Alertmanager
and high availability

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Prometheus/Alertmanager/Kubernetes

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Where does CoreOS fit in?

- Automating Monitoring infrastructure
- Prometheus + Kubernetes

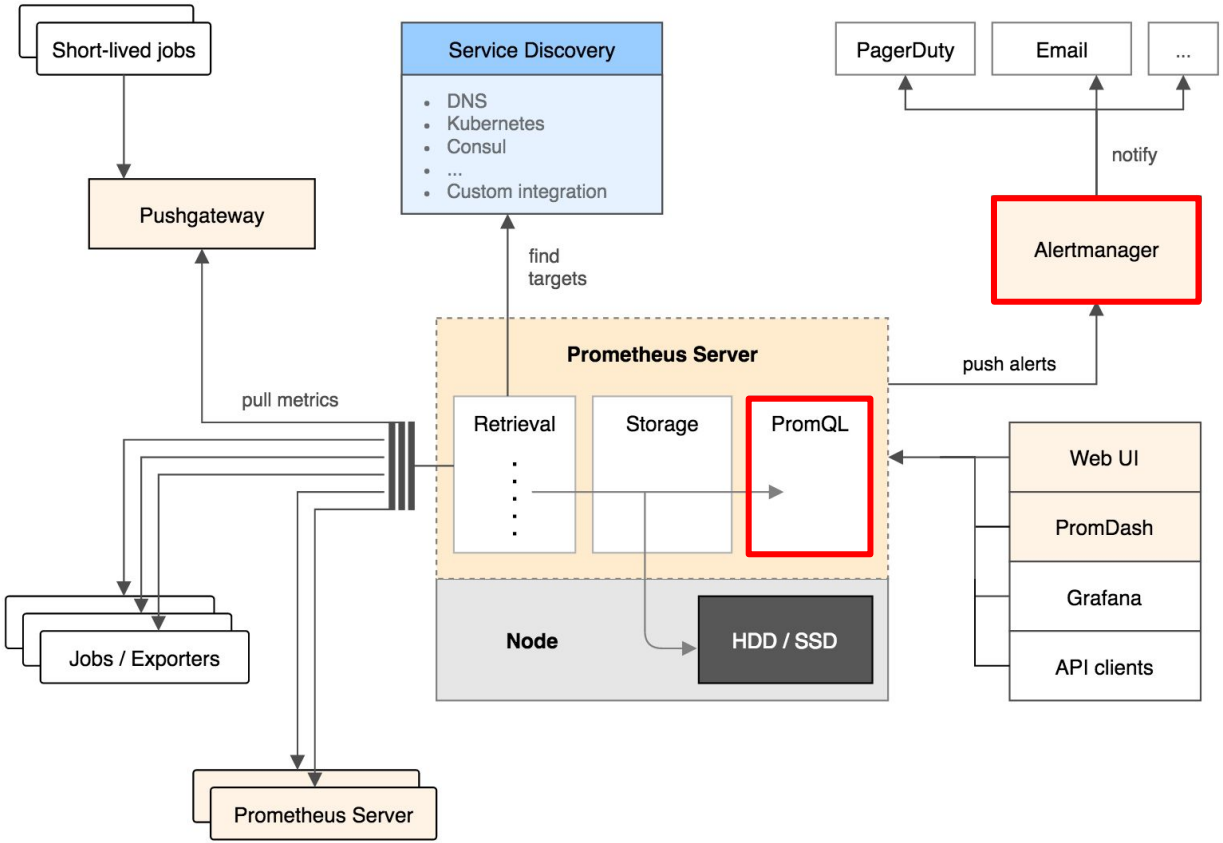
What will I be talking about?

