ETHEREUM BLOCKCHAIN AND SMART CONTRACTS

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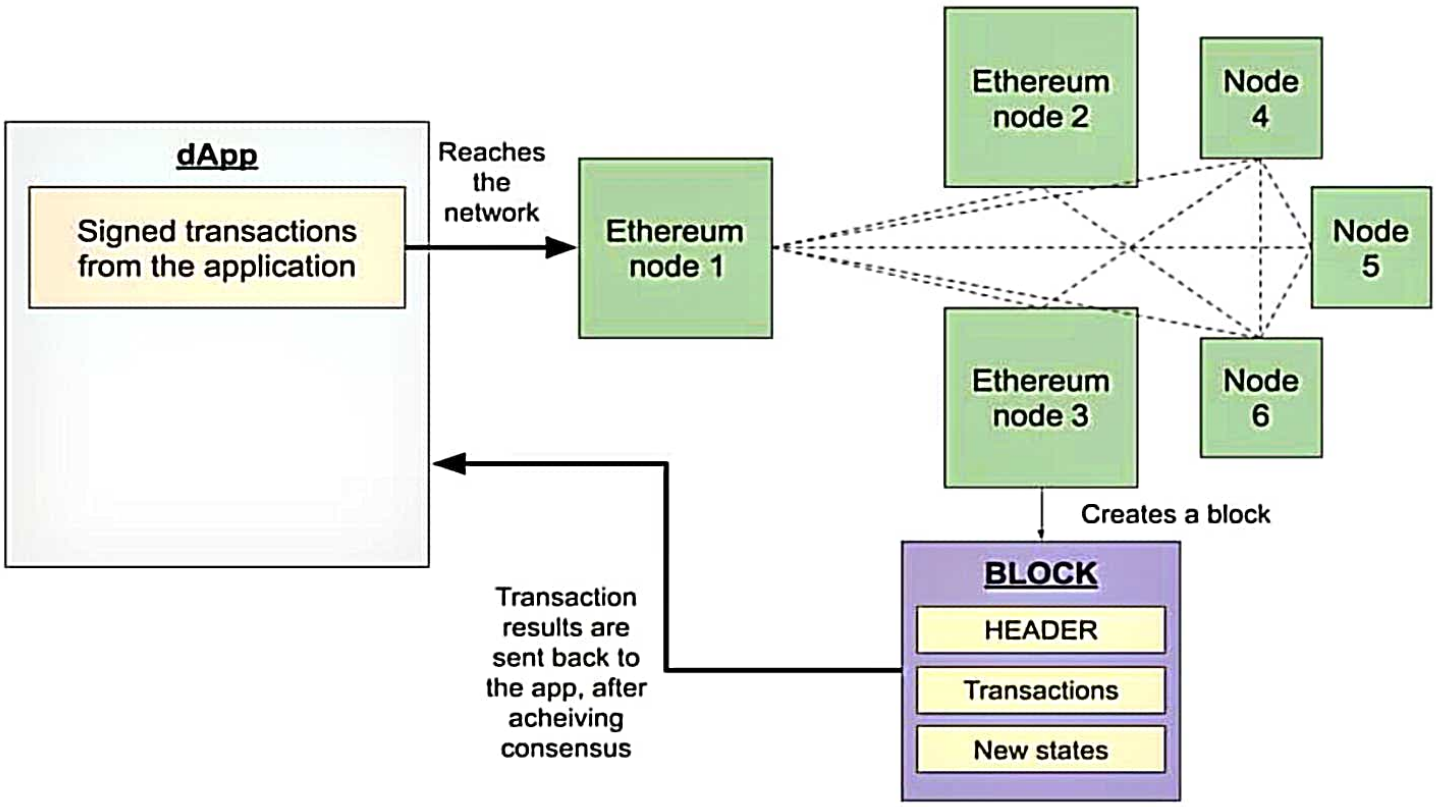
INTRODUCTION TO ETHEREUM PLATFORM:

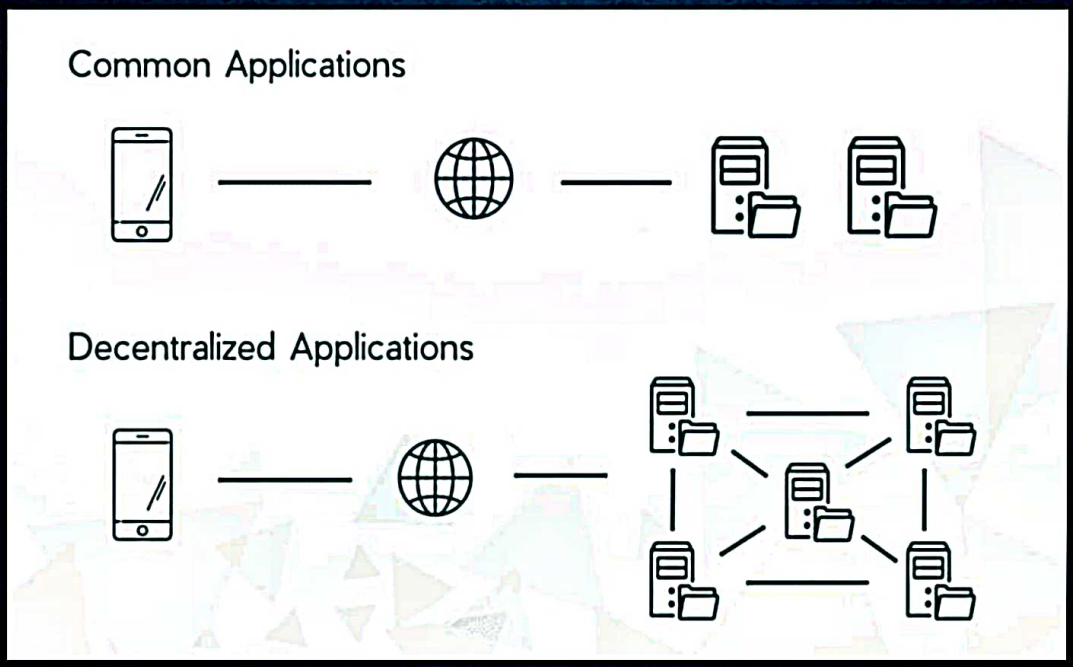
- Ethereum is a decentralized platform where developers can create and deploy smart contracts and decentralized applications (DApps).
- It was proposed by **Vitalik Buterin** in 2013 and launched in 2015, offering a new way to execute smart contracts using Ether (ETH), its native cryptocurrency.
- Ethereum stands out for its ability to handle various types of smart contracts and its Ethereum Virtual Machine (EVM), which executes code securely on the network.



D APPS :

decentralized application (DApp) is a type
distributed, open source software
pplication that runs on a peer-to-peer (P2P)
lockchain network rather than on a single
omputer.

Apps are similar to other software
pplications that are supported on a website
r mobile device,



EVM

- The Ethereum Virtual Machine (EVM) is like a computer that runs smart contracts on the Ethereum network.It's designed to securely execute smart contract code without affecting the rest of the network.
- Smart contracts are written in high-level languages and compiled into bytecode that the EVM can understand and execute.

GAS IN ETHEREUM :

- Gas is a unit of measurement for the computational work needed to execute actions on the Ethereum network.
- Each action, like sending Ether or executing a smart contract, requires a certain amount of gas, which is paid for with Ether.
- Gas limits and prices ensure that the network runs smoothly and efficiently, preventing abuse and prioritizing transactions based on their complexity

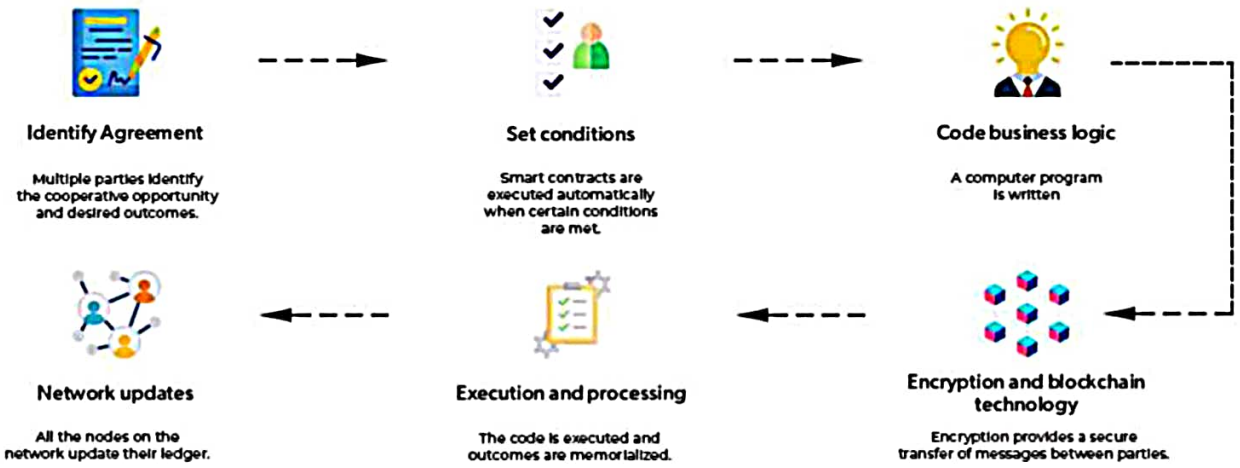
SMART CONTRACTS IN BLOCKCHAIN:

- Smart contracts are digital agreements that automatically execute when certain conditions are met, without the need for intermediaries.
- Examples include token sales, decentralized exchanges, and governance systems
- Ethereum has developer-friendly languages for writing smart contracts:
- Solidity and vyper

ADVANTAGES:

- Immutable
- Transparent
- Secure
- Making them suitable for various applications such as finance,supply chain management, and voting systems.

How does a
Smart Contract Work?



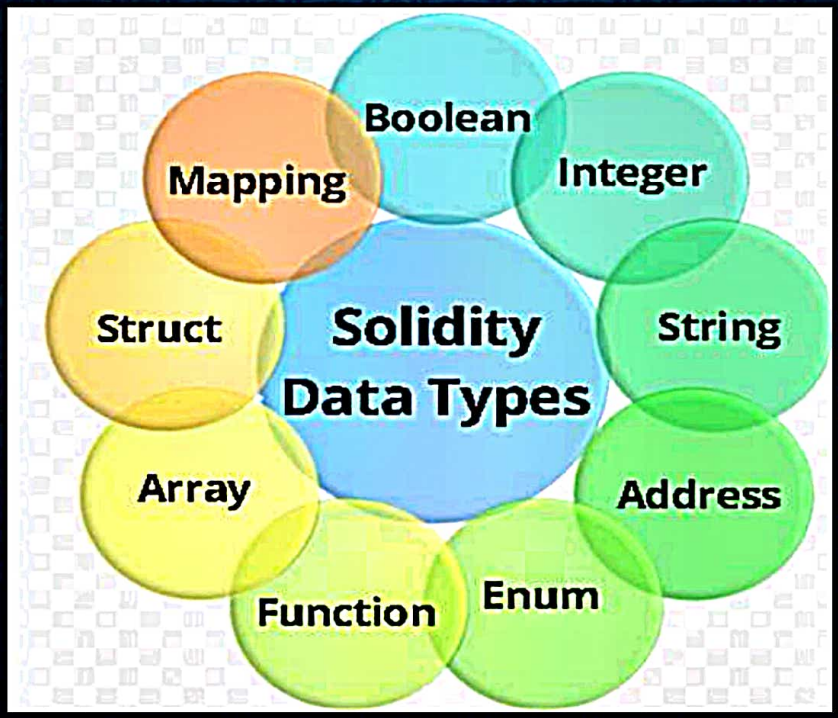
STRUCTURE OF ETHEREUM SMART CONTRACTS

Ethereum smart contracts consist of data storage, functions, and logic.

Data storage holds information on the blockchain, functions define what the contract can do, and logic determines when functions are executed and transactions are processed.

SOLIDITY:

- Solidity is the main language for writing smart contracts on Ethereum.
- It's similar to JavaScript and supports features like data types, functions, events, and modifiers, making it versatile for creating complex smart contracts.



MODIFIERS :

- Functions that modify behavior of other functions.
- **Syntax**: Defined with modifier keyword followed by function definition.
- **Use Cases**: Access control, input validation.
- **Example** :

```
modifier onlyOwner()
{
require(msg.sender == owner, "Only owner can call this function");   _;
}
```

ADVANCED SOLIDITY:

- Advanced Solidity covers topics like complex data structures, error handling, security practices, gas optimization, and contract upgradability.
- Techniques such as error handling and gas optimization improve the efficiency and security of smart contracts, while contract upgradability patterns allow for seamless updates without disrupting functionality.

ADVANTAGES & DISADVANTAGES OF SOLIDITY

ADVANTAGES	DISADVANTAGES
+ Integration with Ethereum	- Not supported on other blockchain
+ Smart contracts	- Security vulnerabilities
+ Large community	- Relatively new language
+ Simplicity	- High cost
+ Educational resources	

Industries that could Benefit from Solidity and Smart Contracts

- Healthcare
- Supply Chain Management
- Logistics
- ECommerce and Retail
- Finance
- Insurance
- Voting in Politics

CONCLUSION:

- Ethereum revolutionizes decentralized applications and smart contracts with its versatile platform and Ethereum Virtual Machine. Its use of gas ensures efficient network operation while maintaining security. Smart contracts, powered by Solidity, offer transparent and immutable digital agreements, enabling various real-world applications

THANK YOU !