



**Project Proposal of RadiumBlock Endpoint Service
Q4 2022 and Q1 2023**

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1.0 Summary

Proponent	RadiumBlock (RealWeb, LLC) an LLC registered in the United States with EIN 87-2225143
Date	May 10, 2023
Requested Allocation	19256 DOT (\$88,490 USD, based on EMA 7 value of \$4.718 + 500 DOT for proposal 284)
Recipient Address	13GtCixw3EZARj52CVbKLrsAzyc7dmmYhDV6quS5yeVCfnh1

Short Description:

The RadiumBlock team, an infrastructure provider for the Polkadot/Substrate community, is seeking reimbursement for the provision of RPC services for the Polkadot networks for Q4 2022 and Q1 2023. We are committed to the DotSama ecosystem and we are investing significant capital upfront, believing we can provide a reliable and secure service to the community at a fixed and reasonable cost.

2.0 Innovation Highlights

RadiumBlock is committed to providing high-quality infrastructure services to our customers. Our mission is to continuously improve and innovate in order to meet the evolving needs of the Web3 ecosystem. Over these last two quarters we have significantly overhauled our infrastructure resulting in the following:

- Deployed Hybrid On-Prem + Cloud computing strategy
- Expanded Edge locations
- Security upgrades

2.1 Hybrid On-Prem + Cloud computing strategy

Why we mostly left the cloud:

A little commentary on why we made the switch from a cloud only approach to a hybrid public cloud + on-prem computing strategy could prove illuminating. Cloud computing has two primary benefits. The first benefit is simplicity - in launching a simple application using fully managed services. Our expertise in cloud from managing infrastructure for enterprises equipped us to build a complex blue green deployment approach on cloud.

The second benefit is scalability - scaling the compute capacity up or down

based on load that is highly irregular. Swings in compute demand can be elegantly handled in a cloud environment without degrading the service quality. A beneficial side effect is that it helped us estimate the computing capacity needed when provisioning such a service.

Of these two benefits only the second one ever really applied to us. However the place we are at now, having run the endpoint service for several quarters, we have a fair idea of steady state demand allowing for provisioning of on-prem resources to match the demand.

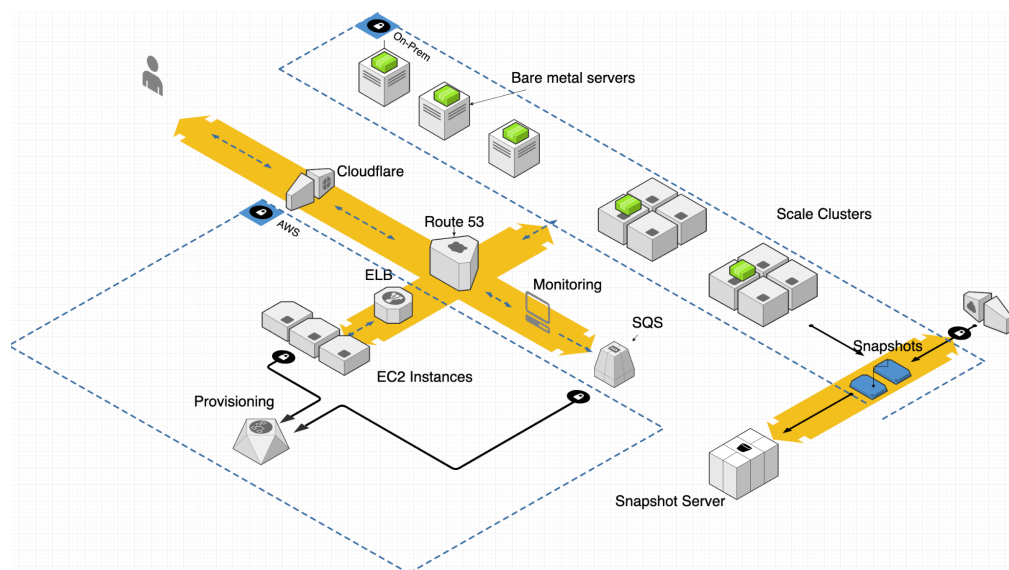
We also learned about a significant downside to cloud, particularly for blockchains - cost - specifically cost of egress bandwidth. Blockchain by its distributed nature is bandwidth and compute intensive in trying to keep the chain in sync.

