BLUE TEAM

→ SECURITY INCIDENT RESPONSE

Incident Response

Google Cloud Platform

Hej

```
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    Incident Response / Digital Forensics
    Twitter @dvirus
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```
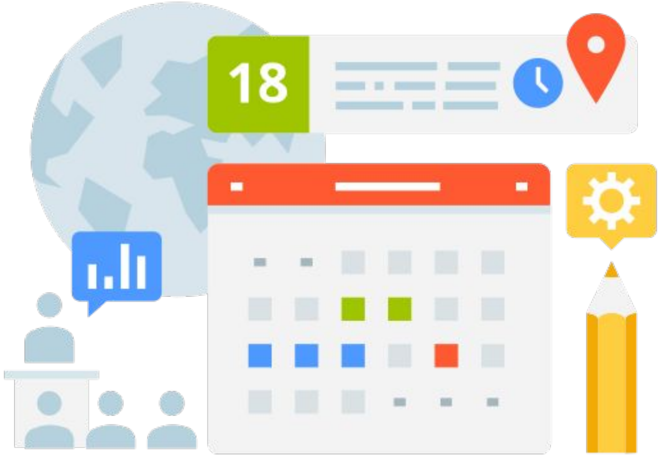
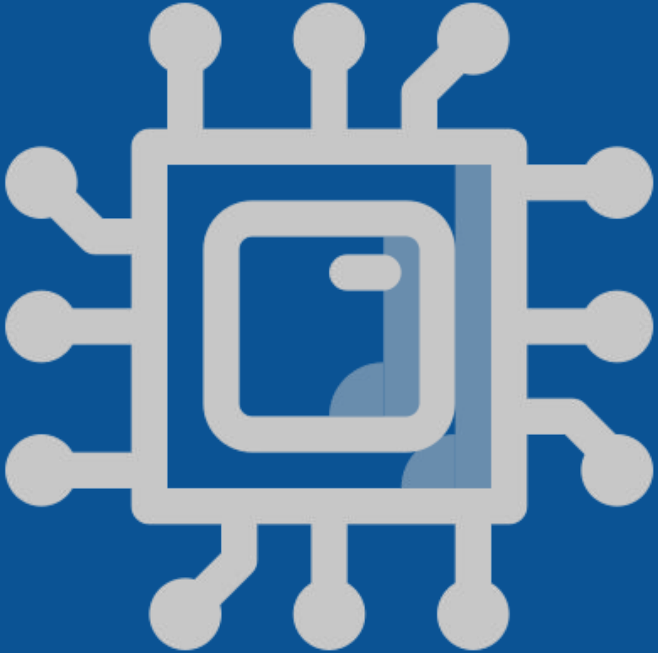

Agenda



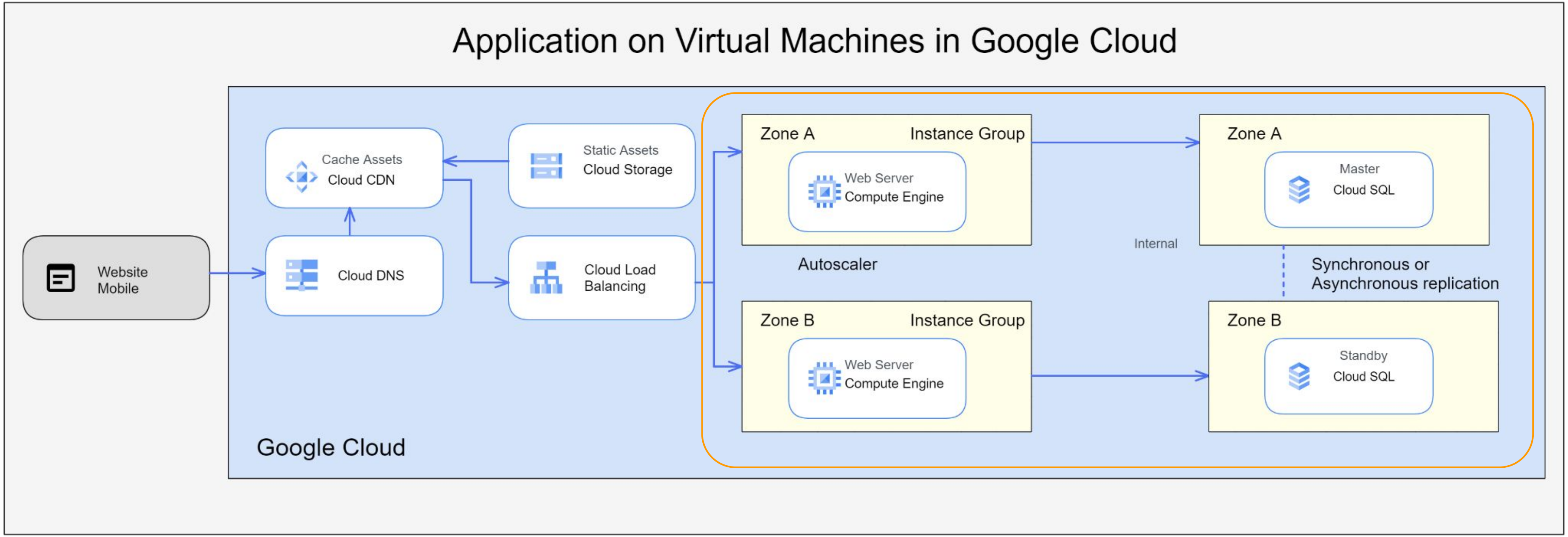
- Investigation of VMs Attacks
- VM logs
- Network Logs
- Network Traffic
- Snapshots
- Questions
- 🍕 ➕ 🍺



Investigating

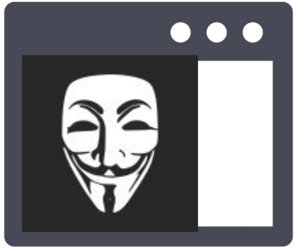
