



KubeCon



CloudNativeCon

North America 2024





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# Cortex Intro: Multi-Tenant Scalable Prometheus

Daniel Blando, AWS & Charlie Le, Apple

# Speaker Introduction



Daniel Blando  
Cortex Maintainer  
“Be curious”



Charlie Le  
Cortex Maintainer  
“Stay hungry, stay foolish”

# Agenda

Cortex Introduction

Getting started

What's New

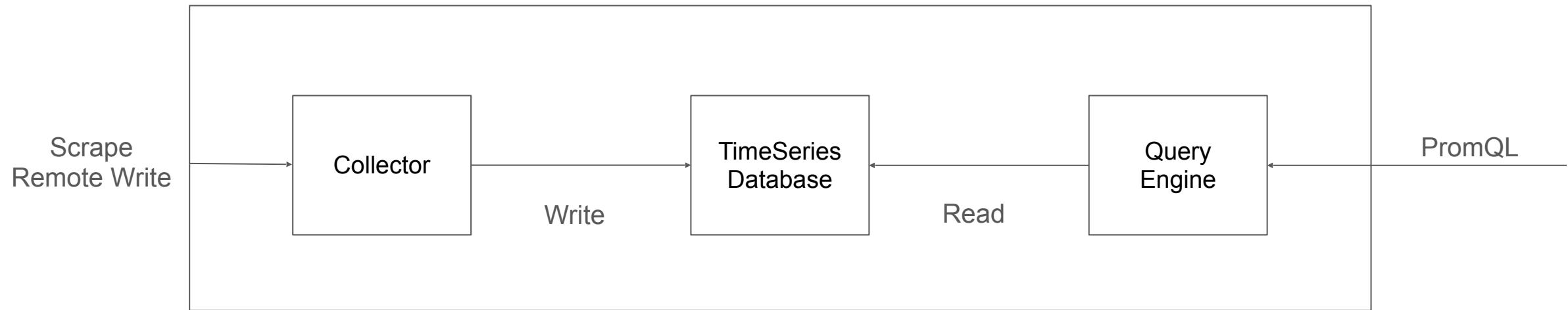
What's Next

Deep Dive - Partition Compactor

Q & A

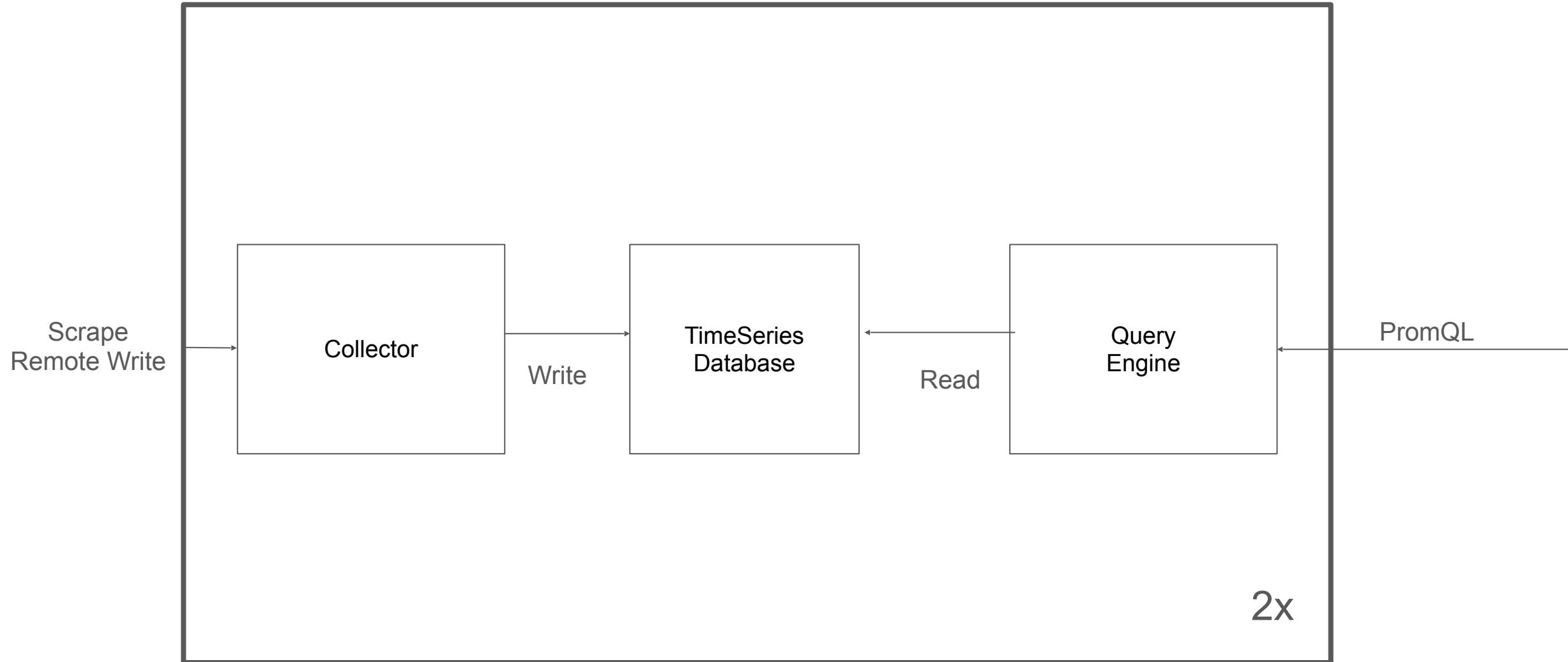
# Cortex Introduction - Prometheus

## Prometheus Server Node

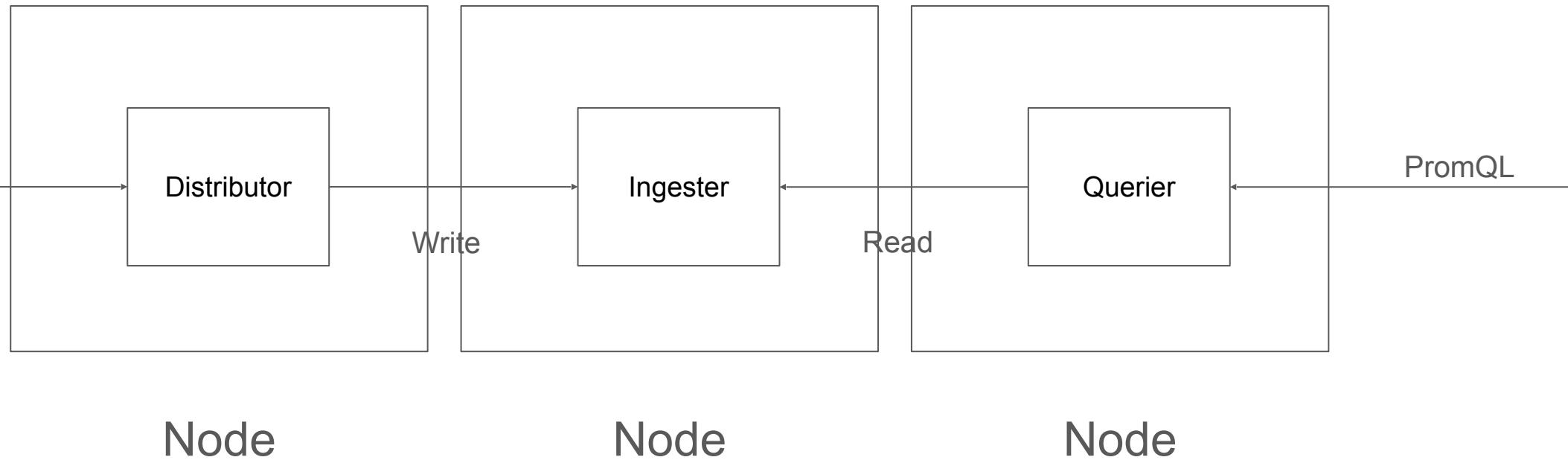


# Cortex Introduction - Prometheus

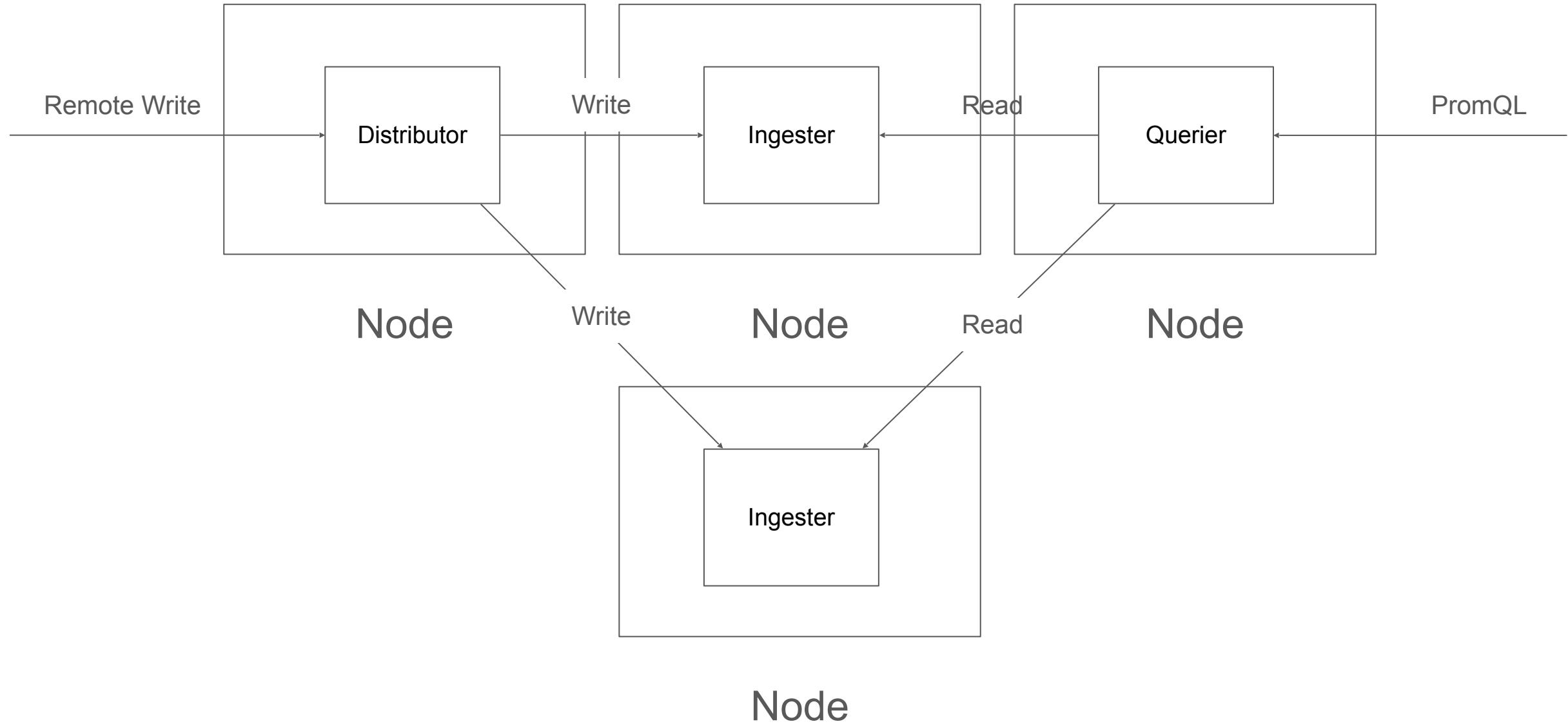
## Prometheus Server Node (Vertically Scaled)



