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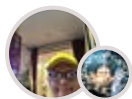
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# Web3: Demystifying IPFS (InterPlanetary File System)



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The internet has transformed the world like no other technology before it. If you've ever surfed the web, you're probably familiar with HTTP, or Hypertext Transfer Protocol, which currently dominates online communication.

But HTTP has its limitations, prompting the need for an IPFS . When you access a website, your browser connects directly to servers hosting that site, often resulting in slow load times and consuming significant bandwidth. Enter the InterPlanetary File System, or IPFS, poised to revolutionize how we share and access data online.

## Understanding the Need for IPFS

In today's digital landscape, much of our data resides in centralized cloud storage managed by tech giants like Amazon, Microsoft, and Google. However, developers are envisioning a better internet, known as Web 3.0, where data is decentralized, enhancing resiliency and ownership. IPFS represents a significant step toward realizing this vision by distributing data across a global network of peers, fostering security and resilience. Let's explore how IPFS came to be and its core components.

## The Origins of IPFS

IPFS emerged in 2015 from the efforts of Protocol Labs to redefine how information is shared worldwide. Designed to create a distributed web with enhanced resilience, IPFS has found applications across various industries, from weather risk protection

in agriculture to removing intermediaries in the music industry. Today, projects like IPFS tutorial, alongside modular protocols and tools, serve millions globally, transforming information management infrastructure.

## **What is IPFS?**

IPFS is a distributed system for storing and accessing files, data, applications, and websites. Unlike HTTP, which relies on location-based addressing, IPFS identifies content based on its unique cryptographic hash. This allows for flexible communication across various transport layers, including TCP, Bluetooth, and TOR. IPFS operates on rules similar to Kademlia, a popular peer-to-peer DHT protocol, enabling a wide range of decentralized applications.

## **Simplifying IPFS**

Imagine you're searching for information on hoverboards. With HTTP, your computer requests the page from a specific server, often located far away. IPFS, however, searches for content based on its contents, not its location. It retrieves data from multiple peers worldwide, ensuring faster access and reduced reliance on centralized servers. Moreover, IPFS allows users to share files directly, enhancing collaboration and accessibility.

## **Key Traits of IPFS**

IPFS focuses on three critical aspects: decentralization, content addressing, and participation. By decentralizing data storage, IPFS ensures better resilience and censorship resistance. Content addressing enables files to be located based on their content, not their location, fostering flexibility and accessibility. Participation is key to IPFS, as users share files with one another, ensuring availability and reliability across the network.

## **IPFS vs. HTTP**

Compared to HTTP, IPFS offers a decentralized solution that reduces dependence on centralized servers and improves data availability. Unlike HTTP, which relies on location-based addressing, IPFS uses content-based addressing, allowing data to be accessed from any peer in the network. Additionally, IPFS reduces bandwidth costs and offers greater flexibility for content distribution, making it a promising alternative for the future of the internet.

## Some IPFS Web

Here are a few websites that utilize IPFS:

1. OpenBazaar — An online marketplace where you can buy and sell goods using cryptocurrency.  
Website: [OpenBazaar](#)
2. Infura — A platform providing API access to the Ethereum and IPFS networks.  
Website: [Infura](#)
3. Textile — A platform for building applications powered by decentralized storage infrastructure.  
Website: [Textile](#)
4. Filecoin — A decentralized storage network designed to store humanity's most important information.  
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5. DappNode — A project aimed at decentralizing the infrastructure of the internet.  
Website: [DappNode](#)

## What Programming Language for IPFS based Website

IPFS (InterPlanetary File System) is a protocol and network designed for decentralized storage and sharing of data. It primarily focuses on the storage and distribution of content, regardless of the technology used to build the frontend or backend of a web application. Therefore, you can use a wide range of frontend technologies to build web applications that leverage IPFS for content storage and distribution. Some of the common frontend technologies that can be used with IPFS include:

1. HTML, CSS, JavaScript: This is the fundamental stack for building web applications. You can create static web pages or dynamic web applications using HTML for structure, CSS for styling, and JavaScript for interactivity. IPFS can host static assets like HTML, CSS, and JavaScript files, making it easy to distribute web content.

