Cilium + eBPF Day EUROPE

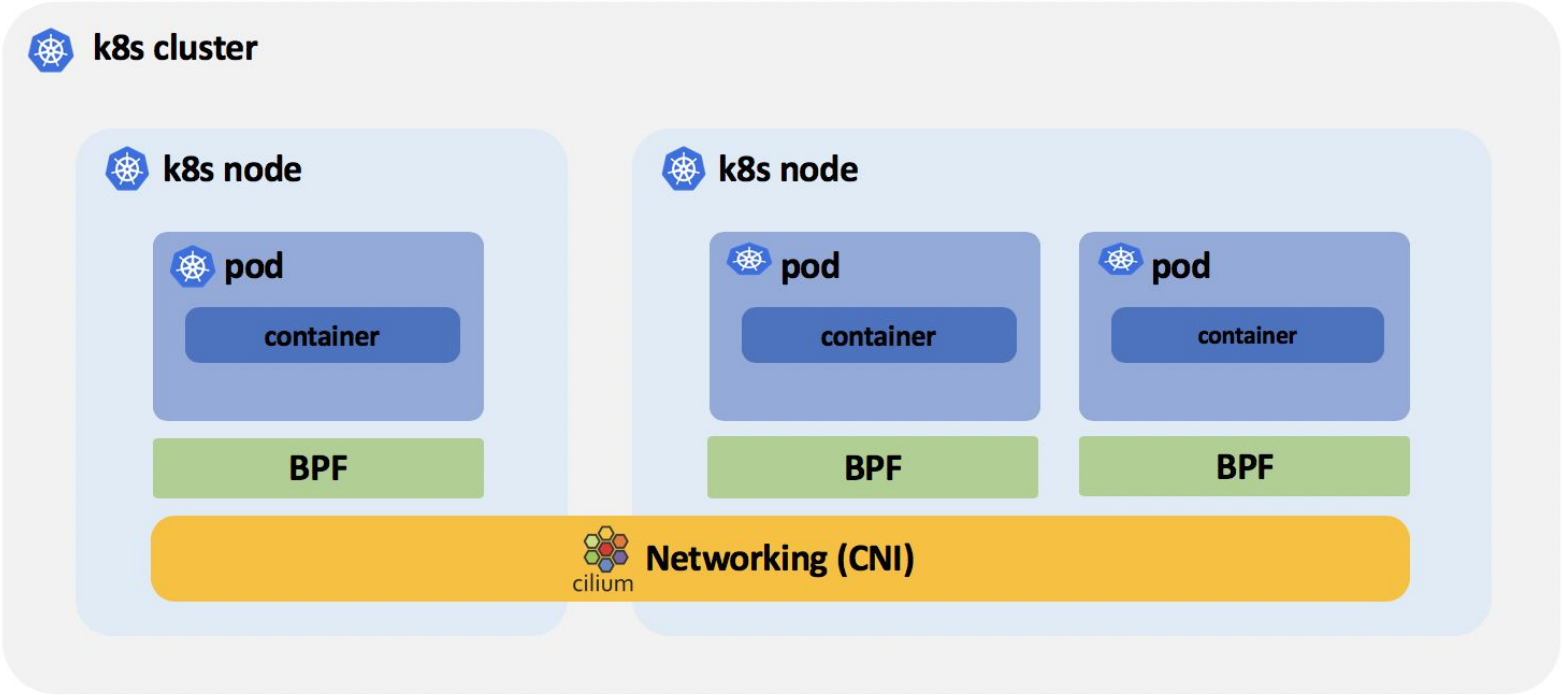
Deep Dive Into Cilium Resilient Architecture

Jussi Mäki

Martynas Pumputis

ISOVALENT

Cilium CNI


k8s cluster
k8s node
pod
container
BPF
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pod
container
BPF
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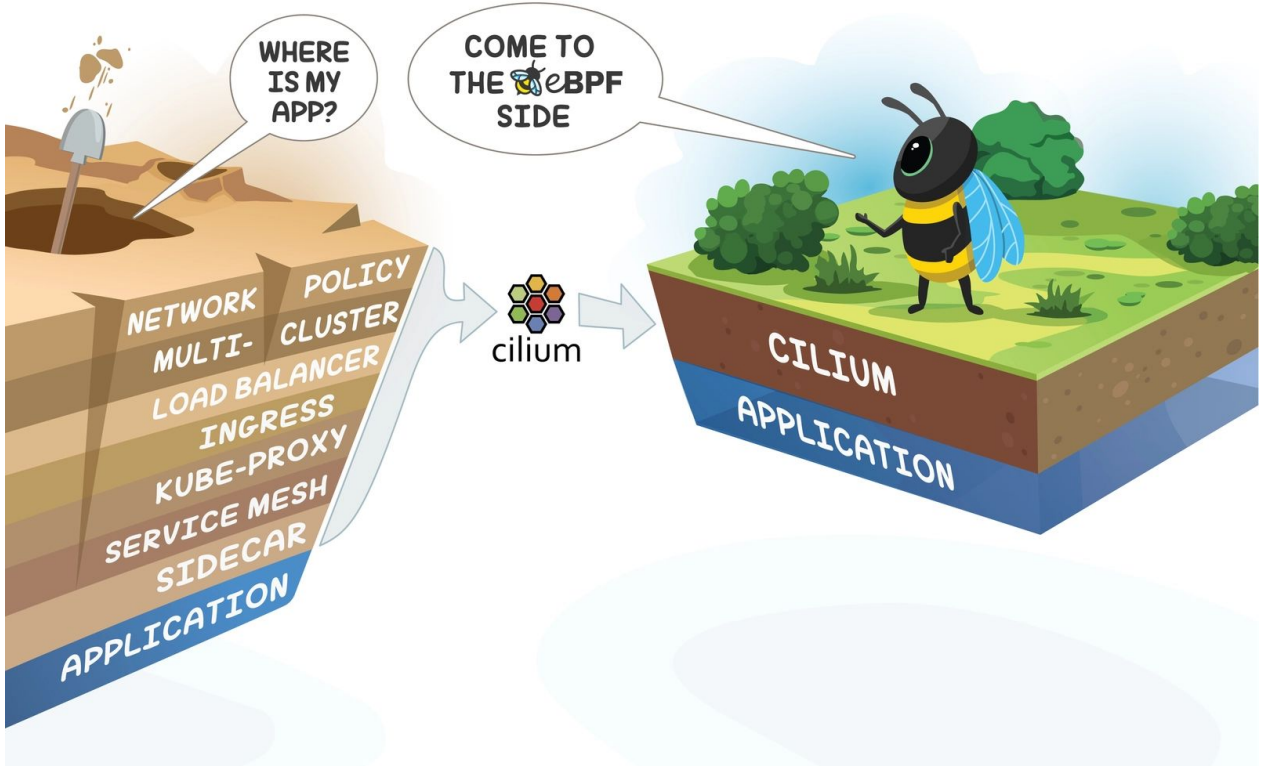
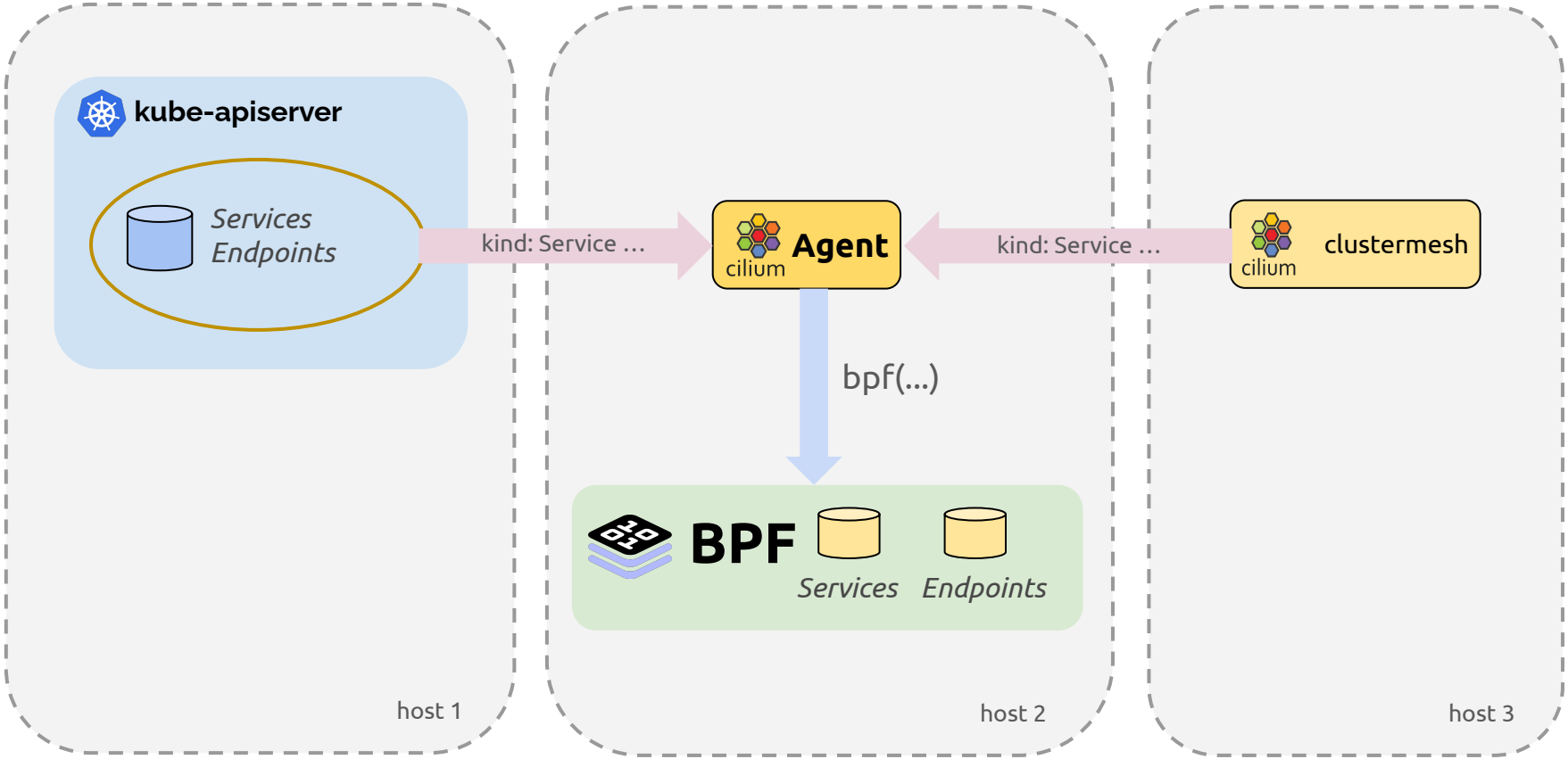
container
BPF
cilium
Networking (CNI)