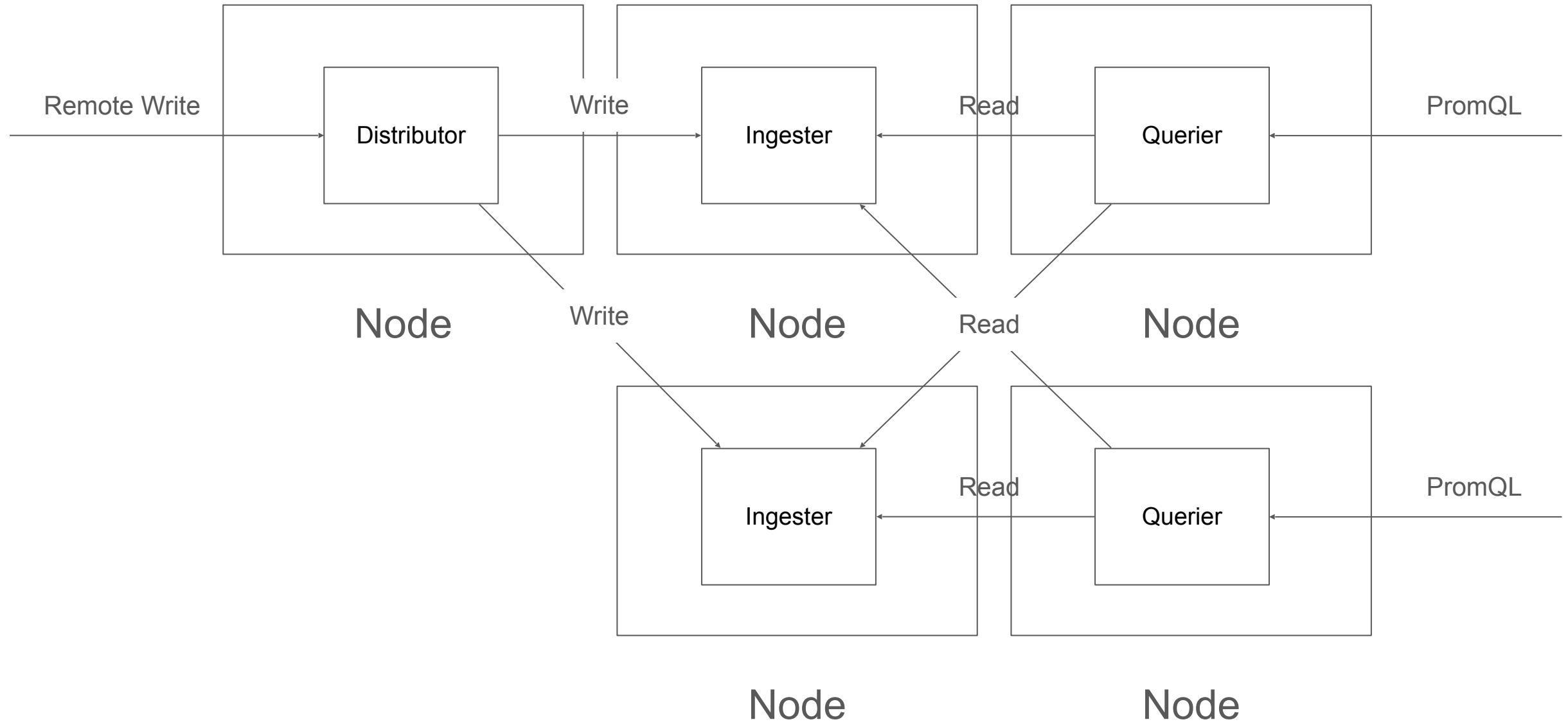
# Cortex Introduction - Microservices



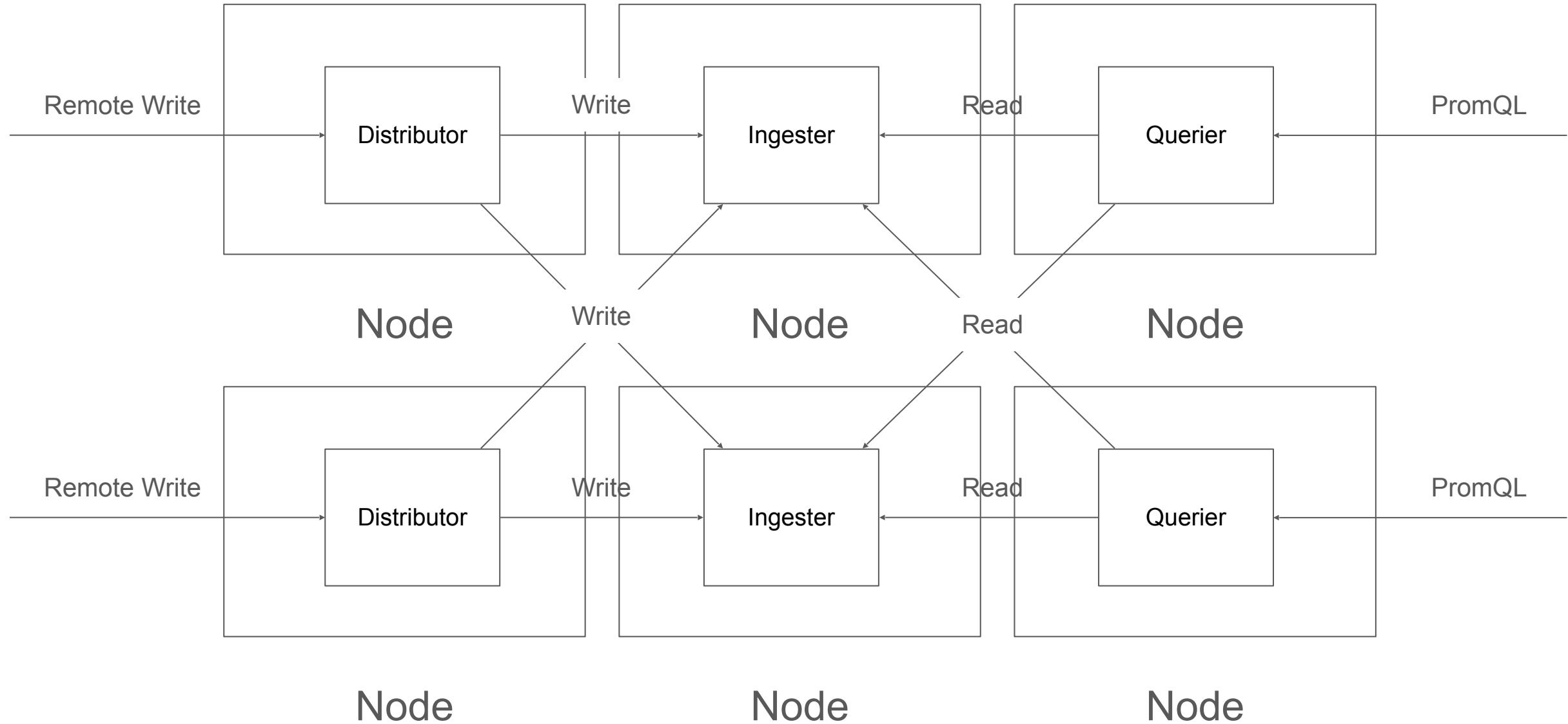
# Cortex Introduction - Horizontally Scalable



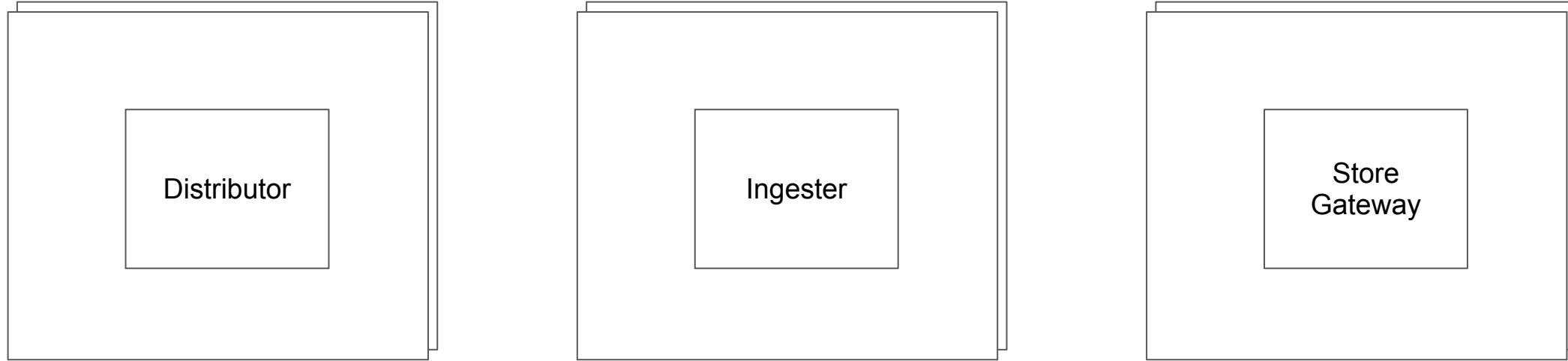
# Cortex Introduction - Horizontally Scalable



