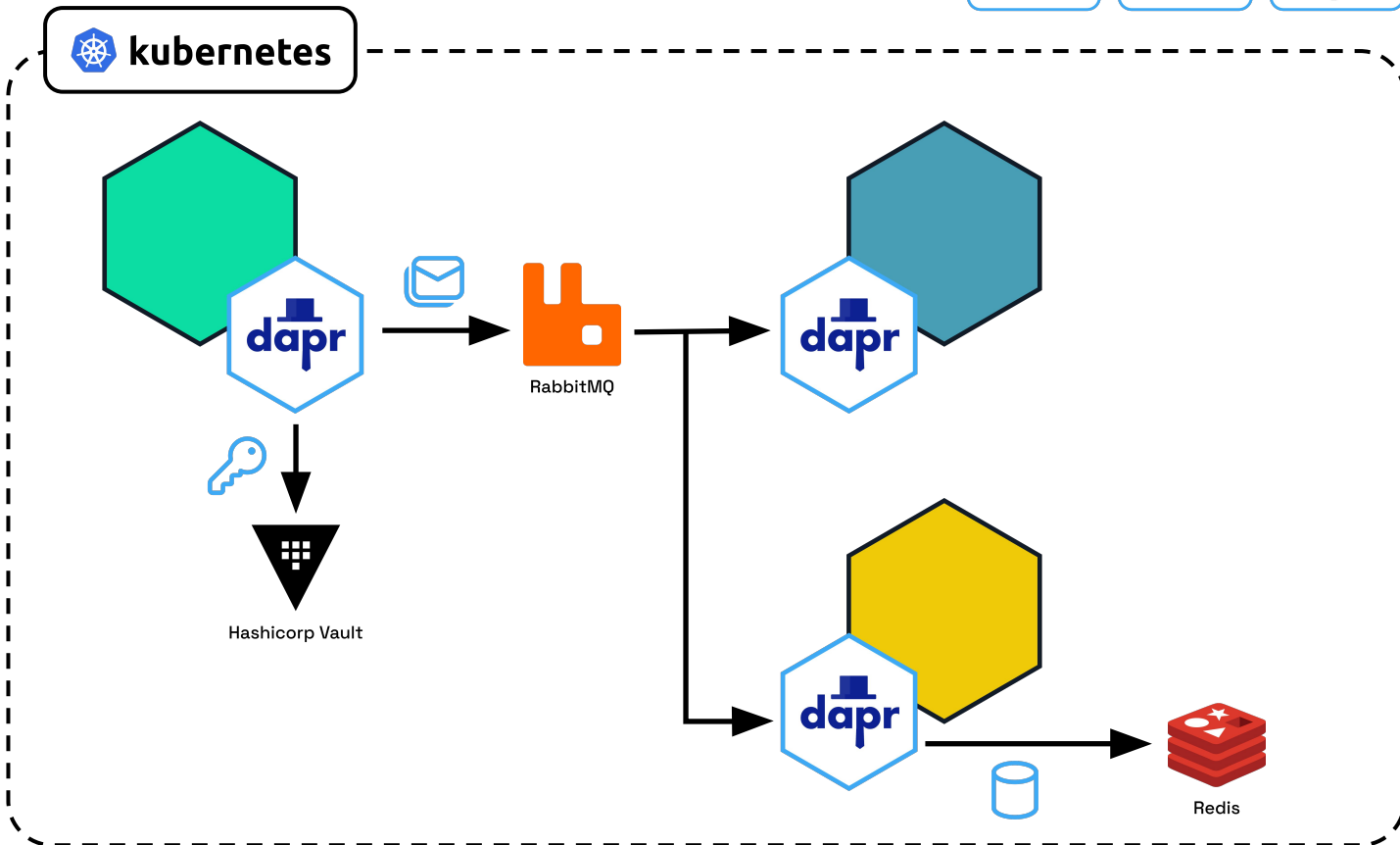
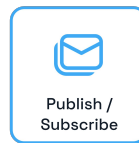
# Dapr components