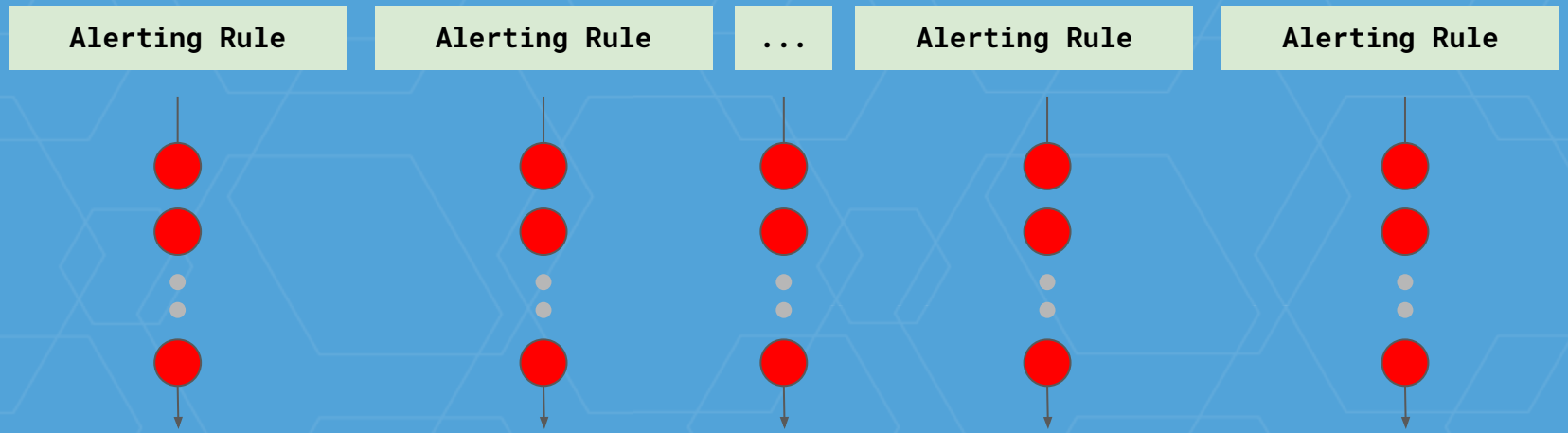
- From alert to notification
- High availability contract
- High availability implementation
- Implications on operating HA Alertmanager

Alertmanager Features

- Receives and groups alerts
- Deduplicates alerts
- Sends notifications to providers
  - Pagerduty, email, Slack, etc.
- Silencing

Prometheus & Alertmanager






```
04:11   hey, HighLatency,   service="X", zone="eu-west", path=/user/profile, method=GET
04:11   hey, HighLatency,   service="X", zone="eu-west", path=/user/settings, method=GET
04:11   hey, HighLatency,   service="X", zone="eu-west", path=/user/settings, method=GET
04:11   hey, HighErrorRate, service="X", zone="eu-west", path=/user/settings, method=POST
04:12   hey, HighErrorRate, service="X", zone="eu-west", path=/user/profile, method=GET
04:13   hey, HighLatency,   service="X", zone="eu-west", path=/index, method=POST
04:13   hey, CacheServerSlow, service="X", zone="eu-west", path=/user/profile, method=POST
        . . .
04:15   hey, HighErrorRate, service="X", zone="eu-west", path=/comments, method=GET
04:15   hey, HighErrorRate, service="X", zone="eu-west", path=/user/profile, method=POST
```