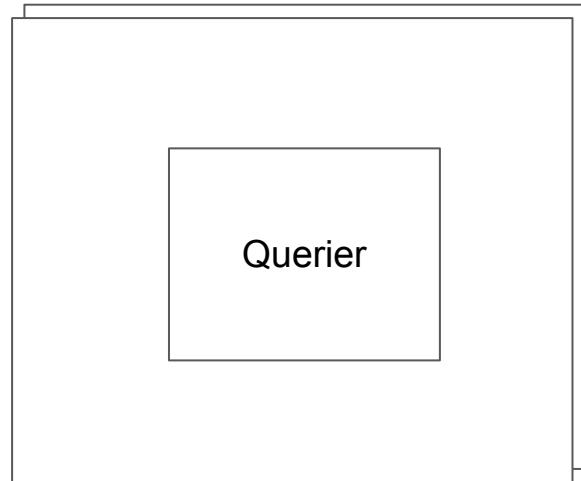
# Cortex Introduction - Horizontally Scalable



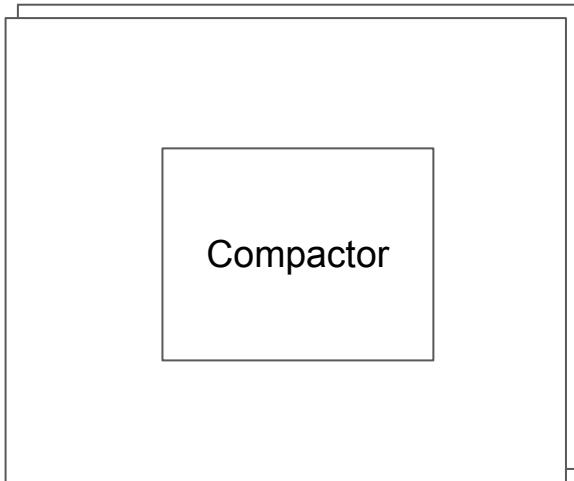
# Cortex Introduction - Memberlist



Nodes



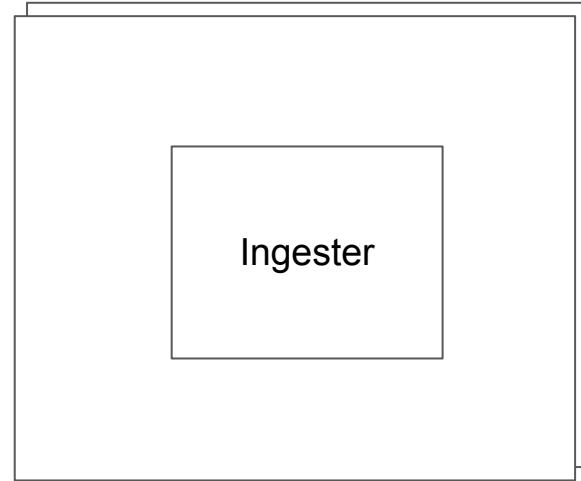
Nodes



Nodes

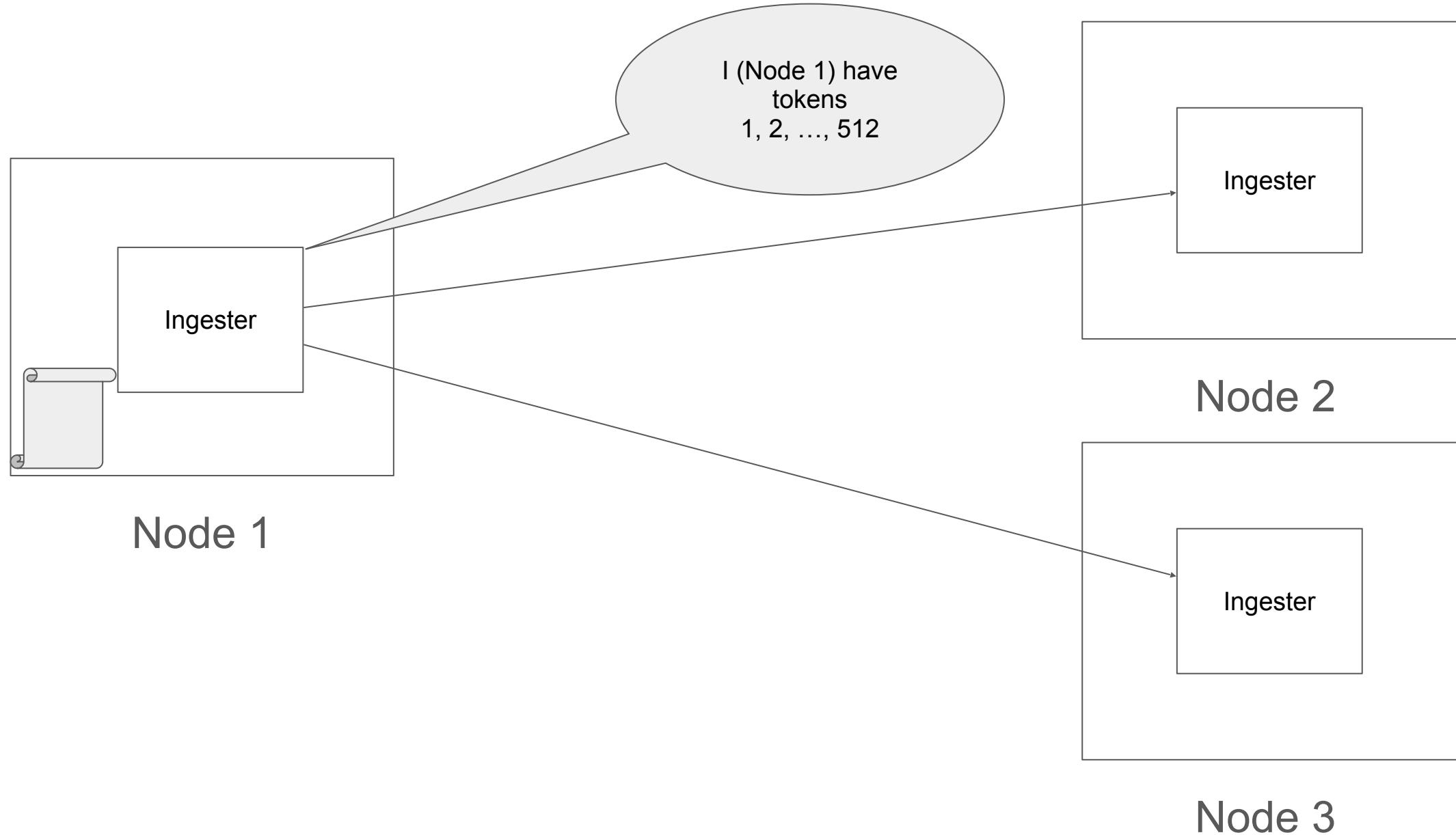
Nodes

# Cortex Introduction - Memberlist

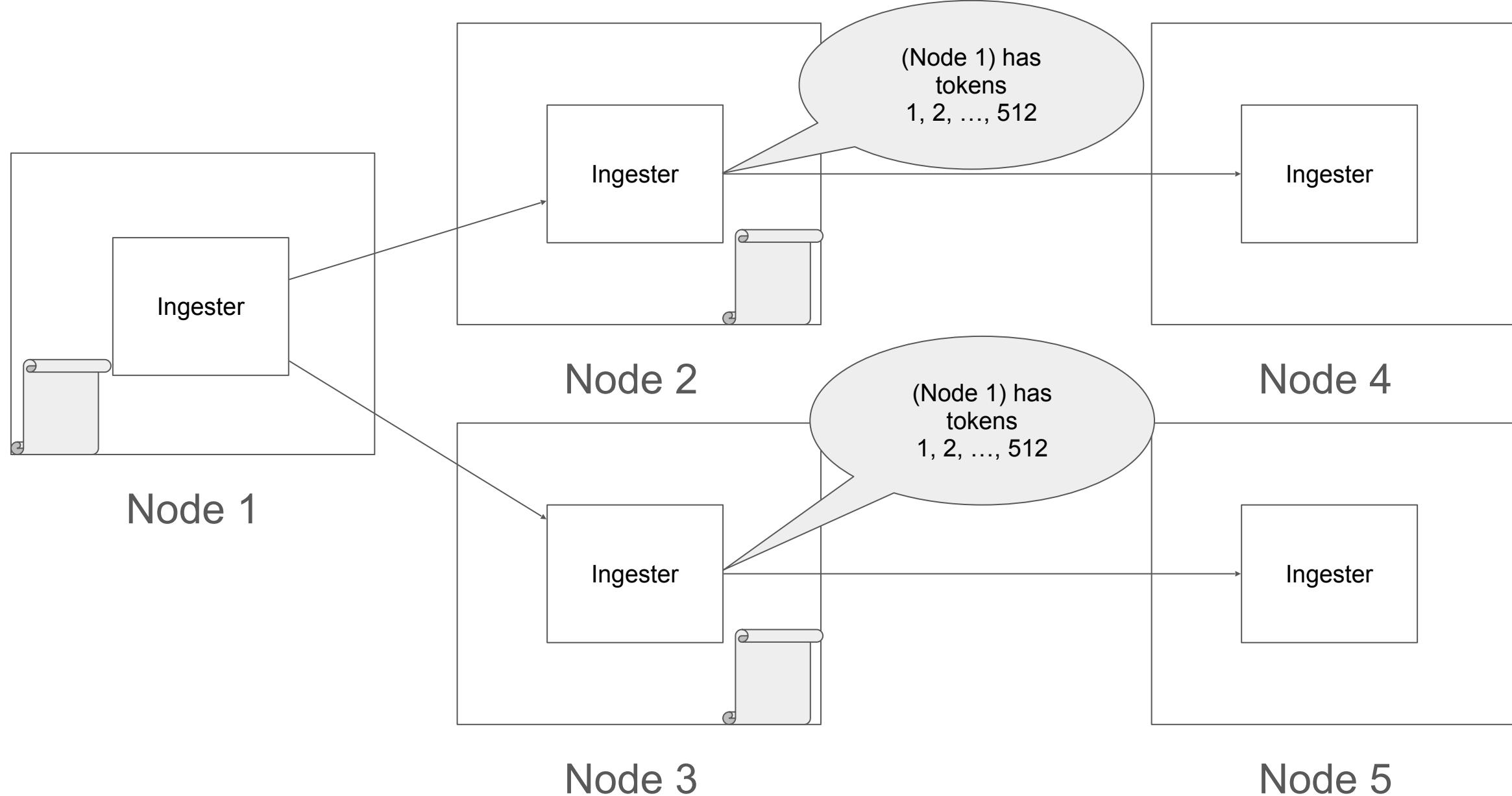