# Swappable component model

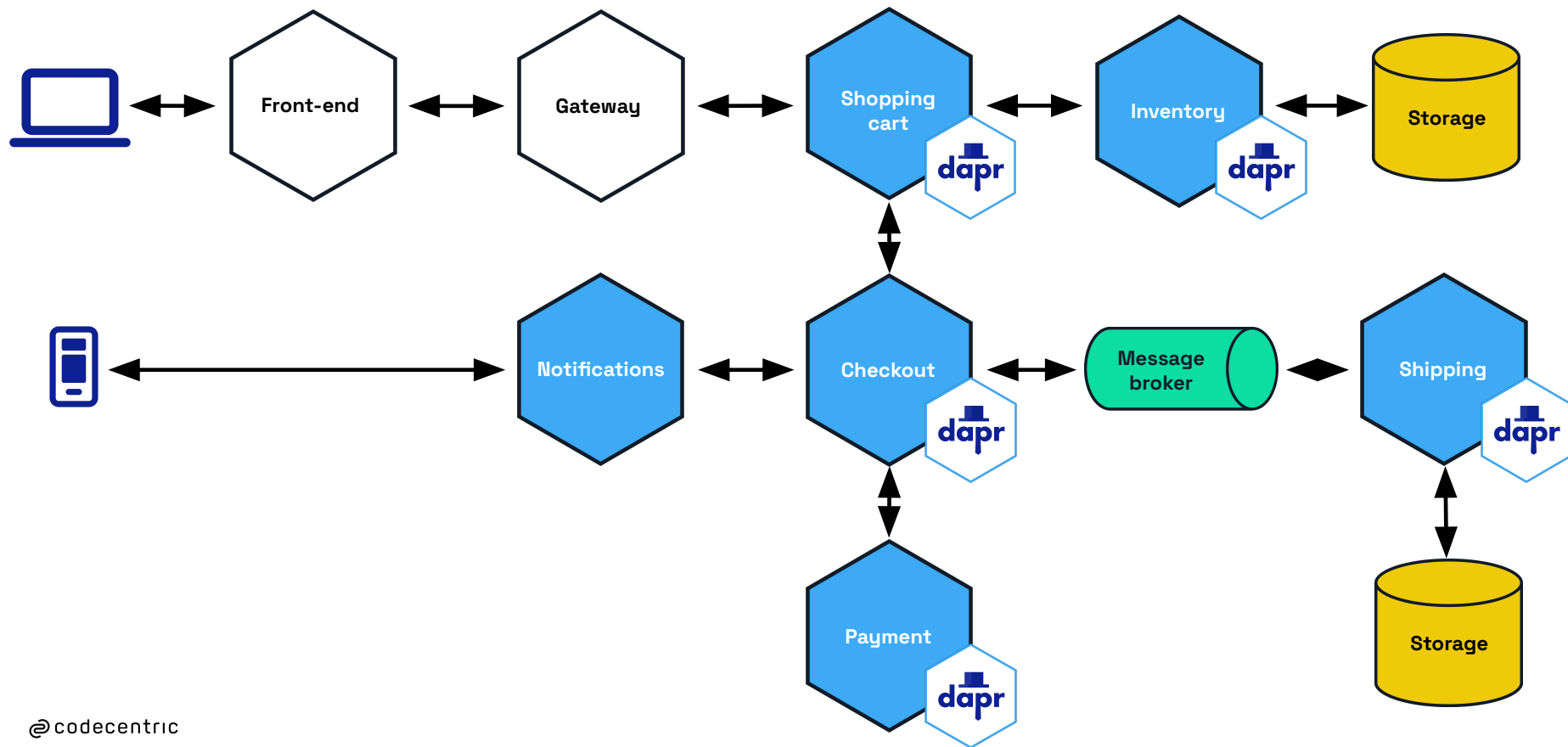


# Swappable component model



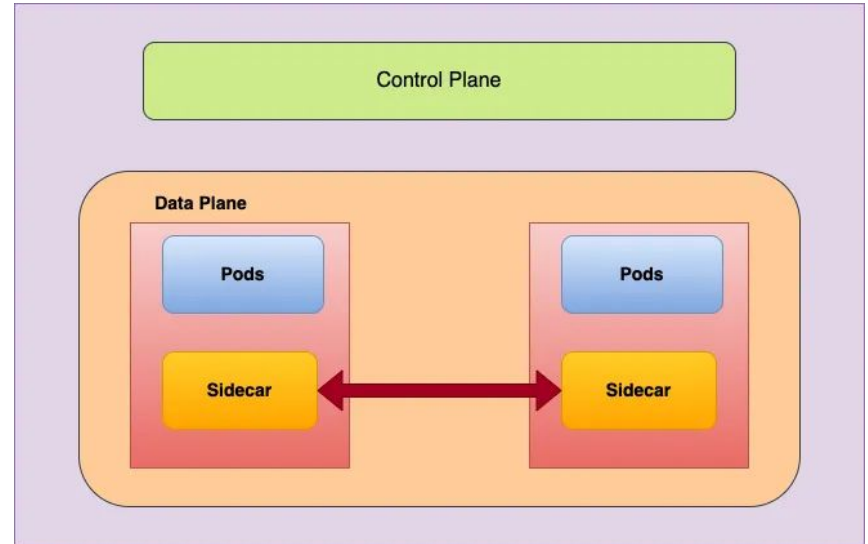


# Dapr uses a sidecar pattern



## What's a Service Mesh?

- **Dedicated infrastructure layer in microservice environments**
- **Offloading of important functions**
  - Service Discovery and Routing
  - Observability
  - Security
  - Traffic Management
  - Resiliency
  - Policy Enforcement



Taken from <https://pramodshehan.medium.com/istio-service-mesh-a7b8204f9da2>

## Current Implementations



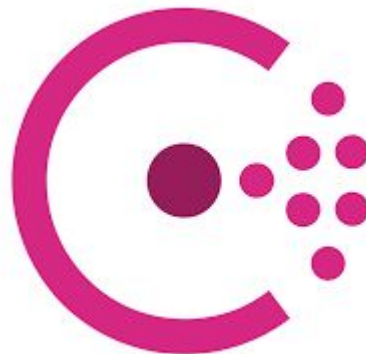
cilium



LINKERD



Istio



Kuma

## Sidecar vs Sidecarless

### Sidecars were the de facto standard

Back in the days of first meshes, sidecars were a necessary evil to use. However it had challenges

