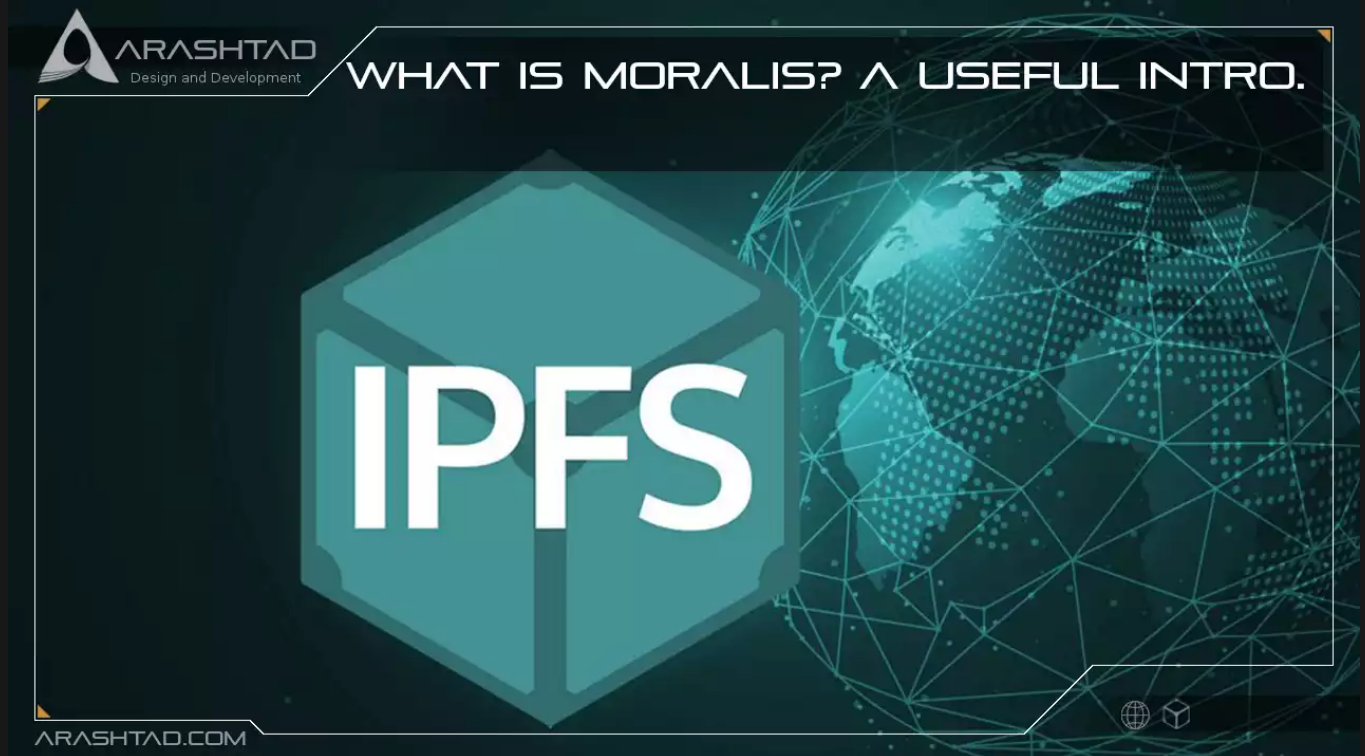


## Why is IPFS Essential for Blockchain?

No comments



*Protocol Labs invented the Interplanetary File System (IPFS) as a peer-to-peer file sharing system. This system stores and accesses files, websites, applications, and data. It uses content-addressing to identify every file in a global namespace connecting all computing devices. Peer-to-peer file sharing with IPFS allows users to host and receive content in a decentralized manner. this means that users hold a portion of the overall data, resulting in a secure system for storing and sharing data. Users can serve files simply by providing their content addresses, and other users can locate and request those files using a distributed hash table (DHT).*

### What is IPFS?

IPFS is a distributed, peer-to-peer file-sharing network that provides a scalable, decentralized foundation for the internet. This system implements a decentralized network. Git, a version control software that is popular among decentralized systems, is one of the most popular decentralized systems. Due to the fact that every developer who has cloned a repository on their computer has a copy of it all, including the history, Git is distributed. If the central

repository wipes out, any copy can be used to restore it. IPFS applies that distributed concept to file storage and data retrieval. As a result of Juan Benet's creation, IPFS is maintained by Protocol Labs. by combining the decentralization of Git with the distributed, bandwidth-saving techniques of torrents, they have created a file system that works across all of the IPFS nodes. And it's here now and is working.