… which liberated K8s from iptables

… and solved most of the K8s networking problems



Cilium under the hood



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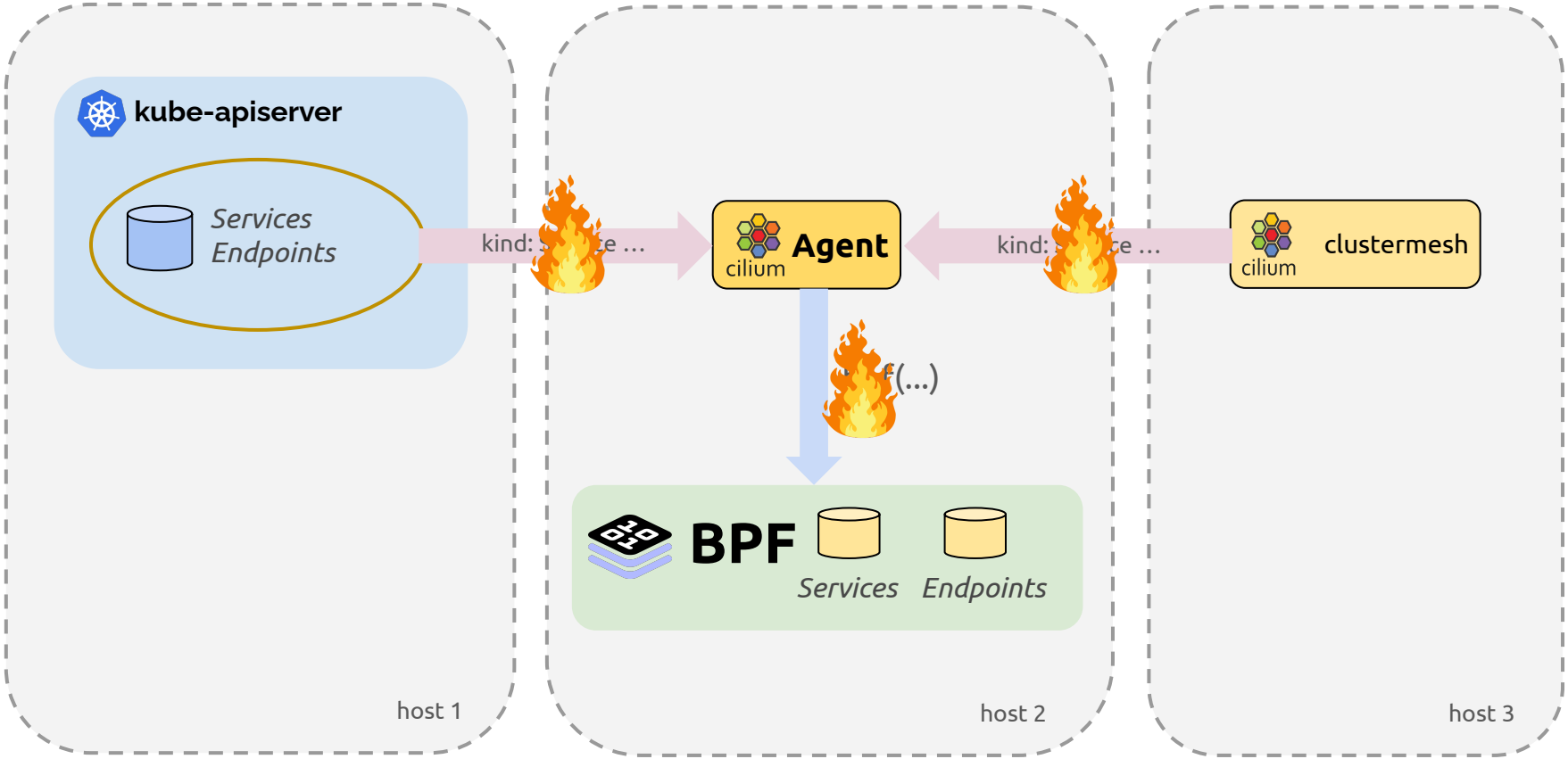

Reconciliation

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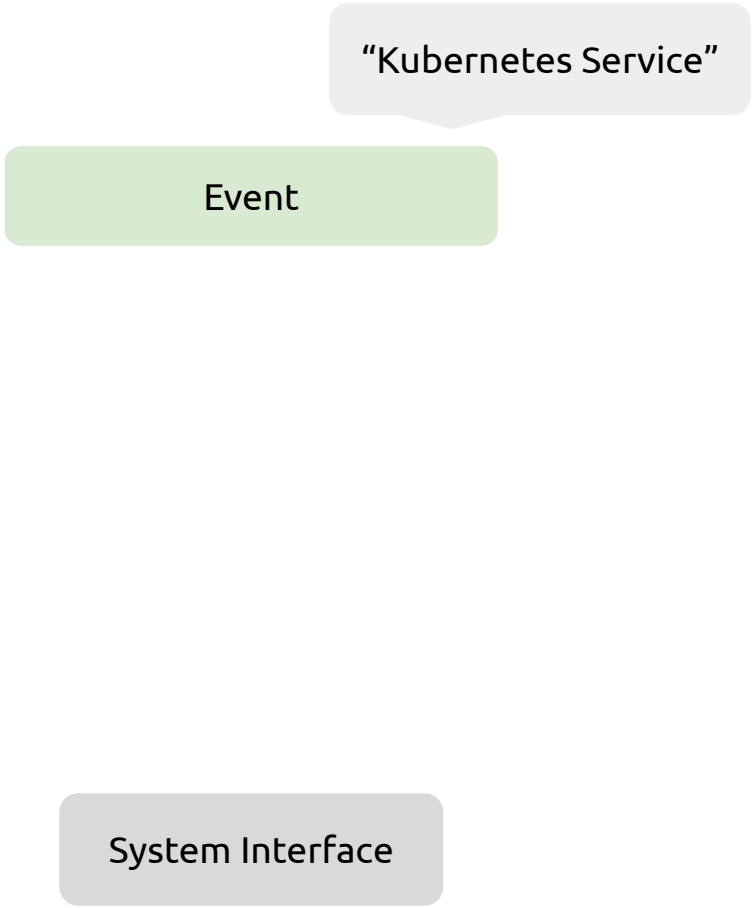

