# Polkadot Lightpaper Polkadotの紹介

Polkadotの紹介

「Polkadotは、強い企業や国の機関に対し、個人に力を与える。」

ーギャビン・ウッズ博士

Polkadot創設者

目次

|  |  |
| --- | --- |
| はじめに | 3 |
|  |  |
| 概要 | 4 |
|  |  |
| Heterogeneous Sharding | 5 |
|  |  |
| 拡張性（スケーラビリティ） | 6 |
|  |  |
| Upgradeability | 7 |
|  |  |
| 透明性のあるガバナンス | 8 |
|  |  |
| Cross-Chain Composability | 8 |
|  |  |
| Polkadotの構造 | 9 |
|  |  |
| Polkadotコンセンサス役割分担 | 10 |
|  |  |
| Polkadotガバナンス役割分担 | 10 |
|  |  |
| DOTトークン | 11 |
|  |  |
| Kusamaネットワーク | 12 |
|  |  |
| Substrate | 13 |
|  |  |
| Web3 Foundationについて | 14 |
|  |  |
| Parityについて | 15 |
|  |  |
| Polkadotの仲間 | 16 |
|  |  |
| 問い合わせ | 17 |

### はじめに

3

わずかな信頼で

より多くの真実を

私たちは、毎日自分自身の興味や、受けるべき恩恵と異なるものを提供する一握りの大企業がコントロールするテクノロジーに触れながら生きています。

もし彼らのアプリを使用し、その恩恵に授かりたいならば、多くの場合読むことのない利用規約に同意させられ、私たちが彼らが提供するツールを使用することにより生成されるデータを企業たちの思いのままに使うことを許可しなければならないのです。

このデータは、その人がどのような生活を送っているかについて、分析もできてしまうため、原油よりも価値あるものとなっています。 私たちはこれが失われず、盗まれず、また悪用されないことを信じることしかできず、無料で手放しているのです。

同時に、オープンソースおよびブロックチェーンのような分散型技術を利用すれば、中央集権ではなく、個人が力を持つことを優先するシステムの構築が可能であることが分かっています。 これらの新しいシステムにおいては、第三者が悪ではない、と信じる必要はありません。

しかし、現在のブロックチェーン技術では、大手がウェブに対して握っている力をまだ壊すことはできません。 現在、確約と進歩があるものの、未だ現実世界における技術の革新的な導入は見受けられていません。

### 概要

4

Polkadotは多様な目的を果たすブロックチェーンのネットワークを繋ぎ合わせ、それぞれのブロックチェーンがスムーズに相互作用することを可能にする次世代ブロックチェーンプロトコルです。 Polkadotはどのようなデータをも、どのようなブロックチェーンの間でも送ることができるため、様々な現実世界におけるユースケースを可能にしてくれます。

複数の特殊ブロックチェーンの最善の要素を収集することで、Polkadotは新しい分散型マーケットプレイスを生じさせ、様々なサービスを、多様なアプリ及び提供者から平等に受けることができるようにします。

ブロックチェーンはーIoT、金融、ガバナンス、アイデンティティ管理、ウェブの分散化、また資産トラッキングなど様々な分野において確約的な可能性を生み出していますが、これまでのシステム設計に制限があったことが、スケーリング及び導入されることに対する大きなハードルとなっていました。

Polkadot’s design offers several distinct advantages over existing and legacy networks, including *heterogeneous sharding, scalability,* *upgradeability, transparent governance and cross-chain composability.*

THIS IS

BLOCKCHAIN UNBOUNDED

### Heterogeneous Sharding

5

Many chains,

one network

Will there eventually be one blockchain to rule them all? We don’t think so.

All blockchains make different tradeoffs to support specific features and use cases, and as chain specialization increases, the need to transact between them will only increase over time.

Polkadot is a sharded blockchain, meaning it connects several chains together in a single network, allowing them to process transactions in parallel and exchange data between chains with security guarantees.

Thanks to Polkadot’s unique heterogeneous sharding model, each chain in the network can be optimized for a specific use case rather than being forced to adapt to a one-size-fits-all model.

More chains and more specialization means more possibilities for innovation.

### Scalability

6

Blockchains

that grow

One blockchain isn’t enough to support a bustling future of decentralized applications. The limited throughput and lack of runtime specialization in early blockchains made them impractical for scaling in many real-world use cases.

By bridging multiple specialized chains together into one sharded network, Polkadot allows for multiple transactions to be

processed in parallel. This system removes the bottlenecks that occurred on earlier networks that processed transactions one-by-one.

