Subscan | Infrastructure Costs of Subscan for Kusama & Asset Hub (Kusama) Networks (from January 2023 to March 2024)

This is a follow-up proposal to what we submitted before:
#229 Subscan | Infrastructure Costs of Subscan for Kusama & Statemine (from July to December 2022)

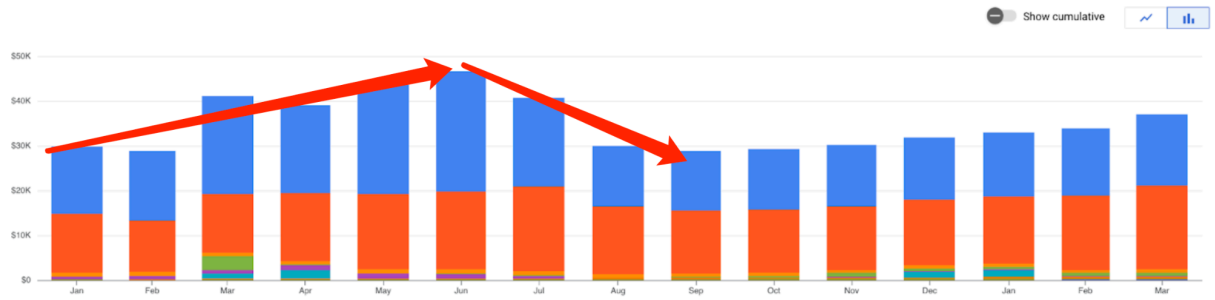
This is also a re-submission of Referendum 316:
#316 Subscan | Infrastructure Costs of Subscan for Kusama & Statemine Networks (from January to September 2023)

Overview

Subscan is an essential block explorer and analytics tool for the Substrate ecosystem, providing valuable insights to the Substrate community. However, the maintenance and operation of Subscan requires a significant investment of resources, including server infrastructure, security, and personnel costs. Therefore, we propose reimbursing the operation and maintenance fee for Subscan **from January 2023 to March 2024** from the Kusama treasury to ensure its continuous operation and maintenance.

We highly value feedback from our community users, and in Q3 2023, we've made substantial efforts to reduce infrastructure costs. The results have been both effective and gratifying. Starting from **July 2023**, the operational expenses have gradually decreased and have recently stabilized. As an illustration, taking our GCP bill as an example, the costs for September 2023 have decreased by more than **50.52%** compared to their historical peak.

In this re-submission, we have appended billing information covering from October 2023 through March 2024. While the ongoing growth in block production naturally entails a rise in GCP expenses, we've managed to moderate this increase, ensuring that the billing growth over the recent half-year remains slow and predictable. Notably, the bill for March 2024 significantly falls below its March 2023 counterpart, despite the elapsed year. This stark reduction attests to the substantial efficacy and enduring benefits of our Operations and Maintenance Cost Reduction Plan.



- For specific parameters and billing details, please refer to the "GCP Bill" section below.
- For our specific development efforts, please refer to the "Operations and Maintenance Cost Reduction Plan" section below.

Subscan Traffic Overview

Take the March 2024 data as an example:

Overview

subscan.io

Monitor security and performance for subscan.io. Configure products and services from the menu.

