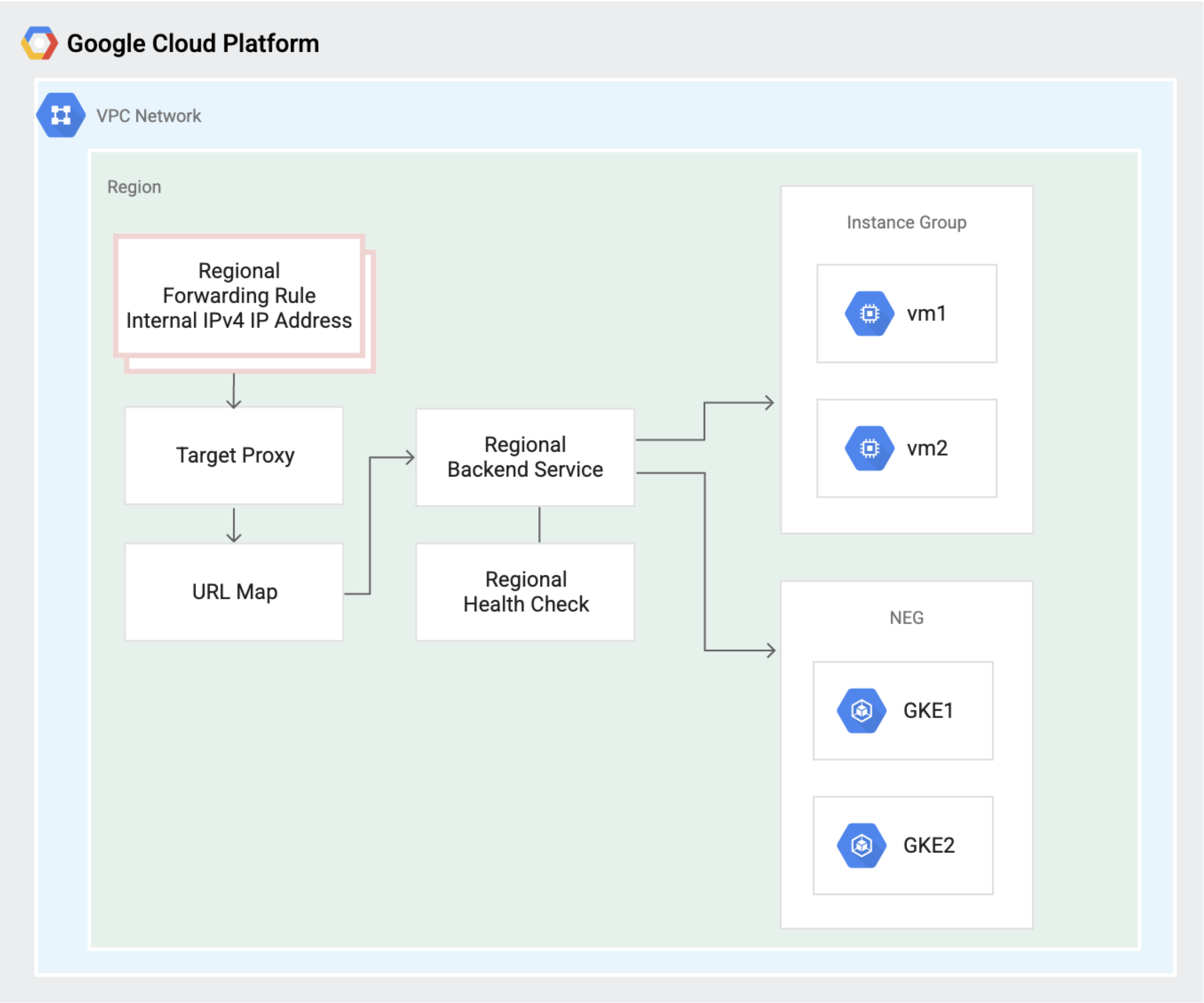
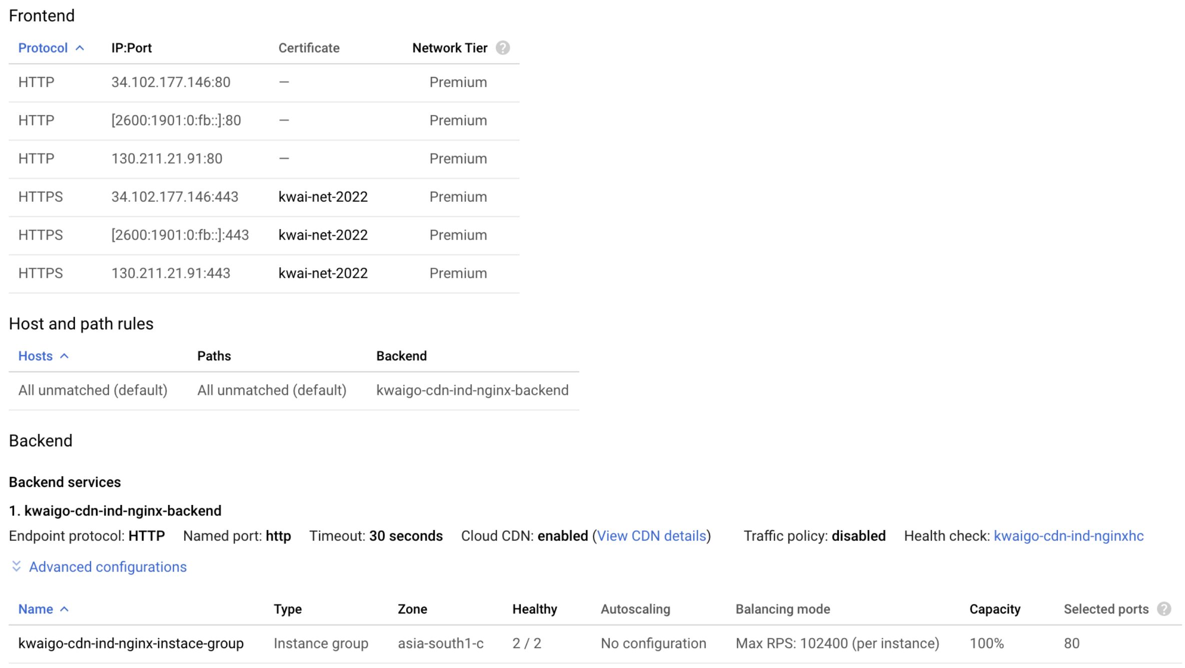
1.HTTP-GLB的架构:

Forwarding Rule ----Target Proxy ------ URL Map -----Backend Service



2.被监控的GLB有6个Forwarding Rule



Frontend

Protocol ^	IP:Port	Certificate	Network Tier
HTTP	34.102.177.146:80	—	Premium
HTTP	[2600:1901:0:fb::]:80	—	Premium
HTTP	130.211.21.91:80	—	Premium
HTTPS	34.102.177.146:443	kwai-net-2022	Premium
HTTPS	[2600:1901:0:fb::]:443	kwai-net-2022	Premium
HTTPS	130.211.21.91:443	kwai-net-2022	Premium

Host and path rules

Hosts ^	Paths	Backend
All unmatched (default)	All unmatched (default)	kwaigo-cdn-ind-nginx-backend

Backend

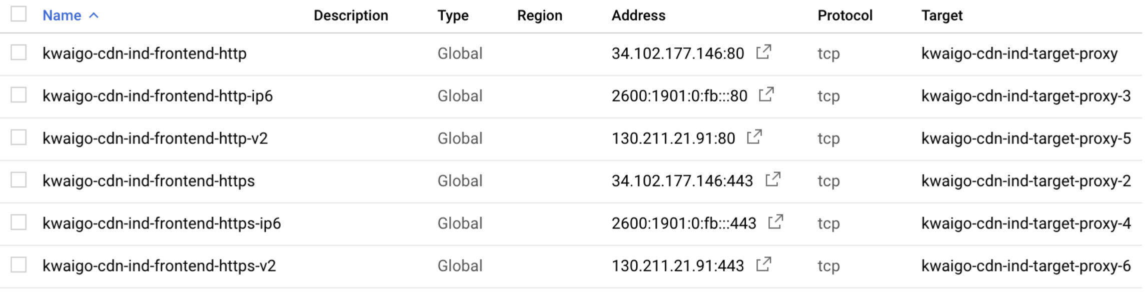
Backend services

1. kwaigo-cdn-ind-nginx-backend

Endpoint protocol: **HTTP** Named port: **http** Timeout: **30 seconds** Cloud CDN: **enabled** (View CDN details) Traffic policy: **disabled** Health check: kwaigo-cdn-ind-nginxhc

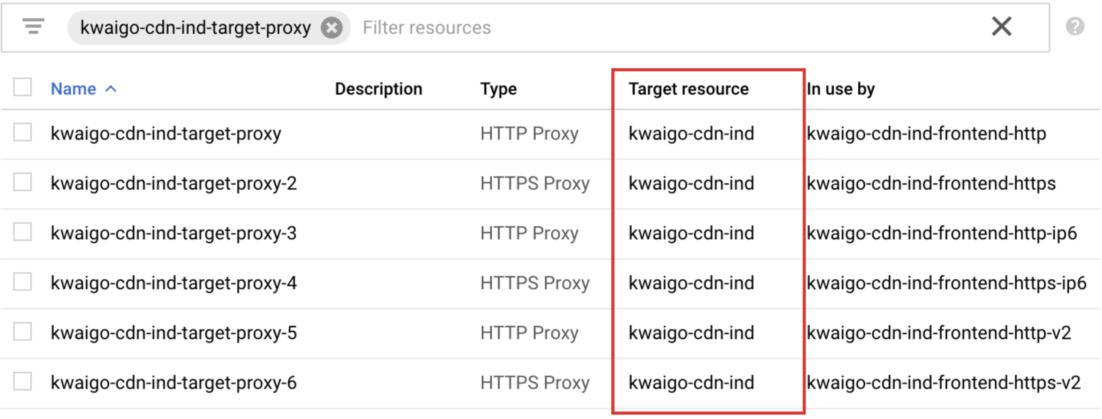
Name ^	Type	Zone	Healthy	Autoscaling	Balancing mode	Capacity	Selected ports
kwaigo-cdn-ind-nginx-instace-group	Instance group	asia-south1-c	2 / 2	No configuration	Max RPS: 102400 (per instance)	100%	80