VM Attacks

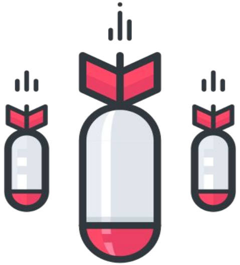
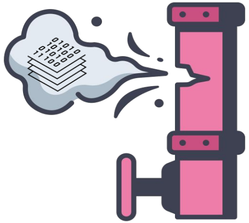
Architecture



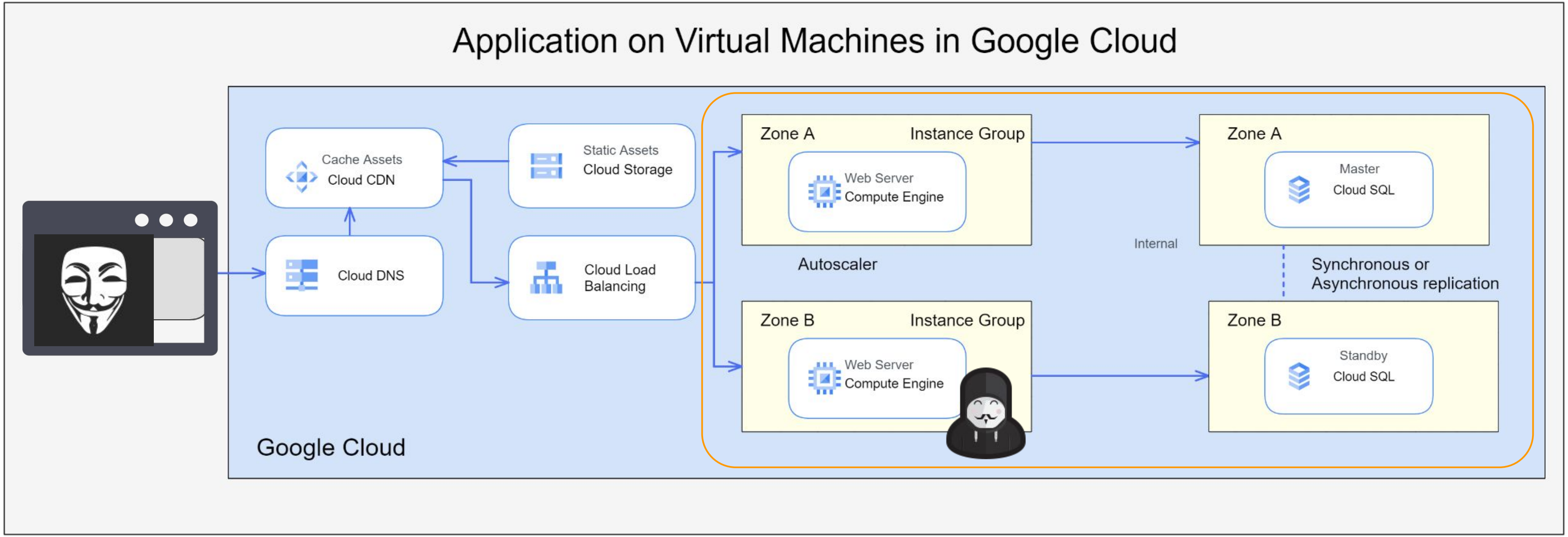
● VPC

VMs Impacts



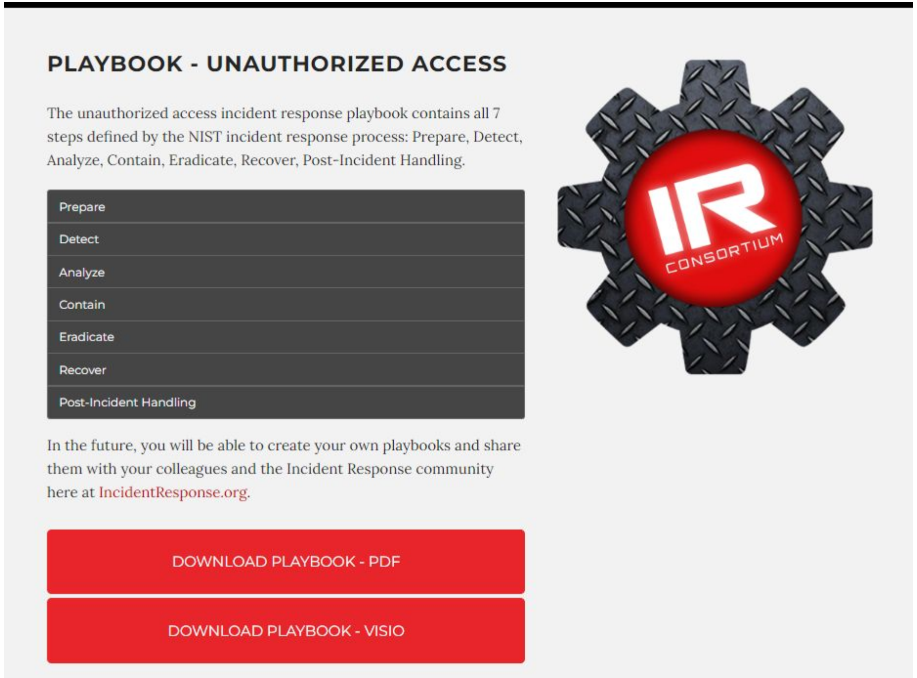



The Incident | Defacement in GCP



🟠 VPC

The Incident | Playbooks



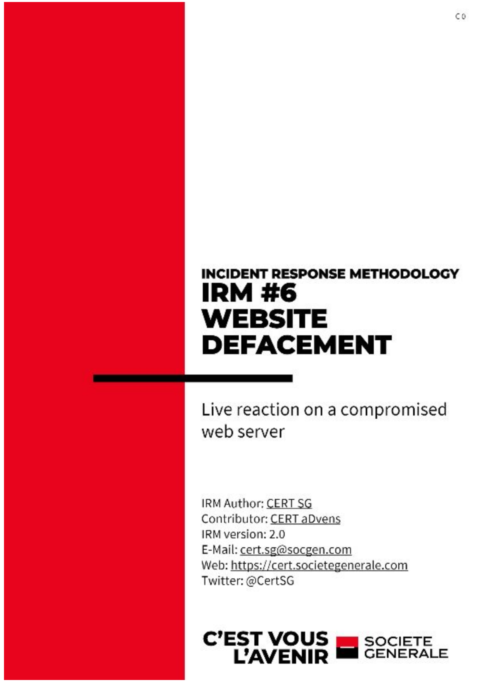
PLAYBOOK - UNAUTHORIZED ACCESS

The unauthorized access incident response playbook contains all 7 steps defined by the NIST incident response process: Prepare, Detect, Analyze, Contain, Eradicate, Recover, Post-Incident Handling.