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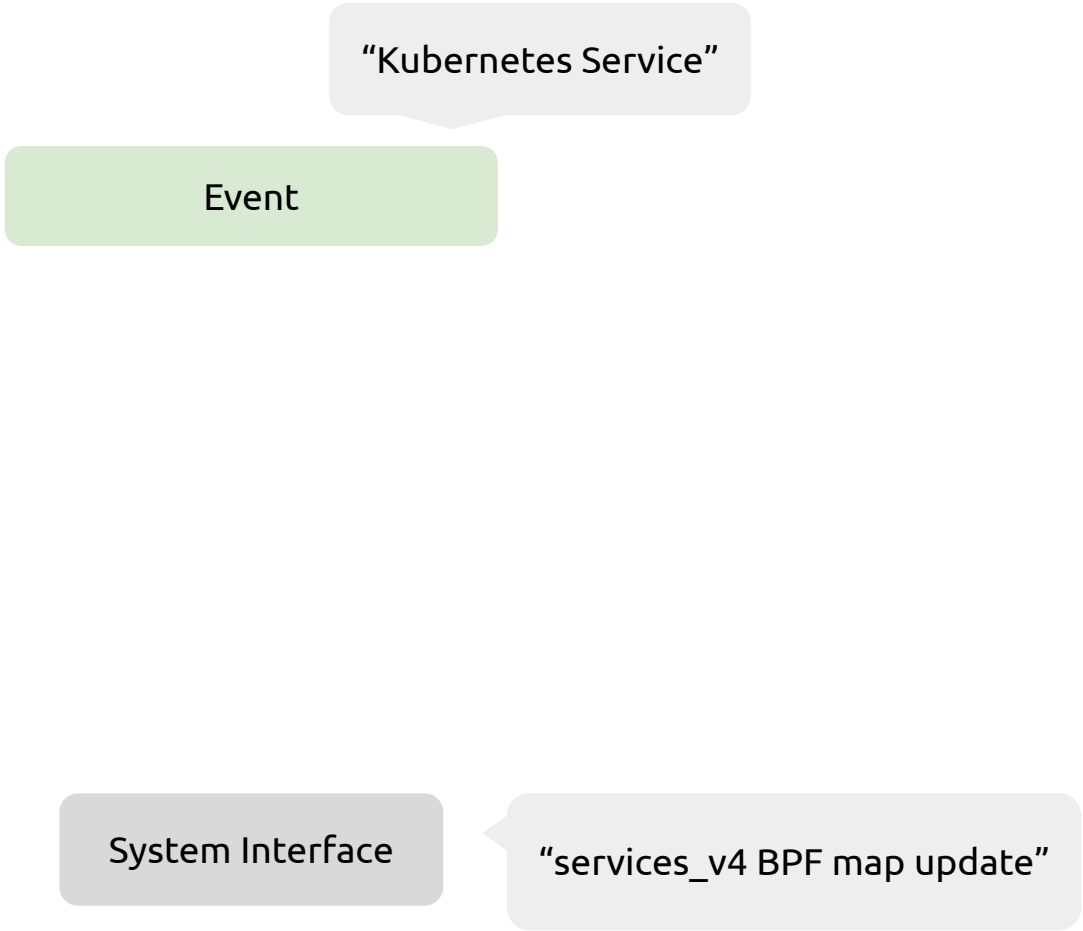

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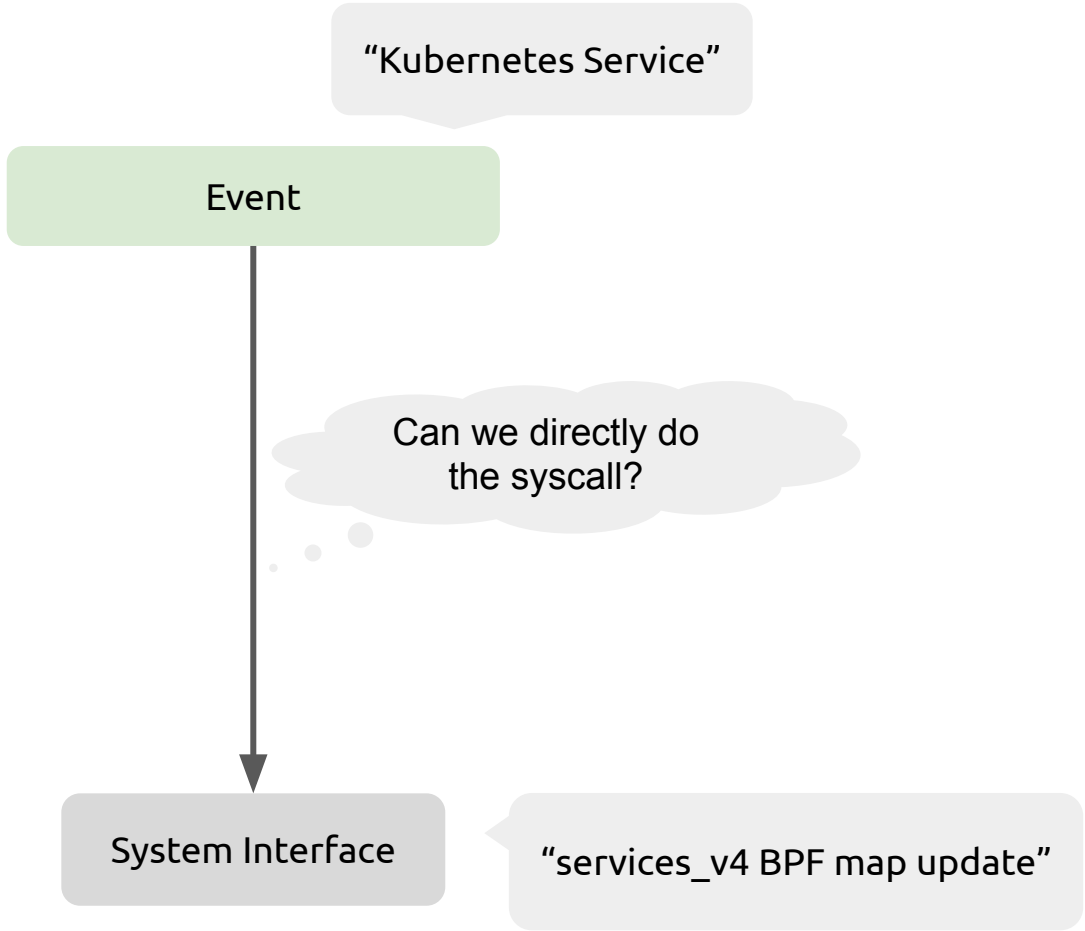