3.每个forwarding rule对应一个target proxy



□	Name ^	Description	Type	Region	Address	Protocol	Target
□	kwaigo-cdn-ind-frontend-http		Global		34.102.177.146:80	tcp	kwaigo-cdn-ind-target-proxy
□	kwaigo-cdn-ind-frontend-http-ip6		Global		2600:1901:0:fb:::80	tcp	kwaigo-cdn-ind-target-proxy-3
□	kwaigo-cdn-ind-frontend-http-v2		Global		130.211.21.91:80	tcp	kwaigo-cdn-ind-target-proxy-5
□	kwaigo-cdn-ind-frontend-https		Global		34.102.177.146:443	tcp	kwaigo-cdn-ind-target-proxy-2
□	kwaigo-cdn-ind-frontend-https-ip6		Global		2600:1901:0:fb:::443	tcp	kwaigo-cdn-ind-target-proxy-4
□	kwaigo-cdn-ind-frontend-https-v2		Global		130.211.21.91:443	tcp	kwaigo-cdn-ind-target-proxy-6

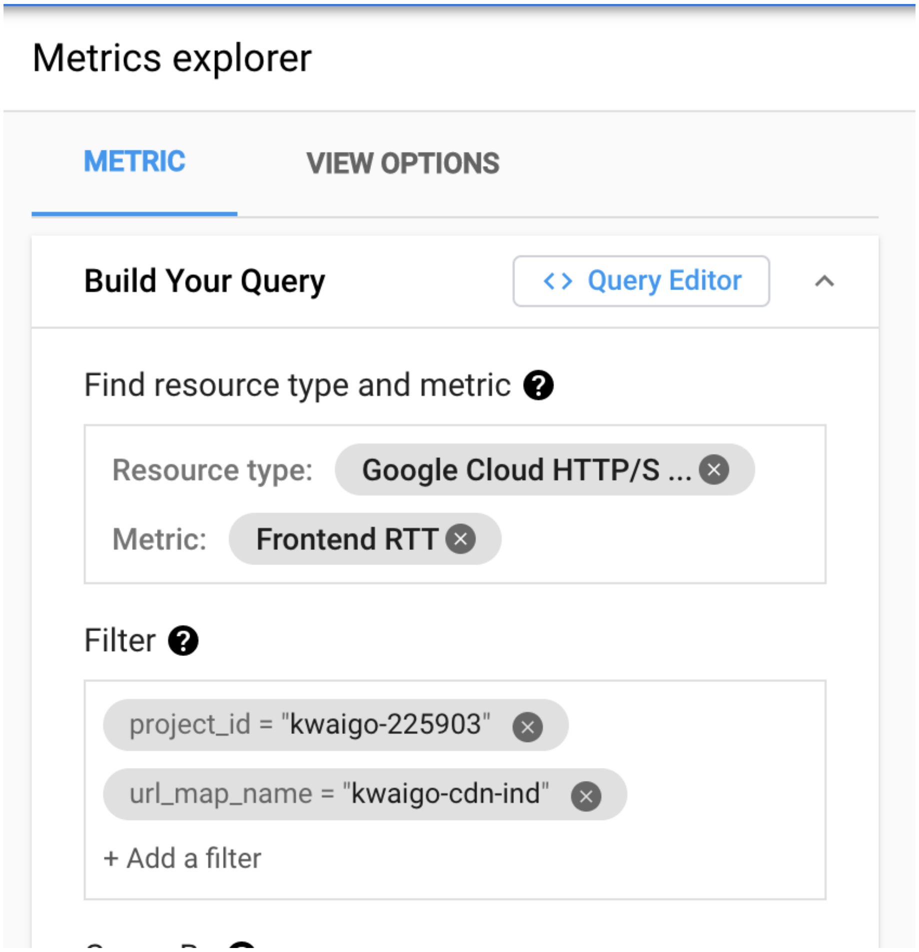
4.每个target proxy对应同一个url map



kwaigo-cdn-ind-target-proxy Filter resources

Name	Description	Type	Target resource	In use by
kwaigo-cdn-ind-target-proxy		HTTP Proxy	kwaigo-cdn-ind	kwaigo-cdn-ind-frontend-http
kwaigo-cdn-ind-target-proxy-2		HTTPS Proxy	kwaigo-cdn-ind	kwaigo-cdn-ind-frontend-https
kwaigo-cdn-ind-target-proxy-3		HTTP Proxy	kwaigo-cdn-ind	kwaigo-cdn-ind-frontend-http-ip6
kwaigo-cdn-ind-target-proxy-4		HTTPS Proxy	kwaigo-cdn-ind	kwaigo-cdn-ind-frontend-https-ip6
kwaigo-cdn-ind-target-proxy-5		HTTP Proxy	kwaigo-cdn-ind	kwaigo-cdn-ind-frontend-http-v2
kwaigo-cdn-ind-target-proxy-6		HTTPS Proxy	kwaigo-cdn-ind	kwaigo-cdn-ind-frontend-https-v2

5. 查看load balancer的metric,实际上是查看url map的metrics



Metrics explorer

Build Your Query

Find resource type and metric

Resource type: Google Cloud HTTP/S ...