- Prepare
- Detect
- Analyze
- Contain
- Eradicate
- Recover
- Post-Incident Handling

In the future, you will be able to create your own playbooks and share them with your colleagues and the Incident Response community here at IncidentResponse.org.

https://www.incidentresponse.org/playbooks/



INCIDENT RESPONSE METHODOLOGY

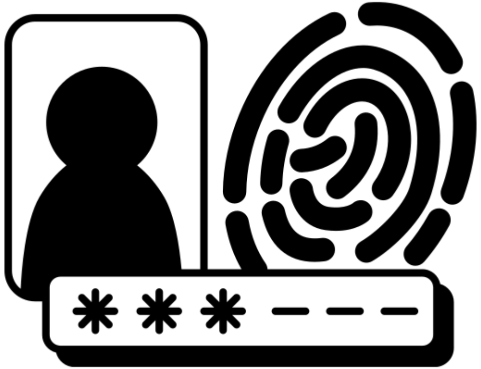
IRM #6
WEBSITE DEFACEMENT

Live reaction on a compromised web server

IRM Author: CERT SG
Contributor: CERT aDvens
IRM version: 2.0
E-Mail: cert.sg@socgen.com
Web: https://cert.societegenerale.com
Twitter: @CertSG

https://github.com/certsocietegenerale/IRM

Logs access control



Attack Trees

MITRE ENGENUITY | Center for Threat Informed Defense

Attack Flow

https://center-for-threat-informed-defense.github.io/attack-flow/

Attack Flow is a language for describing how adversaries combine and sequence various offensive techniques to achieve their goals. The project helps defenders and leaders understand how adversaries operate and improve their own defensive posture.

Investigation - Sources of evidence