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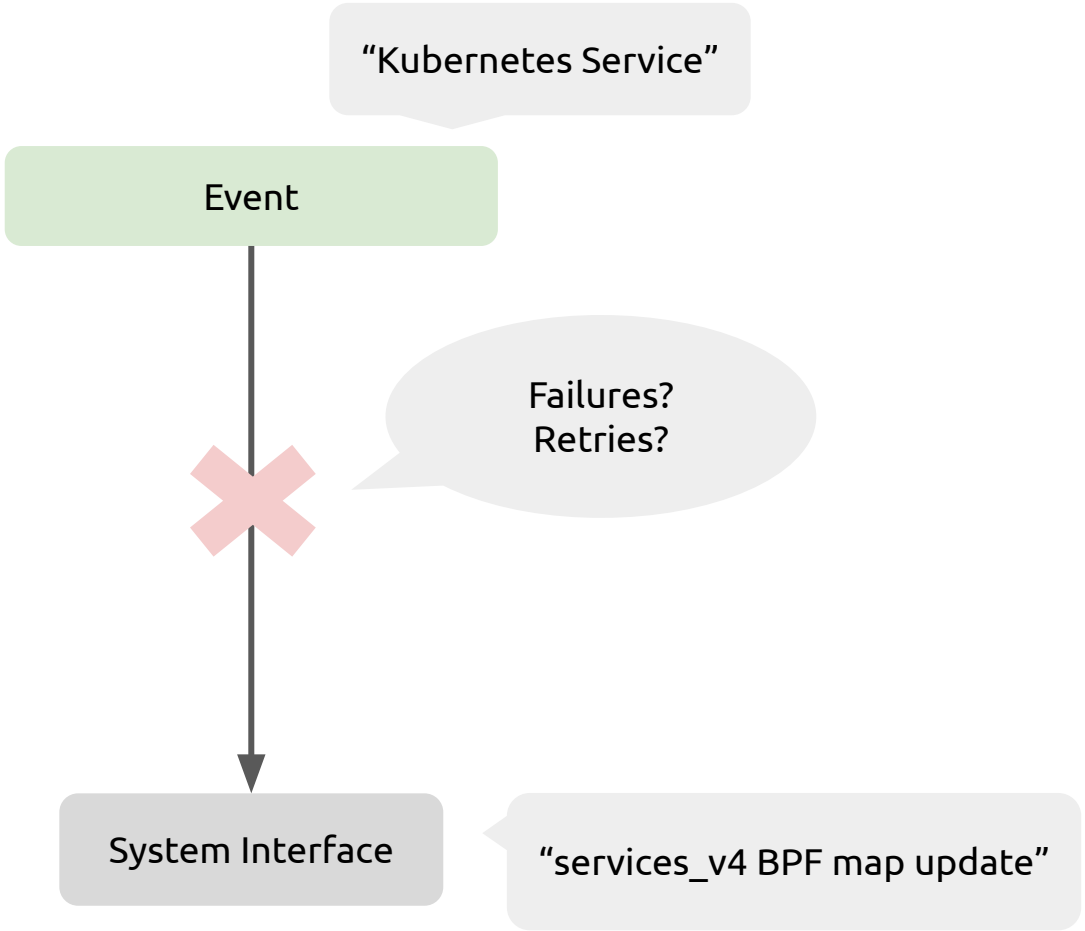

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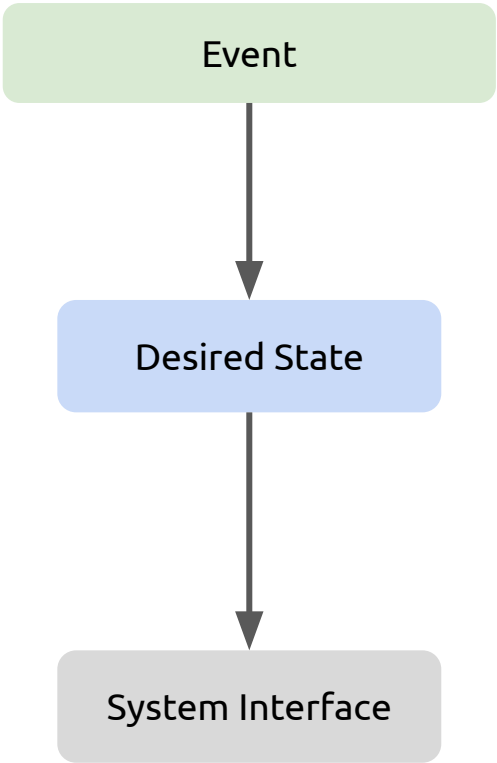

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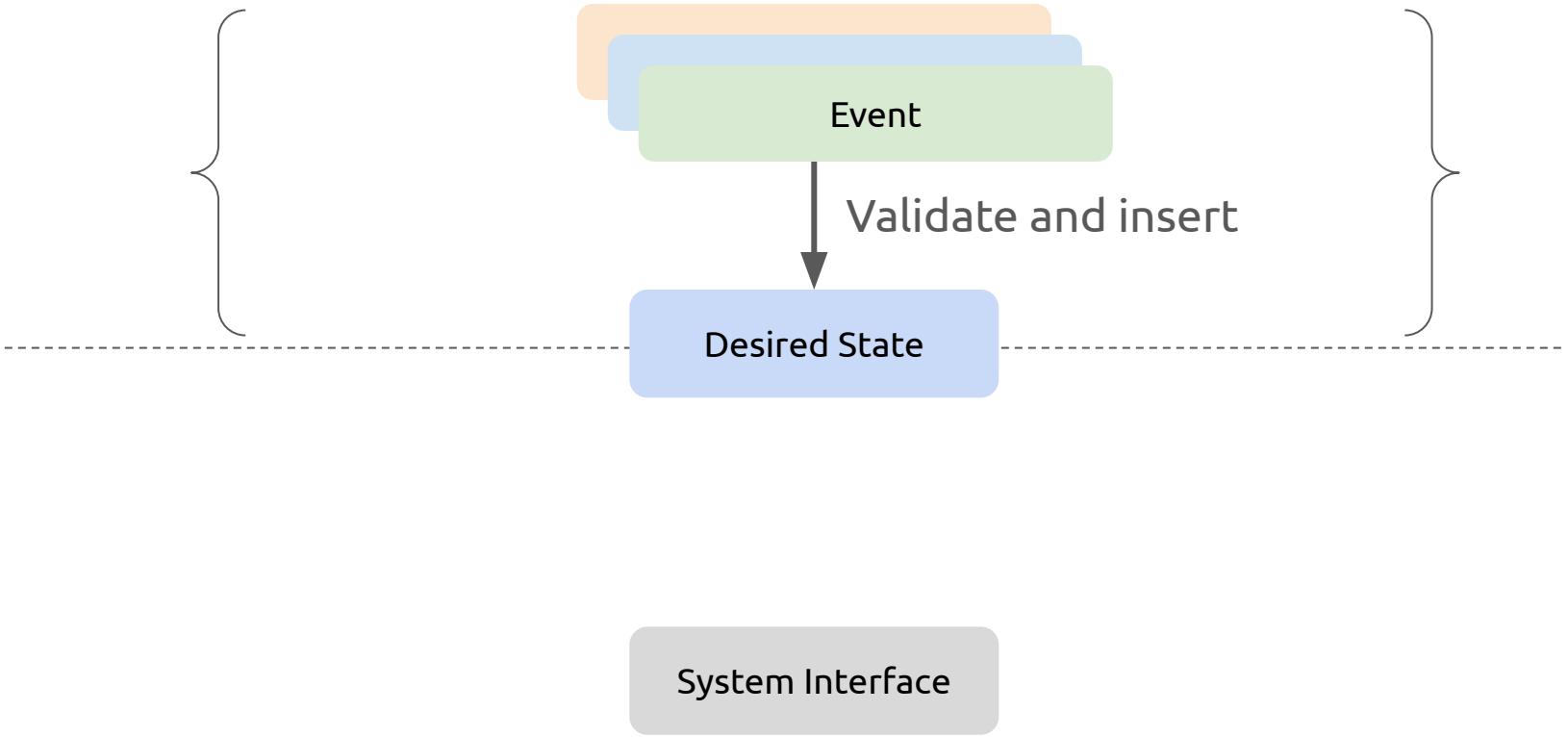

