Roadmap for Blockchain Development

By – Manoj Kumar Rabidas 10-10-2023

Type of Blockchain Developers:

1. Application Developers:
   ⇨ The developers who work on existing blockchain model like Ethereum or Bitcoin and develop an application which is running on the blockchain are called **Blockchain Application Developer.** More than 90 % developers are works as Blockchain Application Developers. The basic skills needed to be a blockchain application developer are:
   i. Solidity:
   ii. JavaScript:
   iii. Python

2. Core Development:
   ⇨ The developer who makes their own block chain or work to make changes in existing blockchain are called **Blockchain Core Developers**. The skills needed to be a blockchain core developer are:
   i. Go
   ii. C++
   iii. Rust

There is also another aspect for types of blockchain developer. 1. Public network developer and 2. Private network developer. Many companies use private blockchain network for their company. But maximum of developers are working with public blockchain network.

What will you do as a blockchain developer (Application developer):

Here we will be discussed about the basic path of how to be a **blockchain Application Developer**. Make smart contracts in Ethereum blockchain using solidity. Smart contracts are fixed and immutable. Means, if you make a smart contract and deploy it on network no one can change it. It is a soft copy of contract recognized and managed by blockchain network just like a hard copy Contract paper which is recognized by government. Most of the time we use Ethereum block chain to write smart contracts. Ethar is a cryptocurrency based on Ethereum blockchain. Solidity is used in app development on Ethereum.

Tools and Tech:

1. JavaScript:
   i. React.js: It is used to design the frontend of application.
   https://react.dev/learn/tutorial-tic-tac-toe
   ii. Node.js: It is used to develop the backend of application.
   https://nodejs.org/en/docs
   iii. Express.js: It is used to develop the backend of application.
   https://expressjs.com/
   iv. Web3.js: It is used to established connections between the frontend and the blockchain network.
   https://web3js.readthedocs.io/en/v1.10.0/

2. Solidity: It is used to write the smart contracts which are the backbone of blockchain application. For example, you want to build an application which transfer some amount of money on every end of month to some specific accounts. So, you can write these types of conditions in your smart contracts and use it in your application.
   https://docs.soliditylang.org/en/v0.8.21/
   https://docs.soliditylang.org/en/v0.8.13/

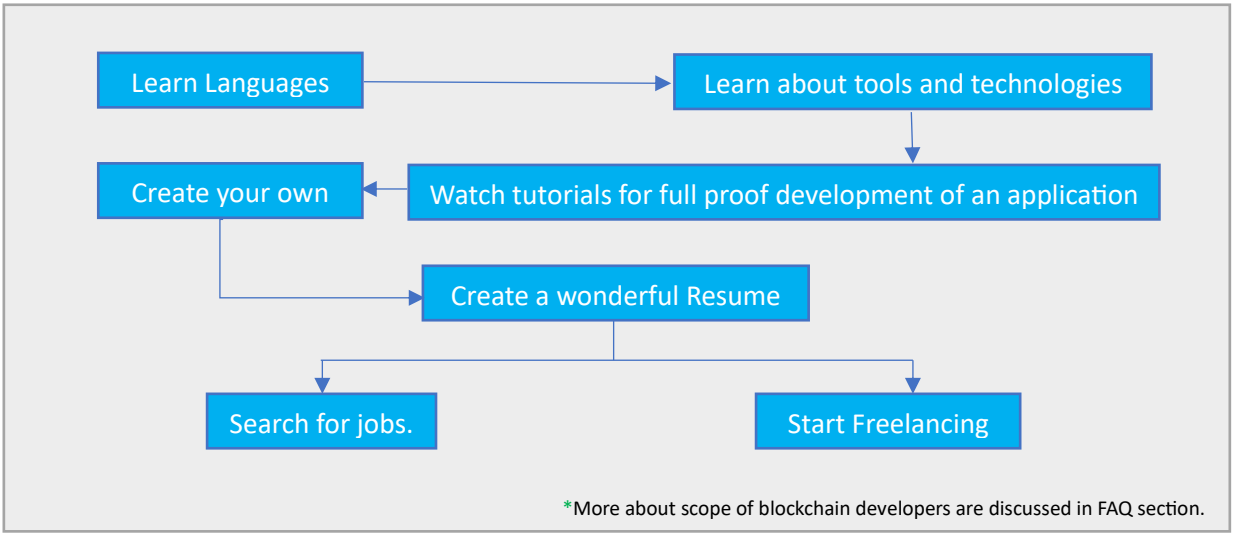
3. Truffle: Truffle is a framework which help us to write smart contracts on Ethereum. You can install truffle in your local system. It creates the environment in your system to develop blockchain apps. You can test your code and deploy your code on that environment.
   https://trufflesuite.com/docs/

4. Ganache: If you want to deploy an application on a blockchain network you must pay a fee for this. But using ganache you will get some free account to test your application is working properly on network or not. You will get 10 free test account and approximate fake 100 ethers to deploy your application.
   https://trufflesuite.com/ganache/

5. MetaMask: This is an extension of browser which will help you to interact with your hosted blockchain application. Remember one thing, once you deploy your application you cannot modify on it. If you try to upgrade it you have to deploy again the whole. So, before you deploy it is very important to test the application on Ganache.
   https://docs.metamask.io/

Next Steps:

⇨ It is important to know two things before you started. One is Web development and another is Cryptography. These two things help you a lot to work with blockchain development.



*More about scope of blockchain developers are discussed in FAQ section.

FAQ:

1. **What is the future of blockchain development? will the web2 developers will finish and the market will accept web3 developer for the whole**?

⇨ The future of blockchain development is highly promising and continues to evolve rapidly. While I cannot provide predictions beyond my last knowledge update in September 2021, I can offer some insights into the trends and possibilities that were emerging at that time.