Access Logs (VM)
/var/log/nginx/access.log

VPC Firewall Logs
Disabled by default

VPC Flow Logs
Disabled by default

Packet Capture
Disabled by default

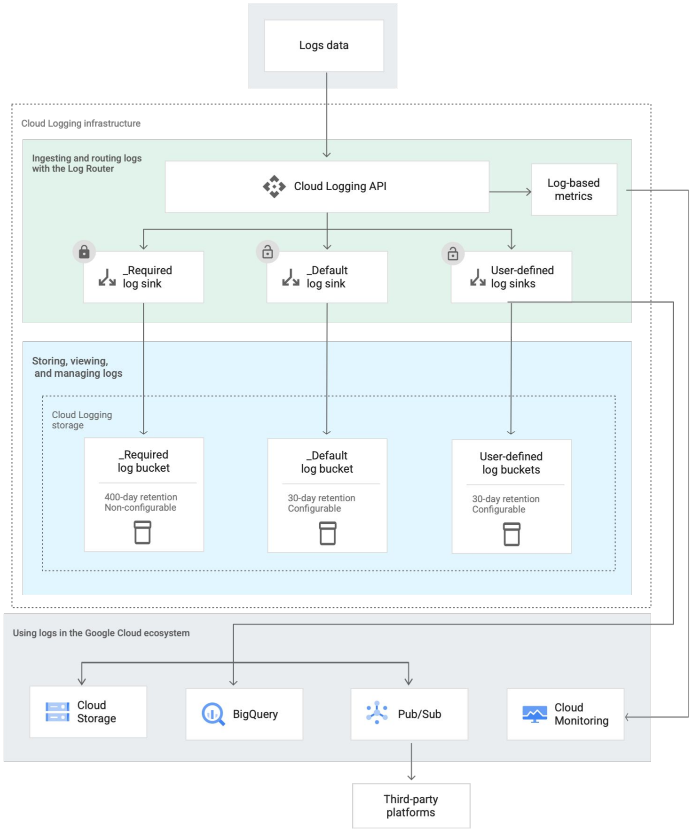
VM Forensic Image

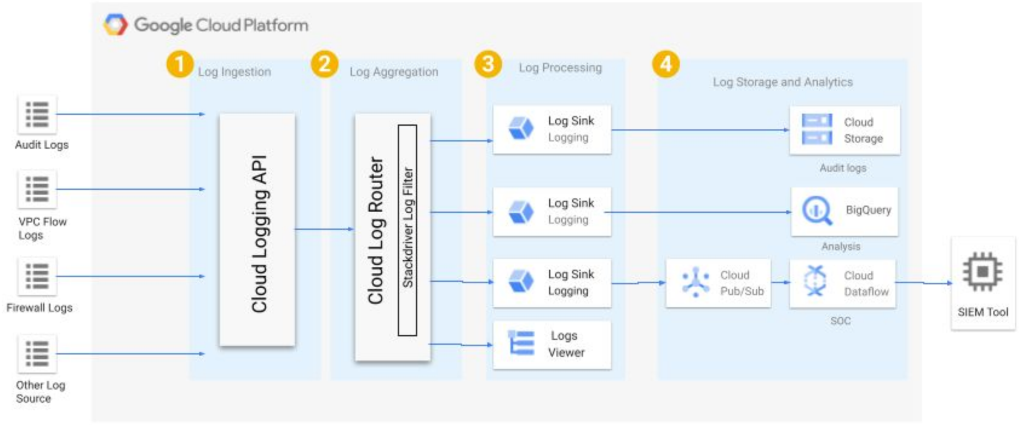
Pricing

Investigating

VM Logs

Google Cloud Logging

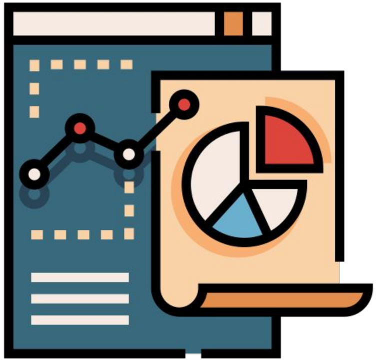




SIEM - Security Information Event Management

https://cloud.google.com/logging/docs/reference/v2/rest/#service:-logging.googleapis.com

Google Cloud Ops Agent



The Ops Agent is the primary agent for collecting telemetry from your Compute Engine instances. Combining logging and metrics into a single agent, the Ops Agent uses Fluent Bit

Linux: Syslog
Windows: EVTX logs

https://cloud.google.com/stackdriver/docs/solutions/agents/ops-agent

Google Cloud Ops Agent

Download

```
curl -sSO https://dl.google.com/cloudagents/add-google-cloud-ops-agent-repo.sh
```

Install

```
sudo bash add-google-cloud-ops-agent-repo.sh --also-install
```

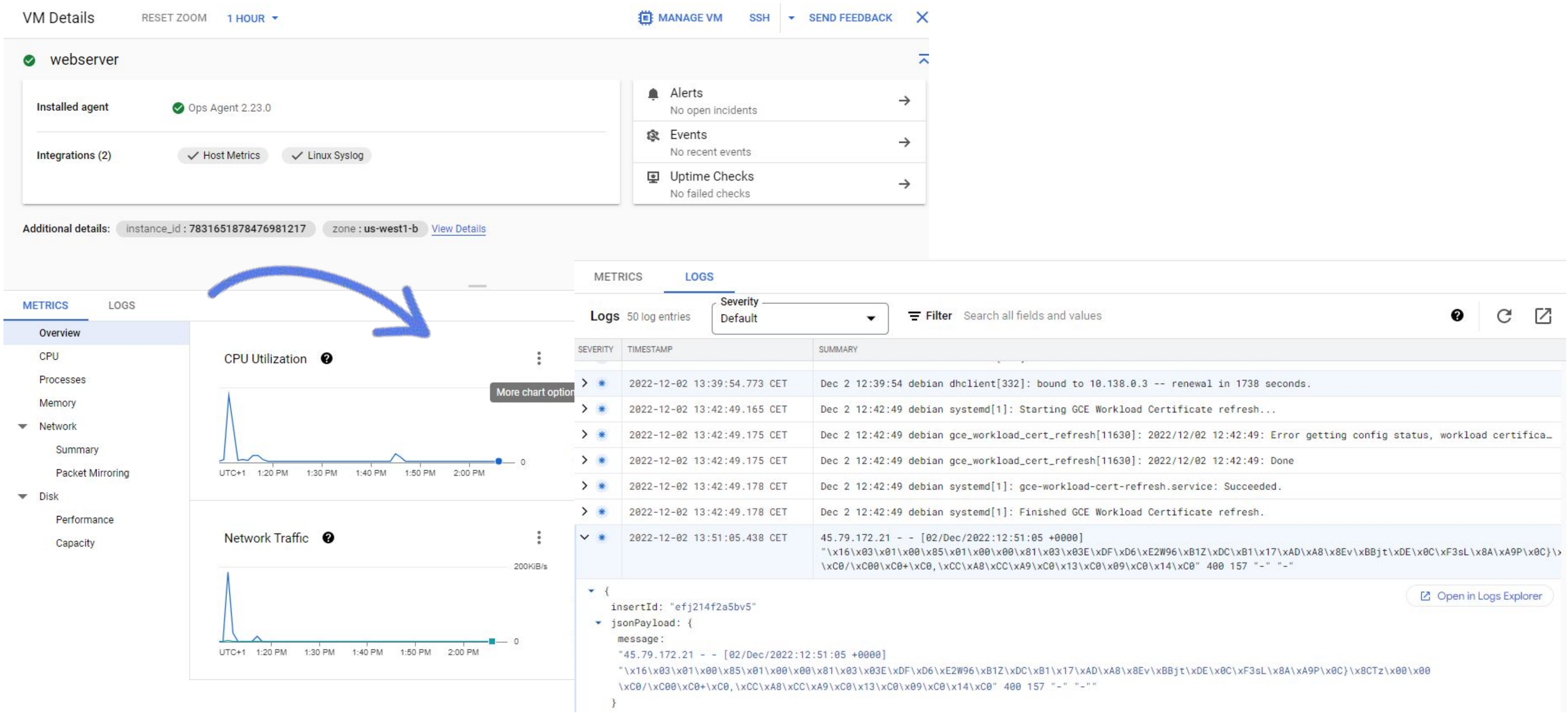
Configuration File

```
