**Describe the Pros and Cons of Blockchain technology.**

Transactions involving cryptocurrencies are permanently recorded on the base of blockchain. The 'chain' is extended by adding 'blocks,' which are collections of transactions. verify the legitimacy of the transactions and maintain network availability. Each batch of the shared ledger, which is open to the public, keeps track of transactions. Anyone may visit and view the transactions taking place on the main blockchains, including Ethereum (ETH) and Bitcoin (BTC).

Through Blockchain technology, we are able to create a safe, dependable, and decentralized autonomous ecosystem for a variety of uses, especially for better utilization of existing hardware, infrastructure, and resources. However, there are some drawbacks that are needed to consider such as high cost of implementation, environmental impact, and storage problems, to name a few.

As mentioned before, cryptocurrency utilizes blockchain technology toad and validate transactions online, providing a decentralized network which in turn creates a safe and secure environment for its users. Here are several benefits as well as drawbacks of blockchain technology in relation with cryptocurrency:

Advantages

1. Blockchain’s main advantage is the capacity to carry out any transaction without depending on a third party. Blockchain users feel confident that nobody is tampering with transactions, viewing personal information, or acting in any other way that compromises their security and privacy.

This implies that blockchain-based apps have the potential to provide stronger security than conventional systems, even though the security of such applications depends on how well their developers design secure code. Thanks to blockchain, you can be more confident in your identity and data.

1. Blockchain embeds documents, agreements, or transactions within the system; there are no payment processing or banking fees because it establishes peer-to-peer transactions without third-party approval; blockchain encryptions are more secure against identity theft than traditional payment systems; and it reduces overhead costs because it has no centralized authority or servers to maintain operations.
2. As blockchain has a decentralized network, it is unlikely to cause failure. It is not centralized, instead, being in a distributed form. It saves the data if the network fails as hackers cannot break into the central grid and affect any connected accounts. It also provides better security than regular networks, providing an option of up to 8-character long passwords (numbers and letters are included).
3. Transactions can be processed by blockchain significantly more quickly than by traditional banks. Because of this, companies who use blockchain rather than banks can save a lot of money on costs.

According to a Deloitte report, businesses might save up to billions in banking fees because of blockchain technology. Due to its decentralized nature, blockchain eliminates the need for large data centers and pricey third-party verification. It also reduces the number of individuals responsible for keeping an eye on the transactions.

1. Blockchain technology offers greater transparency than conventional payment methods like credit cards and cheques, even without anonymity features turned on; you don't need a bank intermediary (or their permission) to know what or to whom you sent or received money.

Everybody has access to the public ledger that contains the blockchain transactions' records. Everyone can see how much money is in the wallet, but no one can tell who the owner is.

Disadvantages

1. One of the main problems with blockchain technology is how much energy it consumes. Mining requires powerful equipment that consumes a lot of electricity since the rewards require miners to solve difficult mathematical puzzles.

Some blockchains are consequently very expensive to operate, especially for individuals or small businesses. You must pay for your blockchain up front; changes cannot be made once it is already online.

1. There is a lot of excitement surrounding the initiatives of these businesses to use blockchain. Even though the technology is useless for their industry, businesses employ it and waste their resources, leading to unnecessary rivalry between them. Businesses will be forced to make significant investments if they want to remain competitive.
2. The speed of blockchain technology is another important drawback. Blockchains need miners, or users of powerful computers and specialized software, in contrast to centralized databases, who solve computational puzzles in return for fresh crypto tokens.

Simply said, transactions on the blockchain take longer than those made with cash or credit cards or other conventional payment methods. If you're considering using blockchain technology as a regular payment method, this may be disheartening.

1. In many regions of the world, regulations for blockchain continue to provide difficulties. Additionally, the usage and implementation of blockchain technology are prohibited by various regulatory requirements in different nations and areas.

Of course, blockchain technology is the wave of the future. However, you must be aware of its drawbacks if you plan to buy it or use it. Technology is still in the early stages of development and is evolving quickly.