1. **Transition to Web3**: Web3 is a term used to describe the vision of a decentralized internet, built on blockchain and other decentralized technologies. Web3 aims to provide users with more control over their data and digital assets, reduce the power of central intermediaries, and enable new types of decentralized applications (dApps). The transition to Web3 could lead to a growing demand for Web3 developers who are skilled in blockchain, smart contract development, and decentralized application development.

2. **Ethereum 2.0 and Scaling Solutions**: Ethereum, one of the most popular blockchain platforms for smart contracts, was in the process of transitioning to Ethereum 2.0 in 2021. This upgrade aims to improve scalability and reduce energy consumption. Other blockchain platforms, such as Polkadot and Cardano, were also gaining traction as they offered innovative solutions for scalability, interoperability, and security. The development of these platforms will likely continue to shape the future of blockchain development.

3. **DeFi and NFTs**: The DeFi (Decentralized Finance) and NFT (Non-Fungible Token) sectors were experiencing significant growth in 2021. DeFi projects were providing decentralized alternatives to traditional financial services, and NFTs were being used for various applications beyond art, such as gaming and collectibles. The development of DeFi protocols, NFT marketplaces, and related infrastructure was a focal point for many blockchain developers.

4. **Regulatory Developments**: The regulatory landscape for blockchain and cryptocurrencies was evolving, with various governments considering or implementing regulations. The future of blockchain development may be influenced by how regulatory frameworks are established and how they impact the industry.

5. **Cross-Chain Development**: As the blockchain ecosystem grows, there's a need for interoperability between different blockchains. Developers working on cross-chain solutions and protocols to facilitate communication and asset transfer between different blockchain networks are likely to be in demand.

6. **Decentralized Identity and Privacy**: Decentralized identity solutions and privacy-preserving technologies were gaining attention as users became more concerned about data privacy. Developers in this space may play a critical role in shaping the future of digital identity and privacy on the blockchain.

7. **Sustainability**: Concerns about the environmental impact of blockchain technologies were growing. Future blockchain development may include a focus on more energy-efficient consensus algorithms and sustainability measures.

Regarding the transition from Web2 to Web3, it's important to note that Web2 technologies and development will likely coexist with Web3 for some time. The transition may be gradual, and many existing applications and services may continue to operate on Web2 infrastructure. However, as Web3 technologies mature and gain wider adoption, the market for Web3 developers could expand significantly.

In summary, the future of blockchain development holds great potential, with opportunities in various areas, including DeFi, NFTs, cross-chain development, decentralized identity, and more. The shift to Web3 is an ongoing process, and the demand for Web3 developers may continue to grow as decentralized technologies become more integral to our digital lives.

2. Which are the technologies for the beginners to start blockchain application development.

⇨ For beginners looking to start blockchain application development, it's important to first gain a solid understanding of the fundamental concepts of blockchain technology. Once you have a good grasp of the basics, you can start exploring specific blockchain platforms and technologies. Here are some technologies and steps to get you started:

1. **Blockchain Fundamentals**:
   - Begin by learning the basics of blockchain technology, including how blocks and transactions work, consensus algorithms (e.g., Proof of Work and Proof of Stake), cryptography, and decentralized ledger concepts.

2. **Programming Languages**:
   - Familiarize yourself with programming languages commonly used in blockchain development, such as:
     - **Solidity**: Used for Ethereum smart contract development.
     - **Rust**: Commonly used for Polkadot and Solana.
     - **JavaScript/TypeScript**: Useful for blockchain development on platforms like Ethereum, Binance Smart Chain, and others.

3. **Development Environments**:
   - Set up your development environment with tools like:
     - **Truffle**: A development framework for Ethereum smart contracts.
     - **Remix**: An online IDE for Ethereum smart contract development.
     - **Ganache**: A personal blockchain for local development and testing.

4. **Blockchain Platforms**:
   - Choose a blockchain platform to work with:
     - **Ethereum**: One of the most popular platforms for decentralized applications.
     - **Binance Smart Chain (BSC)**: Offers compatibility with Ethereum.
     - **Polkadot**: Focuses on interoperability between blockchains.
     - **Cardano**: Known for its focus on security and sustainability.
     - **Solana**: Known for its high-speed and low-cost transactions.

- **Avalanche**: Designed for custom blockchains and assets.

5. **Smart Contracts**:
   - Learn how to write and deploy smart contracts on your chosen blockchain platform. Solidity is particularly important for Ethereum developers.

6. **DApp Development**:
   - Explore decentralized application (DApp) development, which involves integrating smart contracts with front-end web applications using web3.js or ethers.js for Ethereum-based DApps.

7. **Version Control**:
   - Use version control systems like Git to manage your code and collaborate with others.

8. **Resources and Communities**:
   - Utilize online resources, tutorials, and developer communities for support and guidance. Platforms like Ethereum, Binance Smart Chain, and others have active developer communities.

9. **Security Best Practices**:
   - Study blockchain security best practices, as blockchain applications can be vulnerable to various attacks.

10. **Testing and Debugging**:
    - Develop proficiency in testing and debugging smart contracts and DApps using tools like Truffle and Ganache.

11. **Explore Use Cases**:
    - Consider different use cases for blockchain applications, such as decentralized finance (DeFi), non-fungible tokens (NFTs), supply chain management, and more.

12. **Stay Informed**:
    - Blockchain technology is rapidly evolving. Stay up-to-date with the latest developments and trends in the blockchain space by following industry news, attending conferences, and engaging with the community.

Remember that blockchain development can be complex, but starting with a solid foundation in the basics and gradually building your skills and experience will help you become a proficient blockchain developer over time.

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