

Darwinia Genepaper v4

Powering your DApp's cross-chain capabilities

Revised 2024-01

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Background

The blockchain industry has been evolving rapidly, witnessing the emergence of numerous blockchain networks. As proponents of a multi-chain future, we recognize the increasing need for DApp interoperability among these diverse chains. While addressing this interoperability challenge, our focus extends beyond safety to encompass versatility, generalizability, cost-effectiveness, and programmability.

Currently, several service providers offer token bridges for token holders. However, most of these solutions are limited to specific assets or use cases, lacking the desired level of generalization and programmability. Moreover, the complexity that arises from layering application-layer smart contracts on top of underlying cross-chain solutions further compromises security. To meet the needs of cross-chain DApp developers, there is a requirement for layered protocols, including a purpose-built, generalized, and programmable cross-chain messaging layer to support their applications.

Much like how Ethereum revolutionized the industry by introducing smart contracts, thereby transforming blockchains into programmable platforms and laying the foundation for the DApp boom and DeFi summer, we anticipate a substantial increase in blockchain functionality driven by new and emerging cross-chain messaging technologies.

Darwinia aims to lead this trend with its cross-chain messaging services and infrastructure. We focus on enhancing the cross-chain capabilities of DApps by providing developers with Darwinia Msgport. This solution enables seamless integration of cross-chain functionality into their DApps. Additionally, Darwinia offers extensive support facilities and various message protocol options, including ORMP, LCMP, XCMP, L1-L2 Messaging, and more, in addition to the Darwinia EVM+ ability.



RING is the governance token of Darwinia Network and can also be used for gas fees on the Darwinia Chain.

Issuance

RING has an initial supply of 2 billion tokens, and its annual issuance, starting from year 0, follows the table provided in the [Darwinia Genepaper V3](#).

Index of year	Issuable this year	Index of year	Issuable this year	Index of year	Issuable this year	Index of year	Issuable this year
0	0.8	25	1.69005897	50	0.50143962	75	0.08293934
1	1.11773288	26	1.63542519	51	0.47110103	76	0.07645831
2	1.347469885	27	1.57994277	52	0.44220789	77	0.07043743
3	1.527022465	28	1.52392074	53	0.41472652	78	0.06484844
4	1.671311704	29	1.46764063	54	0.38862045	79	0.05966438
5	1.788233108	30	1.4113579	55	0.36385086	80	0.05485963
6	1.882692906	31	1.35530328	56	0.34037705	81	0.0504098
7	1.958079974	32	1.29968413	57	0.31815679	82	0.04629177
8	2.016919383	33	1.2446857	58	0.29714676	83	0.04248363
9	2.061201934	34	1.19047241	59	0.27730281	84	0.03896462
10	2.092565869	35	1.13718915	60	0.25858032	85	0.03571515
11	2.112403946	36	1.08496242	61	0.24093442	86	0.03271673
12	2.121929846	37	1.03390155	62	0.2243203	87	0.02995191
13	2.122221074	38	0.9840999	63	0.20869335	88	0.02740429
14	2.114247617	39	0.93563591	64	0.19400942	89	0.02505842
15	2.098891647	40	0.88857424	65	0.18022495	90	0.02289982
16	2.076961416	41	0.84296682	66	0.16729714	91	0.02091489
17	2.049201292	42	0.79885385	67	0.15518406	92	0.01909087
18	2.016299179	43	0.75626479	68	0.14384477	93	0.01741584
19	1.978892142	44	0.71521926	69	0.13323941	94	0.01587865
20	1.93757076	45	0.675728	70	0.12332926	95	0.01446887
21	1.89288266	46	0.63779363	71	0.11407684	96	0.01317679
22	1.84533528	47	0.60141155	72	0.10544591	97	0.01199333
23	1.79539841	48	0.56657064	73	0.09740153	98	0.01091005
24	1.74350616	49	0.533254	74	0.0899101	99	0.0099191

Burn

Darwinia Chain adopts a token burning mechanism similar to Ethereum's EIP-1559. This system includes base fees and tips. Users can add tips to transactions to incentivize collators to prioritize them in the next block. Base fees are completely burned and represent the minimum transaction fee required for processing in a Darwinia block. RING, the token used as the base fee in Darwinia, is burned upon transaction finalization.

Additionally, fees incurred for cross-chain services such as Msgport may be converted into RING, and there is a possibility that the governance system may choose to burn these fees.