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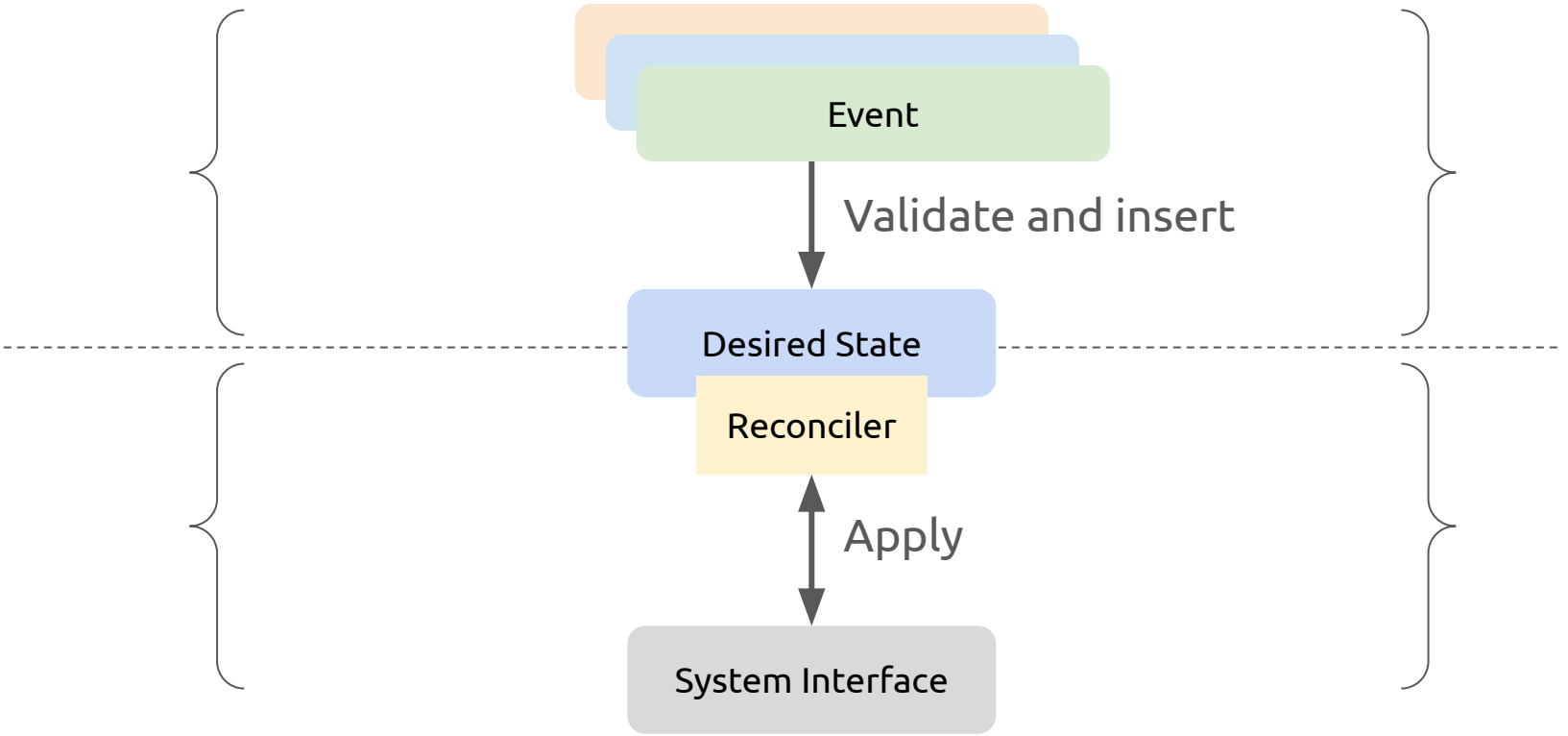

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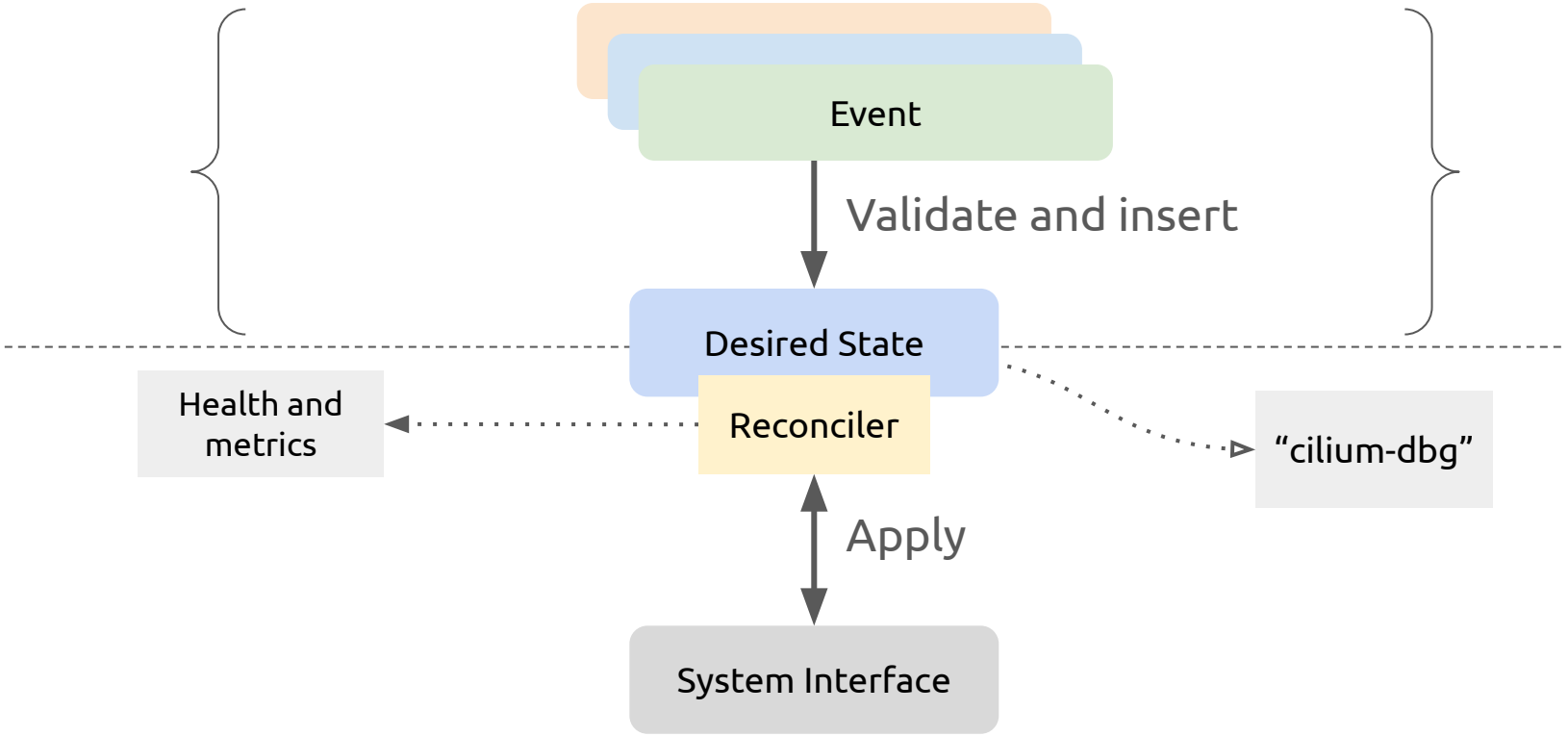

StateDB: in-memory database for state

- In-memory transactional database

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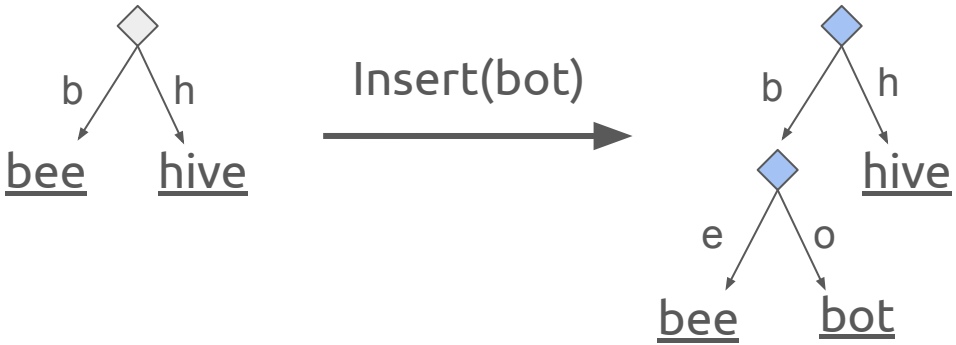