## How Does IPFS Work?

When you put a URL in your browser, your computer asks another computer for the specific page you are searching for. However, there are other ways to find that page, such as using IPFS mirrors. Your computer uses IPFS to share a page with several computers around the world, instead of asking a single computer for it. In other words, you can get the page you're looking for from anyone around the world who uses IPFS, not just from one computer. With IPFS, you don't just download files from others, you also distribute them. This applies to web pages, documents, emails, and database records on your computer.

### IPFS main Components

#### Distributed hash table (DHT)

Data hash tables (DHTs) are data structures that map keys to values using a hash function. A hash code is applicable for creating an index into numerous slots, which can then be used to locate the desired value. In this way, they can share data across a network of computers and coordinate it so that it can be accessed easily. There are several advantages of DHTs, including decentralization, fault tolerance, and scalability. DHTs can accommodate a large number of nodes, and even if a node fails or leaves the network, the system will continue to work.

#### Block Exchanges

As a popular file-sharing system, BitTorrent uses a data exchange protocol to coordinate the transfer of data between countless nodes, but it boils down to the torrent ecosystem. As a result, IPFS implemented BitSwap, a general version of this protocol that functions as a marketplace for all kinds of data.

#### Merkle DAG

The Merkle DAG combines Merkle Tree and Directed Acyclic Graph (DAG). The Merkle Tree ensures that data blocks on P2P networks are correct, and not changing in any way. In order to verify data blocks, cryptographic hash functions which are functions that take inputs and produce unique alphanumeric hashes corresponding to those inputs, are applicable. An input can be guaranteed to result in a given hash, but it is very hard to guess the input from a hash. A DAG is a method of modeling topological information sequences without cycles. A family tree is a basic representation of a DAG. Merkle DAGs are data structures in which hashes refer to data blocks and objects. IPFS follows the general Merkle DAG

model.

### Self-Certifying File System

An SFS is a distributed file system that doesn't require special permissions for data exchange. In other words, you can securely access remote content with the transparency of local storage by simply identifying the filename, that the server signs.

### IPFS and Blockchain:

Because of their similar structure, IPFS and blockchains can work well together. In fact, Juan Benet, the inventor of IPFS, calls this a "great marriage". IPFS is one of a few projects within Protocol Labs. IPLD (Inter-Planetary Linked Data) and Filecoin are some of Protocol Labs' projects that are close to IPFS. As a data model for distributed data structures like blockchains, IPLD is able to store and access blockchain data through IPFS. users who store IPFS data will receive Filecoin as a reward. IPLD allows users to seamlessly interact with multiple blockchains and is compatible with Ethereum and Bitcoin.

Juan Benet says, " IPFS connects all these different blockchains in a way that's similar to how the web connects all these websites together. In the same way that you can drop a link on one page that links to another page, you can drop a link in Ethereum that links to Zcash, and IPFS can resolve all of that."

A permanent web that is resilient and efficient was certainly the goal of the original inventors of our internet protocols. IPFS and other Protocol Labs projects are ambitious by nature. The weaknesses in these protocols became evident over time as our usage of the web changed. IPFS, though still in its infancy, shows promise as a critical component of a new decentralized technology stack.

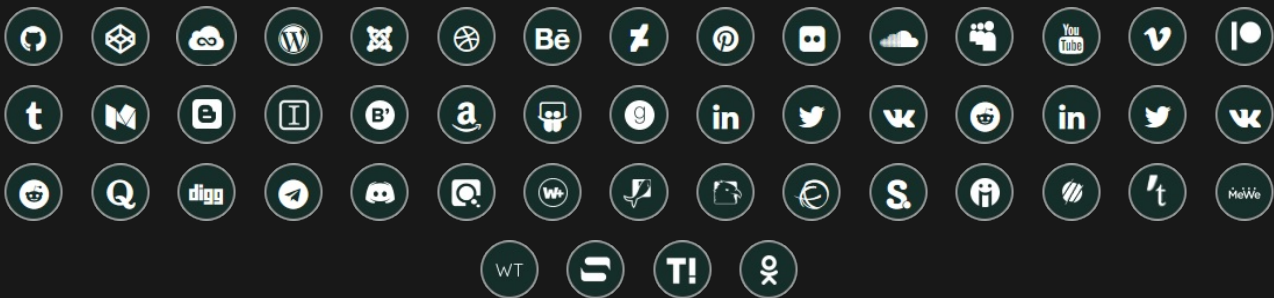
### Conclusion

In this article, you learned about IPFS, how it works, its main components, and its relation to blockchain technology. In general, We access the internet today through location-based addresses and are controlled by central servers. That has the potential to cause problems if a server is hacked or crashes. This would leave the user with nothing more than an error page. This is where IPFS can be of help.

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