Inflation Rate

As the issuance of RING tokens in Darwinia is fixed, increased demand for cross-chain services and Darwinia Chain's block space leads to more RING tokens being burned.

This mechanism has the potential to transition RING from an inflationary asset to a deflationary one. If the number of RING tokens burned exceeds the number issued in a given year, the inflation rate will drop below zero, leading to deflation. This scenario is similar to what happened with the Ethereum network, where the burn rate exceeded the issuance rate, resulting in a deflationary trend for its native token.

Cross-chain Service

Darwinia's cross-chain service for DApps comprises a cross-chain service layer(Darwinia Msgport) along with several message protocols and infrastructure components.

Darwinia Msgport

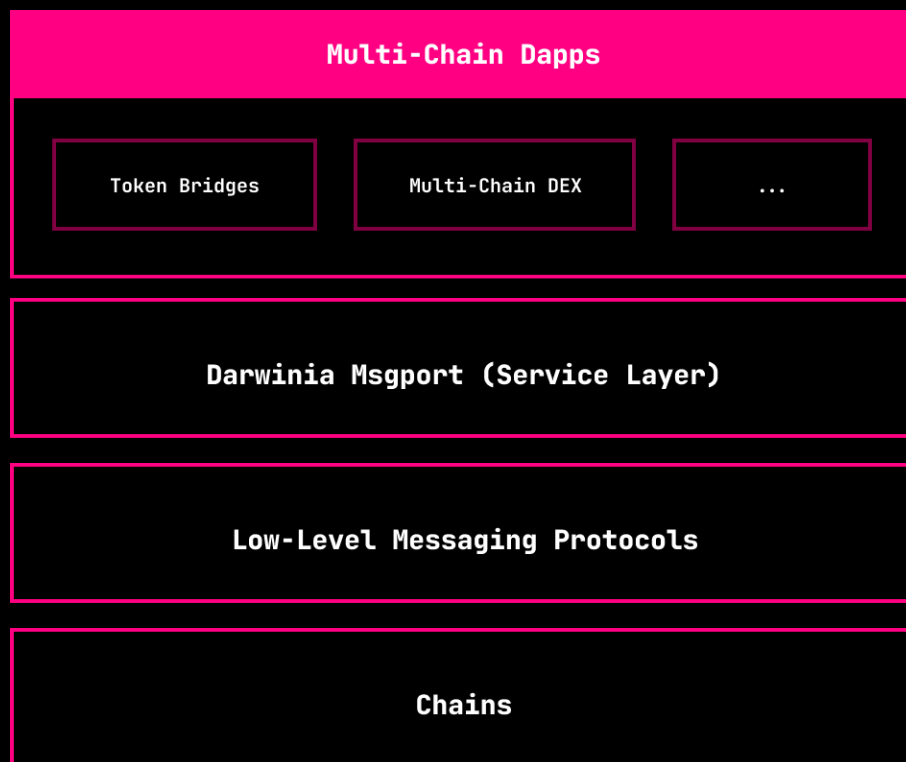


Darwinia Msgport serves as Darwinia's service layer, offering cross-chain capabilities and services for DApps on various chains.

From a technical perspective, Darwinia Msgport can be implemented as a set of smart contracts designed to facilitate message exchange between different chains, enabling cross-chain interoperability by allowing other smart contracts to send and receive in-chain messages.

By leveraging these capabilities, Msgport-based cross-chain DApps offer a user experience similar to that of traditional single-chain DApps. Darwinia Msgport enables a wide range of truly multi-chain DApps.

How it works



Darwinia Msgport is built upon a flexible and modular architecture, enabling users to utilize various cross-chain messaging layers that best suit their specific needs. Msgport offers support for sending arbitrary messages through different low-level cross-chain messaging services.

These underlying cross-chain messaging services offer diverse capabilities. Some may have low fees, while others prioritize

high security even if it results in slower transaction speeds. Msgport is designed to automatically select the most suitable cross-chain messaging layer for users based on a predefined algorithm, or it can allow users to manually choose their preferred cross-chain layer.

Through in-chain message calls to Msgport, smart contracts can communicate and interact across different chains. Msgport utilizes various low-level messaging protocols to facilitate message transmission between different blockchain networks, including EVM chains, Polkadot-based chains, and others.