vim /etc/google-cloud-ops-agent/config.yaml
```

Service Restart

```
sudo systemctl restart google-cloud-ops-agent"*"
```

Google Cloud Ops Agent



Installed agent: Ops Agent 2.23.0

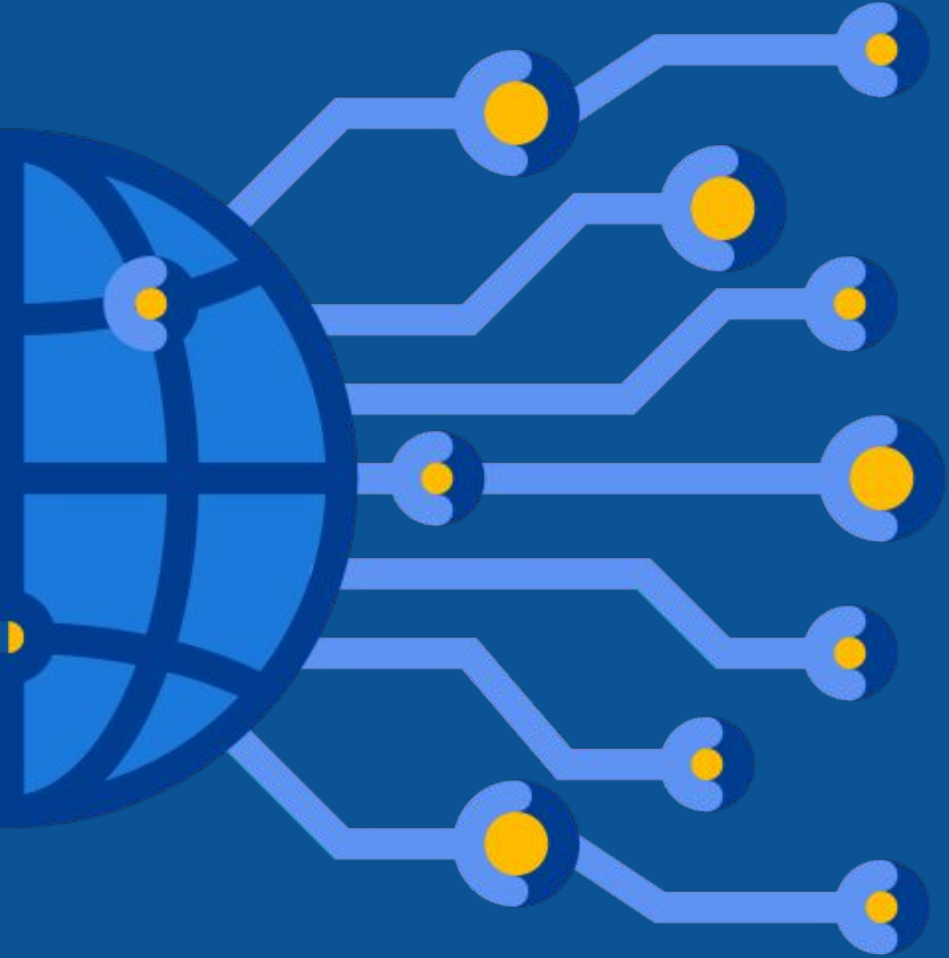
Integrations (2): ✓ Host Metrics ✓ Linux Syslog

Additional details: instance_id : 7831651878476981217 zone : us-west1-b

Severity: Default

```
2022-12-02 13:39:54.773 CET   Dec 2 12:39:54 debian dhclient[332]: bound to 10.138.0.3 -- renewal in 1738 seconds.
2022-12-02 13:42:49.165 CET   Dec 2 12:42:49 debian systemd[1]: Starting GCE Workload Certificate refresh...
2022-12-02 13:42:49.175 CET   Dec 2 12:42:49 debian gce_workload_cert_refresh[11630]: 2022/12/02 12:42:49: Error getting config status, workload certifica…
2022-12-02 13:42:49.175 CET   Dec 2 12:42:49 debian gce_workload_cert_refresh[11630]: 2022/12/02 12:42:49: Done
2022-12-02 13:42:49.178 CET   Dec 2 12:42:49 debian systemd[1]: gce-workload-cert-refresh.service: Succeeded.
2022-12-02 13:42:49.178 CET   Dec 2 12:42:49 debian systemd[1]: Finished GCE Workload Certificate refresh.