Metric: Frontend RTT

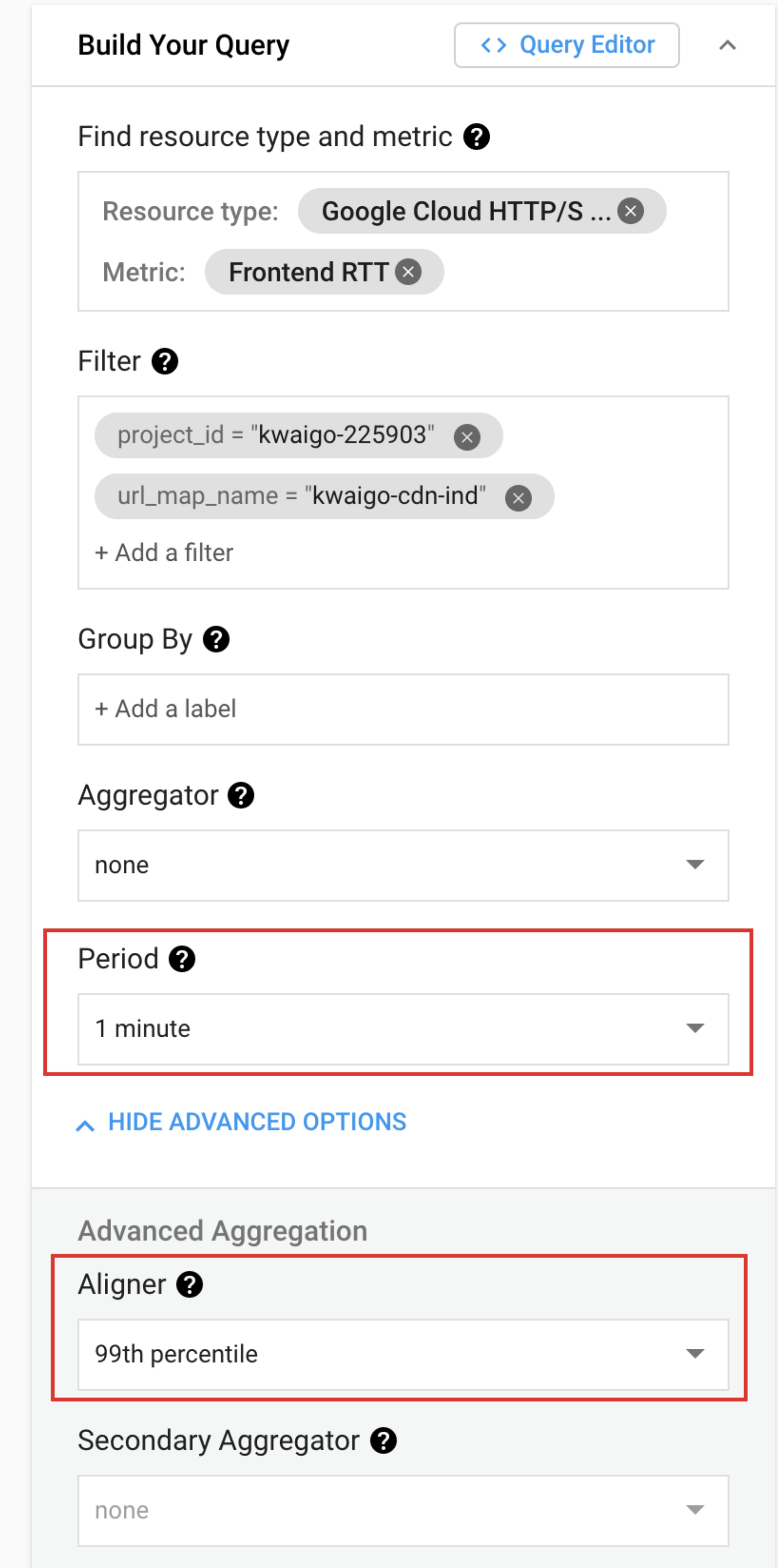
Filter

project_id = "kwaigo-225903"

url_map_name = "kwaigo-cdn-ind"

6.第一级聚合使用: 2个关键指标

- Period: 按照这个时间做第一次的聚合
- Aligner: 在Period内,做统计分析



Build Your Query

Find resource type and metric

Resource type: Google Cloud HTTP/S ...

Metric: Frontend RTT

Filter

project_id = "kwaigo-225903"

url_map_name = "kwaigo-cdn-ind"