All of these factors lead us to try to achieve the best of both worlds - by provisioning steady state compute capacity on-prem and bursting to cloud during unusual spikes. Furthermore, when amortized over 3 years, the savings in compute and bandwidth cost allowed us to channel capital back into increasing the reach and quality of our endpoint service.

What is our on-prem/private cloud?

Our on-prem aka private cloud infrastructure uses a combination of dedicated servers and a platform called “[Scale Computing Platform](#)”, something similar to VMware. Presently, we have scale computing clusters deployed on the private racks we rent out from major data centres in 4 locations: Chicago, Sydney, London, and Singapore. The scale clusters we deploy comprise of 3-6 node servers and a standby server for redundancy. The scale clusters are capable of self healing - auto migrating instances within the cluster should one of the servers fail. We use enterprise hardware on these nodes with Intel Gold/Silver CPUs or similar, NVMe SSDs and high speed networking. In the other locations we operate, we have full or partial colocation rack space.

The Architecture



The figure illustrates a high level architecture of our endpoint service. Our shift to a hybrid computing approach required a rearchitecting of the load balancing strategy. We have switched to DNS based load balancing to route traffic to one of our on-prem endpoints running on our Scale Clusters or bare metal servers. The DNS based routing is both load and geography aware - routing the user request to the nearest available endpoint node. By design, bulk of the traffic is handled by the scale clusters and bare metal servers with a smaller portion of the traffic, capacity spikes and redundancy handled by our AWS based compute deployment.

In addition to edge server proximity, several latency saving optimizations like OCSP stapling, TCP stack tuning are applied to our servers.

2.2 Expanded Edge locations

As stated before, the amortized cost of infrastructure over 3 years, the savings in compute and bandwidth cost allowed us to channel capital back into increasing the reach i.e. more endpoint locations. We are at 12 locations worldwide including South America, Africa and India. The full list is as follows: Santiago, Johannesburg, Chicago, Silicon Valley, Frankfurt, Madrid, London, Hong Kong, Mumbai, Singapore, Tokyo, Sydney. We at RadiumBlock believe an endpoint delivery network leveraging distributed edge locations is the best way to dramatically decrease latency and make blockchain technology more accessible.

2.3 Security upgrades

We have recently made a concerted effort to buttress our security practices.

- Access to the servers are permitted only through a Bastion Server where every keystroke is logged, and scrutinised as part of monthly audit. The Bastion based ssh management service uses 2 factor authentication and enables timed access revocation, role based access control.
- Session keys and controller keys are stored in a hashi vault with access limited to two of our most senior admins who have been with us for over 10 years and us the two directors.
- We ensure our colo partners have SOC2 certification.

These steps are in addition to classic security practices we have learned from 2 decades of Linux security management.

The following lists the Risk Mitigation measures in place :

- Our DDoS protection is two-tiered with our servers hosted on both Cloudflare and AWS
- DDoS protection is enabled and disabled based on probable threat perception

3.0 Company Introduction

3.1 Company Background

RadiumBlock is wholly owned by RealWeb LLC. RealWeb has been in business since 2004. Every year, our team manages millions of dollars in AWS infrastructure, making us one of the industry's most dependable and trustworthy web hosting companies. In addition, our engineers have extensive experience managing data centres and business infrastructure.

We are now harnessing our expertise and experience in building reliable infrastructure services for the future of web3.

3.2 Ecosystem Background

RadiumBlock is an active and known participant in the Polkadot/Kusama community. We participate in the Polkadot and Kusama Thousand Validator Program, offering validator service to several other chains.

We are active infrastructure providers in the DotSama ecosystem. Some of the services we provide are

- Snapshot Service [snapshot](#) services (validator and active snapshots)
- Kusama, Polkadot, Statemine, Statemint endpoints
- White Label validators ([Node-as-a-Service](#))

4.0 Meet The Team

RadiumBlock Web3 infrastructure is managed by 5 full-time staff members who are responsible for configuring and managing the end-points, nodes and the underlying infrastructure. All these team members have a minimum of 15 years of experience in the Server/Cloud Management and Solutions industry.

Vinu Joseph, *Primo Radium*

Vinu is a computer engineer turned Entrepreneur. He is Founder of Vtrio, India, Co-Founder Real Web LLC, based in Texas, USA, and Web2Market Inc, USA and owns 8 brands of hosting companies catering to different demographics. Passionate about decentralized computing, and cryptocurrency in general, he is an early investor in some of the Polkadot projects including Polkadex.