Messaging Protocols

To support the service layer, Darwinia integrated with various low-level messaging protocols, including but not limited to the following:

ORMP

The Oracle Relayer Messaging Protocol (ORMP), developed by Darwinia, is an omni-chain messaging protocol. It's designed to simplify the development of decentralized applications (DApps) that function across multiple blockchain platforms, significantly reducing the complexity for developers. The term "Oracle" in this context refers to any reliable source of off-chain data, which can include traditional oracles, light-client oracles, or zero-knowledge (zk) oracles.

LCMP

Darwinia's Light-client Cross-chain Messaging Protocol (LCMP) utilizes on-chain light clients to facilitate trustless cross-chain messaging. This system enables secure and reliable communication between different blockchain networks without the need for intermediaries.

Polkadot XCMP

A Polkadot parachain is a sovereign blockchain that runs concurrently within the Polkadot Relay Chain. Parachains can serve as DeFi platforms, smart contract platforms, stablecoin protocols, liquidity platforms, privacy-focused appchains, and more. They operate independently with their governance and can interact with other parachains and the Polkadot network through XCMP (Cross-Chain Message Passing) messaging.

Darwinia Chain uses XCMP to communicate with other parachains on the Polkadot network. XCMP is a protocol that allows the transfer of arbitrary data or assets between parachains, promoting cross-chain interoperability and composability.

Messages sent via XCMP are encoded in XCM (CrossConsensus Message), providing a standardized language for describing cross-chain transactions. By using XCMP, Darwinia can access features and services offered by other parachains.

Ethereum L1-L2 Messaging

By employing different messaging protocols between Ethereum (Layer 1, L1) and Layer 2 (L2) networks, it becomes possible to facilitate interactions between contracts across these layers.

Darwinia EVM+

Darwinia EVM+ is an infrastructure that offers EVM-compatible programmable platforms for cross-chain DApps on Darwinia by integrating the EVM executor with various blockchains, including Polkadot.

Darwinia Chain

Darwinia Chain is a fundamental element of Darwinia's EVM+ strategy. It operates as a Polkadot parachain, benefiting from the security of the Polkadot consensus and seamless integration with Polkadot's XCMP messaging protocols. Being EVM-compatible, it enables DApp developers to utilize existing infrastructure, tools, and knowledge developed for EVM, offering an accessible smart contract development experience for them.

Use Cases

Token Bridge

Darwinia cross-chain solution can provide cross-chain messaging services for token bridges and help them realize the transfer of tokens of different standards (such as ERC-20, ERC-721, etc.) between blockchains. For example, [Helix Bridge's LN Bridge](#) leverages Darwinia Msgport to deliver proofs when LnProvider failed to pay out assets to users.

Cross-chain Token Backing/Issuing

The Helix Bridge offers a cross-chain [mapping token](#) service, which is built on a cross-chain token backing/issuing protocol based on the Cryptocurrency Backed Asset (CBA) model. This model ensures that tokens transferred across different blockchain networks are backed by equivalent cryptocurrency assets on the source chain.

Cross-chain Abstract Account

The concept of a cross-chain abstract account involves creating a corresponding account on the target chain for an account on the source chain. This corresponding account is uniquely controlled by the original address on the source chain. To streamline and enhance the user experience in adopting this cross-chain abstract account design, Darwinia has developed xAccount. xAccount is an encapsulation of Darwinia's Msgport cross-chain capabilities, designed to simplify the process for users engaging in cross-chain activities.

Multi-chain DAO Governance

With Darwinia's cross-chain service, decentralized autonomous organizations (DAOs) can establish unified multi-chain governance mechanisms, streamlining decision-making and coordination without the need to operate across multiple chains.

Multichain Gaming and Metaverse

Darwinia Msgport enables cross-chain communication for applications such as Evolution Land, a blockchain-based virtual management game with multiple continents on different chains. This allows users to transfer tokens and NFTs across chains, ensuring a seamless gameplay experience across various blockchain networks.

NFT Marketplace

Imagine a multi-chain NFT market where users can participate in NFT auctions on one chain, even though the NFTs being auctioned belong to multiple chains. There's no need to transfer NFTs across chains to the user's operated chain. All NFT liquidity can originate from various chains, enhancing accessibility and participation in the NFT market.

DEX

Darwinia Msgport enables decentralized exchanges to operate across multiple chains, facilitating seamless asset exchanges between different blockchain networks in a single transaction.