Best Practices to avoid Top User Issues

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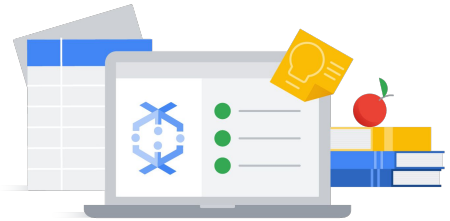
Agenda

1. Setting up Permissions
2. Setting up Networking
3. Other common error messages

Three credentials

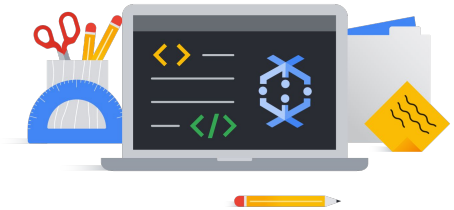
1. User roles
2. Dataflow service account
3. Controller service account

User roles



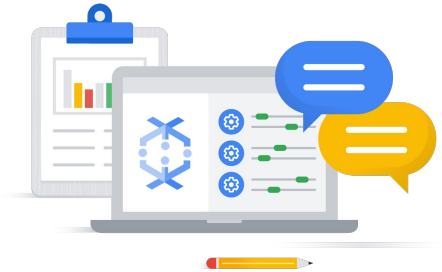
Dataflow Viewer

Provides read-only access to all Dataflow-related resources.



Dataflow Developer

Provides access to view, update, and cancel Dataflow jobs.



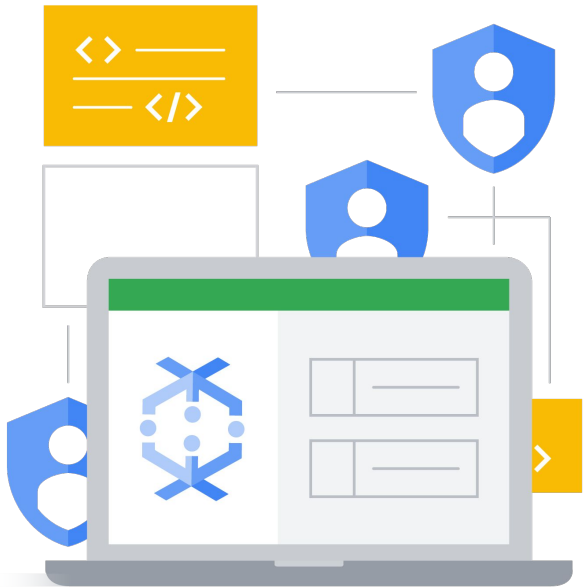
Dataflow Admin

Provides access for creating and managing Dataflow jobs.

Dataflow service account

The Orchestrator

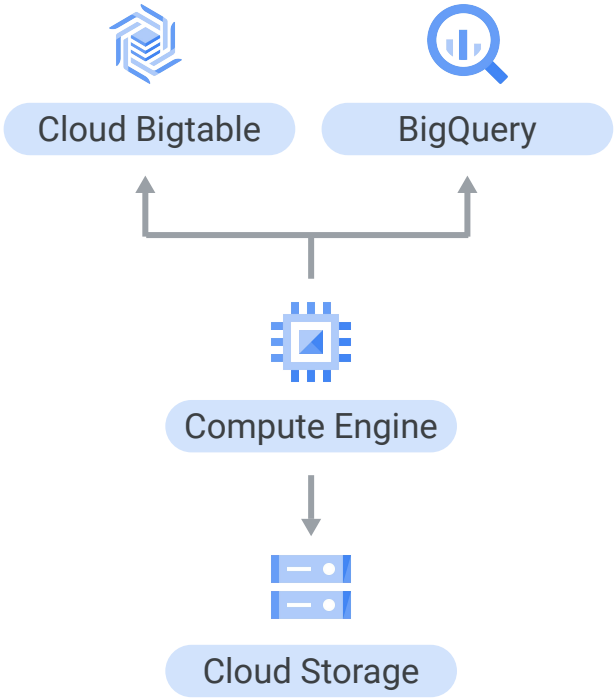
- Interacts between your project and Dataflow
- Used for worker creation and monitoring
- service-<project_number>@dataflow-service-producer-prod.iam.gserviceaccount.com
- Assigned the Dataflow Service Agent role