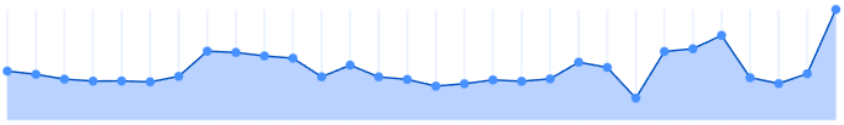
Review Cloudflare fundamentals

★ Starred

24 Hours 7 Days **30 Days** 4 MARCH — 3 APRIL

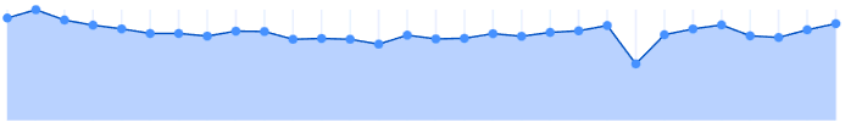
Unique Visitors
4.85M

Total Requests
1.12B



Percent Cached
62.92%

Total Data Served
9 TB



Data Cached
6 TB

View more analytics

Download data

Traffic for subscan.io

Print report Download data

Add filter

Previous 30 days

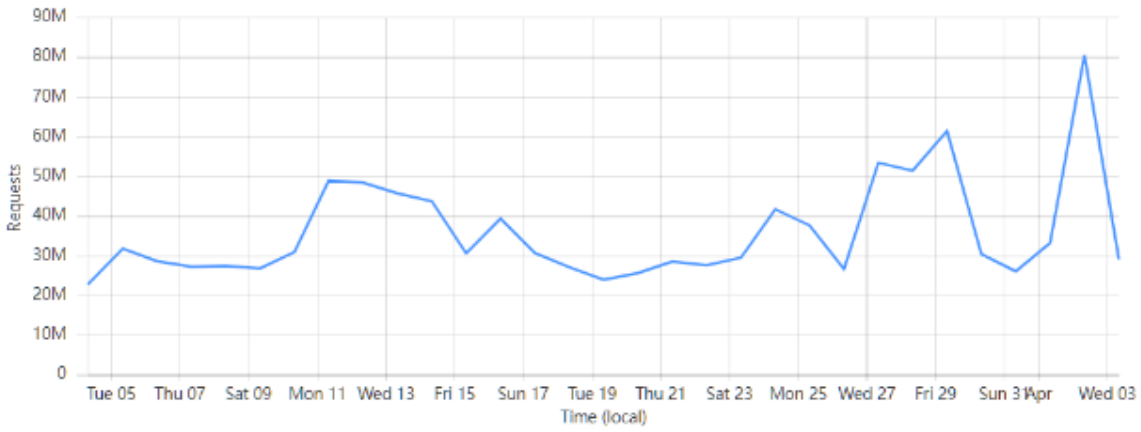
Requests summary

An HTTP request. A typical page view requires many requests.

All Referer Host Country Path Edge status code ...

Total requests

1.12B



Requests by country

United States	366.53M
Germany	69.45M
France	68.25M
Ukraine	44.97M
Singapore	43.75M
Hong Kong	36.62M
Netherlands	35.87M
Russian Federation	28.75M
India	27.72M
Korea, South	26.87M

1 to 10 of 200 items

Requests by source

5 items

Referers

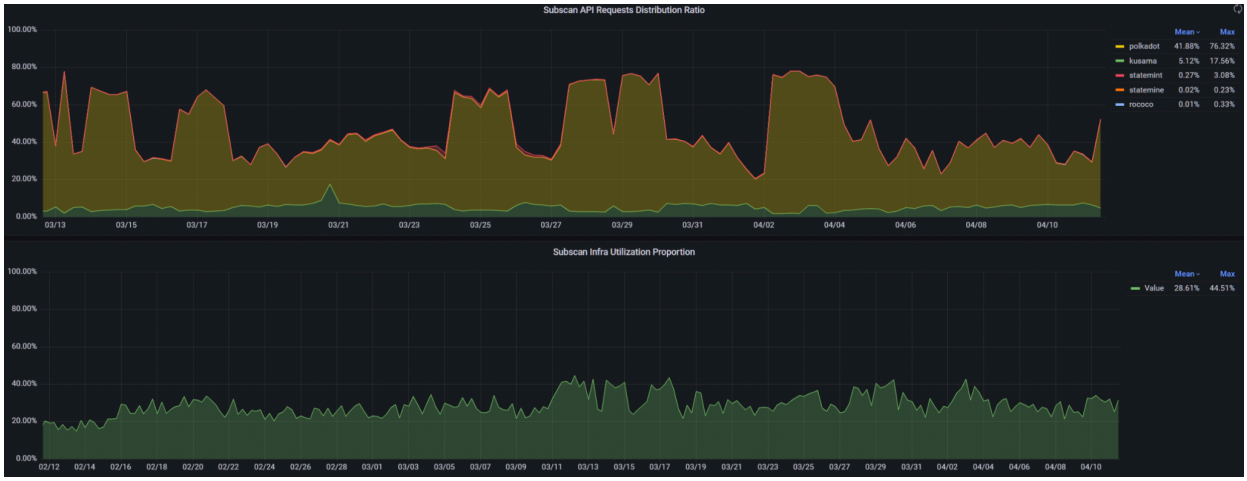
None (direct)	913.82M
www.subscan.io	65.96M
polkadot.subscan.io	51M
localhost:9135	16.32M
assethub-polkadot.subscan.io	7.65M

Paths

/api/scan/multiChain/account	258.61M
/api/liveness	149.2M
/api/scan/extrinsic	123.98M
/api/scan/multiChain/balance_value...	84.31M
/api/scan/account/reward_slash	53.56M

Subscan API Traffic and Distribution

Take the lastest 30 days as an example:



Subscan Database Storage

Take the data on March 31 as an example:

front page | Network storage usage

Network Name	Instance name	Database name	Storage	Storage ratio
kusama	mysql-subscan-mainnet-a	subscan_kusama	2.47 TB	9.3924 %
statemine	mysql-subscan-mainnet-a	subscan_statemine	209.42 GB	0.7960 %

Operations and Maintenance Cost Reduction Plan

We highly value feedback from our community users, and over the past few months, we've made substantial efforts to reduce infrastructure costs. Starting from July 2023, the operational expenses have gradually decreased and have recently stabilized, which can be evident from the bills, and is very conducive to the sustainable development of the Substrate ecosystem.