Group By

Aggregator

none

Period

1 minute

Advanced Aggregation

Aligner

99th percentile

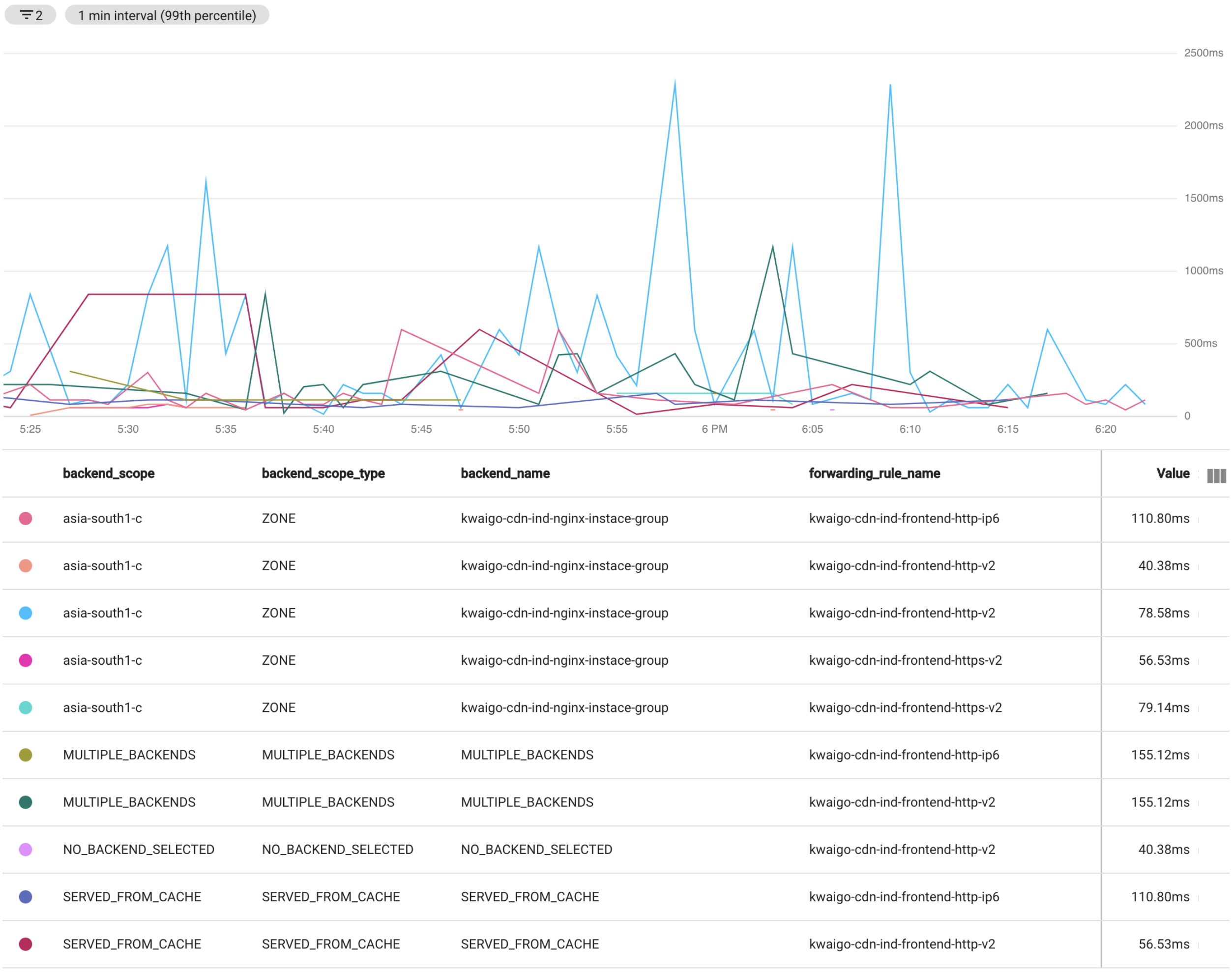
Secondary Aggregator

none

对应的metric query language:

```
fetch https_lb_rule
| metric 'loadbalancing.googleapis.com/https/frontend_tcp_rtt'
| filter
    resource.project_id == '797468826569'
    && (resource.url_map_name == 'kwaigo-cdn-ind')
| group_by 1m,
    [value_frontend_tcp_rtt_percentile: percentile(value.frontend_tcp_rtt, 99)]
| every 1m
```

- 在glb的场景下，按照时间一个维度来聚合之后，会有多个指标，分别对应多个forwarding rule以及不同的backend scope(cache hit, catche miss等)