Nodes

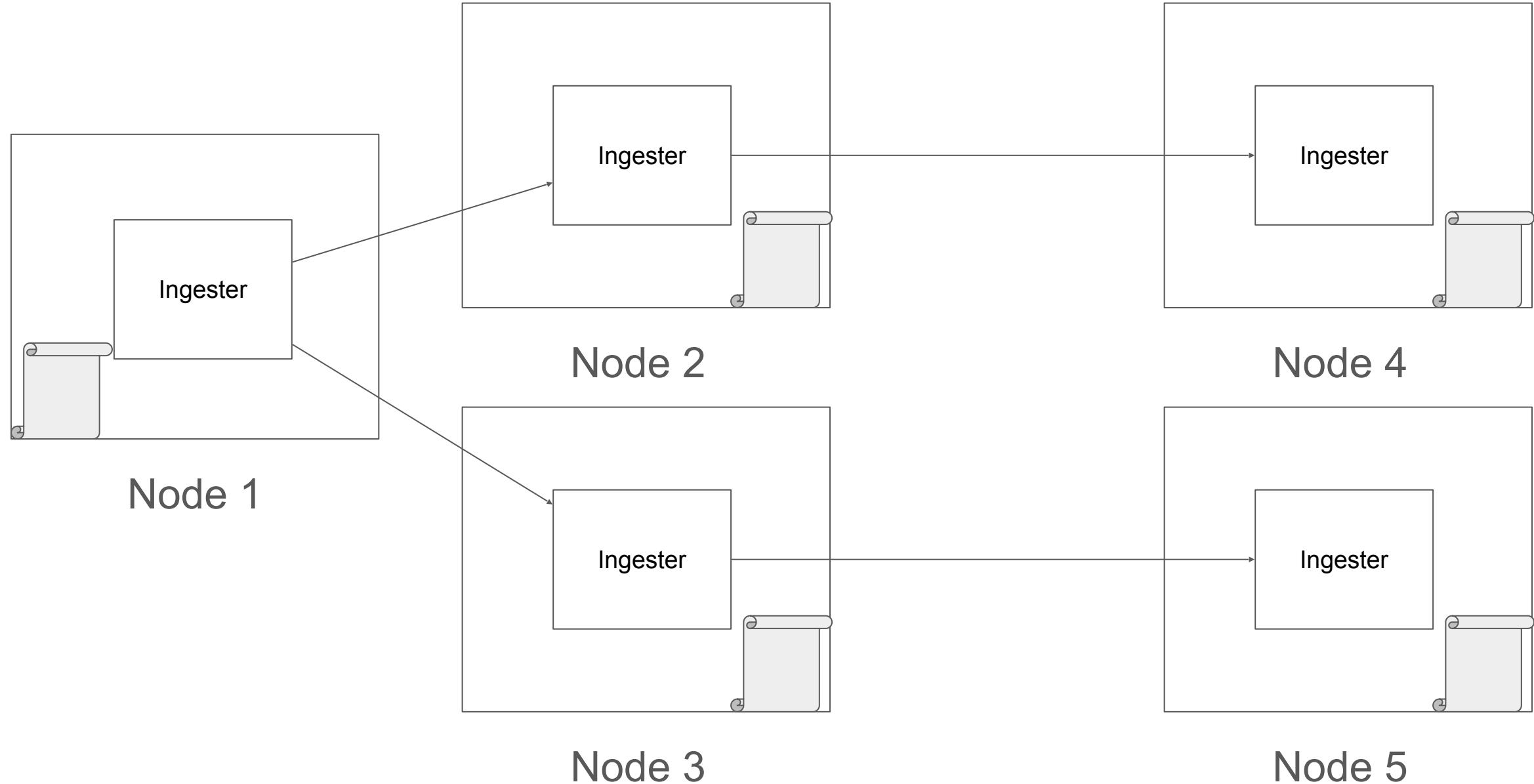
# Cortex Introduction - Memberlist



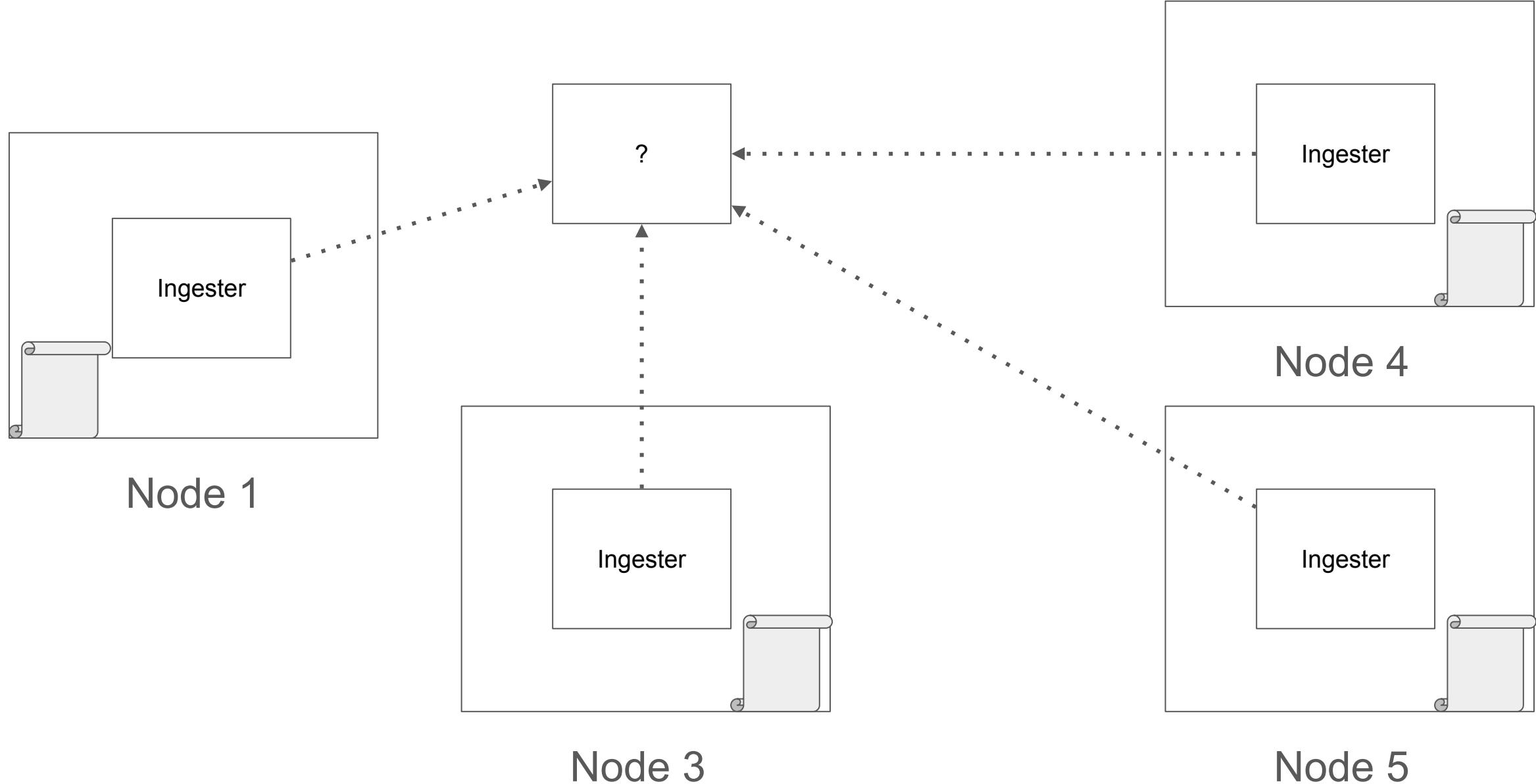
# Cortex Introduction - Memberlist



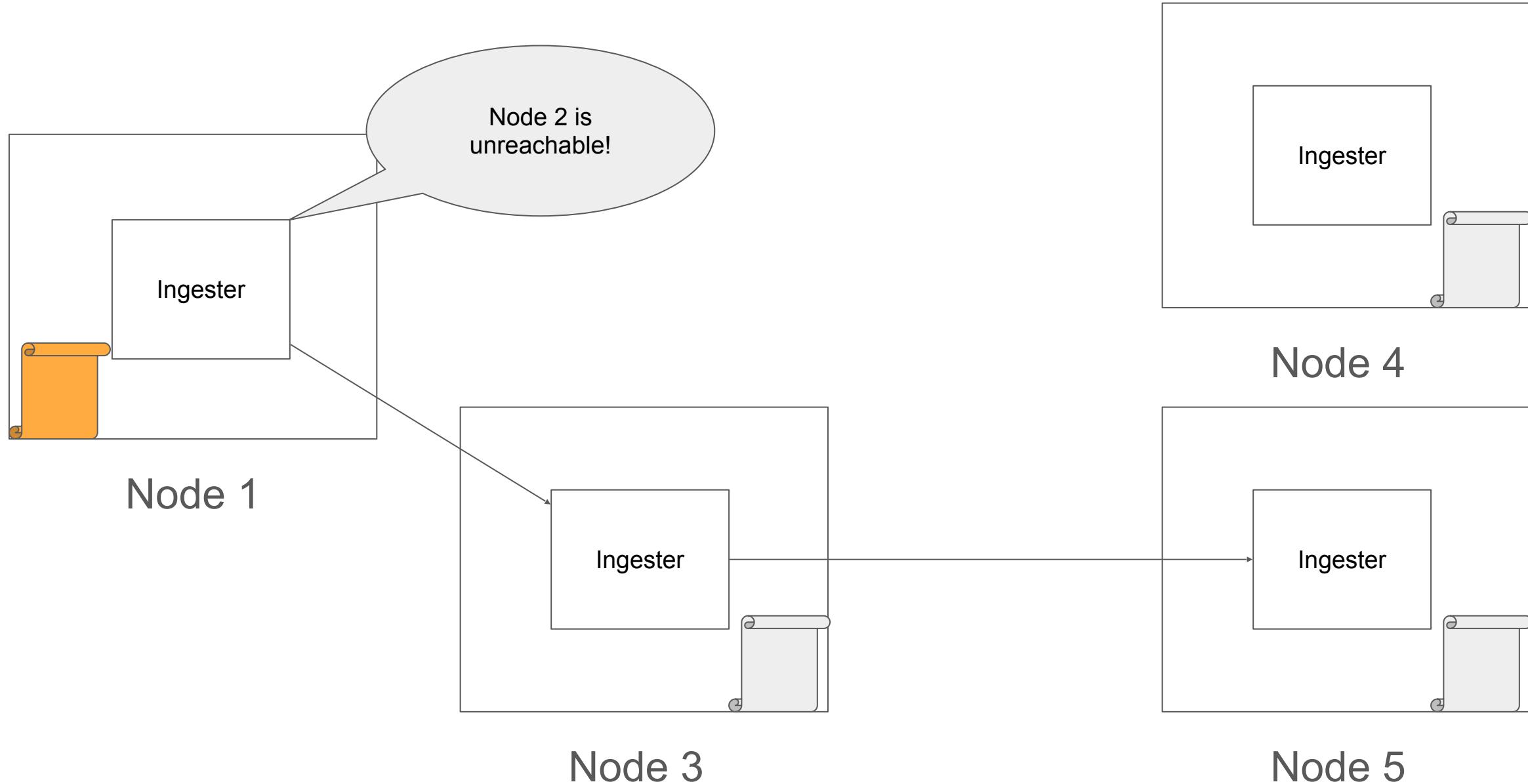
# Cortex Introduction - Memberlist



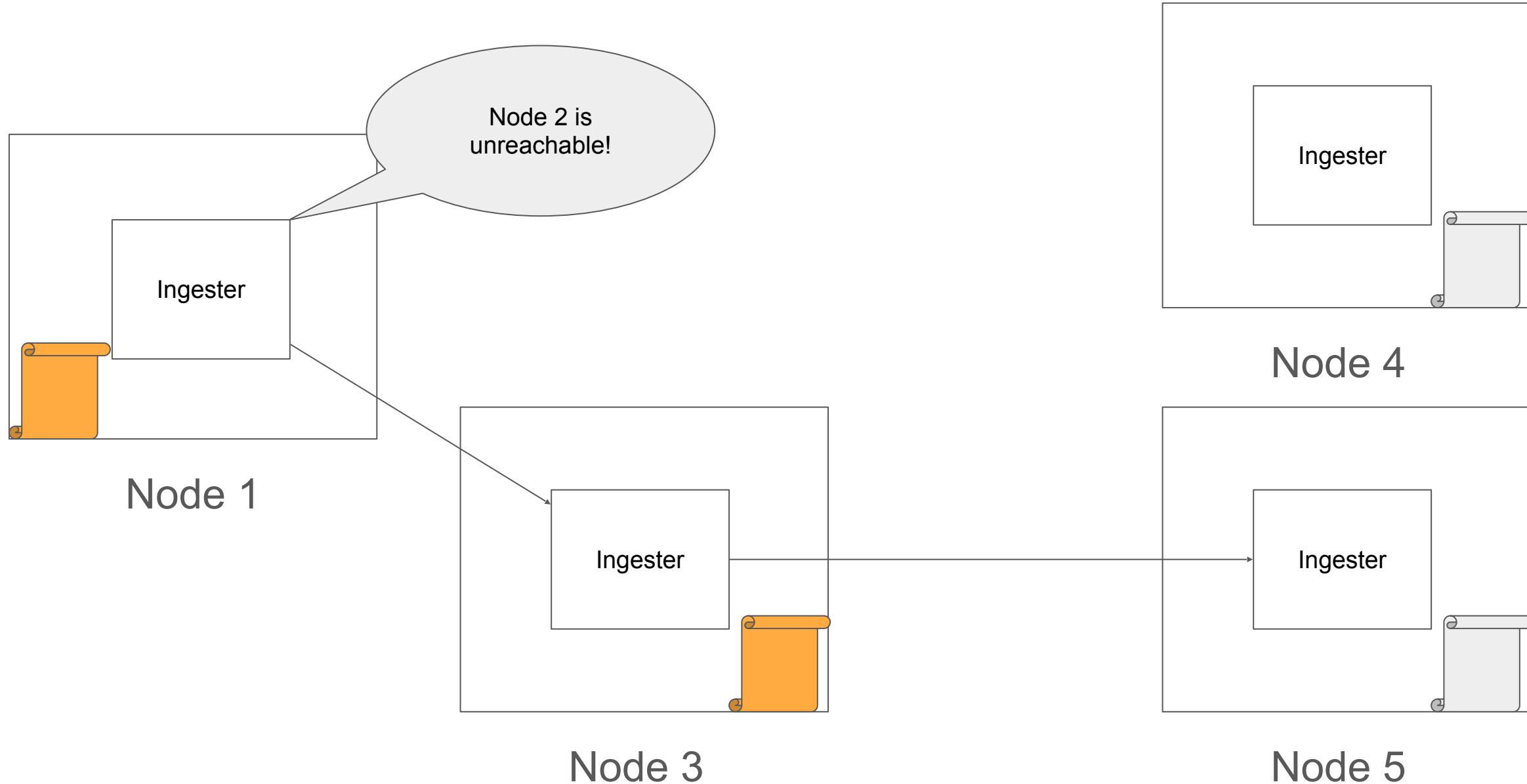
