

OnFinality Multi-Chain Unified NFT API

Proposer: [OnFinality](#) is leading infrastructure provider for the Polkadot/Substrate community.

Proponent: 12mRyiCp9zdh1wEVW5gLLiFBxDPKks72rRXmSupyEK3VAMLf

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Requested DOT: 14,269.071 DOT (USD \$74,983.97) (@5.255 USD/DOT - [EMA7D](#) on 28 Jul 2023)

Short description: This proposal covers the first Unified API, the NFT API for support of ERC721, ERC1155, Uniques Pallet NFTs, and Substrate NFTs Pallet NFTs, as well as hosting costs for Q3 2023

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Tldr;

- Multichain applications operate across multiple networks, allowing users to leverage the unique benefits of multiple Polkadot relay chains and parachains simultaneously
- Polkadot & Kusama ecosystem's size and complexity makes developing multi-chain applications both time and resource intensive, stunting growth and innovation in the ecosystem
- OnFinality's set of Multi-Chain Unified APIs will help ease this problem by providing indexed and processed data for use cases such as NFTs, transactions, staking and governance
- This proposal covers the first Unified API, the NFT API for support of ERC721, ERC1155, Uniques Pallet NFTs, and Substrate NFTs Pallet NFTs, as well as hosting costs for Q3 2023.
- The total cost for all of the above, including an already delivered Milestone 1 that is in use by customers, is US \$74,983.97

Background and Problem Statement

Developers in the Polkadot and Kusama ecosystem face unique challenges due to the size and flexibility of the ecosystem. To access the entire user base, application teams need to integrate with up to 80 separate networks, each potentially implementing similar functionality in different ways.

This leads to an increasing complexity for developers who build in the Polkadot ecosystem, where breadth of support is paramount to enjoying the network effect benefits that the parachain system brings. They are slowed down by the need to understand, implement and index the required data across parachains, each team reinventing the wheel and individually bearing the full infrastructure costs.

For example, tracking transactions and NFTs across the Polkadot and Kusama space are fragmented across a growing matrix of:

- 80 + Networks
- 2+ token transaction implementations
- 6+ NFT Implementations and standards

As XCM usage continues to grow, multi-chain use cases will become more compelling and could offer a real edge to Polkadot, but most applications will not want to deal with up to 640 different data sources ($80 \times 2 + 80 \times 6$).

As a whole for the ecosystem this is highly inefficient and slows growth, and R&D cycles are slow as teams must invest heavily before being able to test their product with users. It puts Polkadot and its teams at a competitive disadvantage over larger networks which closely follow standards, such as EVM, and already have extensive tooling including Unified APIs for their community.

Existing Solutions

Working alongside application teams and networks, we uncovered a disparate mixture of solutions used, none of which provide adequate ecosystem coverage

Self-Indexing

Some teams run their own NFT indexers using products such as SubQuery. This has a large upfront cost both in time and money, with ongoing maintenance and curation required and a constant challenge to keep up with new chains and standards.

Typically, each chain is indexed separately, meaning that an application still needs to make 80+ requests to cover all parachains. Several teams have expressed their desire to move away from maintaining these indexers because of the aforementioned difficulties, ultimately leading to this proposal.

IPFS Gateways

For NFTs, metadata must be retrieved to show the NFT Name and Description, adding complexity and degrading performance of the user-facing application. This adds an additional time delay and cost. Metadata of various formats must also be understood and parsed

Network or Standard Specific Endpoints

Teams such as Unique Network and RMRK have created public endpoints for their NFTs. However, they are not standardised and provide only partial coverage for a single NFT standard within the Polkadot and Kusama ecosystem.

Proposed Solution (Unified NFT API)

OnFinality is building a suite of fast and reliable Multi-Chain Unified APIs for the Polkadot ecosystem to help overcome the integration complexity that comes with 80+ parachains. These new Multi-Chain Unified APIs will include (among other things) transactions, staking, balances, and in this case, NFTs.

This model is well received in other ecosystems, where there is a proven value to multi-chain standardised use case APIs. Barriers to entry of the Polkadot and Kusama ecosystem will be reduced, while existing teams will benefit from faster development and reduced costs - both in personnel and infrastructure, allowing them to focus their efforts on innovation and growth

It will be Polkadot's first reliable, scalable, and complete NFT API.

Open-Source Multi-Chain NFT Indexing project

OnFinality's Unified NFT API will provide access to NFTs and their metadata for all popular standards across the Polkadot and Kusama ecosystems and beyond, in a single, simple request. The OnFinality NFT API will just be the first Unified API offered by OnFinality, with plans to expand to transactions, staking, and more.