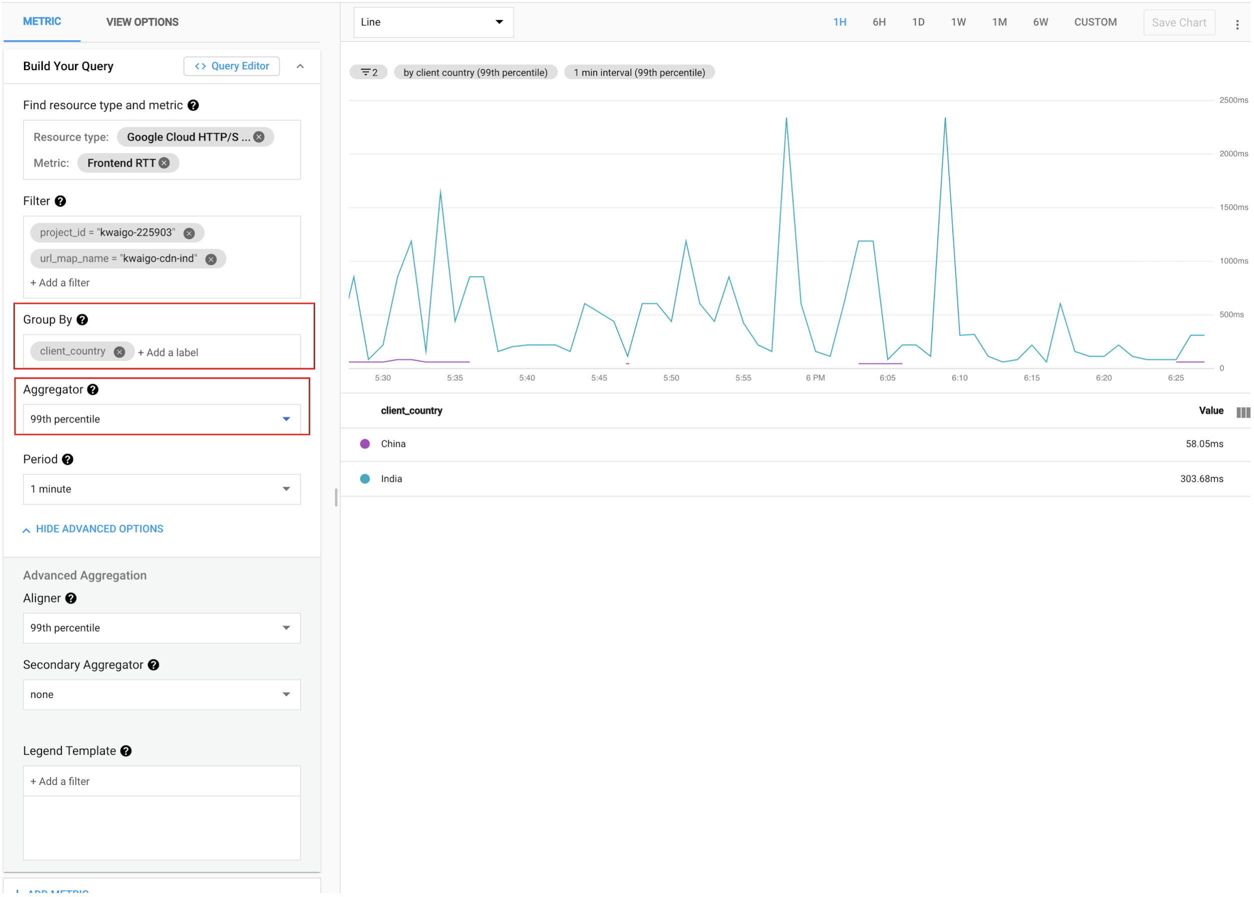


	backend_scope	backend_scope_type	backend_name	forwarding_rule_name	Value
●	asia-south1-c	ZONE	kwaigo-cdn-ind-nginx-instace-group	kwaigo-cdn-ind-frontend-http-ip6	110.80ms
●	asia-south1-c	ZONE	kwaigo-cdn-ind-nginx-instace-group	kwaigo-cdn-ind-frontend-http-v2	40.38ms
●	asia-south1-c	ZONE	kwaigo-cdn-ind-nginx-instace-group	kwaigo-cdn-ind-frontend-http-v2	78.58ms
●	asia-south1-c	ZONE	kwaigo-cdn-ind-nginx-instace-group	kwaigo-cdn-ind-frontend-https-v2	56.53ms
●	asia-south1-c	ZONE	kwaigo-cdn-ind-nginx-instace-group	kwaigo-cdn-ind-frontend-https-v2	79.14ms
●	MULTIPLE_BACKENDS	MULTIPLE_BACKENDS	MULTIPLE_BACKENDS	kwaigo-cdn-ind-frontend-http-ip6	155.12ms
●	MULTIPLE_BACKENDS	MULTIPLE_BACKENDS	MULTIPLE_BACKENDS	kwaigo-cdn-ind-frontend-http-v2	155.12ms
●	NO_BACKEND_SELECTED	NO_BACKEND_SELECTED	NO_BACKEND_SELECTED	kwaigo-cdn-ind-frontend-http-v2	40.38ms
●	SERVED_FROM_CACHE	SERVED_FROM_CACHE	SERVED_FROM_CACHE	kwaigo-cdn-ind-frontend-http-ip6	110.80ms
●	SERVED_FROM_CACHE	SERVED_FROM_CACHE	SERVED_FROM_CACHE	kwaigo-cdn-ind-frontend-http-v2	56.53ms

7.第二级聚合

通过group by,或者aggretator, 把多个时间序列做二次聚合, 对于cpu使用率等指标， 因为一次聚合的时候已经有了一个点数据, 所以二次聚合的算法并不会有影响,只有glb这种第一次按时间聚合后有多个时间序列的值才有意义.

- Group by: 二次聚合的指标
- Aggregator: 二次聚合的方法



Find resource type and metric

Resource type: Google Cloud HTTP/S ...

Metric: Frontend RTT

Filter

project_id = "kwaigo-225903"

url_map_name = "kwaigo-cdn-ind"

+ Add a filter

Group By

client_country + Add a label

Aggregator

99th percentile

Period

1 minute

Advanced Aggregation

Aligner

99th percentile

Secondary Aggregator

none

Legend Template

+ Add a filter

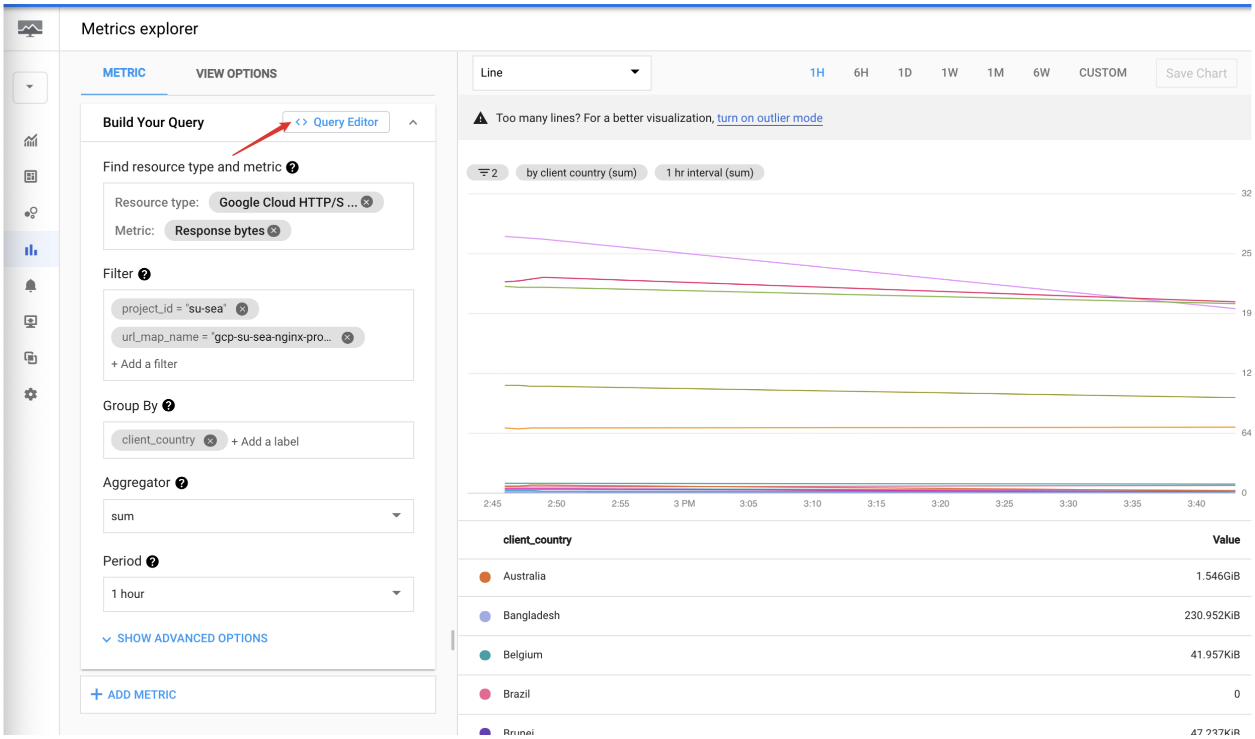
client_country	Value
● China	58.05ms
● India	303.68ms