2022-12-02 13:51:05.438 CET   45.79.172.21 - - [02/Dec/2022:12:51:05 +0000]
                              "\x16\x03\x01\x00\x85\x01\x00\x00\x81\x03\x03E\xDF\xD6\xE2W96\xB1Z\xDC\xB1\x17\xAD\xA8\x8Ev\xBBjt\xDE\x0C\xF3sL\x8A\xA9P\x0C}\x
                              \xC0/\xC00\xC0+\xC0,\xCC\xA8\xCC\xA9\xC0\x13\xC0\x09\xC0\x14\xC0" 400 157 "-" "-"
```

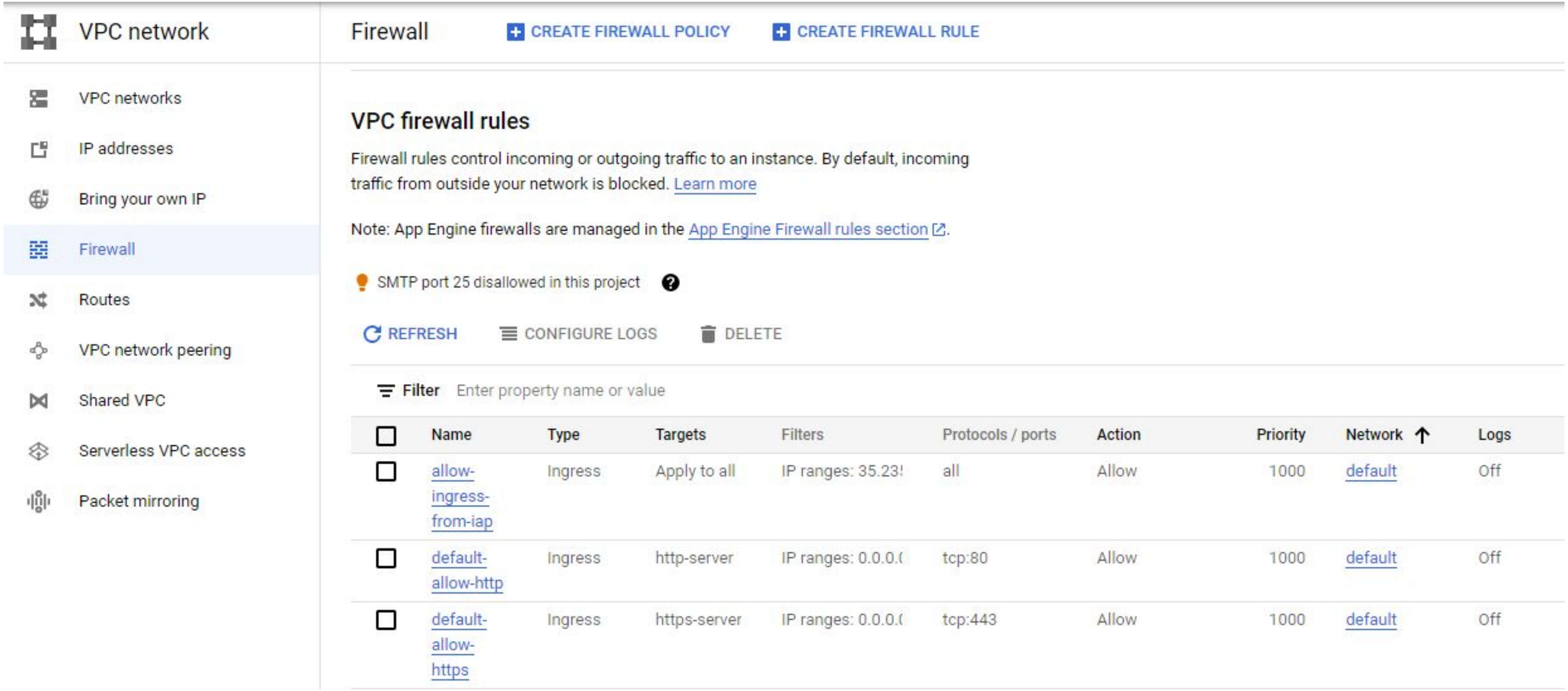
```
{
  insertId: "efj214f2a5bv5"
  jsonPayload: {
   message:
   "45.79.172.21 - - [02/Dec/2022:12:51:05 +0000]
   "\x16\x03\x01\x00\x85\x01\x00\x00\x81\x03\x03E\xDF\xD6\xE2W96\xB1Z\xDC\xB1\x17\xAD\xA8\x8Ev\xBBjt\xDE\x0C\xF3sL\x8A\xA9P\x0C}\x8CTz\x00\x00
   \xC0/\xC00\xC0+\xC0,\xCC\xA8\xCC\xA9\xC0\x13\xC0\x09\xC0\x14\xC0" 400 157 "-" "-""
  }
```



Investigating

Network Logs

VPC Firewall Rules



VPC firewall rules

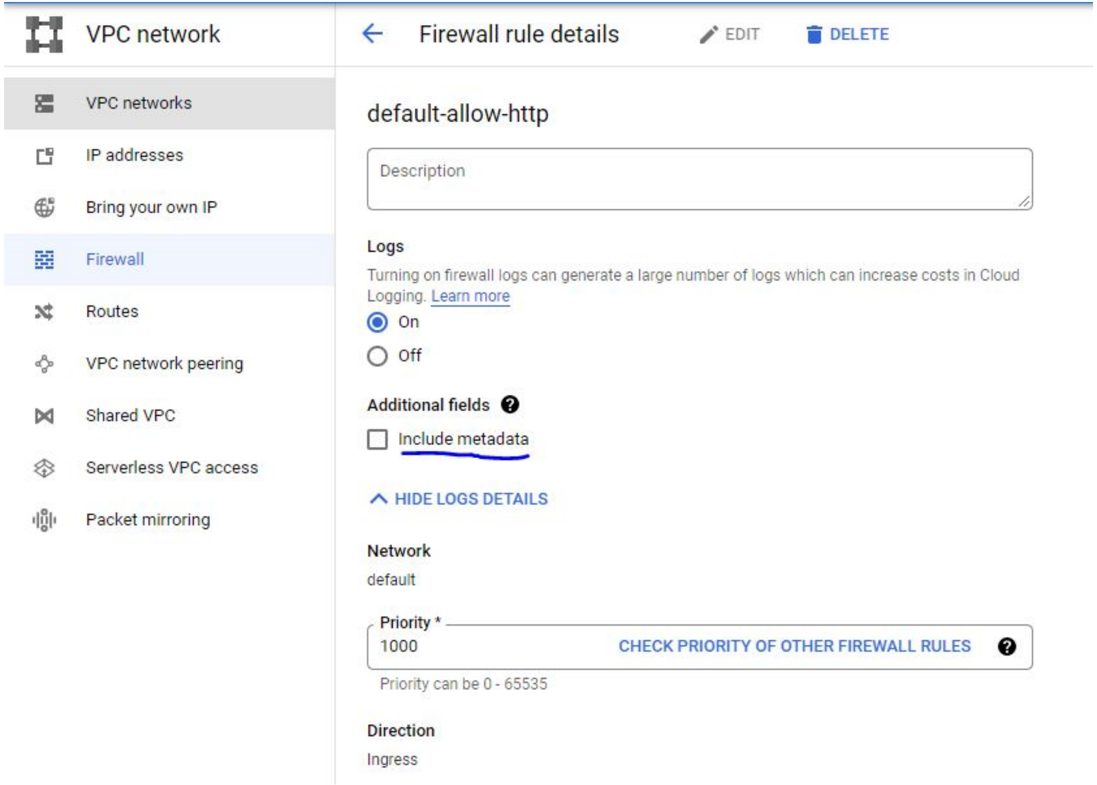
Firewall rules control incoming or outgoing traffic to an instance. By default, incoming traffic from outside your network is blocked. Learn more

Note: App Engine firewalls are managed in the App Engine Firewall rules section.