We envisage that this project will support the following standards over the long term

- EVM ERC-721 & 1155
- WASM PSP34
- Substrate Uniques standard
- Substrate NFTs standard
- ormlNFTs

Open-sourcing this project allows developers who prefer to run their own infrastructure to get value out of this proposal. The project code for the first milestone is here <https://github.com/OnFinality-io/api-nft/tree/main> and is open sourced under the GPLv3 licence.

This project indexes data to allow the following key use cases (but not limited to):

- Get all NFTs for a wallet address across all parachains
- Get an NFT's current owner
- Retrieve all NFTs for a collection
- Retrieve the metadata for an NFT
- Retrieve all transactions for an NFT
- Retrieve all NFT transactions for a wallet address

Important NFT information is often stored off-chain via metadata, usually in the JSON format on IPFS or an HTTP web service. We retrieve and store the entire raw metadata as well as the following parsed, queryable fields:

- NFT Name
- NFT Description
- NFT Image URI

This removes the need for applications to load the metadata after retrieving an NFT, an often slow and complicated process.

Hosted Unified NFT API

OnFinality takes the above open-source NFT indexing project, and hosts a production level high performance public GraphQL endpoint available completely free to the community - up to reasonable rate limits.

This endpoint will be operated with a target uptime of 99.9% allowing wallets and other production applications to utilise this (OnFinality has a proven track record as the largest and most reliable infrastructure provider in the Polkadot and Kusama ecosystems). We will publicly share all daily response counts and uptime status of each Unified API.

GraphQL was chosen for its high flexibility compared to a REST or RPC endpoint, and was specifically requested by teams who provided feedback on this proposal. This common GraphQL API interface can be implemented and extended by each developer to make integration into various dApps or wallet applications easier and faster.

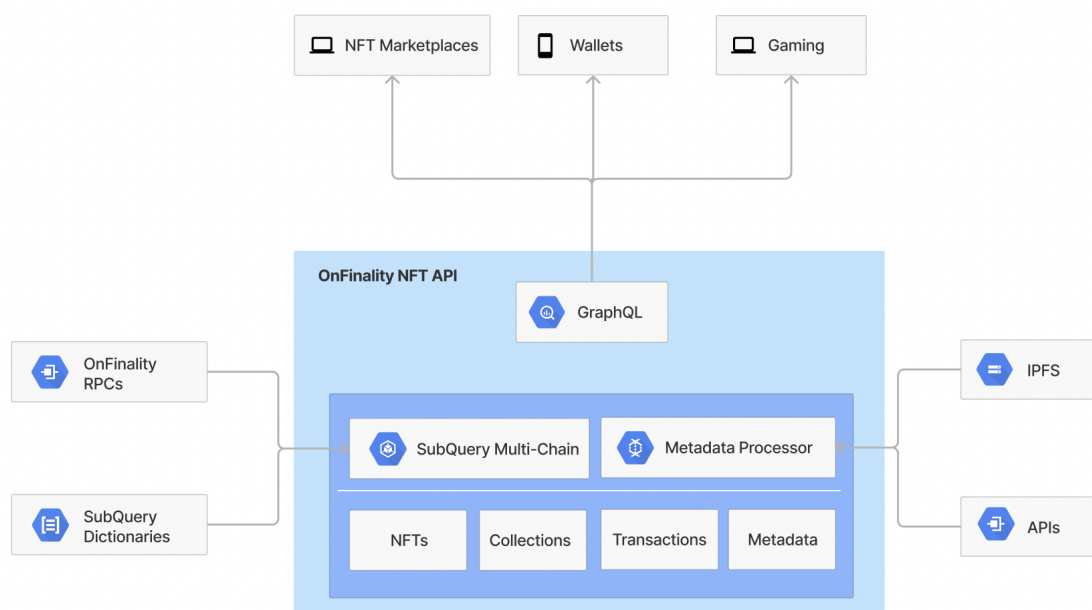
However, GraphQL comes with its own set of challenges which must be addressed. The flexibility means that two requests can cause wildly different demands to the underlying infrastructure. GraphQL Access and Billing layers will be developed to ensure that:

- Poorly formed queries which could degrade performance for other users on shared infrastructure are not permitted
- Rate Limits, and costs on paid endpoints, fairly take into account the resources required to service each request

Additionally to the rate limited public endpoint, users will be able to sign up for private API keys to access all OnFinality services and benefits such as:

- OnFinality API Insights
- Endpoint security
- Dedicated support
- Higher rate limits based on the [existing RPC revenue share model](#)

The Unified NFT API consists of the SubQuery Multi-Chain indexer and a separate Metadata Processor to retrieve and parse Metadata from a variety of sources



Example Requests

Try out these example requests now on our Beta Unified NFT API

Public Endpoint: <https://nft-beta.api.onfinality.io>

Playground: <https://nft-beta.onfinality.io/>

Get NFTs for Address (All Networks)

```
None
{
  nfts(
    first: 20
    filter: {currentOwner: {equalTo:
      "0xe40370a8154222066c2a75c11b7b1efe94558703"}} )
}
```

```
{
  nodes {
    id
    metadata {
      name
      description
      imageUri
    }
  }
}
```

Get Transactions for Address (All Networks)

None

```
{
  transfers(
    first: 20
    filter: { or: [ { to: { equalTo:
"0xe40370a8154222066c2a75c11b7b1efe94558703" } }, { from: {
equalTo: "0xe40370a8154222066c2a75c11b7b1efe94558703" } } ]
  })
  {
    nodes {
      networkId
      nft {
        collection
        {
          contractAddress
        }
      }
    }
  }
}
```

Find more examples in the complete documentation [here](https://documentation.onfinality.io/support/unified-nft-api)

Feedback from ecosystem participants

The OnFinality Unified NFT API has been 100% led and validated by the most successful application teams in Polkadot.

"The need for accurate, real-time multi-chain information is a top priority for our users. Dealing with the complexities of querying various chains and NFT standards is proving to be a performance hindrance, especially as the number of NFTs owned increases. OnFinality's Unified NFT API solution comes as a game-changing opportunity for us to streamline our processes, saving us valuable development time while ensuring optimal performance." - [Talisman](#) (Wallet)

"Even though we have support for displaying Nodle NFTs in our mobile app and web client, Polkadot is an evolving network and it becomes more complex with each added chain. The Unified NFT API provides support for all NFT assets, regardless of where they're hosted: enhancing discoverability across the ever-expanding network of parachains." - [Nodle](#) (Polkadot Parachain)

"OnFinality's Unified NFT API simplifies the development of NFT apps, significantly reducing barriers of entry. This not only fosters the growth of RMRK, but also sparks widespread usage and adoption of all types of NFTs across the Polkadot ecosystem." - [RMRK](#) (NFT Standard)

"During our dilemma of building our own blockchain indexer, or trying to find any service out there for a few weeks, we found out about the Unified NFT API (beta), we tested it out on their playground and using Apollo client. It was a great developer experience. There is a genuine need for the product in the Dotsama space, this will push adoption and growth for the whole ecosystem undoubtedly. We are patiently waiting for the production release." - Development Team, Dotsama NFT Marketplace

[Read more about it on Astar's own documentation](#)

Examples of benefiting teams include

- **Wallets** need to show a user their NFTs across the entire Polkadot ecosystem
- **NFT Marketplaces** wishing to expand their support to more networks
- **Scanners** will benefit from richer data such as NFT Name and Description which aren't available on chain.
- **Data analytics providers** will benefit from a off the shelf API that will allow them to expose Polkadot's NFT ecosystem to a larger audience
- **Parachains** can easily surface their NFTs in dApps, such as wallets, without needing to develop costly integrations

Milestones

This proposal forecasts and budgets for Q3 2023 to cover development and support of an initial 8 Networks and 4 NFT Standards plus expected infrastructure, maintenance and support costs to run the NFT API during the quarter. Future proposals will similarly include a mixture of new

development as we extend the NFT API and add additional unified APIs, plus the ongoing maintenance cost of each quarter.

This proposal covers Q3 2023, during which we will deliver the first 3 milestones. Note that the included networks are not conclusive - once we support a given standard we will take community feedback to add more networks as requested.

1. **[Complete]** Unified endpoint for ERC-721 and ERC-1155 NFTs across the following Networks

- Moonbeam
- Moonriver
- Astar
- Shiden
- Acala

2. Extending support to Uniques Pallet NFTs on

- Statemint
- Statemine
- Westmint

3. Extending support to Substrate NFTs Pallet NFTs on

- Statemint
- Statemine
- Westmint

4. WASM PSP 34 NFT's on *Future Proposal*

- Astar

5. Adding support to ormlNFTs on *Future Proposal*

- Acala
- Bit.Country Pioneer

Costings

In this proposal, we request funding to cover the development of milestones 1, 2, and 3 as well as ongoing infrastructure, maintenance, and support costs throughout the quarter. Milestones 4 & 5 will be included in a future proposal, as they are unlikely to be delivered in Q3. See Appendix 1 for full detail