8.使用cloud monitor API获取metric数据和第三方系统集成

- 建议使用的api:

[Method: projects.timeSeries.query | Cloud Monitoring]

- Grafana 7.4 Later 支持MQL [Link]
- 通过console生成monitor query language



Find resource type and metric

Resource type: Google Cloud HTTP/S ...

Metric: Response bytes

Filter

project_id = "su-sea"

url_map_name = "gcp-su-sea-nginx-pro...

+ Add a filter

Group By

client_country + Add a label

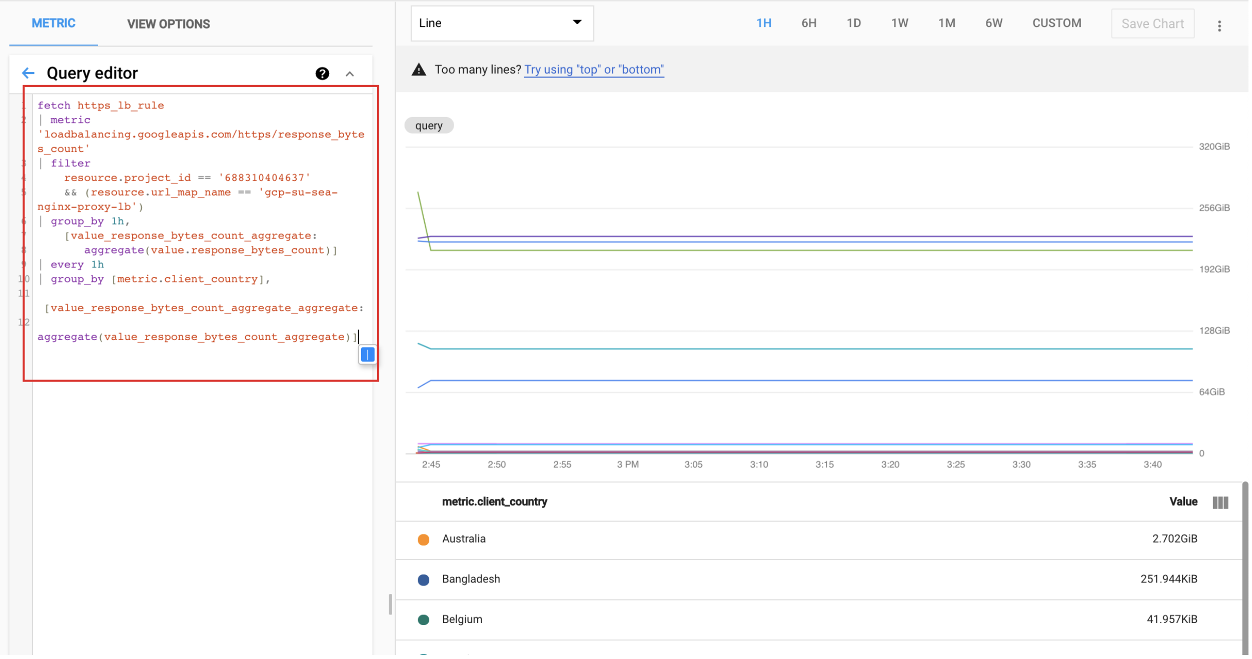
Aggregator

sum

Period

1 hour

	client_country	Value
●	Australia	1.546GiB
●	Bangladesh	230.952KiB
●	Belgium	41.957KiB
●	Brazil	0
●	Brunei	47.237KiB



Too many lines? Try using "top" or "bottom"

```
fetch https_lb_rule
| metric
'loadbalancing.googleapis.com/https/response_byte
s_count'
| filter
    resource.project_id == '688310404637'
    && (resource.url_map_name == 'gcp-su-sea-
nginx-proxy-lb')
| group_by 1h,
    [value_response_bytes_count_aggregate:
       aggregate(value.response_bytes_count)]
| every 1h
| group_by [metric.client_country],

 [value_response_bytes_count_aggregate_aggregate:

aggregate(value_response_bytes_count_aggregate)]
```

	metric.client_country	Value
●	Australia	2.702GiB
●	Bangladesh	251.944KiB
●	Belgium	41.957KiB