2. **React.js:** React is a popular JavaScript library for building user interfaces. You can use React.js to create dynamic and interactive frontend components for your web application. With IPFS, you can host React applications and use IPFS links to distribute them across the network.
3. **Vue.js:** Vue.js is another JavaScript framework for building user interfaces. It provides a flexible and modular approach to building frontend components. You can build Vue.js applications and host them on IPFS for decentralized distribution.
4. **Angular:** Angular is a comprehensive JavaScript framework maintained by Google. It provides a structured and scalable approach to building web applications. You can use Angular to create frontend components and host them on IPFS for decentralized access.
5. **Svelte:** Svelte is a modern JavaScript framework that compiles your code to efficient JavaScript at build time. It offers a simple and intuitive approach to building frontend applications. You can build Svelte applications and deploy them on IPFS for decentralized hosting.
6. **Web3.js:** Web3.js is a JavaScript library that provides access to the Ethereum blockchain and smart contracts. You can use Web3.js to interact with Ethereum-based decentralized applications (DApps) and host them on IPFS for decentralized access.
7. **Next.js:** Next.js is a React framework for building server-side rendered (SSR) and statically generated web applications. You can build Next.js applications and deploy them on IPFS for decentralized hosting and distribution.
8. **Gatsby:** Gatsby is a React-based framework for building static sites and progressive web apps (PWAs). You can build Gatsby applications and publish them to IPFS for decentralized access and distribution.

## **Sample Code hosted on IPFS**

Here's a simple example of a dynamic web application built on IPFS using HTML, JavaScript, and the `ipfs-http-client` library for interacting with an IPFS node.

## HTML (index.html):

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>IPFS Dynamic Web App</title>
</head>
<body>
  <h1>IPFS Dynamic Web App</h1>
  <form id="submitForm">
    <label for="textInput">Enter Text:</label><br>
    <input type="text" id="textInput" name="textInput"><br><br>
    <button type="submit">Submit</button>
  </form>
  <div id="output"></div>

  <script src="app.js"></script>
</body>
</html>
```

## JavaScript (app.js):

```
const IPFS = require('ipfs-http-client');

// Connect to the IPFS API
const ipfs = IPFS.create({ host: 'ipfs.infura.io', port: 5001, protocol: 'https' });

// Function to handle form submission
async function handleSubmit(event) {
  event.preventDefault();

  const textInput = document.getElementById('textInput').value;

  try {
    // Add text to IPFS
    const result = await ipfs.add(textInput);

    // Display IPFS hash
  }
}
```

```
document.getElementById('output').innerHTML = `<p>Text submitted succes
                                         <p>IPFS Hash: <a href="h

} catch (error) {
  console.error('Error submitting text to IPFS:', error);
  document.getElementById('output').innerHTML = '<p>Error submitting text
}

// Attach event listener to form submit event
document.getElementById('submitForm').addEventListener('submit', handleSubmit);
```

This example creates a simple web form where users can enter text. When the form is submitted, the text is added to IPFS using the `ipfs-http-client` library. The resulting IPFS hash is then displayed to the user as a link to the text stored on the IPFS network.

Note: Before running this code, make sure to include the `ipfs-http-client` library in your project using `npm` or `yarn`:

```
npm install ipfs-http-client
```

Additionally, this example assumes that you have access to an IPFS node API endpoint. You can use a public IPFS gateway like Infura or run your own IPFS node locally. Adjust the `host`, `port`, and `protocol` parameters in the `IPFS.create()` function accordingly.

## The Future of IPFS

IPFS holds the potential to revolutionize the internet as we know it, offering a decentralized, resilient, and accessible web for users worldwide. Its applications in blockchain technology and beyond are poised to redefine how we store, share, and access data online. With IPFS, the possibilities are endless, offering a glimpse into a truly distributed future for the internet.

In conclusion, IPFS represents a paradigm shift in how we approach online communication and data storage. Its decentralized nature, coupled with content

addressing and active participation, makes it a powerful tool for building a more open, equitable, and resilient internet. As we continue to explore the potential of IPFS, one thing is clear: the future of the internet looks brighter with IPFS leading the way.

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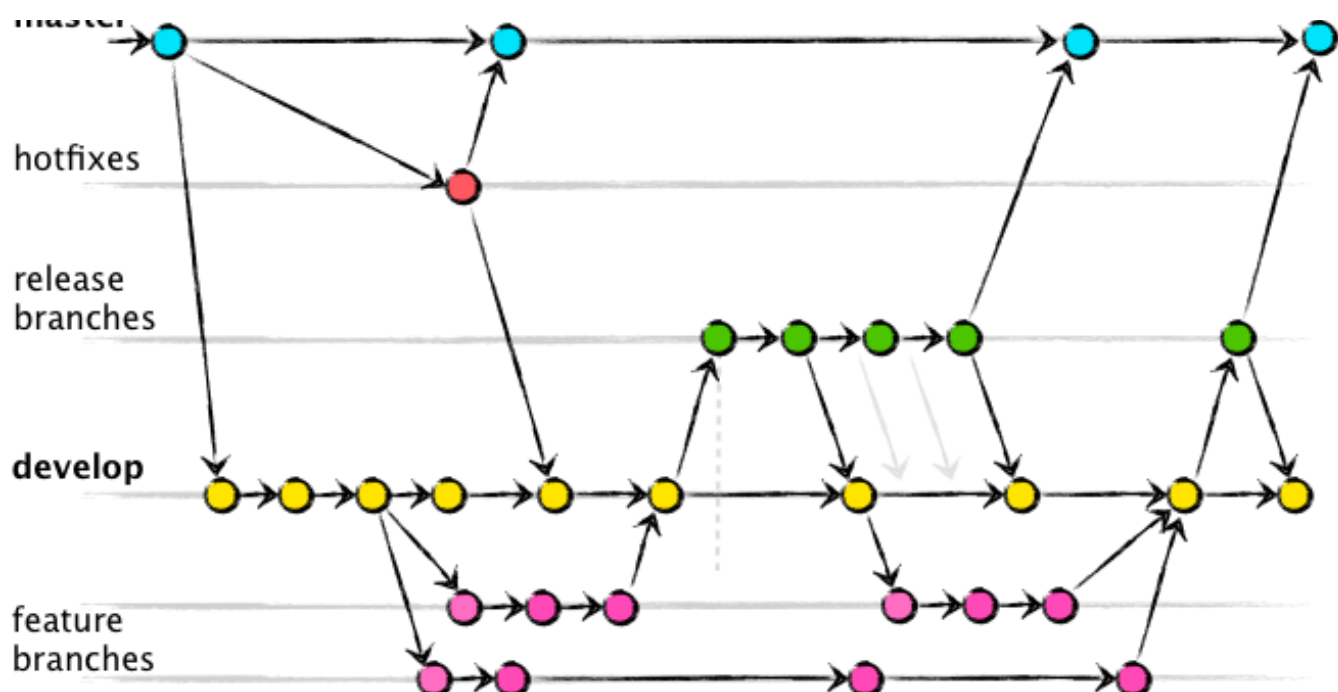
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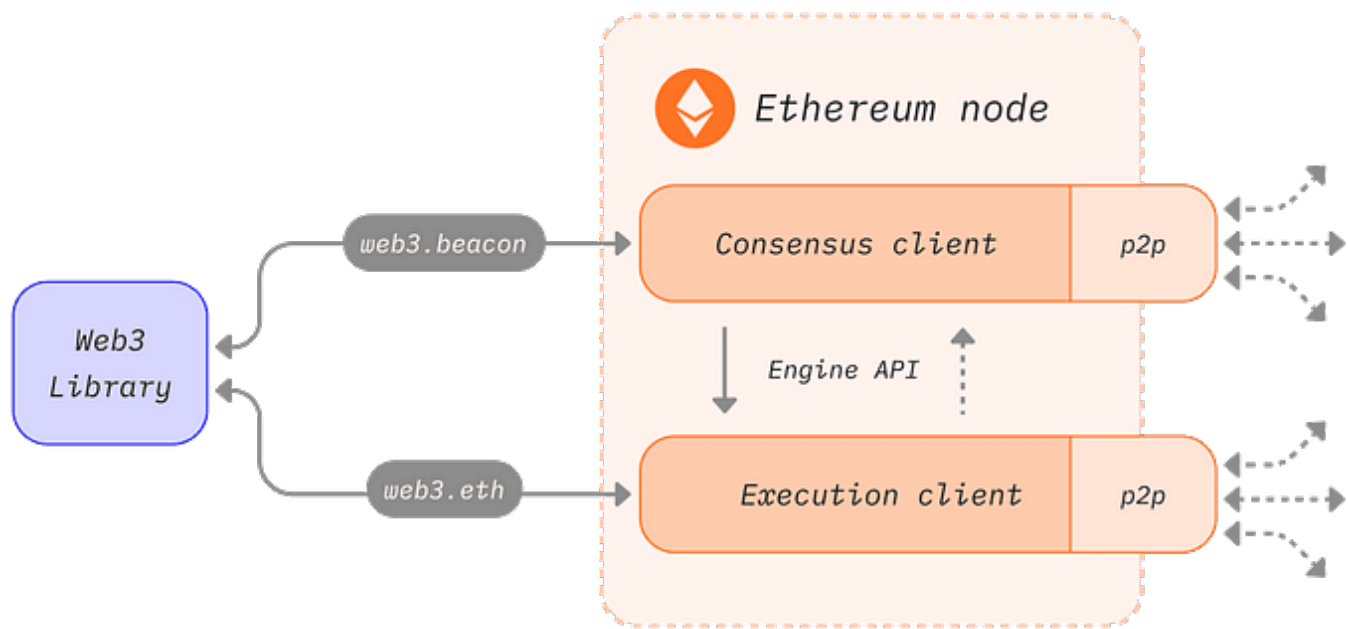
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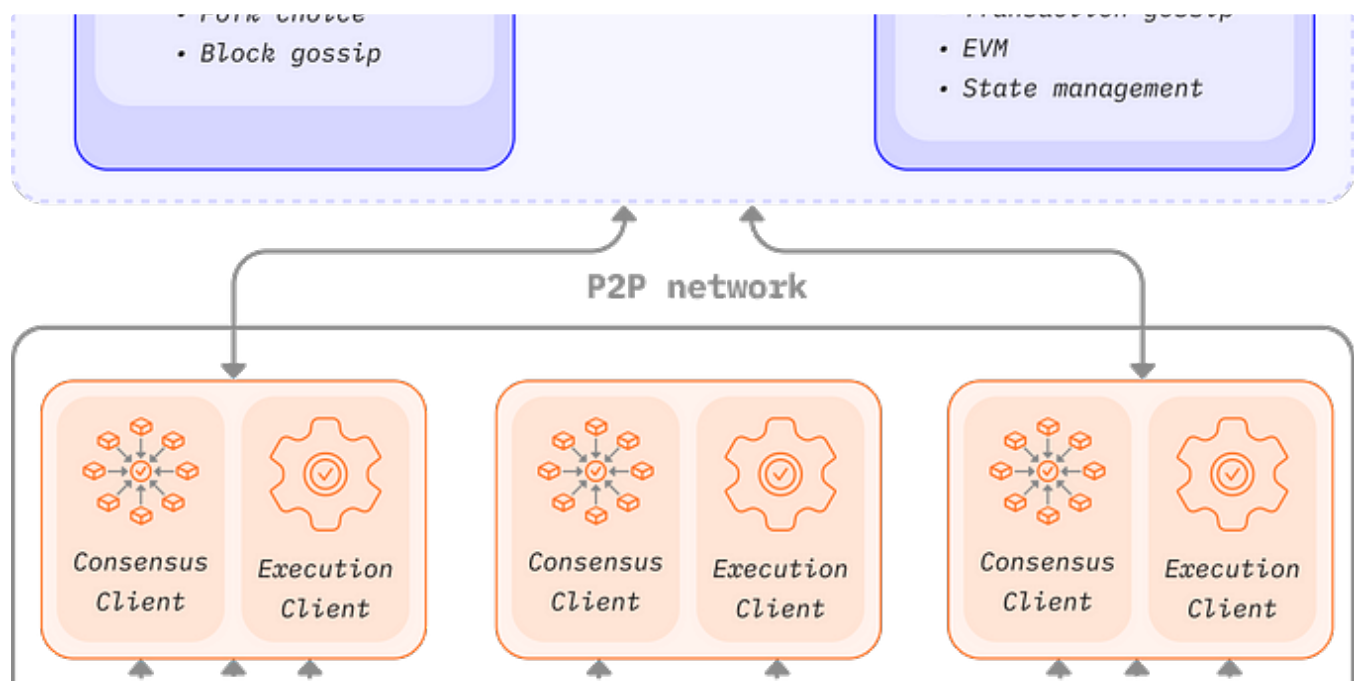


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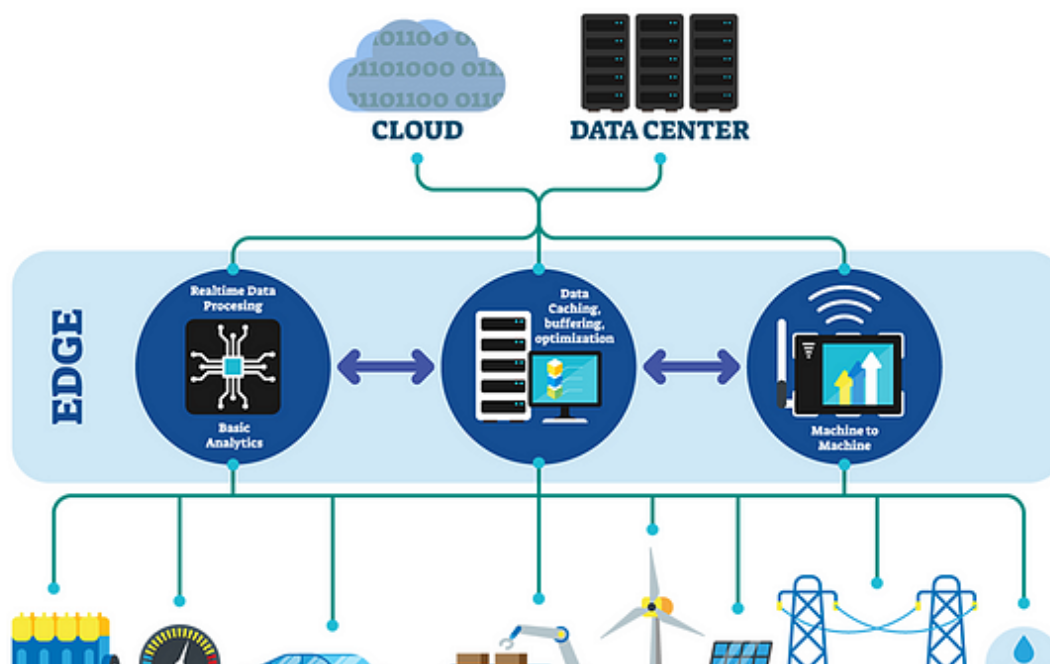
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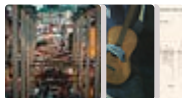
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