Grouped in one notification

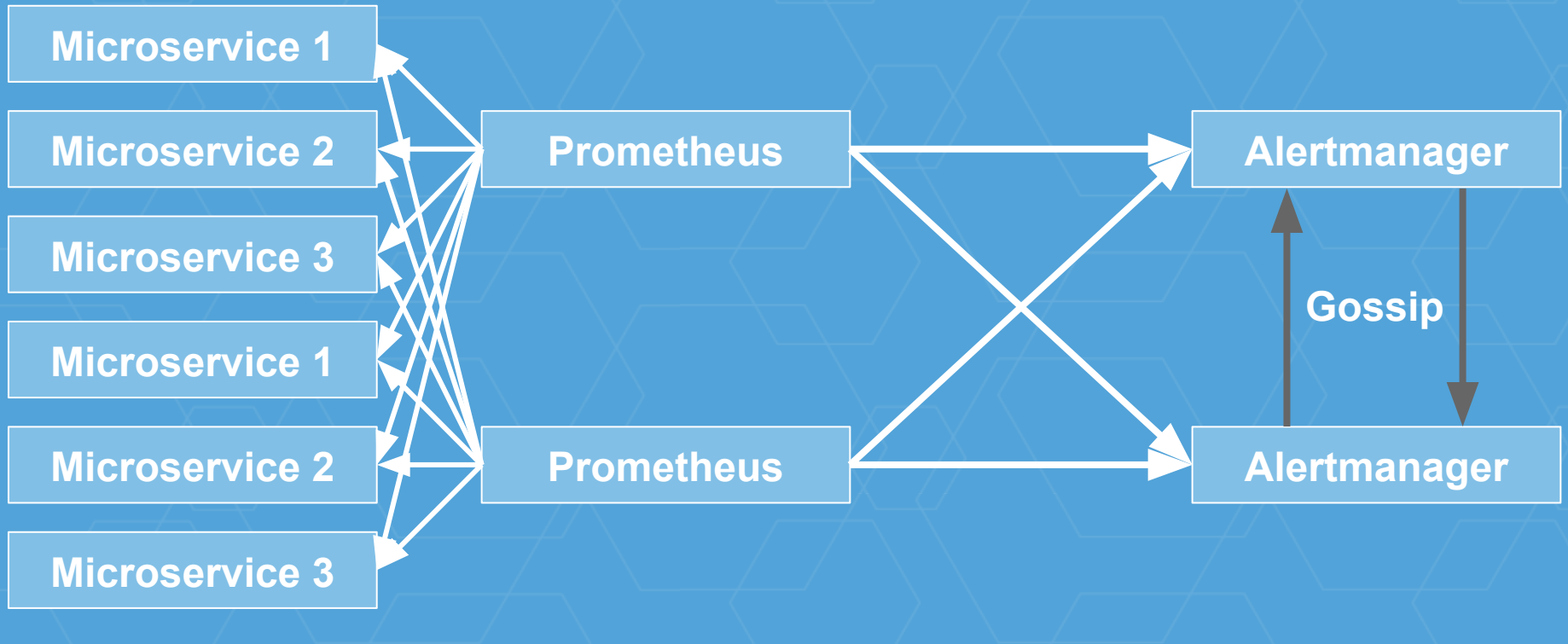
- 3 x HighLatency
- 10 x HighErrorRate
- 2 x CacheServerSlow
- (+individual Alerts)

Boiled down:

Alertmanager reliably sends notifications

High Availability

Infrastructure Scaling Story



Why decoupled?

- Keep Prometheus alerting simple
- High availability of Prometheus
- No state sharing between Prometheus

Example Alerting Rule

```
ALERT NoLeader
IF etcd_has_leader == 0
FOR 10m
LABELS {
  severity = "warning"
}
ANNOTATIONS {
  summary = "etcd no leader",
  description = "etcd instance has no leader",
}
```

Alert Evaluation in Prometheus

Rule 1

Rule 2

Rule 3

...

- Evaluate Rule/Alert
- Fire alert against Alertmanager

Repeat in *rule evaluation interval*

Simple configuration

```
global:
  resolve_timeout: 5m

route:
  group_by: ['job']
  group_wait: 10s
  group_interval: 10s
  repeat_interval: 1h
  receiver: 'webhook'
receivers:
- name: 'webhook'
  webhook_configs:
  - url: 'http://127.0.0.1:5001/'
```

- Resolve alerts in 5m
- Group by *job* label
- Group for 10 seconds
- Send via webhook receiver

Notification Pipeline

Silence	Wait	Dedup	Send	Gossip
Do not continue	Position in cluster multiplied by 5 seconds	Has notification already been sent?	Send notification via favorite provider	Tell other peers notification has been sent

What is gossiped?

- Yes
  - Sent notifications
  - Silences
- No
  - Received alerts

How? CRDTs!

- Conflict-free replicated data type
- Associativity (a+(b+c)=(a+b)+c)
- Commutativity (a+b=b+a)
- Idempotence (a+a=a)
- Well suited for AP systems

Yes, but how? mesh by Weaveworks!