- 给自动生成的query, 增加时间范围

```
fetch https_lb_rule | metric
'loadbalancing.googleapis.com/https/response_bytes_count' | filter
resource.project_id == '688310404637' && (resource.region == 'global') | align
rate(1m) | every 1m| group_by
[],[value_response_bytes_count_aggregate:aggregate(value.response_bytes_count)] |
within d'2021/01/15-12:00:00'-d'2021/01/17-12:00:00'
```

- 按照query rest api保存json文件

para.json

```
{
  "pageSize": 100,
  "query": "fetch https_lb_rule | metric
'loadbalancing.googleapis.com/https/response_bytes_count' | filter
resource.project_id == '688310404637' && (resource.region == 'global') | align
rate(1m) | every 1m| group_by
[],[value_response_bytes_count_aggregate:aggregate(value.response_bytes_count)]|wit
hin d'2021/01/15-12:00:00'-d'2021/01/17-12:00:00'"
}
```

- 配置curl环境

```
gcloud auth login --update-adc
export GOOGLE_APPLICATION_CREDENTIALS=/Users/liuchenggang/.config/gcloud/application_default_credentials.json
```

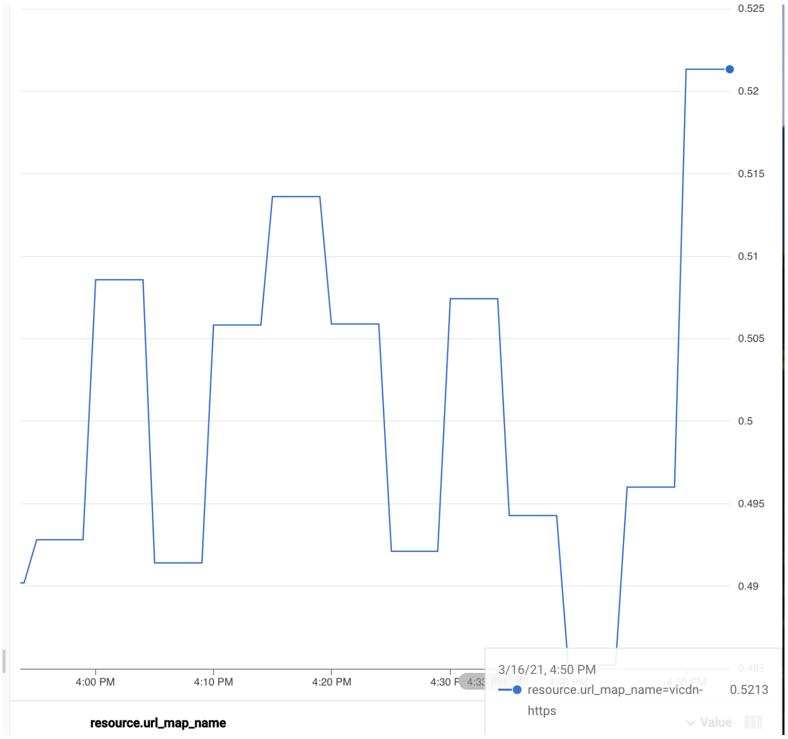
- 测试monitor time series query方法

```
curl -X post --data @./para.json -H "Authorization: Bearer $(gcloud auth application-default print-access-token)" -H "Content-Type: application/json; charset=utf-8" https://monitoring.googleapis.com/v3/projects/su-sea/timeSeries:query
```

9. 几个常用的查询MQL

Query 语句：
需求1:指定GLB的按域名的回源带宽情况

```
fetch https_lb_rule::loadbalancing.googleapis.com/https/request_count
| {filter
    (resource.backend_target_name == 'instance-dynamic-without-cache-hk'
     && resource.url_map_name == 'vicdn-https')
    && (metric.response_code_class == 400)
    ;
    filter
    (resource.backend_target_name == 'instance-dynamic-without-cache-hk'
     && resource.url_map_name == 'vicdn-https')}
| group_by [resource.url_map_name]
| align rate(5m)
| every 5m
| ratio
```



Query 语句：
需求3:指定GLB的按域名的回源带宽情况

```
fetch https_lb_rule

| metric 'loadbalancing.googleapis.com/https/response_bytes_count'

| filter
   resource.project_id == '932681033225'
   &&
   (resource.url_map_name == 'https-dynamic-need-cache-sin'
    || resource.url_map_name == 'http-dynamic-need-cache-sin'
|| resource.url_map_name == 'vivoxglobal-com-https-mig'
|| resource.url_map_name == 'vivoglobal-com-https-mig'
)
   && (metric.cache_result == 'MISS' || metric.cache_result == 'PARTIAL_HIT')
| align rate(1m)
| every 1m
| group_by [resource.forwarding_rule_name, resource.backend_target_name],
   [value_response_bytes_count_aggregate:
      aggregate(value.response_bytes_count)]
| condition value_response_bytes_count_aggregate > 197132288 'By/s'
```

需求4：基于GLB的forwording_rules 分组建立的请求数大于1.8亿次的告警

```
fetch https_lb_rule
| metric 'loadbalancing.googleapis.com/https/request_count'
| filter
    resource.project_id == '932681033225'
    && (resource.url_map_name == 'iqoo-com-https-mig')
| align rate(5m)
| every 5m
| group_by [resource.forwarding_rule_name],
    [value_request_count_aggregate: aggregate(value.request_count)]
| condition val() > 1.8e+08 '1/s'
```