Dataflow Monitoring

Jérémie Gomez
Data Consultant, Google Cloud
linkedin.com/in/jeremiegomez/
medium.com/@foup

Metrics for Dataflow

We can think of metrics for Dataflow as different types.

- Native metrics
- Worker metrics
- Monitoring agent metrics
- Custom metrics

They all show up in Cloud Monitoring. The most important ones are also shown in the Dataflow UI.

Native metrics (1)

Frequently used ones include:

- dataflow.googleapis.com/job/is_failed
- dataflow.googleapis.com/job/system_lag
- dataflow.googleapis.com/job/per_stage_system_lag (per stage)
- dataflow.googleapis.com/job/current_num_vcpus
- dataflow.googleapis.com/job/element_count (per PCollection)

Some metrics are influenced by time, such as:

- dataflow.googleapis.com/job/total_memory_usage_time
- dataflow.googleapis.com/job/total_vcpu_time

Native metrics (2)

Some additional metrics are available if your job uses Pub/Sub, such as:

- dataflow.googleapis.com/job/pubsub/read_latencies

Some additional metrics about the amount of logs your jobs write, such as:

- logging.googleapis.com.byte_count

Full list: https://cloud.google.com/monitoring/api/metrics_gcp#gcp-dataflow

Worker metrics

Frequently used metrics include:

- compute.googleapis.com/instance/cpu/utilization
- compute.googleapis.com/instance/disk/write_bytes_count
- compute.googleapis.com/guest/disk/bytes_used
- compute.googleapis.com/instance/memory/balloon/ram_used (only for E2 machines)

Full list: https://cloud.google.com/monitoring/api/metrics_gcp#gcp-compute

Monitoring agent metrics (1)

Enabling the agent

To monitor persistent disk, CPU, network, and process metrics from your Cloud Dataflow worker instances, use the pipeline option **`--experiments=enable_stackdriver_agent_metrics`**

These metrics are chargeable.

Monitoring agent metrics (2)

Some useful metrics from the agent include:

- agent.googleapis.com/cpu/utilization
- agent.googleapis.com/disk/bytes_used
- agent.googleapis.com/memory/percent_used (not to be confused with agent.googleapis.com/agent/memory_usage)

Full list: https://cloud.google.com/monitoring/api/metrics_agent

Custom metrics

Counter: Metric that can be incremented and decremented.

Distribution: Metric that records various statistics about the distribution of reported values.

```
class SomeDoFn extends DoFn<String, String> {

     private  Counter  counter  =  Metrics.counter(SomeDoFn.class,  "my-counter");
                                                                  @ProcessElement
               public      void      processElement(ProcessContext      c)      {
                                                                  counter.inc();
                        Metrics.counter(SomeDoFn.class,     "my-counter2").inc();
                                                                  }
 }
```

Which metrics for common use cases? (1)

Has my job failed?
job/is_failed > 0, filter by job_name

Is there lag ?
job/system_lag, filter by job_name or job/per_stage_system_lag, filter by job_name and stage

Is there a spike in processing?
/job/current_num_vcpus to know if the job has scaled, /job/element_count or job/elements_produced_count (throughput) on an upstream PCollection

Is data processed fresh?
/job/per_stage_data_watermark_age or /job/data_watermark_age (a.k.a data freshness)

Which metrics for common use cases? (2)

What is my CPU utilization?
compute.googleapis.com/instance/cpu/utilization or agent.googleapis.com/cpu/utilization

Is my memory close to full?
dataflow.googleapis.com/job/total_memory_usage_time (not easy to alert on)
compute.googleapis.com/instance/memory/balloon/ram_used (only for E2 machines)
agent.googleapis.com/memory/bytes_used
agent.googleapis.com/memory/percent_used

Is a dependency failing?
Use metrics specialized for your dependency (e.g. Memorystore). Use your custom metric (e.g. number of times that connecting to your dependency failed), or use a log-based metric.

Setting up alerts

Choose your policy

- Add conditions: e.g. mean data freshness has been above 10 minutes for 2 minutes.
- Choose policy trigger: ALL conditions are met, ANY condition is met, ALL conditions are met for different resources for each condition.

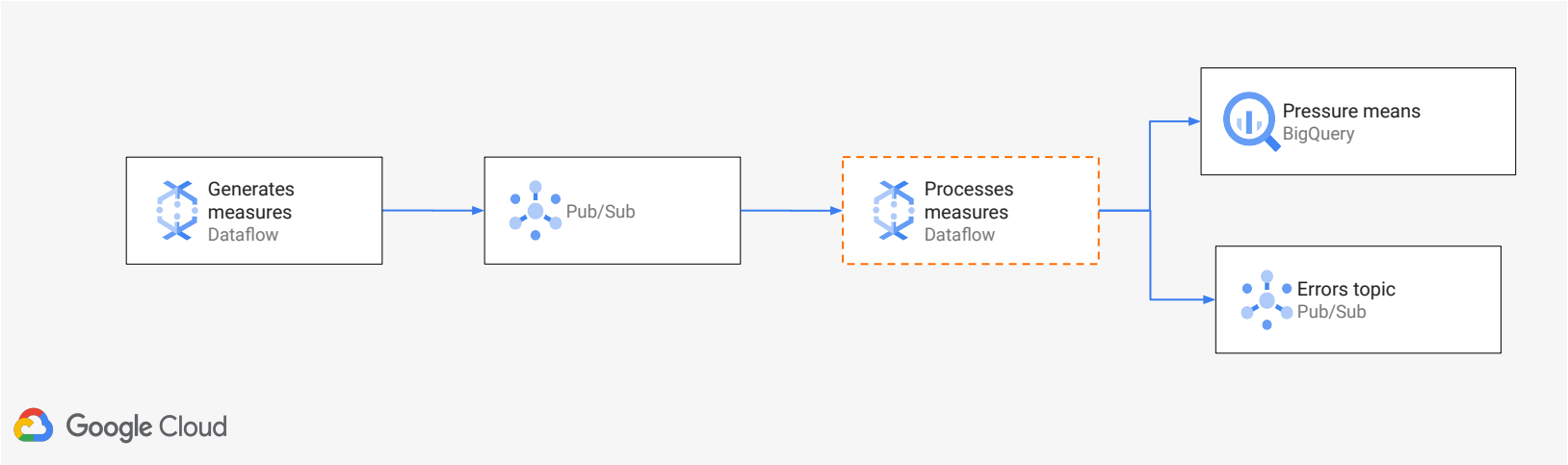
Choose your notification channel

- Choose between PagerDuty, Slack, Webhooks, Email, SMS or Cloud Pub/Sub.
- The Pub/Sub channel will enable you to integrate with other GCP components, or with third-party systems.

Demo

Cloud Monitoring & Dataflow UI

Example job


Generates measures
Dataflow
Pub/Sub
Processes measures
Dataflow
Pressure means
BigQuery
Errors topic
Pub/Sub
Google Cloud

Thank you!

Q & A