- Eventually consistent
- LWW-element-set
- Mergeable log of records
- Merges based on UID
  - On conflict latest timestamp wins

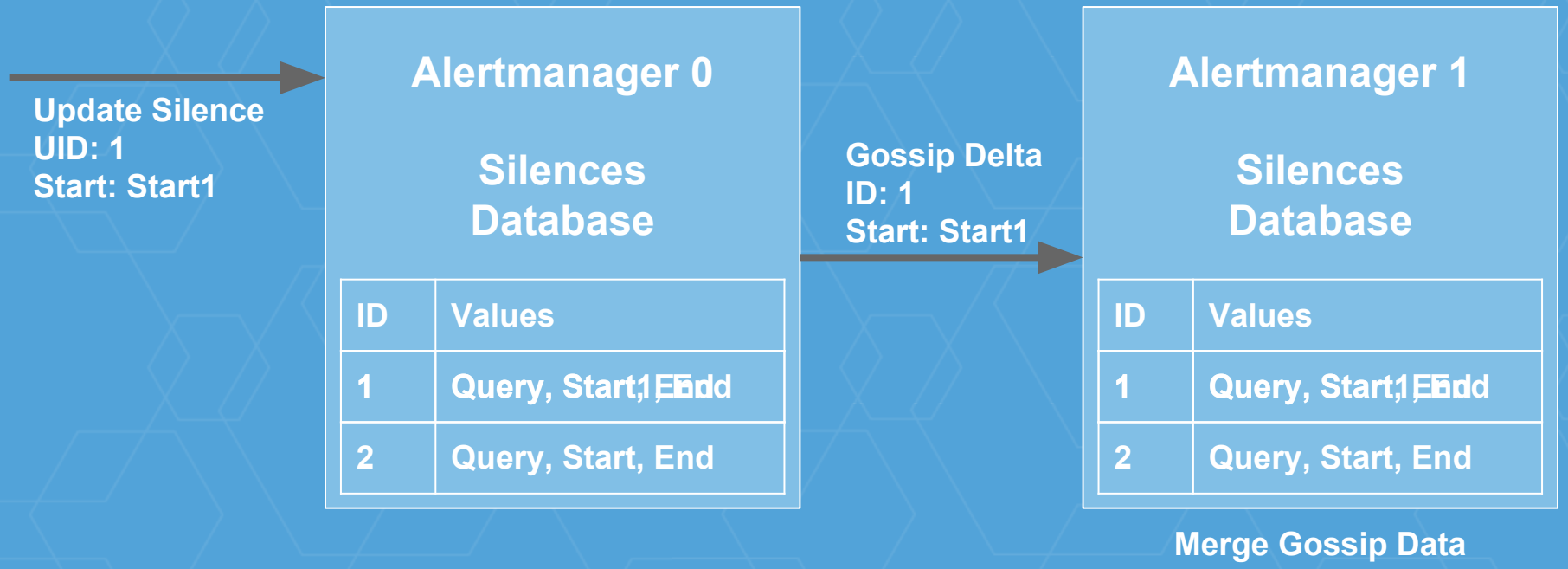
Why not etcd?