# Cortex Introduction - Memberlist



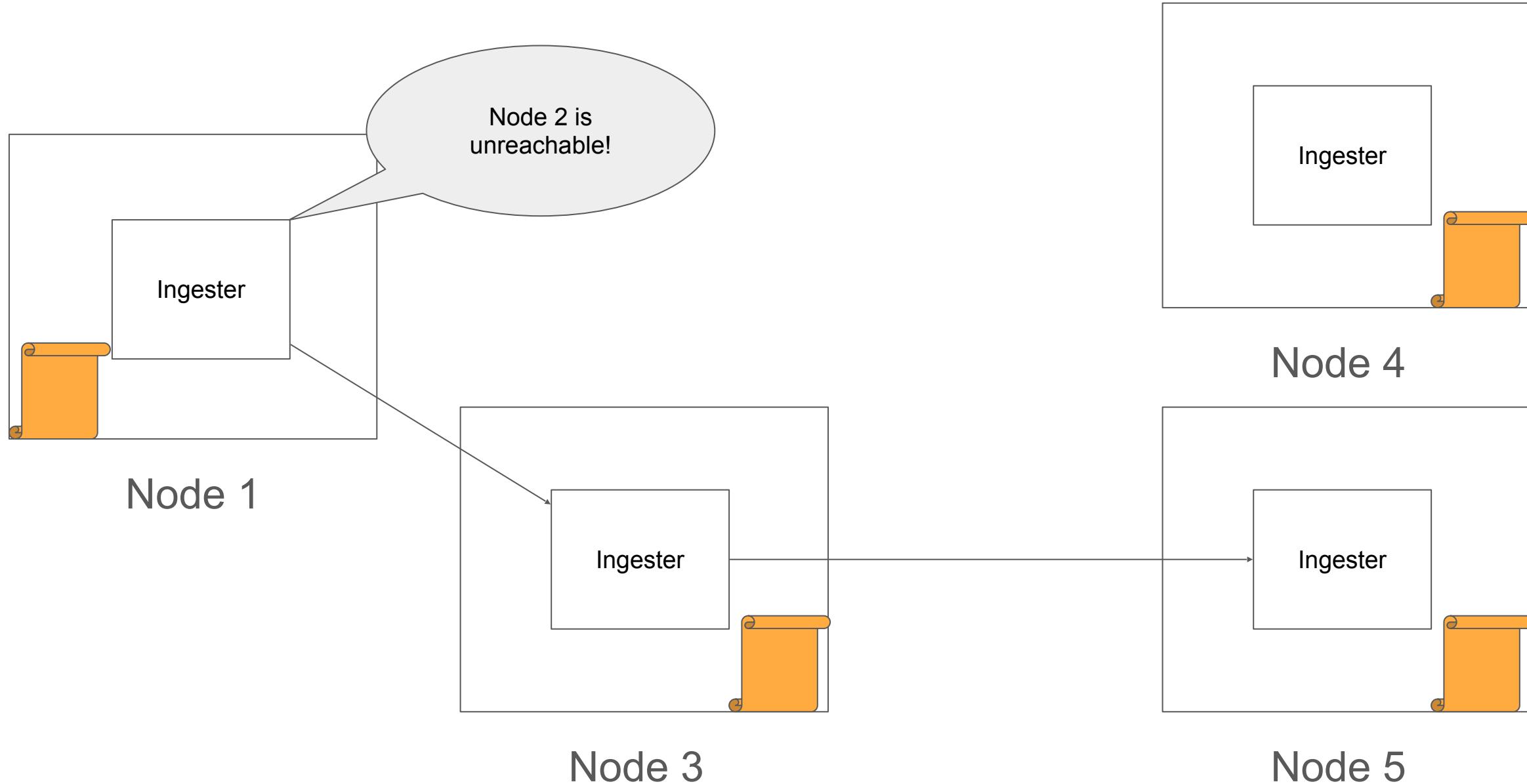
# Cortex Introduction - Memberlist



# Cortex Introduction - Memberlist

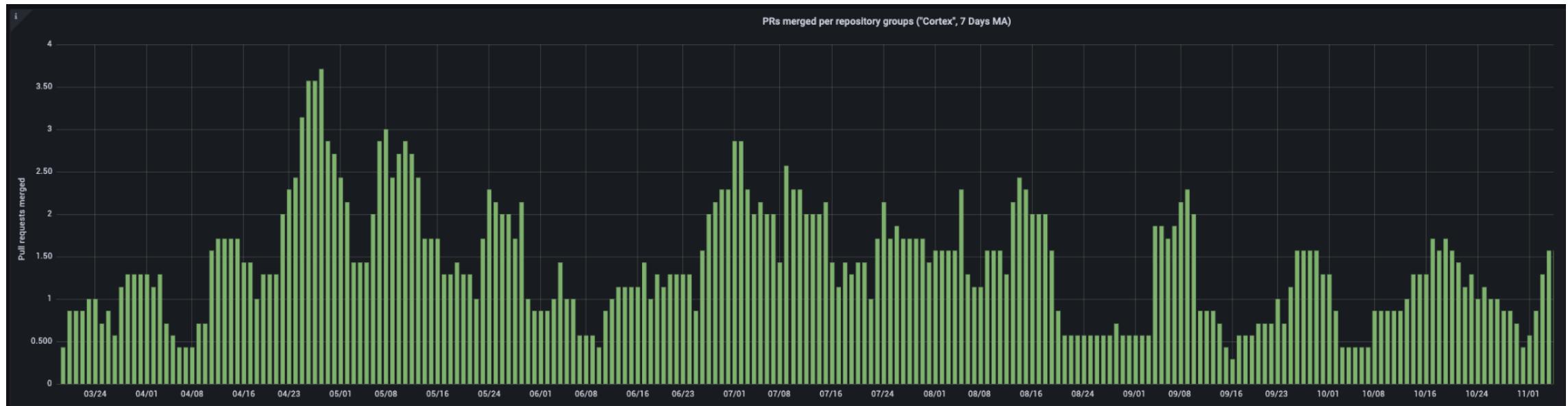


# Cortex Introduction - Memberlist



## Since March 2024

- 2 new releases (1.17, 1.18)
- 22 new contributors
- 2 new maintainers
- 325 PRs merged