Mr Curie

In true web3 spirit, Mr Curie prefers to use a pseudonym in public documents. He serves as the chief architect and technology advisor of RadiumBlock. A technology enthusiast with advanced experience in high performance computing and data center hardware technology, Mr Curie is passionate about decentralized computing and channels that enthusiasm into RadiumBlock.

Les Barton, *Edge Computing Operations*

Les has 15 years of experience in edge computing operations - managing and maintaining geo-diverse edge nodes for CDNs and ecommerce platforms. He is the VP, Operations of a leading e-commerce hosting company in the USA

Matt, *DevOps*

Matt too prefers to use a pseudonym in public documents. He has been a senior system administrator for a leading e-commerce hosting company. He is a technology enthusiast always driven by curiosity. At RadiumBlock he is in charge of DevOps flows.

Sindhu R, *Cloud and On-prem Systems*

An AWS architect with 16 years of experience in Infrastructure and systems management, she is Chief Tech Manager of RadiumBlock. More than 10 years of expertise in Cloud systems including AWS, GPC and Cloudstack. Have architected Infra on AWS on many corporations including billion dollar companies.

Veena John, *Web3 Infrastructure*

Veena is a computer engineer with 20+ years of experience in infrastructure and system management - AWS, GPC and Cloudstack. Energized and passionate about web3 infrastructure, she has architected infra on AWS for many corporations.

Additionally we have a team of 9 computer engineers who function as our 24/7 support team whose responsibilities include monitoring and updating systems, performing periodic audits on testing system performance, and resolving any alert notifications.

Sunshine Autentico, *Coordination and Outreach*

Sunshine recently started at RadiumBlock and is in charge of coordinating various projects and helping with customer outreach and engagement.

5.0 Infrastructure Highlights

We offer a scalable, enterprise-grade infrastructure that can auto-scale to handle traffic bursts and provide services in different regions around the world, while still delivering low latency responses. Additionally, the infrastructure is designed to be resilient and fault-tolerant irrespective of any downtimes in our service regions. The failover mechanism will patch over traffic from a failed data centre to other healthy data centres with minimal disruption. To ensure a stable and optimal infrastructure, our team works around the clock using several monitoring tools.

The prominent features of our Endpoint services are:

- Low Latency through Endpoint Delivery Network
- Monitoring and Observability
 - Endpoint availability and latency in different parts of the world
 - Endpoint performance and load in each region of the world we deploy

- User experience of our Endpoint on the polkadot.js application
- Monitor the blockchain stats of the nodes.
- Auto-scaling and Load Balancing
- Fault Tolerance
- Live Rolling Updates and Upgrades

6.0 Service Usage Summary

For Q4 2022 (Oct-Dec)

- Our Polkadot RPC nodes have served an average of 21 million responses per day
- Our Statemint RPC nodes have served an average of 450k responses per day

For Q1 2023 (Jan-March)

- Our Polkadot RPC nodes have served an average of 11 million responses per day
- Our Statemint RPC nodes have served an average of 315k responses per day

7.0 Q3 Proposal Loss

In Q3 2022 our Polkadot proposal(<https://polkadot.polkassembly.io/motion/307>) we requested and was approved for an allocation of USD 47,141.00 to cover our Q3 expenses. This was computed to be 8563.31 in DOT based on DOT EMA7 value of 5.505 as on 6 December 2022. The proposal was approved on 9 December 2022 however when the tokens were released on 23 December 2022. On that day the spot price for DOT had dropped to 4.47. We immediately tried to convert to fiat by selling the tokens (along with some rewards) via coinbase. This resulted in a loss of the awarded amount of \$8863.

The token history can be verified on chain 13GtCixw3EZARj52CVbKLrsAzyc7dmmYhDV6quS5yeVCfnh (<https://polkadot.subscan.io/account/extrinsic/13GtCixw3EZARj52CVbKLrsAzyc7dmmYhDV6quS5yeVCfnh1>) and Coinbase transaction statement is also linked (https://drive.google.com/file/d/10eT41s4_1hYwtKvtPA5mT64Wts7BdBcj/view?usp=sharing) for verification. Note, the coinbase statement includes a few of our validator reward tokens in addition to the proposal award tokens.