Main work including:

1. Database Storage Structure Optimization

- Optimized block index
- Enhanced event index
- Improved extrinsic index
- Streamlined transfer index

2. Database Data Cleanup

- Cleaned up redundancy in blocks: extrinsics, logs, and event fields
- Eliminated redundant log_index in logs
- Removed redundant fields such as extrinsic block_hash and extrinsic_index
- Cleared redundant event_index
- Data cleanup for prod-a and prod-c

3. Merged prod-c data into prod-a to reduce number of database instances.

4. Node Service Testing and Migration to Onfinality

5. Resource Optimization

- Checked the actual CPU and memory usage of each application, adjusted requests and limits in the cluster
- Replaced six c2-standard-16 type machines with more cost-effective t2d-standard-16 type machines

6. Data Backup Type Adjustment

- Transitioned most backup data from SSD disks to more cost-effective single-zone object storage
- Converted some SSD disks to single-zone storage

7. Service Log Adjustment

- Implemented a self-hosted EFK (Elasticsearch, Fluentd, Kibana) log center
- Transferred the majority of service logs to the self-hosted log center, filtering out non-essential logs to reduce Datadog costs
- Discontinued GCP log collection for the cluster, reducing GCP logging and monitoring expenses

This plan strikes a balance between cost reduction and security. We assessed the option of migrating from a **GKE cluster** to a **self-hosted Kubernetes cluster**, which would have significantly lowered costs. However, for security reasons, we did not adopt this option.

However, some unavoidable factors will lead to increased infrastructure costs, such as:

1. Addition of New Features:

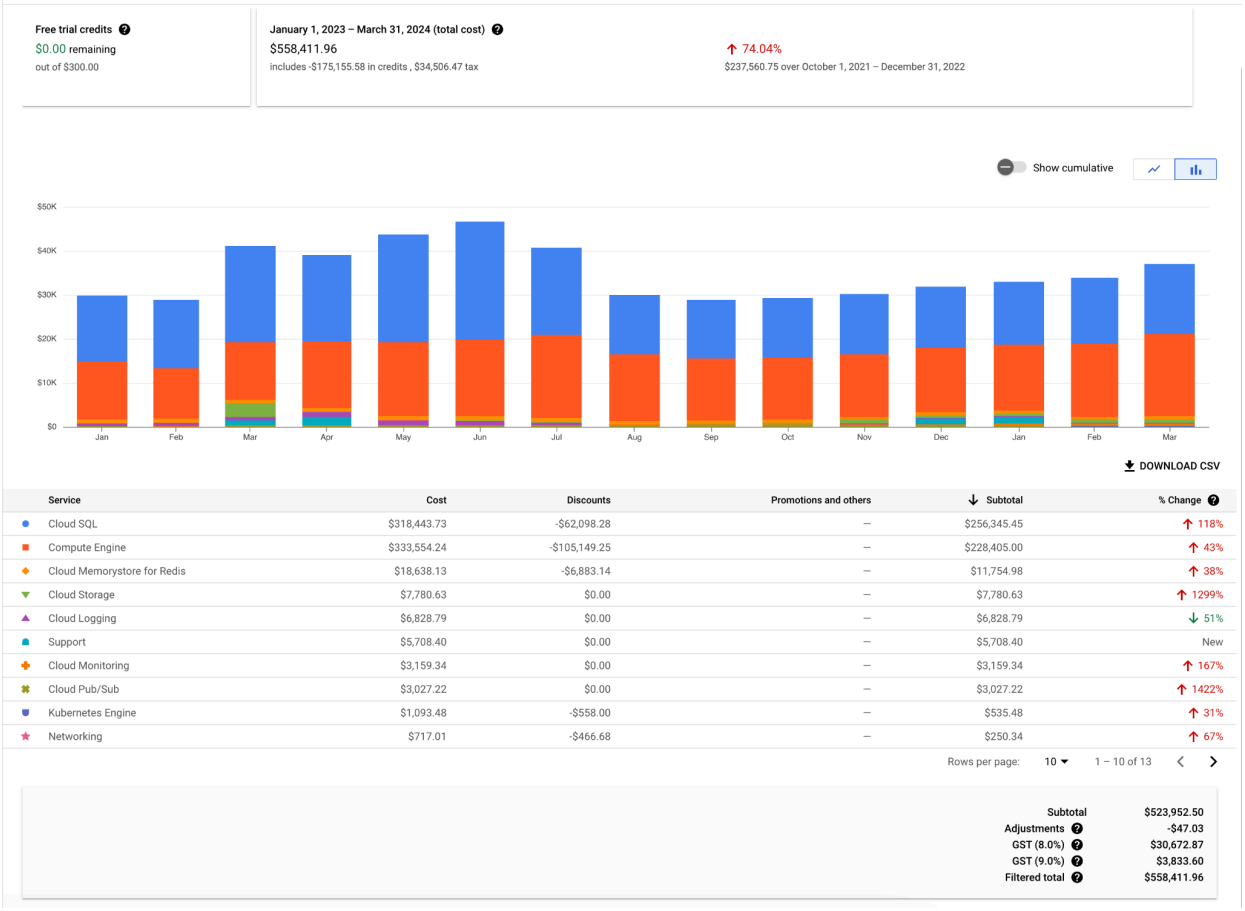
The introduction of new features such as **trace**, **xcm**, and **opengov** has significantly increased the volume of data processed and stored by Subscan. These features enhance the user experience but also entail additional infrastructure costs.