SMTP port 25 disallowed in this project

□	Name	Type	Targets	Filters	Protocols / ports	Action	Priority	Network ↑	Logs
□	allow-ingress-from-iap	Ingress	Apply to all	IP ranges: 35.23!	all	Allow	1000	default	Off
□	default-allow-http	Ingress	http-server	IP ranges: 0.0.0.(	tcp:80	Allow	1000	default	Off
□	default-allow-https	Ingress	https-server	IP ranges: 0.0.0.(	tcp:443	Allow	1000	default	Off

VPC Firewall Rules



default-allow-http

Description

Logs

Turning on firewall logs can generate a large number of logs which can increase costs in Cloud Logging. Learn more

● On

○ Off

Additional fields

□ Include metadata

HIDE LOGS DETAILS

Network

default

Priority *

1000 CHECK PRIORITY OF OTHER FIREWALL RULES

Priority can be 0 - 65535

Direction

Ingress

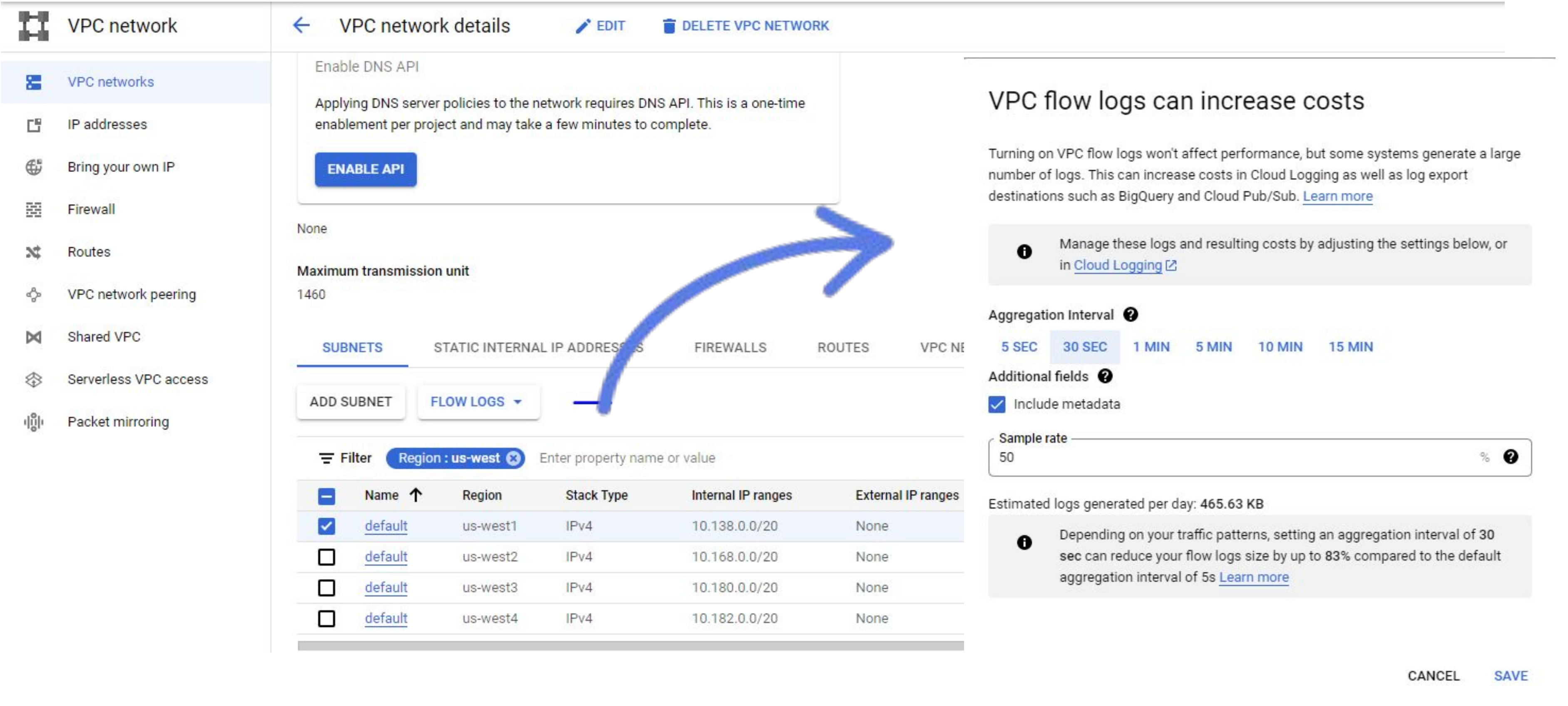
VPC Flow Logs

VPC Flow Logs records a sample of network flows sent from and received by VM instances, including instances used as GKE nodes. These logs can be used for network monitoring, forensics, real-time security analysis, and expense optimization.

TCP and UDP / No ICMP

https://cloud.google.com/vpc/docs/using-flow-logs

VPC Flow Logs



Enable DNS API

Applying DNS server policies to the network requires DNS API. This is a one-time enablement per project and may take a few minutes to complete.