8.0 Budget Q4 2022

Our budget is presented as two sections. In the first section, we will furnish the actual costs incurred during the final quarter of 2022. It was during this period we commenced the deployment of on-prem servers and moved the major payload from Cloud servers. We tested with two regions in October and after reviewing the results of this transition, we went ahead with the plan of migrating the rest of the regions into on-prem services. This process was completed by 10th of January 2023.

8.1 Total Q4 2022 costs :

Network	Monthly	Quarterly
Polkadot - Cloud	\$4,518.00	\$13,554.00
Polkadot - On Prem	\$5,317.00	\$15,951.00
Statemint - Cloud	\$1,160.00	\$3,480.00
Statemint - On Prem	\$1,714.00	\$5,142.00
Labour (\$70 * 30 hrs)	\$2,100.00	\$6,300.00
Total Q4 2022	\$14,809.00	\$44,427.00

8.2 Polkadot Q4 2022 costs

Polkadot On – Prem			
Type	Unit Price	Units per month	Cost
RPC Instances	\$ 225.00	20	\$ 4500.00
Load Balancer	\$ 20.00	20	\$ 400.00
Storage	0	0	\$ 0.00
Log Storage/TB	\$ 120.00	1	\$ 120
Back-ups	\$0.058	4000	\$ 232
DNS	\$ 15	1	\$ 15
Monitoring	\$ 50	1	\$ 50
Monthly Total			\$ 5317.00
3 Months Total			\$ 15,951.00

Polkadot Cloud			
Type	Unit Price	Units per month	Cost
Compute Hours	\$0.26	9730	\$2,529.80
Load Balancer	\$25	2	\$50

Storage/GB (month)	\$0.10	3072	\$307.20
Log Storage/TB	\$120.00	2	\$240
Back-ups/GB (month)	\$0.058	6000	\$348
DNS	\$15	1	\$15
Traffic (Data Transfer)/GB	\$0.13	4500	\$585.00
Monitoring	\$50	1	\$50
Multi-region Sync (AMI Transfer)/GB	\$0.086	1500	\$129
Total			\$4254
US Sales Tax			\$264
Monthly Total			\$4518
3 Months Total			\$13,554

8.3 Statemint Q4 2022 costs

Statemint – On – Prem			
Type	Unit Price	Units per month	Cost
RPC Instances	225	6	\$ 1350.00
Load Balancer	\$ 20.00	6	\$ 120.00
Storage	0	0	\$ 0.00
Log Storage/TB	\$ 120.00	1	\$ 120
Back-ups/GB (month)	\$0.058	1024	\$ 59
DNS	\$ 15	1	\$ 15
Monitoring	\$ 50	1	\$ 50
Monthly Total			\$ 1714

3 Months Total			\$ 5142

Statemint – Cloud			
Type	Unit Price	Units per month	Cost
Compute Hours	\$0.26	760	\$197.60
Load Balancer	\$25	2	\$50.00
Storage//GB (month)	\$0.10	1024	\$102.40
Log Storage/TB	\$120.00	1	\$120
Back-ups/GB (month)	\$0.058	1024	\$59.39
DNS	\$15	1	\$15
Traffic (Data Transfer)/GB	\$0.13	3500	\$455.00
Monitoring	\$50	1	\$50
Multi-region Sync (AMI Transfer) /GB	\$0.086	500	\$43
Total			\$1,092.39
US Sales Tax			\$67.8
Monthly Total			\$1,160
3 Months Total			\$3,480

9.0 Budget Q1 2023

9.1 Total Q1 2023 costs :

Network	Monthly	Quarterly
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Polkadot - Cloud	\$1,594	\$4,782
Polkadot - On Prem	\$5,433	\$16,299
Statemint - Cloud	\$816	\$2,448
Statemint - On Prem	\$1,163	\$3,489
Labour (\$70 * 20 hrs)	\$1,400	\$4,200
Total Q1 2023	\$10,406	\$31,218

9.2 Polkadot Q1 2023 costs

Polkadot On-Prem			
Type	Unit Price	Units per month	Cost
RPC Instances	\$ 225.00	20	\$ 4500.00
Load Balancer	\$ 20.00	20	\$ 400.00
Storage	0	0	\$ 0.00
Log Storage/TB	\$ 120.00	1	\$ 120
Back-ups	\$0.058	6000	\$ 348
DNS	\$ 15	1	\$ 15
Monitoring	\$ 50	1	\$ 50
Monthly Total			\$ 5433.00
3 Months Total			\$ 16299.00