Polkadot will be able to scale even further in the future with a planned feature known as *nested relay chains*, which will increase thenumber of shards that can be added to the network.

### Upgradeability

7

Future-proof your blockchain with forkless upgrades

Early computer games were shipped on printed circuit boards known as cartridges. These cartridges were expensive and time-consuming to make as the code was etched onto the chips, leaving no room for error.

These days we’re used to our apps, games and browsers updating frequently, even automatically. Developers fix bugs before they can cause problems, and new features are added as better solutions become available.

Like all software, blockchains need upgrades in order to stay relevant. However, it’s far more difficult to upgrade a blockchain than an app, game, or browser. Upgrading conventional blockchains requires forking the

network, often taking months of work, and particularly contentious hard forks can break apart a community.

Polkadot revolutionizes this process, enabling blockchains to upgrade themselves without the need to fork the chain. These forkless upgrades are enacted through Polkadot’s transparent on-chain governance system.

With this feature, Polkadot enables projects to stay agile, adapting and evolving with the pace of technology. It also significantly reduces the risk associated with contentious hard forks—a severe barrier to entry for many organizations.

### Transparent Governance

8

Community

powered

Early blockchains had no formal governance procedures. Individual stakeholders were powerless to propose or veto protocol changes unless they knew the right people.

Polkadot is different. It’s governed by anyone who owns DOTs, Polkadot’s native currency, in a fair and transparent way.

All DOT holders are able to propose a change to the protocol or vote on existing proposals. They can also help elect council members who represent passive stakeholders within Polkadot’s governance system.

Cross-Chain Composability

Collaborative

by design

Early blockchains were like walled gardens closed off to other networks. But as the number of chains for specific use cases continues to rise, so does the need for cross-chain communication and interoperability.

Polkadot’s cross-chain composability and message passing allows shards to communicate, exchange value, and share functionality, opening the door to a new wave of innovation.

Thanks to Polkadot’s ability to bridge blockchains, Polkadot shards will also be able to interact with popular decentralized-finance protocols and cryptoassets on external networks like Ethereum.

### Polkadot Architecture

9

Connecting

the dots

Polkadot unites a network of

heterogeneous blockchain shards

called parachains. These chains

connect to and are secured by

the Polkadot Relay Chain. They

can also connect with external

networks via bridges.

Relay Chain

The heart of Polkadot, responsible for the network’s security, consensus and cross-chain interoperability.

Parachains

Sovereign blockchains that can have their own tokens and optimize their functionality for specific use cases. To connect to the Relay Chain, parachains can pay as they go or lease a slot for continuous connectivity.

Bridges

Special blockchains that allow Polkadot shards to connect to and communicate with external networks like Ethereum and Bitcoin.

### Polkadot Consensus Roles

10

Validators

Secure the Relay Chain by staking DOTs, validating proofs from collators and participating in consensus with other validators.

Collators

Maintain shards by collecting shard transactions from users and producing proofs for validators.

Nominators

Secure the Relay Chain by selecting trustworthy validators and staking DOTs.

Fishermen

Monitor the network and report bad behavior to validators. Collators and any parachain full node can perform the fisherman role.

Polkadot Governance Roles

Council Members

Elected to represent passive stakeholders in two primary governance roles: proposing referenda and vetoing dangerous or malicious referenda.

Technical Committee

Composed of teams actively building

Polkadot. Can propose emergency

referenda, together with the council,

for fast-tracked voting and implementation.

### DOTs

11

The DOT Token

The DOT token serves three

distinct purposes: governance

over the network, operation and

bonding.

Governance

Polkadot token holders have complete control over the protocol. All privileges, which on other platforms are exclusive to miners, will be given to the Relay Chain participants (DOT holders), including managing exceptional events such as protocol upgrades and fixes.

Operation

Game theory incentivizes token holders to behave in honest ways. Good actors are rewarded by this mechanism whilst bad actors will lose their stake in the network. This ensures the network stays secure.

Bonding

New parachains are added by bonding tokens. Outdated or non-useful parachains are removed by removing bonded tokens. This is a form of proof of stake.

### Play with chaos on Kusama, Polkadot’s wild cousin

|  |  |
| --- | --- |
| Kusama Network | 12 |

Kusama is an early, unaudited and unrefined release of Polkadot created to test the network’s technology and economic incentives in a real-world environment. It’s also the perfect place for parachain developers to test ideas before deploying to Polkadot.

Kusama is owned and governed by a community of supporters who hold KSM tokens. There is no central kill switch, meaning it will live on as an independent community network.

Ready to break stuff? Find out how to get KSM tokens and start staking, validating and participating in governance by reading the user guide.