Proposal is for Milestones 1, 2, and 3 + Q3 hosting costs. Milestones 4 & 5 will be in a future proposal. See Appendix 1 and Appendix 2 for full breakdown of costs

Area	Details	Cost
Milestone 1 (Already delivered)	Development costs for Milestone 1 including: - Open source ERC-721 & ERC-1155 indexing project - Metadata Processing	US \$37,820

	- GraphQL public endpoint with fair use control - Self Service private endpoints	
Milestone 2	Open source indexing project for: - Substrate Uniques Pallet And inclusion of standard and networks into unified API	US \$15,200
Milestone 3	Open source indexing project for: - Substrate NFTs Pallet And inclusion of standard and networks into unified API	US \$12,000
Milestone 4	Open source indexing project for WASM PSP34 Inclusion of the standard and networks into OnFinality Unified NFT API	<i>Future Proposal</i>
Milestone 5	Open source indexing project for ormlNFT Inclusion of the standard and networks into OnFinality Unified NFT API	<i>Future Proposal</i>
Q3 Public Endpoint Hosting Costs	Expected infrastructure, monitoring, maintenance, support costs during Q3 2023	US \$9,963.97
Total	Milestones 1, 2, 3 + Q3 hosting costs	US \$74,983.97

About OnFinality

[OnFinality](#) is a SaaS platform providing infrastructure services for the Polkadot/Substrate community. Our mission is to support all blockchain developers in the world by providing core infrastructure so they can focus on building the next dApp.

We continue to reaffirm our dedication to providing free support of 500,000 responses to our API service each day for users around the world. You can access our public API service by connecting to it using [Polkadot.js](#) or via the [endpoints listed on our website](#). You can also [create your own free API key in our application](#) and track metrics and statistics.

Thanks to the funding of our original treasury proposals back in 2020, OnFinality has run over 68 API service endpoints for many different teams around the growing Polkadot and Kusama ecosystems. We've been able to take the tools and infrastructure that we've built and help other teams scale while providing superior experiences to their communities. We are dedicated to helping the Polkadot ecosystem through this next phase of parachain growth.

Our mission remains the same, to support all blockchain and dApp developers by providing core infrastructure and developer tools that save them hours.

Appendix 1: Milestones, Deliverables & Costs

All dollar values are in USD

Milestones	Tasks	Deliverables	Developer	Project Manager	Tech Lead	Costs	Notes
1	1.1 Indexer	ERC-721 & ERC 1155 indexing project	145 h	23 h	25 h	\$20,260	Initial networks: - Moonbeam - Moonriver - Astar - Shiden - Acala
	1.2 Metadata	NFT Metadata as part of indexed data set	58 h	8 h	6 h	\$7,480	
	1.3 GraphQL endpoint	GraphQL public endpoint	32 h	10 h		\$4,400	
	1.4 Self Service Portal	Extension of OnFinality's Self Service portal to include the NFT API	40 h	6 h	8 h	\$5,680	Includes: - API Insights - Security controls: Allowlist by origin or IP - Private endpoints
	Total					\$37,820	
2	Additional networks & Standards	Open Sourced Substrate Uniques pallet indexing project	96 h	12 h	8 h	\$15,200	
3	Additional networks & Standards	Open Sourced Substrate NFTs pallet indexing project	96 h	12 h	8 h	\$12,000	

Total:	\$65,020	<i>Milestones 1, 2, 3</i>
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Ratecard	
Role	Rate (\$USD/Hour)
Developer	\$100
Project Manager	\$120
Tech Lead	\$120

See Appendix 2 on following page

Appendix 2: Public Endpoint Hosting Costs Q3

All dollar values are in USD

Item	Price	Billable Units	Cost
Indexer - Compute Units	US\$0.25 / Hr	21024 Hours	US \$5,256.00
Indexer - Dedicated Database	1 x db.r6g.large @ \$0.313 / Hr	2190 Hours	US \$685.47
Metadata Processor	US\$0.25 / Hr	2190 Hours	US \$547.50
Egress	US\$0.25 / GB	300 GB	US \$75.00
Support & Maintenance - Indexing	US \$100 / Hr	16 Hours	US \$1,600.00
Support & Maintenance - Metadata	US \$100 / Hr	12 Hours	US \$1,200.00
Support & Maintenance - Public Endpoint	US \$100 / Hr	6 Hours	US \$600.00
Total			US \$9,963.97