Polkadot Cloud			
Type	Unit Price	Units per month	Cost
Compute Hours	\$0.26	1525	\$396.5
Load Balancer	\$25	2	\$50

Storage/GB (month)	\$0.10	3072	\$307
Log Storage/TB	\$120.00	1	\$120
Back-ups/GB (month)	\$0.058	3000	\$174
DNS	\$15	1	\$15
Traffic (Data Transfer)/GB	\$0.13	2000	\$260
Monitoring	\$50	1	\$50
Multi-region Sync (AMI Transfer)/GB	\$0.086	1500	\$129
Total			\$1,501.5
US Sales Tax			\$93
Monthly Total			\$1594.5
3 Months Total			\$4783

9.3 Statemint Q1 2023 costs

Statemint On-Prem			
Type	Unit Price	Units per month	Cost
RPC Instances	225	4	\$ 900.00
Load Balancer	\$ 20.00	4	\$ 80.00
Storage	0	0	\$ 0.00
Log Storage/TB	\$ 120.00	0.5	\$ 60
Back-ups/GB (month)	0.058	1000	\$ 58.00
DNS	\$ 15	1	\$ 15
Monitoring	\$ 50	1	\$ 50
Monthly Total			\$ 1163
3 Months Total			\$ 3489

Statemint Cloud			
Type	Unit Price	Units per month	Cost
Compute Hours	\$0.26	750	\$195.00
Load Balancer	\$25	2	\$50.00
Storage/GB (month)	\$0.10	1024	\$102.40
Log Storage/TB	\$120.00	1	\$120
Back-ups/GB (month)	\$0.058	1024	\$59.39
DNS	\$15	1	\$15
Traffic (Data Transfer)/GB	\$0.13	1024	\$133.12
Monitoring	\$50	1	\$50
Multi-region Sync (AMI Transfer) /GB	\$0.086	500	\$43
Total			\$767.91
US Sales Tax			\$47.61
Monthly Total			\$816
3 Months Total			\$2,448

10.0 Budget Summary

Q4 2022 Total	\$44,247
Q1 2023 Total	\$31,218
Q3 Slippage Loss	\$8,863
DOT to Fiat Conversion Cost - 5% (Fees charged by exchanges)	\$4,162
Total Budget for Proposal	\$88,490

10.1 Gov1 Proposal Cost recovery

[Our proposal to the treasury](#) got stuck in the transition to OpenGov resulting in 500 DOT being locked up. We have been advised to request a refund for the tokens locked for the proposal via this proposal.

11.0 Future Plans

11.1 Cost Reduction and Fixed Price SaaS Model

From Q2 2023, we will be able to pass on the full cost reduction advantage of our Hybrid infrastructure model. Moreover we will be switching to a fixed price SaaS style model. This should also allow us to submit the proposal upfront. The following is the projected cost model.

Network	Monthly	Quarterly
Polkadot	\$4500	\$13500
Statemint	\$2000	\$6000
Westend	\$1000	\$3000
Collectives	\$1000	\$3000
Total Q2 2023	\$8500	\$25500

11.2 Continue Expanding to other Dotsama chains:

We plan to support more DotSama chains and be a strong infrastructure provider for the ecosystem. So far we have put our technical skill to expand our endpoint services to other DotSama chains such as Polkadot, Statemint and Statemine.

12.0 Appendix

Infrastructure Capital Expense Estimate :

Summarized here is the capital expense for our on-prem infrastructure. This is listed here purely for informational purposes (i.e. **not** for the quarterly budget) **nor** are we seeking reimbursement for it. All costs are denominated in USD and are presented as-is and do not constitute a portion of any allocations.

Item	One-time expenses	Monthly fees
Electrical Power	1200	\$ 1,600.00
Bandwidth		\$ 1400.00
Rack Provisioning	2,500	\$ 900.00
PDU's	4,500	
Firewalls	8860	
Firewall Subscription		\$ 160.00
Accessories (cable/spare HW/KVM)	15000	
6 Scale Servers	99828	
Scale HW Setup	2870	
Scale License/Support		\$ 2250.00
8 Bare Metal Servers	78400	
Total	\$ 213158.00	\$ 6310.00