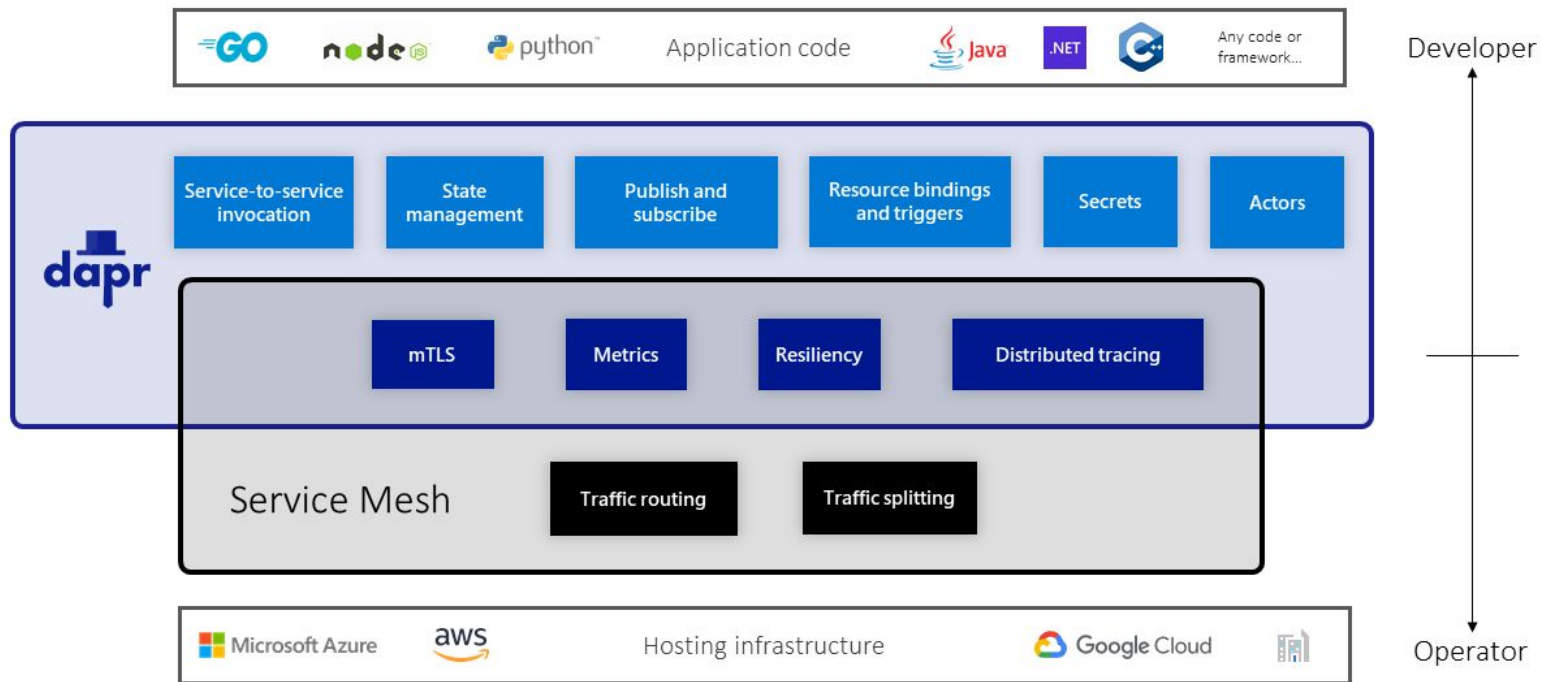
- Increased Costs
- Race conditions
- Maintenance

### Sidecars are just proxies?

Since Meshes offer layer 7 Traffic Management, a proxy was needed to implement that functionality

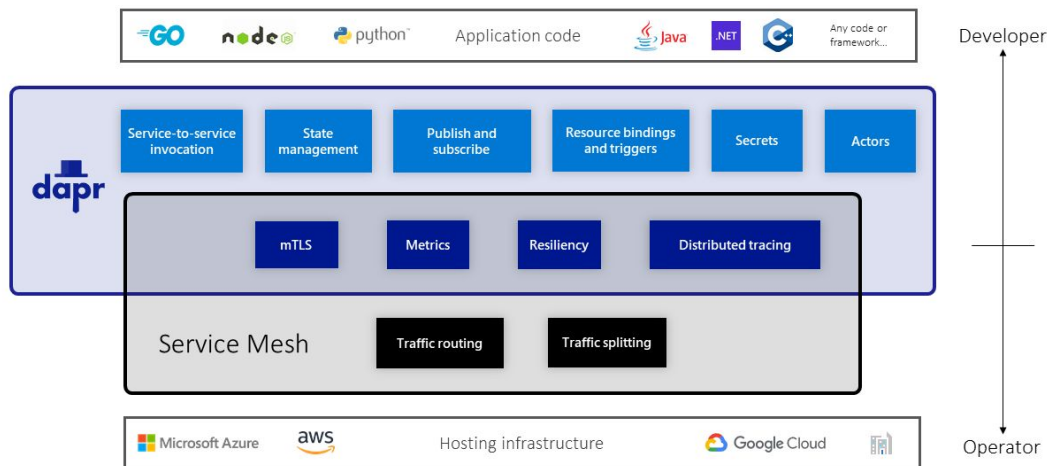
### eBPF to the rescue

eBPF allows to run a “servicemesh” in the kernel, removing the need for sidecars to some extent. Ending in a sidecarless service mesh