None

Maximum transmission unit

1460

☐	Name ↑	Region	Stack Type	Internal IP ranges	External IP ranges
☑	default	us-west1	IPv4	10.138.0.0/20	None
☐	default	us-west2	IPv4	10.168.0.0/20	None
☐	default	us-west3	IPv4	10.180.0.0/20	None
☐	default	us-west4	IPv4	10.182.0.0/20	None

VPC flow logs can increase costs

Turning on VPC flow logs won't affect performance, but some systems generate a large number of logs. This can increase costs in Cloud Logging as well as log export destinations such as BigQuery and Cloud Pub/Sub. Learn more

Manage these logs and resulting costs by adjusting the settings below, or in Cloud Logging

Aggregation Interval: 5 SEC [✓ 30 SEC] 1 MIN 5 MIN 10 MIN 15 MIN

Additional fields

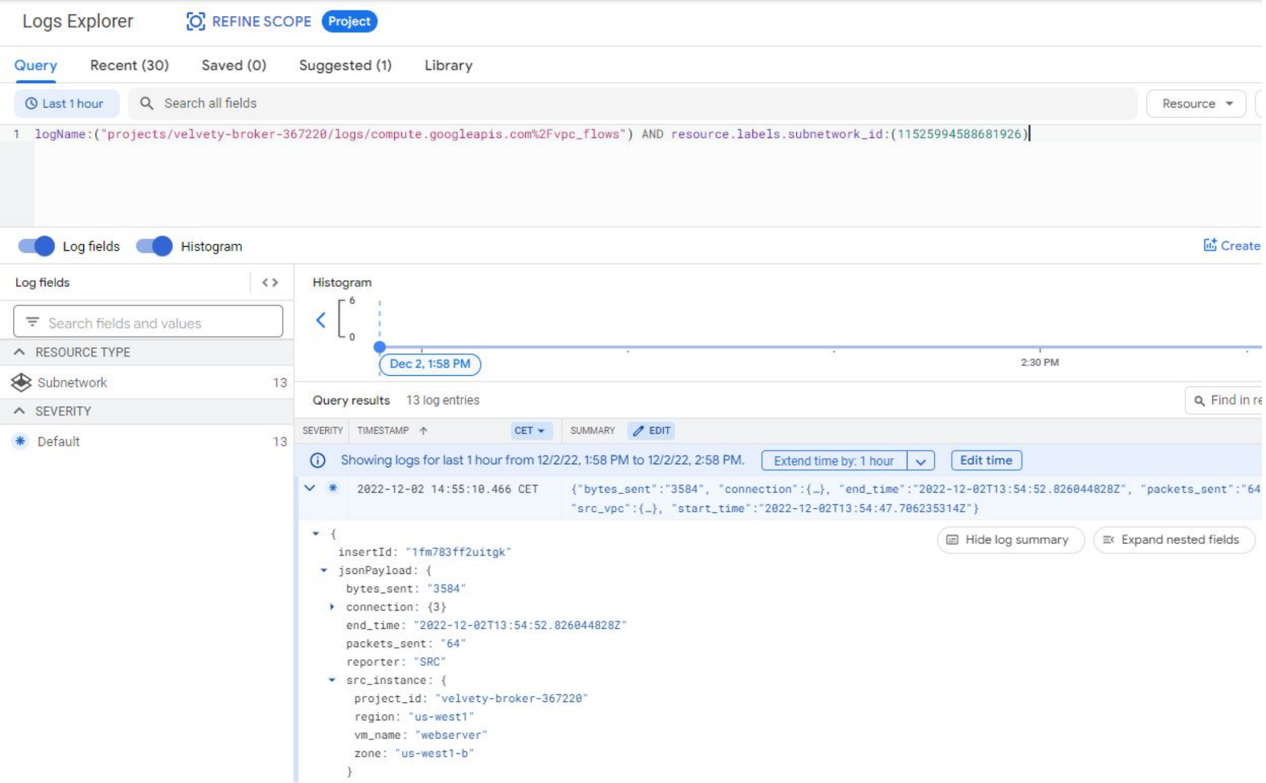
☑ Include metadata

Sample rate: 50 %

Estimated logs generated per day: **465.63 KB**

Depending on your traffic patterns, setting an aggregation interval of 30 sec can reduce your flow logs size by up to 83% compared to the default aggregation interval of 5s Learn more

VPC Flow Logs



```
logName:("projects/velvety-broker-367220/logs/compute.googleapis.com%2Fvpc_flows") AND resource.labels.subnetwork_id:(11525994588681926)
```

Query results 13 log entries

Showing logs for last 1 hour from 12/2/22, 1:58 PM to 12/2/22, 2:58 PM.

```
2022-12-02 14:55:10.466 CET   {"bytes_sent":"3584", "connection":{…}, "end_time":"2022-12-02T13:54:52.826044828Z", "packets_sent":"64
                              "src_vpc":{…}, "start_time":"2022-12-02T13:54:47.706235314Z"}
```

```
{
  insertId: "1fm783ff2uitgk"
  jsonPayload: {
   bytes_sent: "3584"
   connection: {3}
   end_time: "2022-12-02T13:54:52.826044828Z"
   packets_sent: "64"
   reporter: "SRC"
   src_instance: {
    project_id: "velvety-broker-367220"
    region: "us-west1"
    vm_name: "webserver"
    zone: "us-west1-b"
   }
```

Investigating
Network Packets

Packet Mirroring

You can use Packet Mirroring to mirror traffic to and from particular virtual machine (VM) instances. The collected traffic can help you detect security threats and monitor application performance.

TCP/UDP load balancer is required

https://cloud.google.com/vpc/docs/using-packet-mirroring

Forensic Images

Snapshots

- Disk image of the current state of the VM
- Attach the snapshot to your DFIR instance
- Mount as a R/O

https://cloud.google.com/compute/docs/disks/snapshots

```
┌──(dvirus㉿gondor)-[~]
└─$ whoami
  Daniel Rodriguez
  Security Consultant
  Incident Response / Digital Forensics
  Twitter @dvirus
  Website:   https://dvirus.training/
```

FOOCAFÉ
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2600
MALMÖ

Pizza Time