1.17 (Apr 30, 2024)

- OTLP Ingestion ([#5813](#))
- Token Spread Strategy ([#5855](#))
- Query Scheduling Query Priority ([#5605](#))
- ListRules API HA ([#5782](#))

1.18 (Sep 3, 2024)

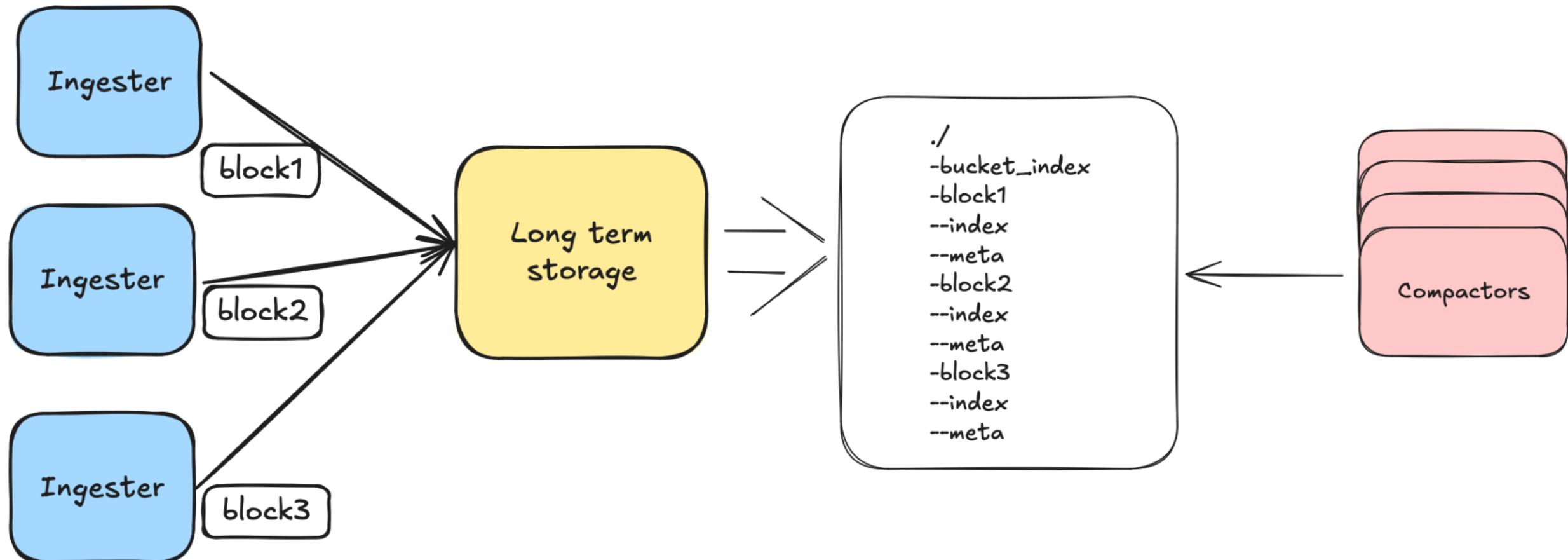
- Filtering Alerts on ListRules API ([#6011](#))
- Query Rejection ([#6005](#))
- Ingestor Metadata API Limits ([#6128](#))
- Native Histogram ([#5986](#))

In progress:

- Partition Compactor ([#6172](#))
- Ruler HA ([#6129](#))
- Remote Write 2.0 ([#6292](#))
- Multi level chunk cache ([#6249](#))