- Simple operation
  - Less moving pieces
  - Single binary
- Want: AP not CP

Silences

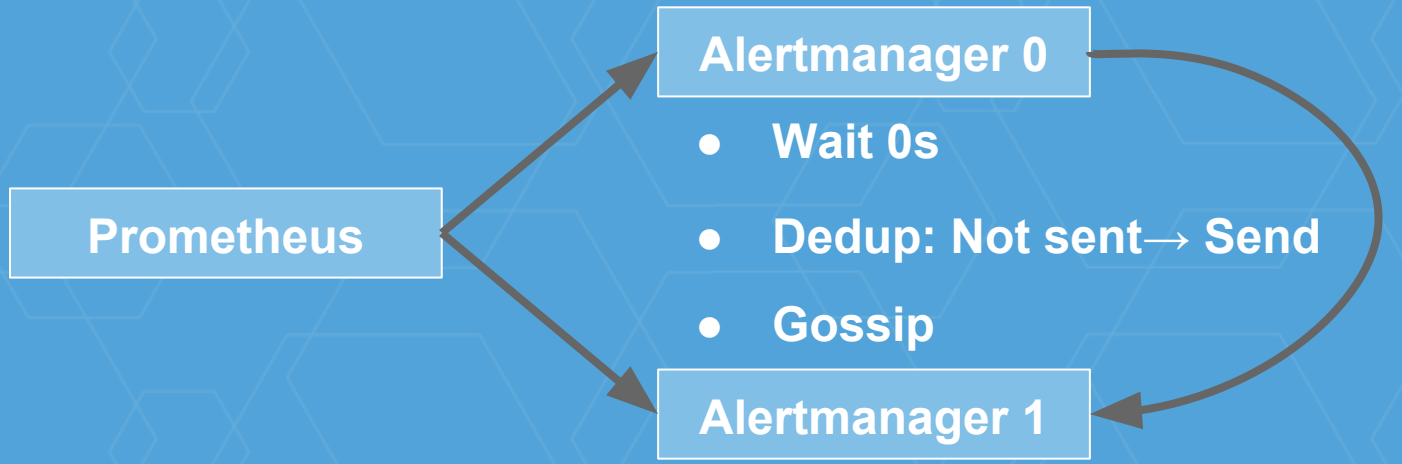
Create Silences

Update Silences

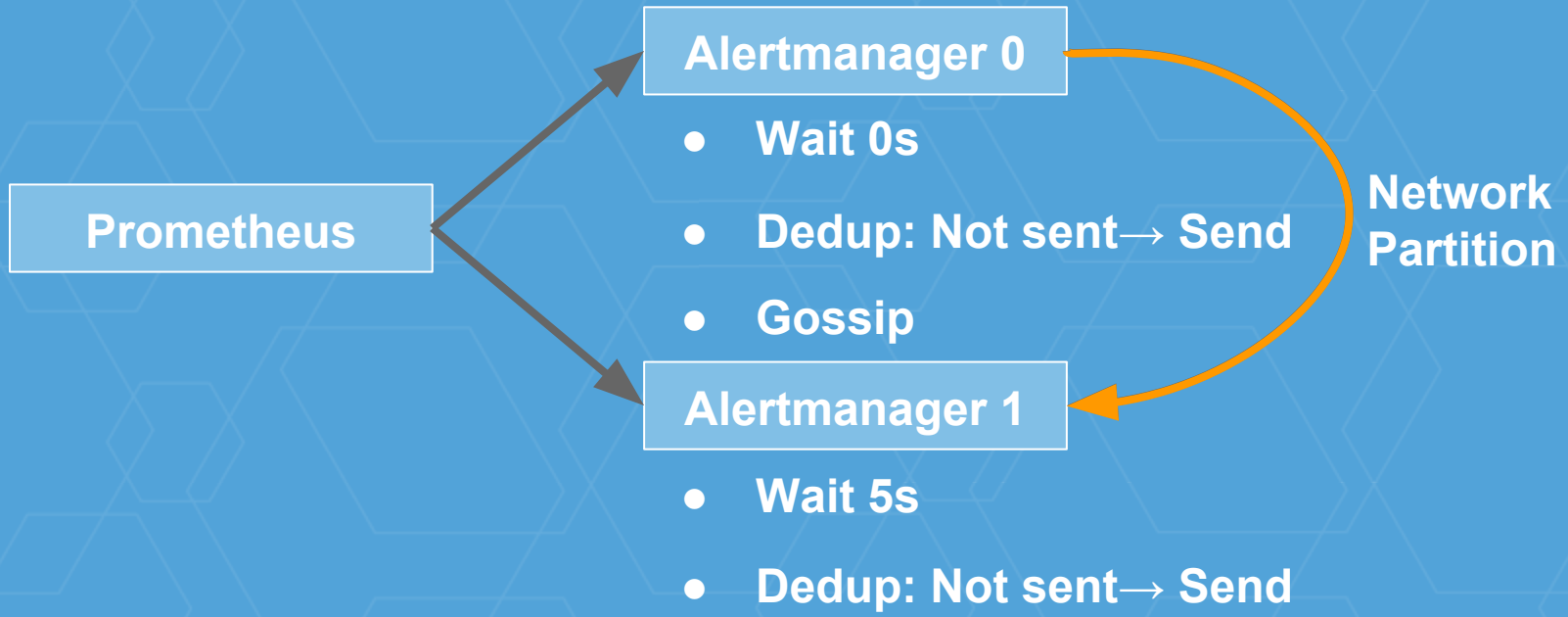


Notification Log

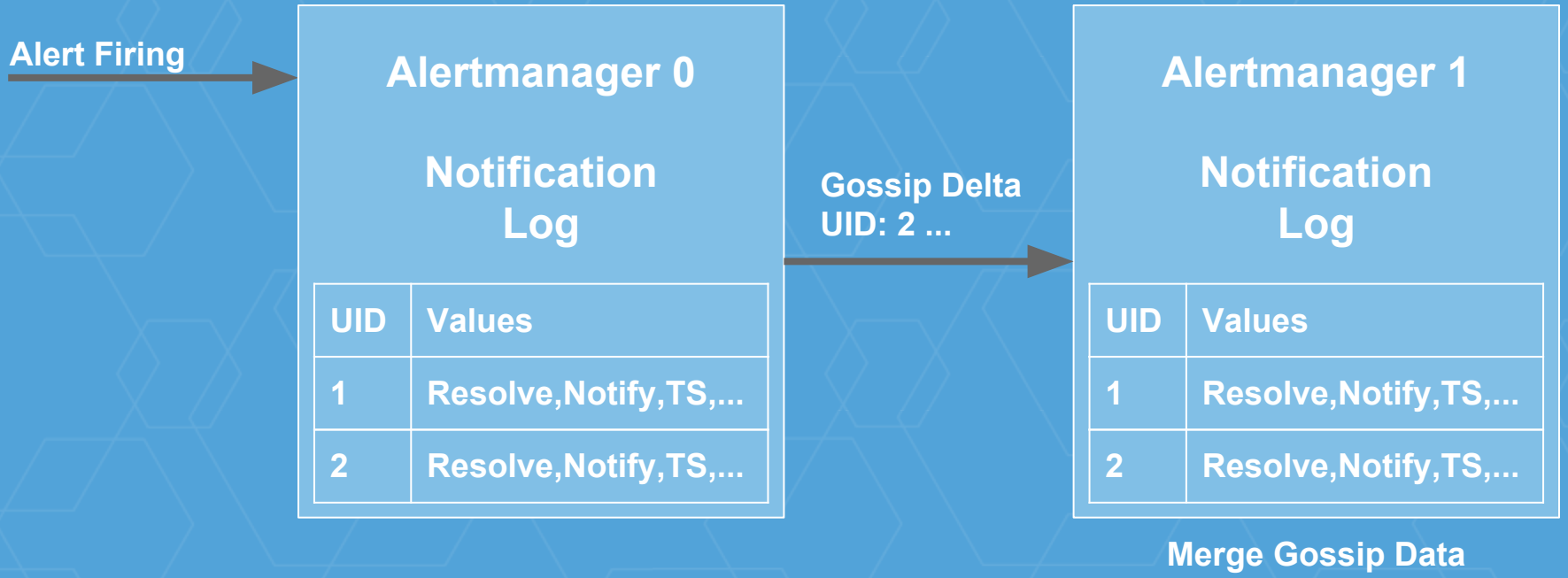
Non silenced alert example



Gossip Partition



Notification Log



Group Key

```
global:
  resolve_timeout: 5m

route:
  group_by: ['job']
  group_wait: 10s
  group_interval: 10s
  repeat_interval: 1h
  receiver: 'webhook'
receivers:
- name: 'webhook'
  webhook_configs:
  - url: 'http://127.0.0.1:5001/'
```

- Group at runtime
  - By Group By labels
- XOR with Route
- Concat with Receiver

DEMO!

Thanks!

QUESTIONS?

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LONGER CHAT?

Let's talk!

#prometheus on Freenode

More events: coreos.com/community

We're hiring: coreos.com/careers

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