1. The amount of data that each block can store varies. Transaction validation becomes extremely laborious and slow as a result. On a blockchain, it is impossible to raise the block size. Ethereum, which is well renowned for its poor network speeds, can have its transaction speed increased with the help of networks like Polygon. The primary issue is still unresolved, even though this may be a short-term fix.

That being said, blockchain technology and cryptocurrency are a great innovation both in technology and business applications. The development of blockchain technology today makes it the greatest option for companies looking to benefit from its distributed ledger capabilities. Advantageous as it may be, we still must consider its limitations and risk when implementing the technology.

**Explain how blockchain technology works in different focus areas.**

Given its explosive growth in popularity over the past 10 years, saying that blockchain is the next big thing in technology may be an understatement. Blockchain technology has applications in virtually every sector of business imaginable, including identity management, banking, healthcare, and government. Bitcoin, its most well-known application, is excluded from that.

Each Blockchain block has a unique 32-bit whole number called a nonce, which is connected to a 256-bit hash number attached to it. These blocks are connected to each other using a chain of a cryptographic hash function, which links each block to its previous block. These three components together ensure security in the blockchain. A blockchain is created as a chain of blocks where each of these blocks has some digital information.

Blockchain is distributed, therefore in the event of a public blockchain, everyone gets a copy. As a result, it is very difficult to change the data in the blockchain because doing so would require changing every copy in every location, which is practically impossible. This makes the blockchain distributed and immutable while also preserving transparency because the information in the block is not concealed in any way. Since blockchain has all these characteristics, it guarantees the highest levels of security, which is why it is so well-liked in many applications that place a high value on security and transparency.

Listed below are some of the real-world applications of blockchain technology.

1. **Asset Management**

Blockchain plays a crucial role in asset management, just like it does in the financial sector. The processing and trading of numerous assets that a person may possess, such as fixed income, real estate, stock, mutual funds, commodities, and other alternative investments, constitutes asset management in general. Trading in normal asset management can be expensive, especially when it includes several countries and cross-border payments. Blockchain can be a tremendous help in these situations because it eliminates the need for middlemen like the broker, custodians, brokers, settlement administrators, etc. The blockchain ledge, in contrast, offers a clear and open process that leaves no opportunity for error.

1. **Healthcare**

Blockchain is also incorporated in the field of healthcare with the introduction of smart contracts. Smart contracts are computer programs or protocols that enable automated transactions between parties without needing an intermediary. The terms of the contract are known to all parties, and it is automatically implemented when its requirements are satisfied. Personal health records can be encrypted using Blockchain technology so that they are only available to primary healthcare practitioners with a key. This can be very helpful in the healthcare industry. Additionally, they support the HIPAA Privacy Rule, which guarantees privacy and restricted access to patient information.

1. **Cryptocurrency**

Blockchain’s popularity skyrocketed due to cryptocurrency, who hasn’t heard about bitcoin and its tremendous popularity? One of the numerous benefits of adopting blockchain for cryptocurrencies is that it has no geographical restrictions. As a result, cryptocurrency can be used for transactions everywhere. Exchange rates and the possibility that some people may lose money during this process are the only essential considerations. This alternative is superior to regional payment applications.

1. **Internet of Things**

Internet of Things is a network of interconnected devices that interact with one another, collecting useful data/information and connecting to the internet. They are objects embedded with sensors, software, and connectivity functions. Blockchain plays a crucial role in providing security to the said systems. The security of an IoT system is only as strong as the weakest link, or device, in the chain. In this case, blockchain can make sure that the data collected by IoT devices is secure and accessible to only the right people.

1. **Online Identity Verification**

Without online identity and authentication, no financial transaction may be completed online. And this is true for any potential service providers that any user in the banking and financial sector might have. Blockchain can, however, centralize the online identity verification process, allowing individuals to share their identity with whatever service provider they want after just having to authenticate it once using the blockchain. Additionally, users have a choice of identity verification techniques, including user authentication, facial recognition, etc.

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