Controller service account

The Worker

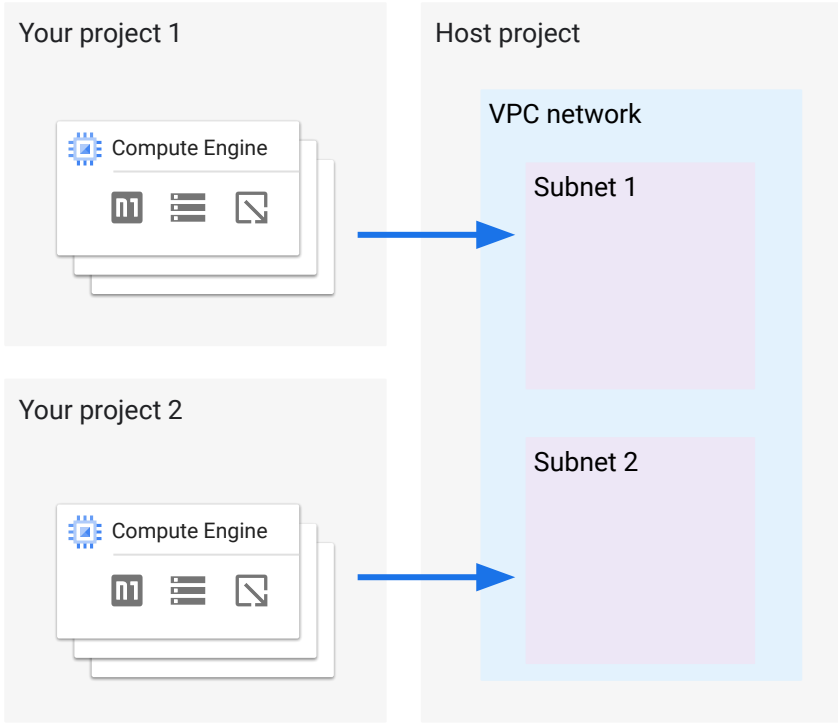
- Used by the workers to access resources needed by the pipeline
- <project-number>-compute@developer.gserviceaccount.com
- Flag to override default:
  - Python: **--service_account_email**
  - Java: **--serviceAccount**
- At a minimum, your custom service account must have the Dataflow Worker role.



Shared VPC

Hosts and services

- Dataflow jobs can run in either VPC or Shared VPC
- Works for both default and custom networks
- Number of VMs is constrained by subnet IP block size
- Dataflow service account needs Compute Network User role in host project



Configuring internet access

- Dataflow workers need to be able to reach Google Cloud APIs and services to be able to successfully start up and execute pipeline code.
- By default, Dataflow worker VMs are configured with external IP addresses so that they meet the Internet access requirements.
- If you are using workers with only Private IP, please refer to the GCP documentation on Configuring Private Google Access to ensure the workers can reach the required Google Cloud APIs and services.
    - https://cloud.google.com/vpc/docs/configure-private-google-access

Firewall Rules required by Dataflow

- Along with access to Google Cloud APIs, Dataflow worker VMs also need to communicate with each other.
- Dataflow requires that workers communicate with each other using TCP ports 12345 and 12346.
- Lack of this firewall rule will result in RPC “DEADLINE_EXCEEDED” errors visible in Cloud Logging as part of the Shuffler logs for the job.
- The automatically created `default` network, includes a `default-allow-internal` rule that meets the firewall requirement for Dataflow. If you are using a custom network or have customer firewall rules, you can look at the instructions in the link below to add the required firewall rule:
    - https://cloud.google.com/dataflow/docs/guides/routes-firewall#firewall_rules_required_by