# Dapr vs Service Mesh

- **Dapr is *\*not\** a Service Mesh**
- **It offers overlapping capabilities**
  - Service Invocation
  - mTLS
  - Metrics
  - Resilience
  - ...
- **Dapr focuses on building blocks for distributed applications**
- **A service mesh on wiring them together**



# Introducing Dapr Shared

## Alternative Deployment Model

Dapr Shared allows to deploy daprd instances not only as sidecar, but also as Daemonset or Deployment.

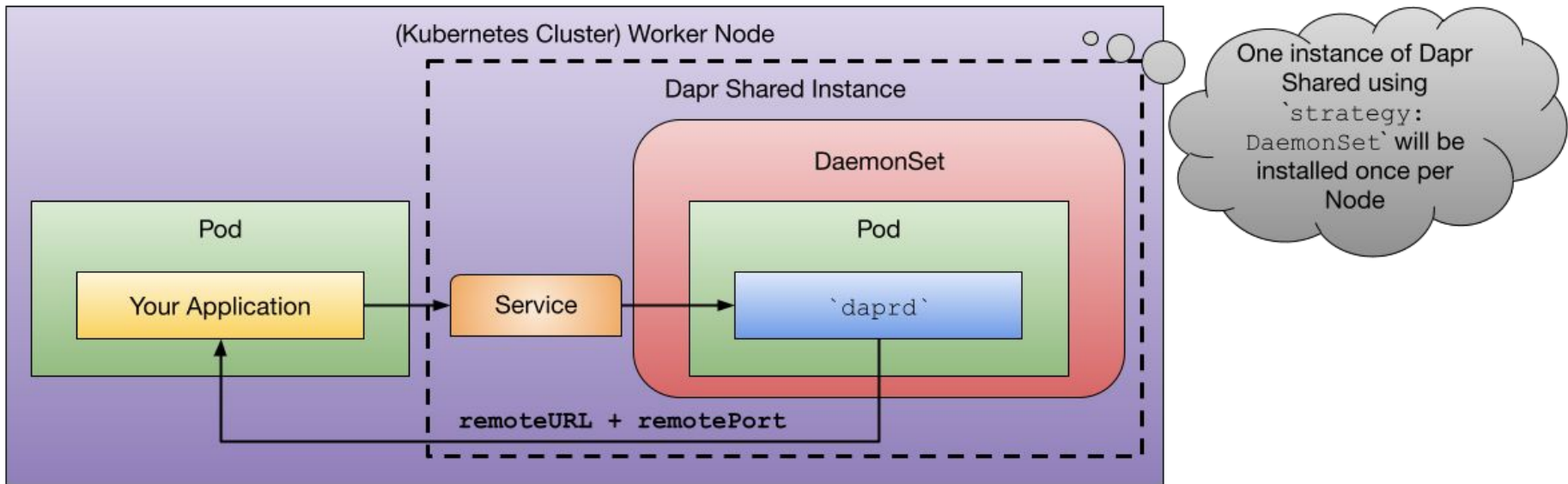
## Decouple Lifecycle

This flexibility allows to decouple the lifetime of a dapr instance of the actual instance lifecycle.

## Allows great integration

This flexibility in deployment and decoupling of lifecycles allows for greater integration within various aspects in Kubernetes, especially with sidecarless service meshes.