2. Increasing Data Volume

As the network continues to produce blocks, the volume of data on Subscan has gradually expanded. This is due to the growing activity within the Substrate ecosystem, necessitating more resources to handle the increased workload.

GCP Bill

The operation and maintenance of Subscan require significant server infrastructure, including high-performance servers and storage devices. The total cost for the server infrastructure is estimated to be **558,411.96 USD(tax included)**. To more accurately account for the costs associated with these two networks, we have used the storage proportions of both networks as reference metrics for resource usage, totaling **10.1884%**. Therefore, the actual GCP cost for these networks is **56893.24 (tax included)**, averaging **3792.88** USD per month.



Others Cost

The operation and maintenance of Subscan demand a dedicated team of experienced professionals to ensure its seamless functionality. To provide an overview of the labor costs, we present a breakdown of the actual workload and associated expenses for **Kusama and Asset Hub (Kusama)**. The estimated total cost for personnel is **117,000** USD, averaging **7,800** USD per month.

Please note that the amount requested in this application solely covers the basic operation and maintenance of the aforementioned networks, as well as our efforts to reduce infrastructure costs. It does not encompass any development of new features. Despite our diligent efforts, such as developing Trace , XCM, OpenGov, and more, these development costs have been shouldered by Subscan for nearly three years. This has not been an easy feat, particularly in the

current market environment. In the future, Subscan hopes to seek partial subsidies for workloads proposed or recognized by the community; this will foster the healthy growth of Subscan's economic model and ensure sustainable operation.

Basic Maintenance for Kusama and Asset Hub (Kusama) Networks:
The total labor cost amounts to 108,000 USD, averaging 7,200 USD per month, which include:
- One DevOps engineer: $600 per day, working 4 days per month.
- One front-end engineer: $600 per day, working 4 days per month.
- One backend engineer: $600 per day, working 4 days per month.

Technical Infrastructure Optimization for Kusama and Asset Hub (Kusama) Networks:
The total labor cost for this special task is 9000 USD, which include:
- Database migration, resource cleanup, index optimization, and MySQL storage data optimization: 1 engineer, total working 8 days
- Node service testing and migration to Onfinality: 1 engineer, total working 2 days
- Resource optimization for applications: 1 engineer, total working 1.5 days
- Data backup type adjustment: 1 engineer, total working 1.5 days
- Service log adjustment: 1 engineer, total working 2 days

Total

We believe that this reimbursement proposal will help to ensure the continuous operation and maintenance of Subscan, and benefit the growth and development of the Kusama and Asset Hub (Kusama) networks. This time, we plan to apply for a total of **173,893.24 USD** in Kusama, the amount of KSM will be converted based on the EMA7 price on the day of the official submission.

Exchange rate

2024-04-11 16:55:54 (+UTC), Block #22694298

KSM EMA7 Price (USD): 42.025341;

Number of KSM: 4137.818655

https://kusama.subscan.io/tools/price_converter?value=173893.24&type=block&from=USD&to=KSM&time=22694633

Regarding re-submission

Following the rejection of Referendum 316, we diligently reviewed and implemented optimization strategies suggested by the community. Data from the past 9 months demonstrates that these measures have been highly effective, and making future costs more predictable.

However, it's important to note that the Kusama network has not covered any costs for Subscan for **15 months**, posing a significant financial challenge for our team. The substantial cost shortfall has us concerned about our future. Should this proposal not be approved, we may need to consider pausing the development of new features for the Kusama network, potentially impacting the ecosystem negatively—an outcome we earnestly wish to avoid.

We appeal to the Polkadot community for support in this proposal. Our commitment to enhancing and maintaining the infrastructure remains steadfast. By securing the necessary funding, we can continue our work without interruptions or compromises, ensuring the robustness and innovation of the ecosystem.