Common Error Messages - 1

"Worker Lost Contact with the Service"

```
Workflow failed. Causes: S09:<redacted> Dofn failed., The job failed because a work item has failed 4 times. Look in
previous log entries for the cause of each one of the 4 failures. For more information, see
https://cloud.google.com/dataflow/docs/guides/common-errors. The work item was attempted on these workers:
  worker1-harness-2rns
      Root cause: The worker lost contact with the service.,
  worker2-harness-qq62
      Root cause: The worker lost contact with the service.,
  worker3-harness-wvzm
      Root cause: The worker lost contact with the service.,
  worker4-harness-7lj6
      Root cause: The worker lost contact with the service."
```

- This error is common in Batch jobs.
- Indicates that the worker was unable to report progress updates back to the backend.
- Often caused by the workers being Memory or CPU bound.

Common Error Messages - 1 Contd.

“Worker Lost Contact with the Service”

```
resource.type="dataflow_step"
resource.labels.job_id="[YOUR_JOB_ID]"
("thrashing=true" OR "OutOfMemoryError" OR "Out of memory" OR "Shutting down JVM")
```

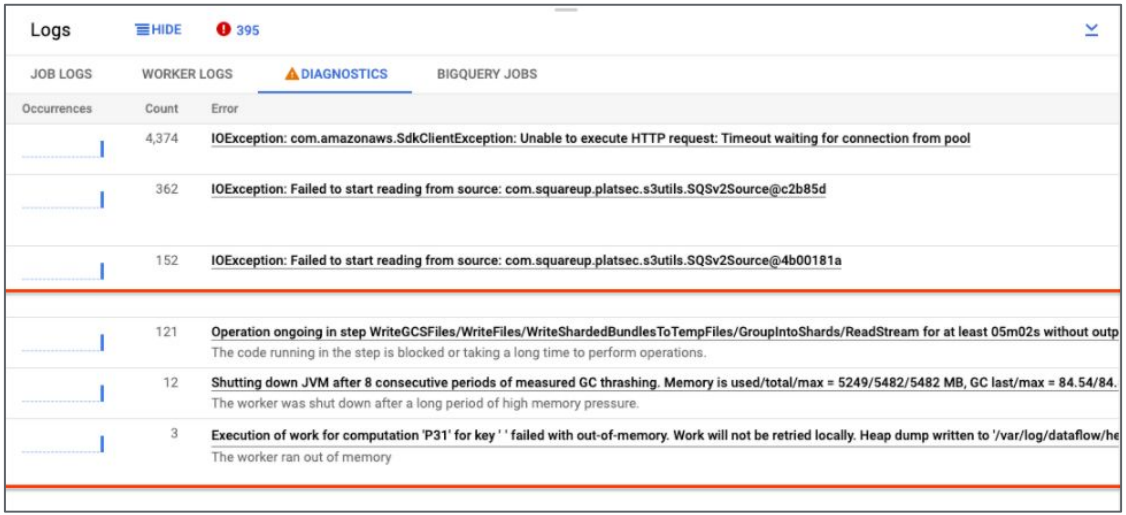
- Memory Bound: Look for memory errors in Cloud Logging using the filter shown above.
- CPU Bound: Investigate the CPU usage of the workers mentioned in the error message
- Simple Solution: Use highmem machines or larger machines with more vCPUs.

Common Error Messages - 2

“Processing stuck/Operation ongoing in step <step_id> for at least <time_interval> without outputting or completing in state finish at <stack_trace>”

- The appropriate interpretation of this message is that a single operation has been running for over X minutes.
- This error has two possible causes:
  - Your `DoFn` code is simply slow, or waiting for some slow external operation to complete.
  - Or, your `DoFn` code might be stuck, deadlocked, or abnormally slow to finish processing.
- Look for messages in Cloud Logging that indicate that the DoFn code is stuck or otherwise encountering issues.
- If none are present, the issue might be the execution speed of the DoFn code. Consider using a code profiler or other tool to investigate the code's performance.

Dataflow Recommender



- Dataflow recently launched a new feature integration with logs that provides more insight into common error messages.
- These recommendations can be found in the Diagnostics section of the Dataflow job.

Thank you!

Questions?