StateDB: Creating a table

```
type Example struct { ID string }
var IDIndex = statedb.Index[*Example, string]{
    Name: “id”,
    FromObject: func(e *Example) index.KeySet {
        return index.NewKeySet(index.String(e.ID))
    },
    FromKey: index.String,
    Unique: true,
}
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StateDB: Querying and watching

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type Service struct { Name, Namespace string; … }
var Services statedb.Table[*Service]
var NamespaceIndex statedb.Index[*Service, string]
var db *statedb.DB

txn := db.ReadTxn()
iter, watch := Services.Get(txn, NamespaceIndex.Query(“default”))
for svc, rev, ok := iter.Next(); ok; svc, rev, ok = iter.Next() {
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  …
}
<-watch // chan struct{}
```
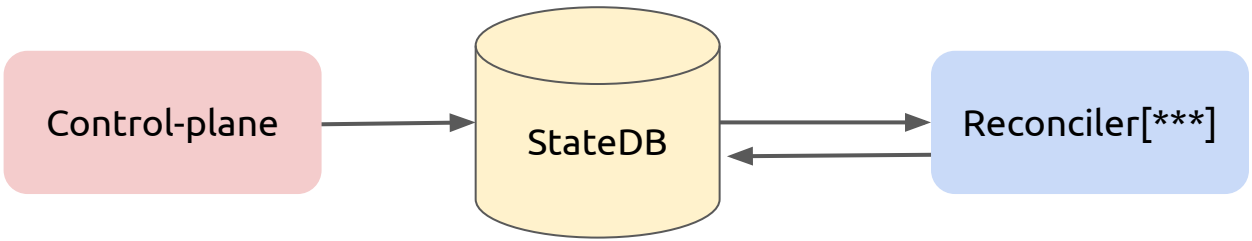

StateDB Reconciler



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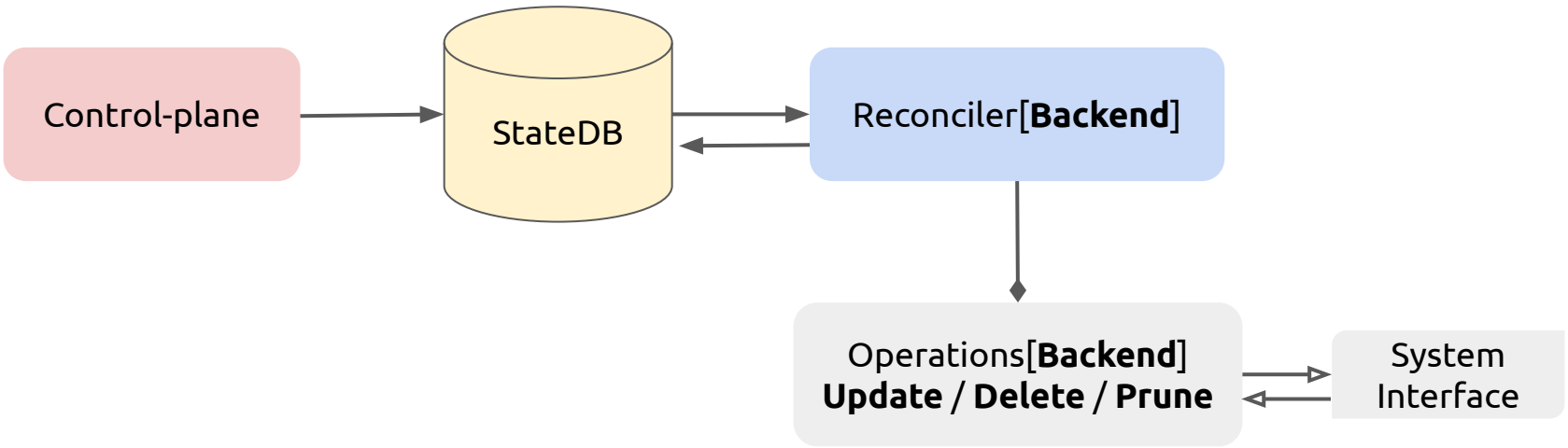

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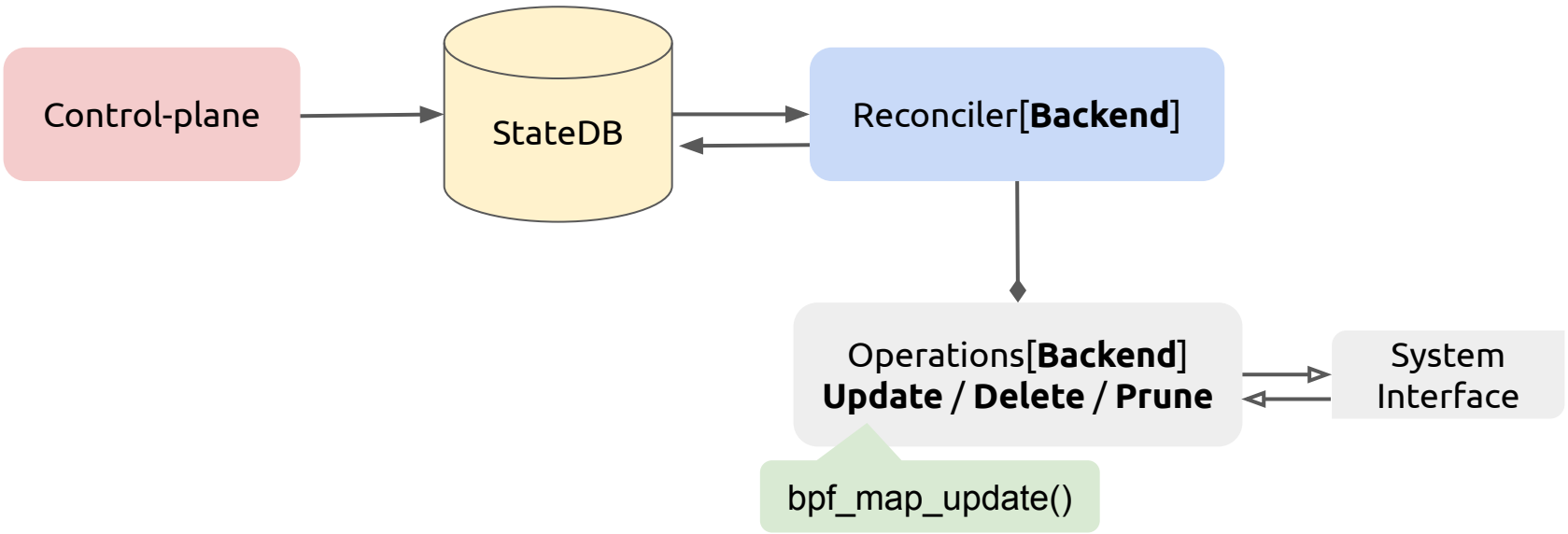

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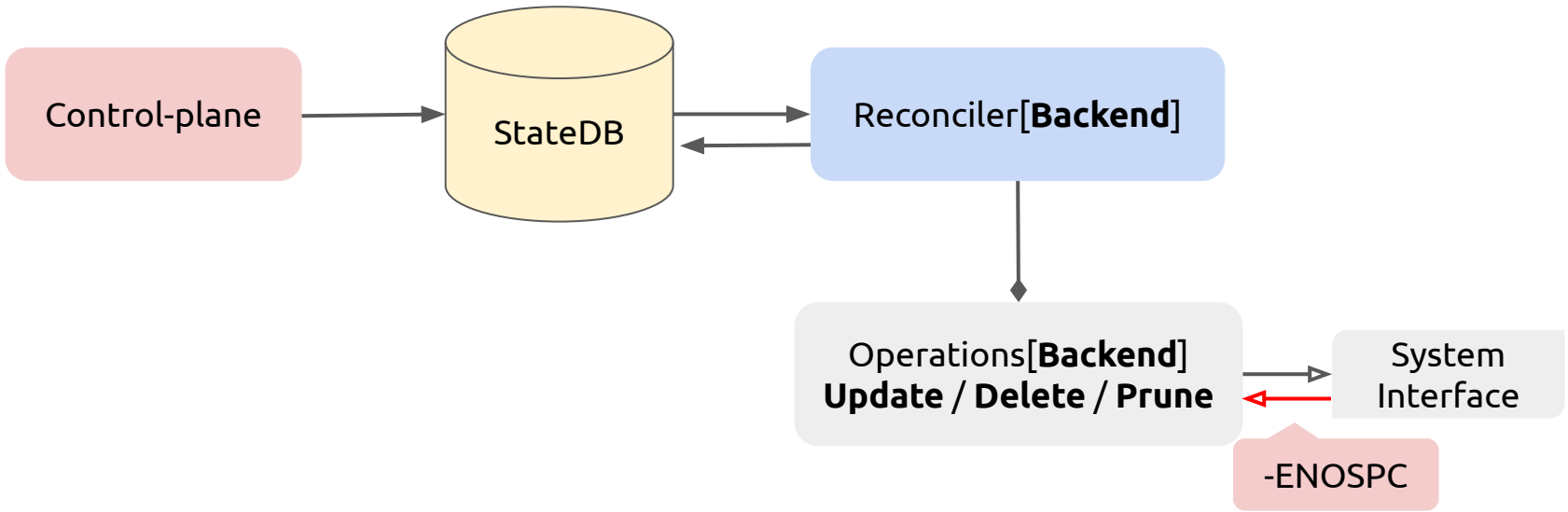