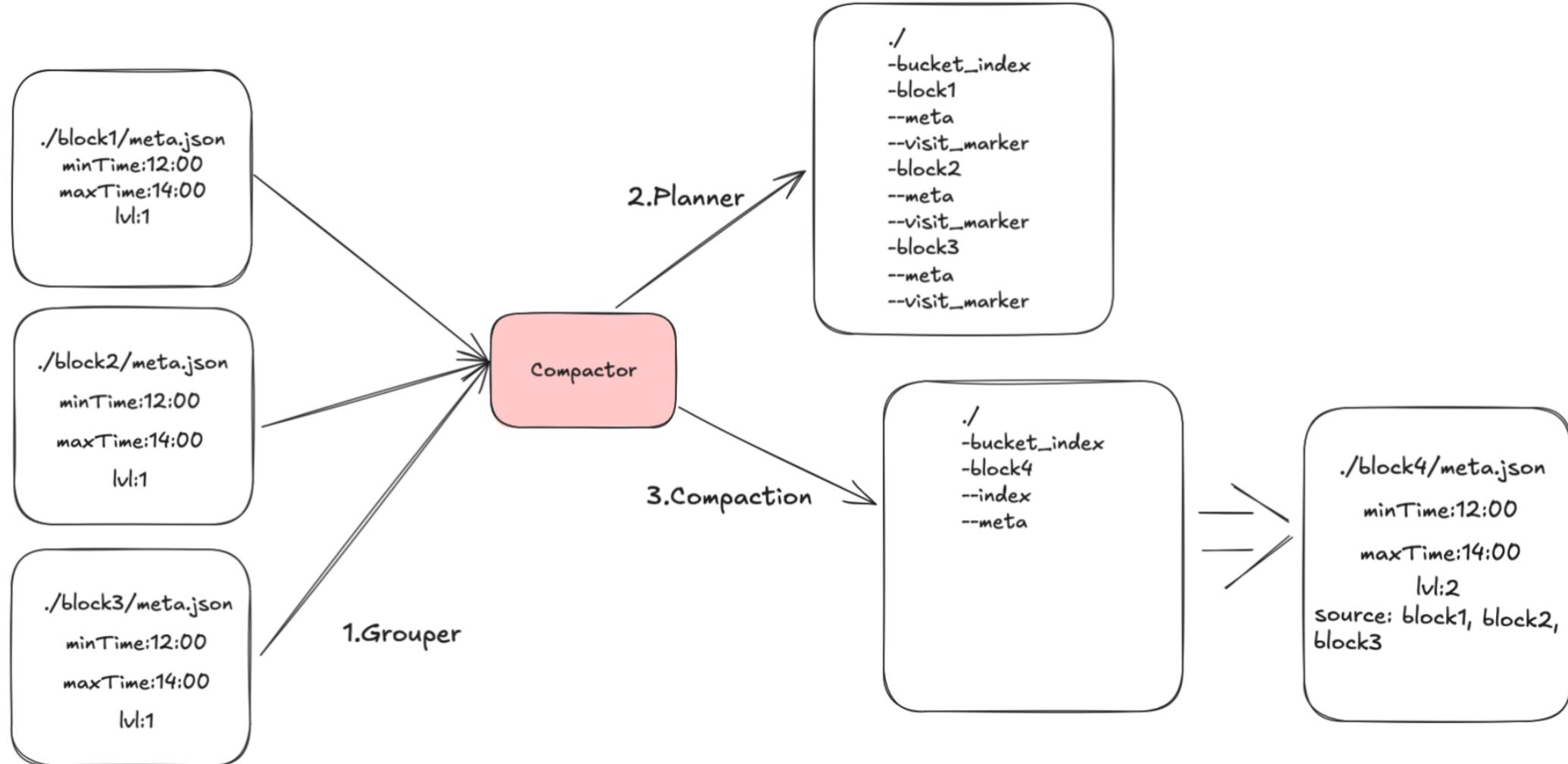
# Deep Dive - Partition compactor

## Default compactor

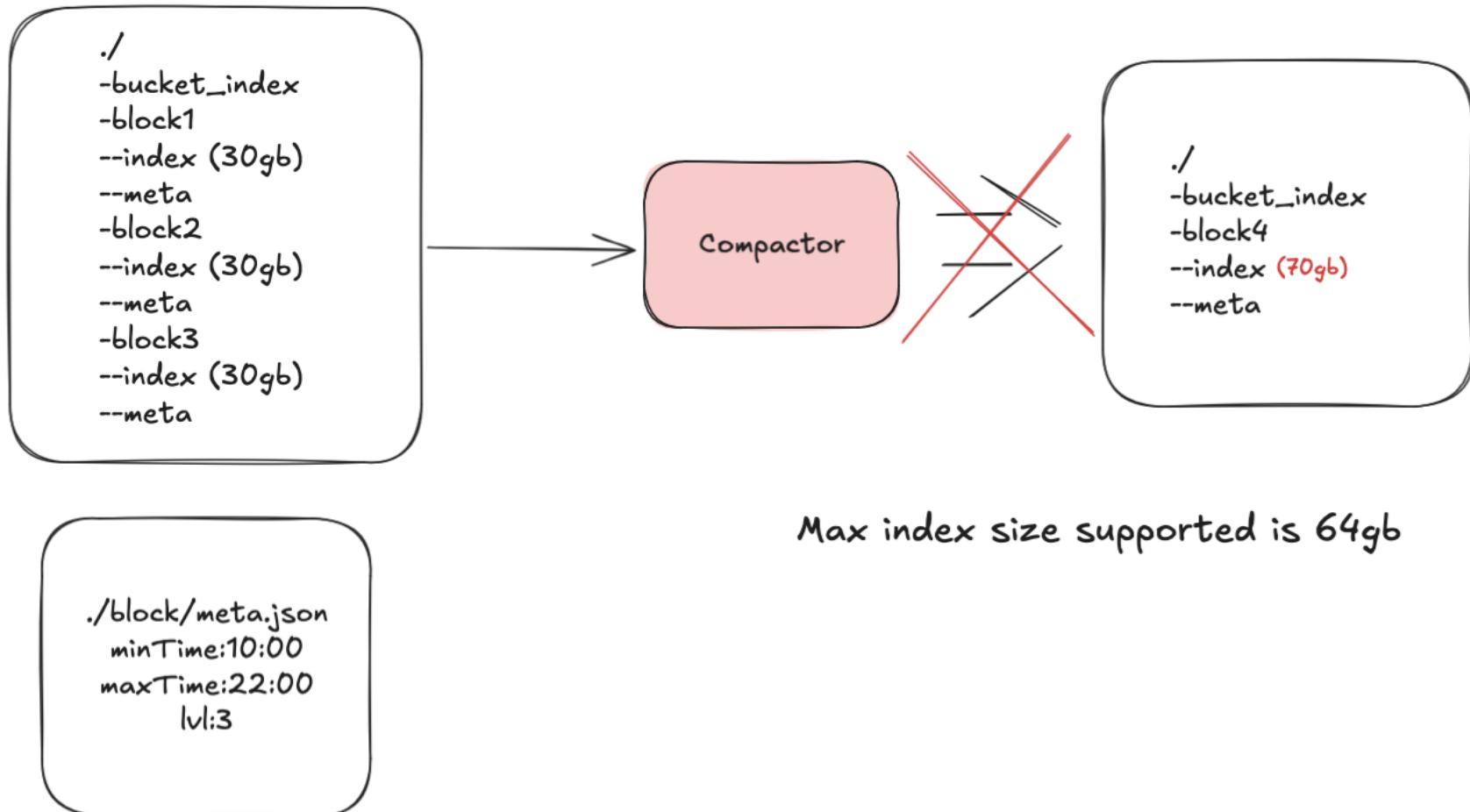


# Deep Dive - Partition compactor

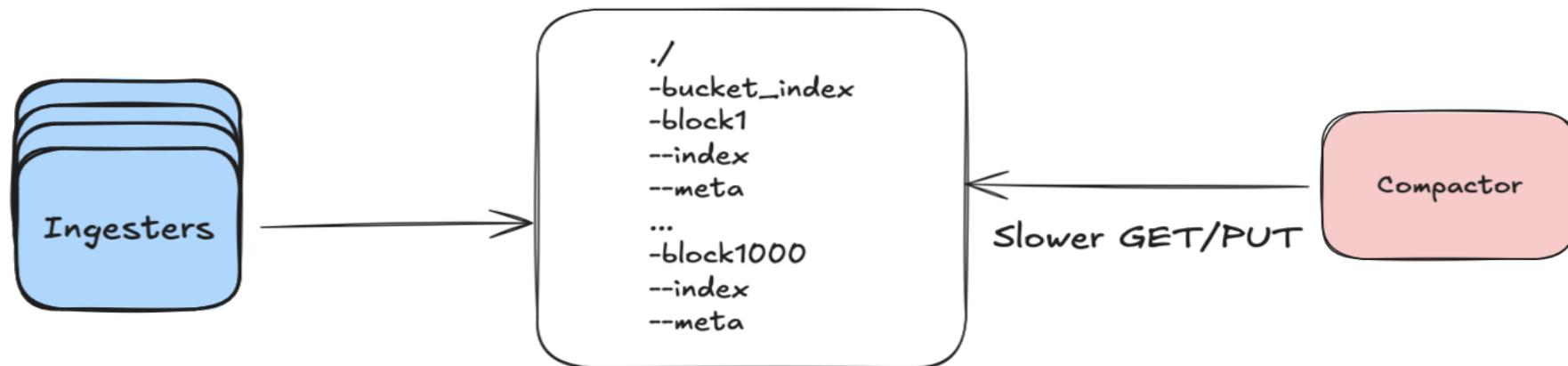
## Default compactor



## Problem 1:



## Problem 2:



- Bigger blocks also can cause same issue

# Deep Dive - Partition compactor

- Partition metadata

```
./meta.json
{
  "ulid": "01JBWZME63YRVNCRQ9ZREF7M8F",
  "version": 1,
  "thanos": {
    "source": "compactor",
    "extensions": {
      "partition_info": {
        "partition_count": 1,
        "partition_id": 0,
        "partitioned_group_creation_time": 1730770661,
        "partitioned_group_id": 1448534778
      }
    }
  }
}

{
  "ulid": "01JBT2WRE6EGES9RTCWCBSX9W",
  "thanos": {
    "source": "compactor",
    "extensions": {
      "partition_info": {
        "partition_count": 2,
        "partition_id": 1,
        "partitioned_group_creation_time": 1730764836,
        "partitioned_group_id": 2264776132
      }
    }
  }
}
```

# Deep Dive - Partition compactor

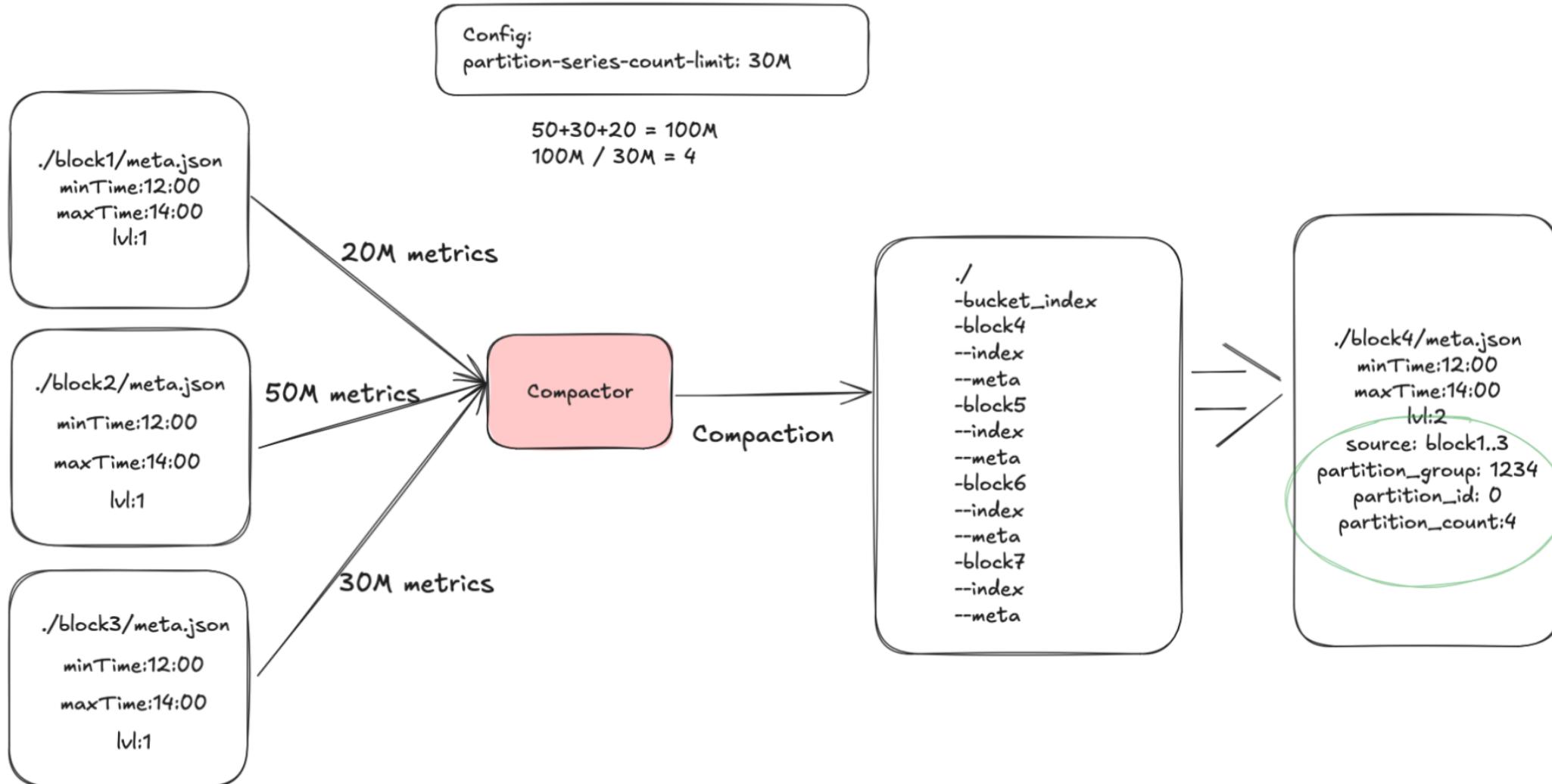
- Grouper

```
./partitioned-groups/2264776132.json
{
  "partitionedGroupID": 2264776132,
  "partitionCount": 2,
  "partitions": [
    {
      "partitionID": 0,
      "blocks": [
        "01JBWZME63YRVNCRQ9ZREF7M8F",
        "01JBWTKH40YACS07FFRMX29RX9"
      ]
    },
    {
      "partitionID": 1,
      "blocks": [
        "01JBWZME63YRVNCRQ9ZREF7M8F",
        "01JBWT2WRE6EGES9RTCWCBSX9W"
      ]
    }
  ],
  "rangeStart": 1730678400000,
  "rangeEnd": 1730764800000,
  "creationTime": 1730774396,
  "version": 2
}
```

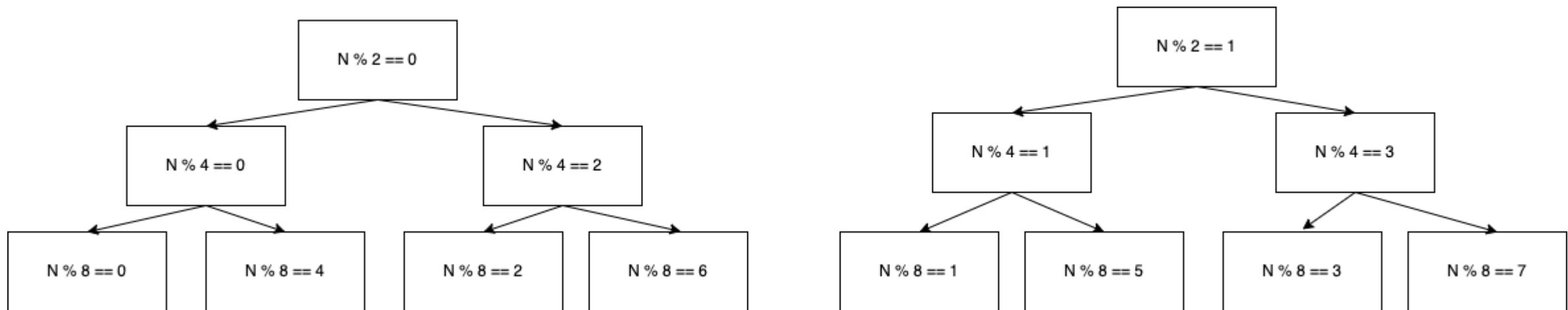
- Planner

```
./partitioned-groups/visit-marks/partition-0-visit-mark.json
{
  "compactorID": "pod-1",
  "status": "completed",
  "partitionedGroupID": 2264776132,
  "metricNamePartitionID": 0,
  "partitionID": 0,
  "visitTime": 1730774917,
  "version": 1
}
```