### Substrate

13

Your blockchain builder, Your blockchain upgrader,

Your blockchain.

Substrate is your blockchain-building framework, making it easy to create a custom blockchain optimized for your unique use case.

Substrate is fully modular and flexible: mix and match ready-made components and build out your core business logic while leaving the rest to the framework. Plug-and-play modules like consensus, networking and finality give you the freedom to focus on your specific area of expertise, saving you substantial time and effort in the development process. Keep things lean by implementing only the necessary functionality on your custom blockchain.

Thanks to Substrate’s forkless upgrades and transparent governance tools, you can add new features over time without fear of splitting the network. Easier, risk-free upgrading means your blockchain can grow and evolve with the pace of innovation and ever-changing market needs.

Substrate also comes with native support for connecting to Polkadot right out of the box. Cumulus, Substrate’s tool for connecting your blockchain to a network of blockchains, unlocks interchain communication, collaboration and shared security.

Learn more about Substrate here and at the Substrate Developer Hub.

### About Web3 Foundation

14

Web3

Foundation

Web3 Foundation was created to nurture and steward technologies and applications in the fields of decentralized web software protocols, particularly those that utilize modern cryptographic methods to safeguard decentralization, to the benefit

and for the stability of the Web3 ecosystem. Polkadot is the flagship protocol of Web3 Foundation.

The future of the foundation

Web3 Foundation seeks to fund or otherwise assist in the development and deployment of projects aligned with its mission:

Innovative blockchain technologies, cryptographic messaging protocols.

Peer-to-peer networking infrastructure (such as libp2p and devp2p)

Crypto-economic mechanisms (such as DAC/DAOsoftware)

Data publication systems

(such as IPFS).

Learn more at [web3.foundation](http://web3.foundation) and on [Twitter](https://twitter.com/web3foundation) and [YouTube](https://www.youtube.com/channel/UClnw_bcNg4CAzF772qEtq4g).

The

development

team

### 

|  |  |
| --- | --- |
| About Parity | 15 |

### 

Web3 Foundation has commissioned Parity Technologies to build Polkadot.

Founded by Ethereum cofounder

Dr. Gavin Wood, Parity is a global team of top distributed systems engineers, cryptographers, solutions architects and researchers. Parity has fundamentally shaped the blockchain industry, from building the highly-adopted Parity Ethereum client and implementations of Bitcoin and Zcash, to developing the next generation of blockchain technology with Substrate and Polkadot.

Learn more about Parity Technologies at [parity.io](http://parity.io) and follow the team on [Twitter](https://twitter.com/ParityTech), [Telegram](https://t.me/parity_technologies), [YouTube](https://www.youtube.com/channel/UCSs5vZi0U7qHLkUjF3QnaWg), and [Riot](https://matrix.to/%23/!IWlcTyHSqIEjpUReHD:matrix.parity.io?via=matrix.parity.io&via=matrix.org&via=web3.foundation).

Friends of

Polkadot

& Substrate

|  |  |
| --- | --- |
| Collaborations | 16 |

Polkadot is designed to work with public, private and enterprise chains. We are excited to work closely with the following partners to develop the first use cases, and look forward to collaborating with other blockchain projects seeking to adopt this technology:

17

### Dive deeper, stay connected and get building!

|  |  |
| --- | --- |
| Learn more on the | [→ Join](https://www.meetup.com/pro/polkadot) or [→ host](https://www.meetup.com/pro/polkadot) |
| Polkadot [→ Website](https://polkadot.network/) | a Polkadot meetup |
| and [→ Wiki](https://wiki.polkadot.network/en/) | in your area |
| Subscribe to the Polkadot | Chat with the Polkadot team |
| [→ Newsletter](https://share.hsforms.com/7051618/2cbd4207-0880-4b10-b9a4-951864088357) | on [→ Riot](https://riot.im/app/%23/room/%2523polkadot-watercooler:matrix.org) |
| Get involved by [→ joining](https://docs.google.com/forms/d/e/1FAIpQLSdq9dzqCPhFj5b71caPlUD0wHogq0UDSrz4nnGI7wFrwr4BDQ/viewform) the | Additional resources |
| [→ Polkadot Ambassador](https://polkadot.network/polkadot-ambassador-program/) | can be found |
| [Program](https://polkadot.network/polkadot-ambassador-program/) | → [here](https://www.reddit.com/r/dot/comments/d6k8ch/welcome_to_polkadot_start_here/) |

Follow Polkadot on:

hello@web3.foundation 20-12-2019 version: 3