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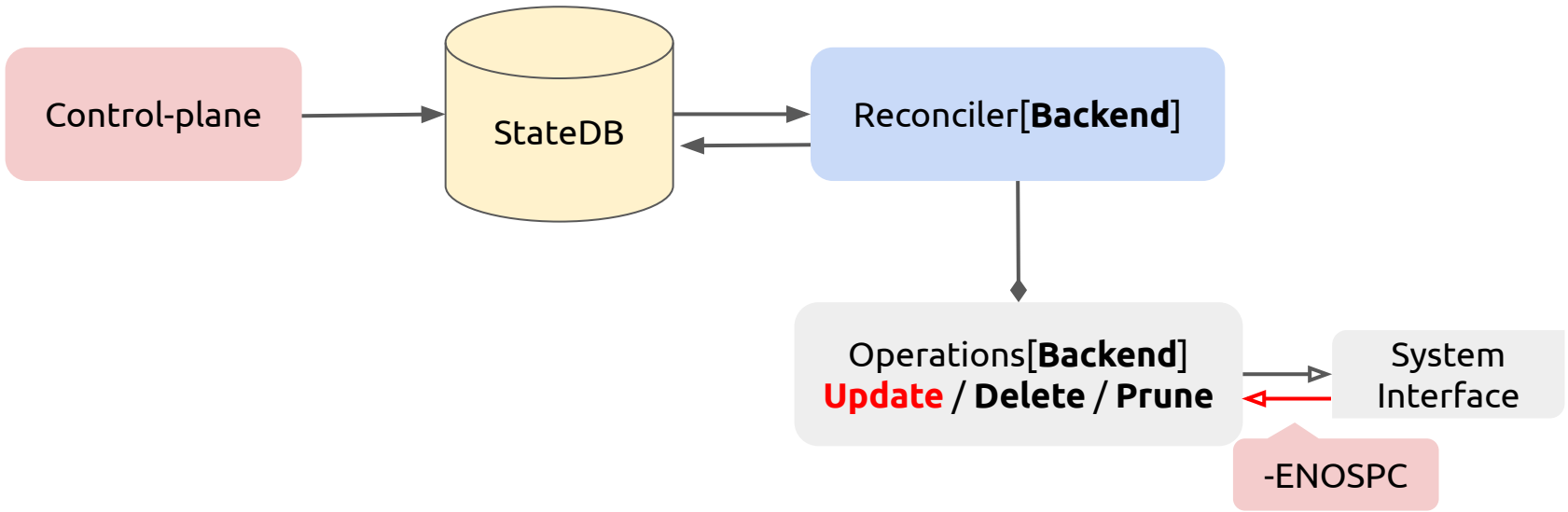

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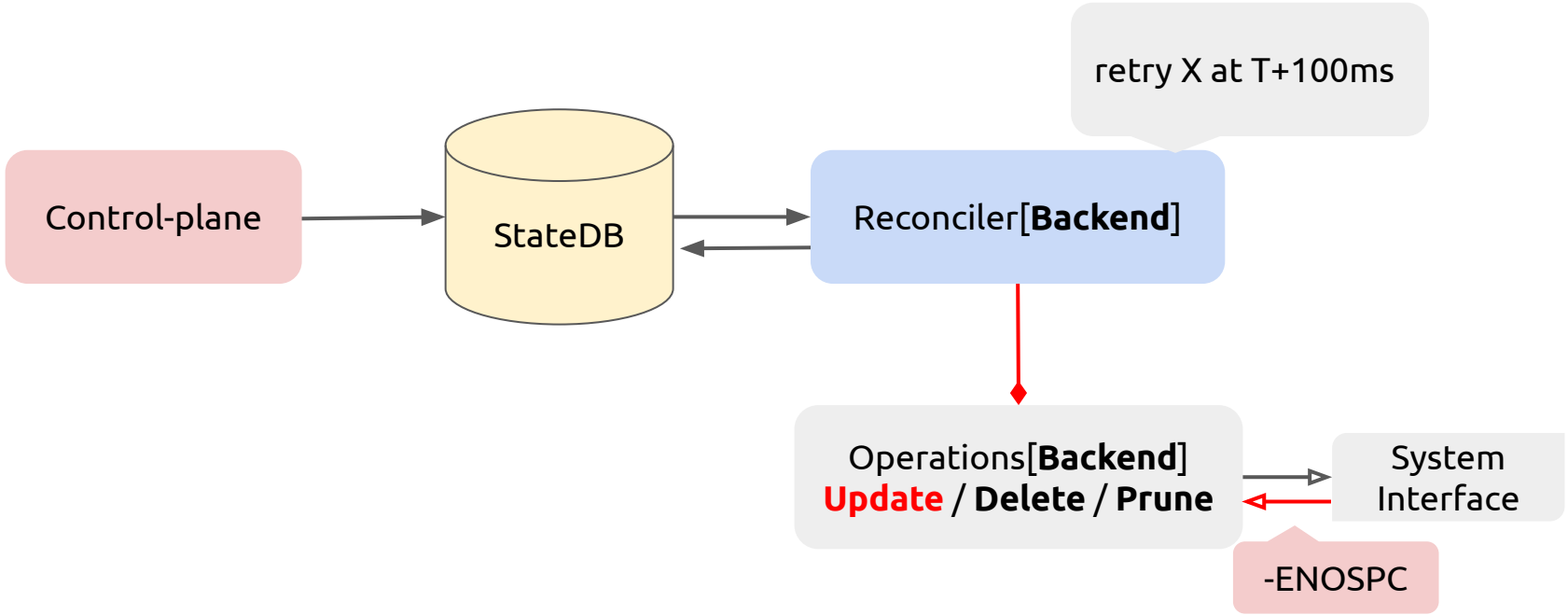

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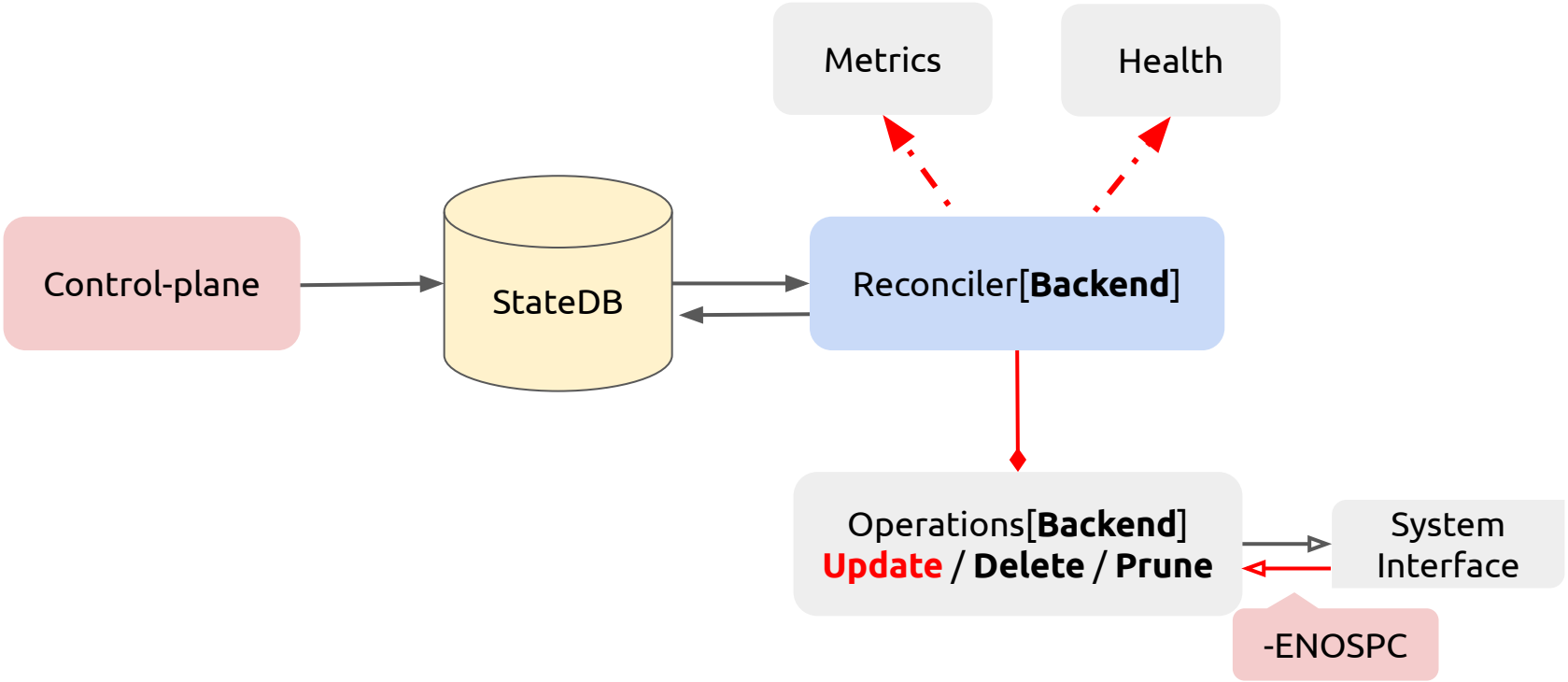