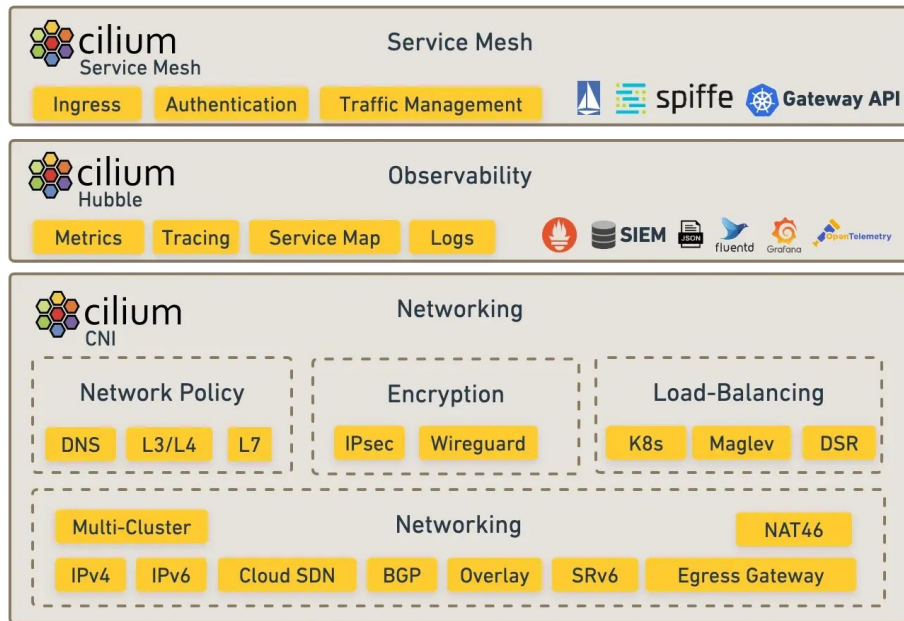
# Architecture





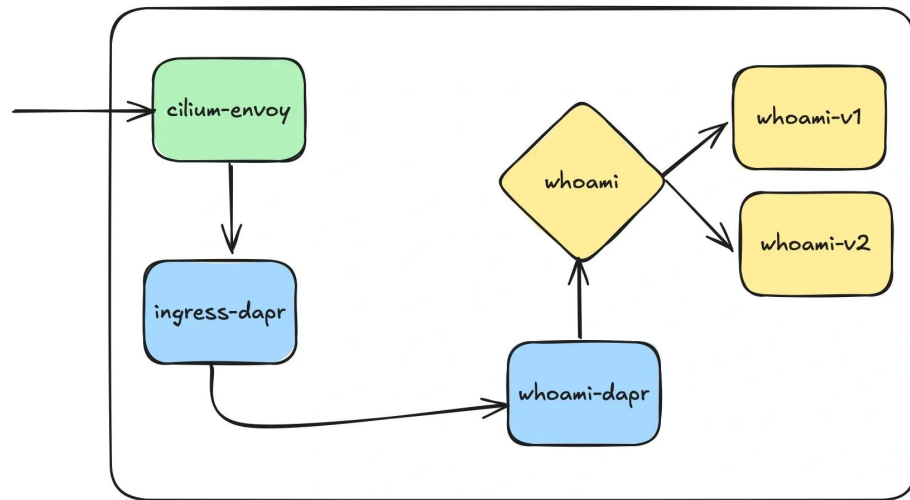
# Cilium in da house

- Cilium has an implementation of a sidecarless service mesh
- utilising eBPF for Kernel extensions
- Envoy Proxies per default for layer 7 capabilities
- Cilium allows for a variety of (advanced features)
- also covers the ingress part using Kubernetes Ingress or the new Kubernetes Gateway API



# Daprise things!

- Cilium Gateway as the Gateway into our cluster
- Have the gateway point to a Dapr Shared instance rather than to an app
- Dapr Shared of Gateway calls a Dapr Shared of a Dummy app



**Demo Time!**