## New metadata

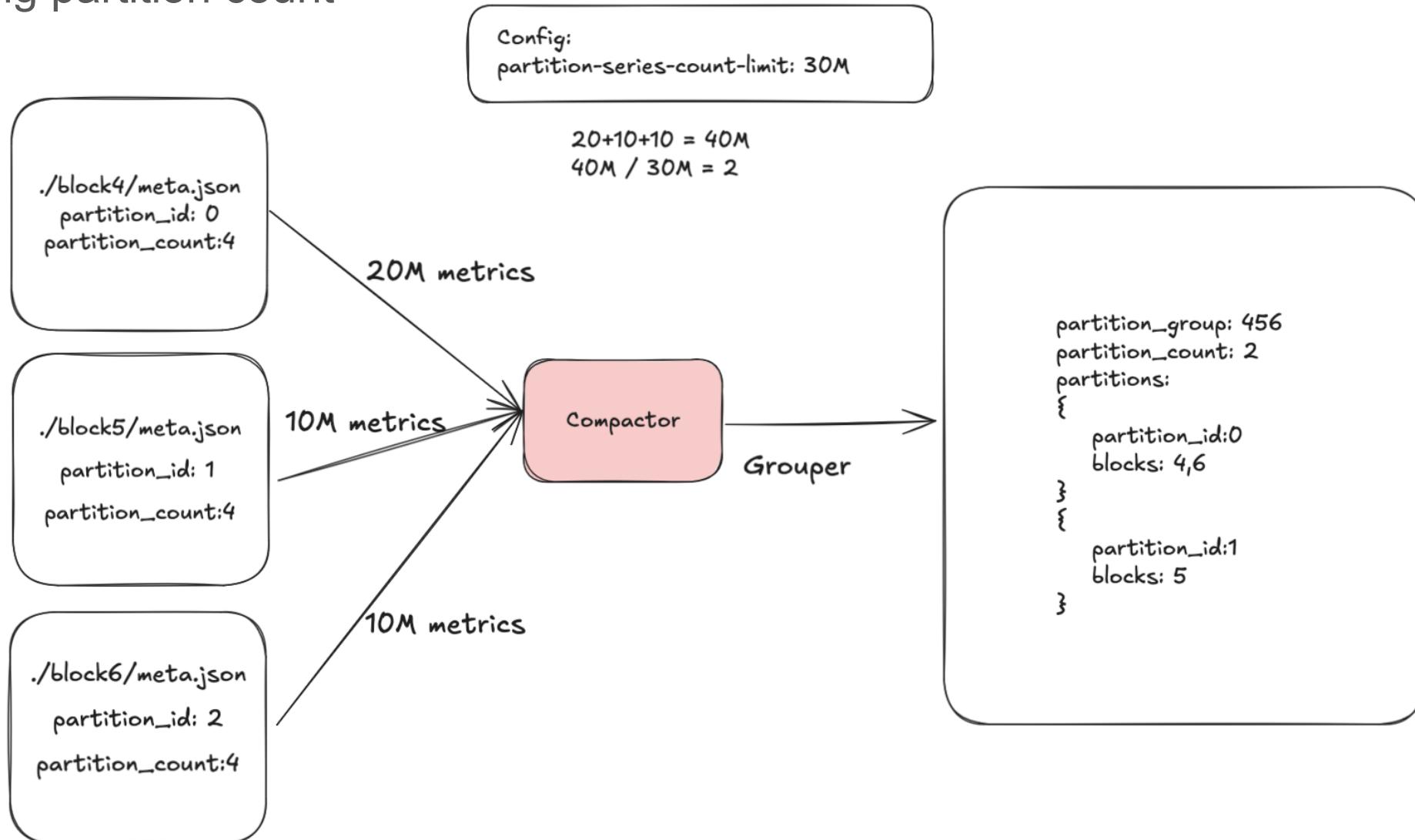


## Determining partitions



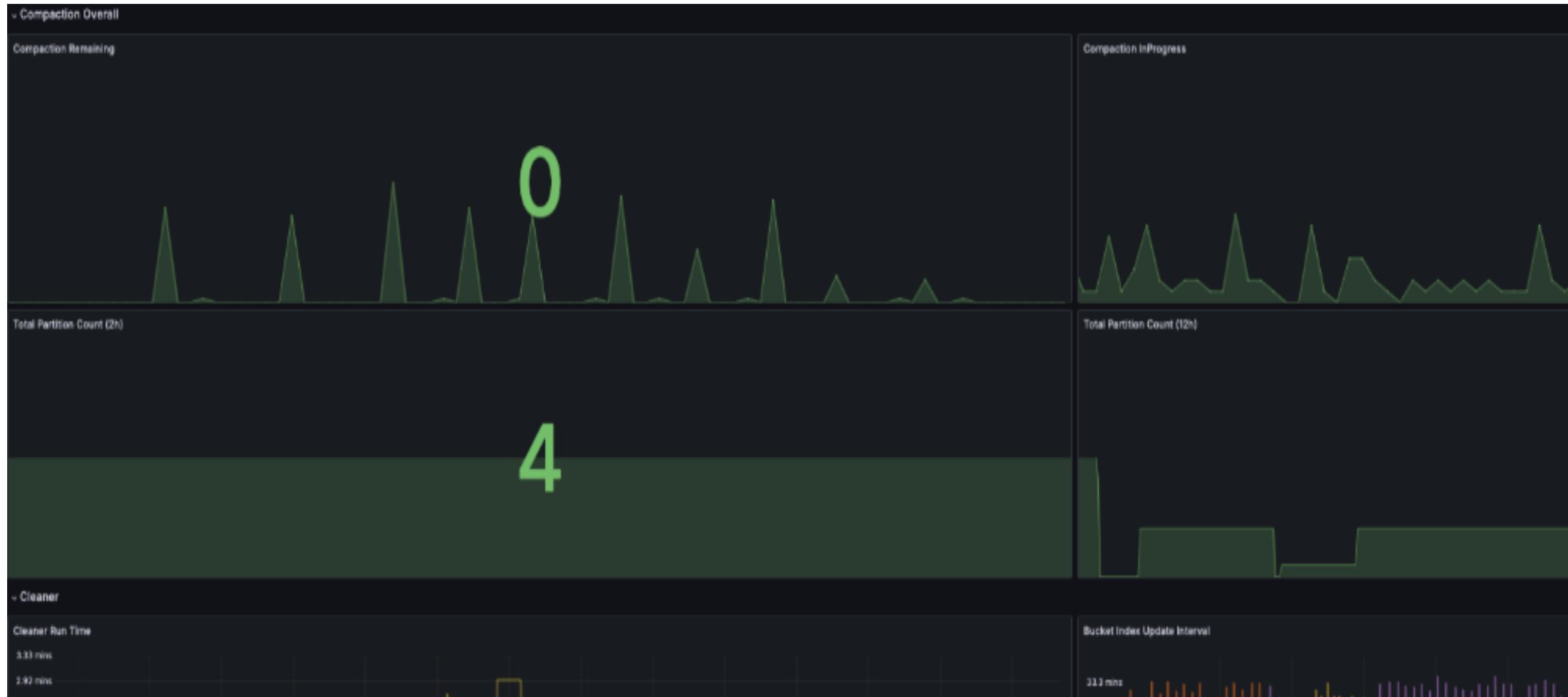
# Deep Dive - Partition compactor

## Decreasing partition count

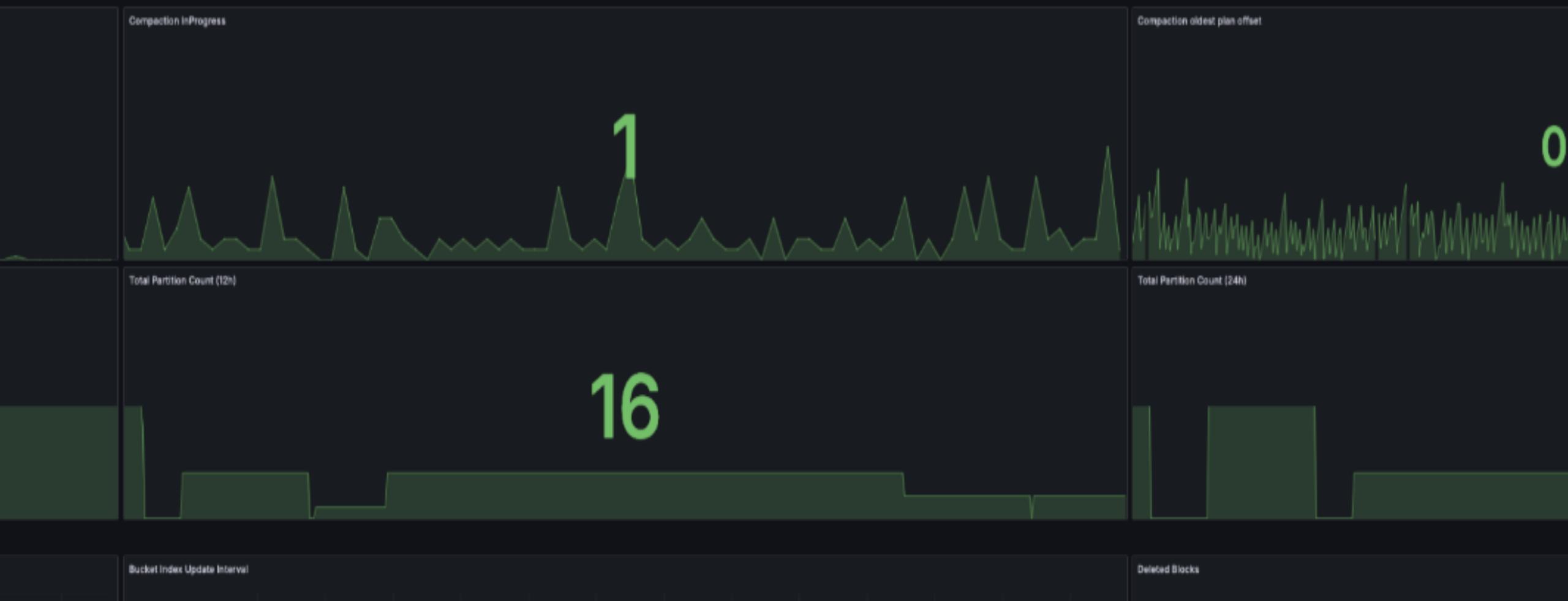


## New metrics

## New metrics



## New metrics



# Deep Dive - Partition compactor



Daniel Blando  
<https://github.com/danielblando>

Charlie Le  
<https://github.com/CharlieTLe>

Cortex Community Meetings

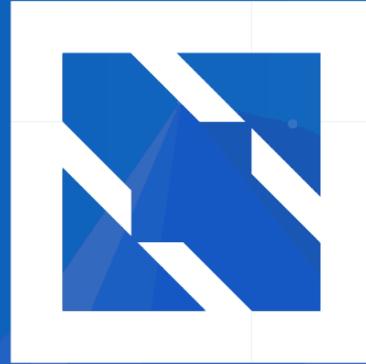


Feedback





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