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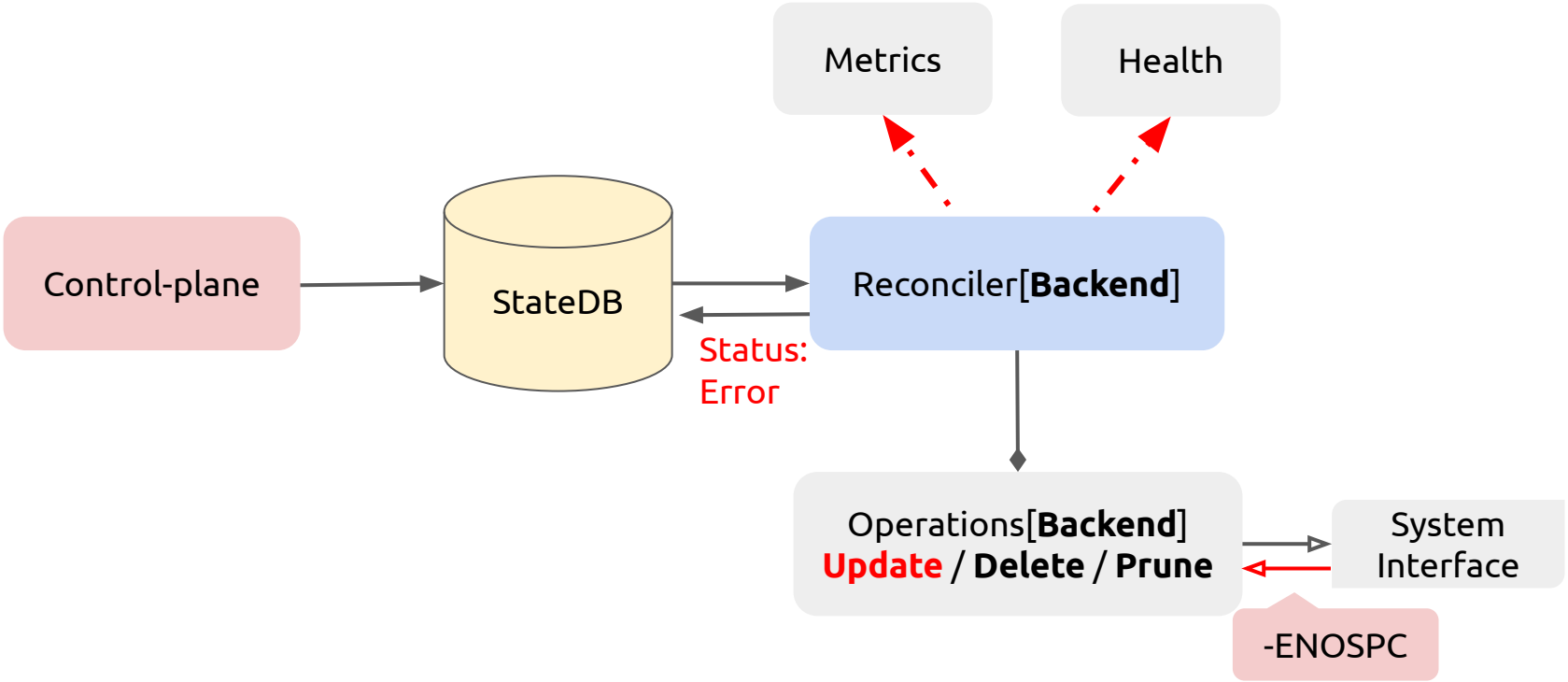

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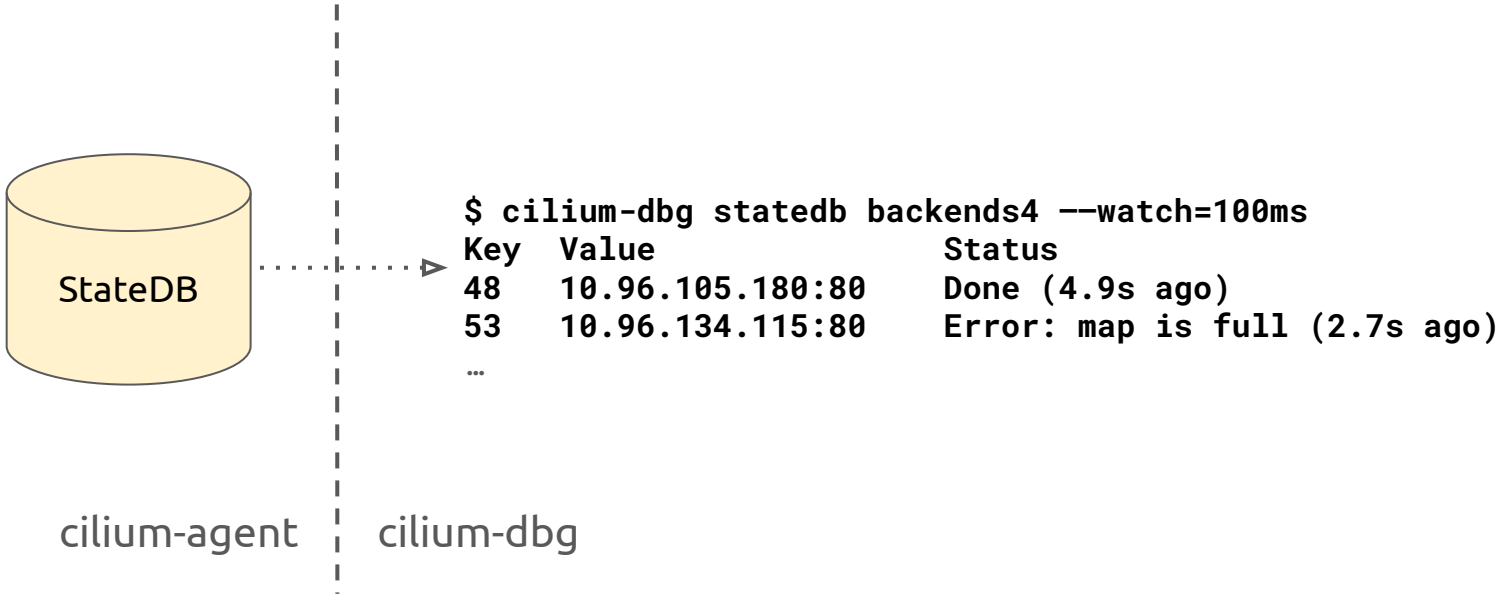

Summary

- Infrastructure is ready (StateDB, Hive and Agent Health, Reconciler)
- In Cilium v1.16 we’ll see first use-cases, for example runtime device reconfiguration.
- New features highly encouraged to leverage the new tooling for improved resiliency and observability

Thanks! Questions?

github.com/cilium/statedb (try out **reconciler/example**)