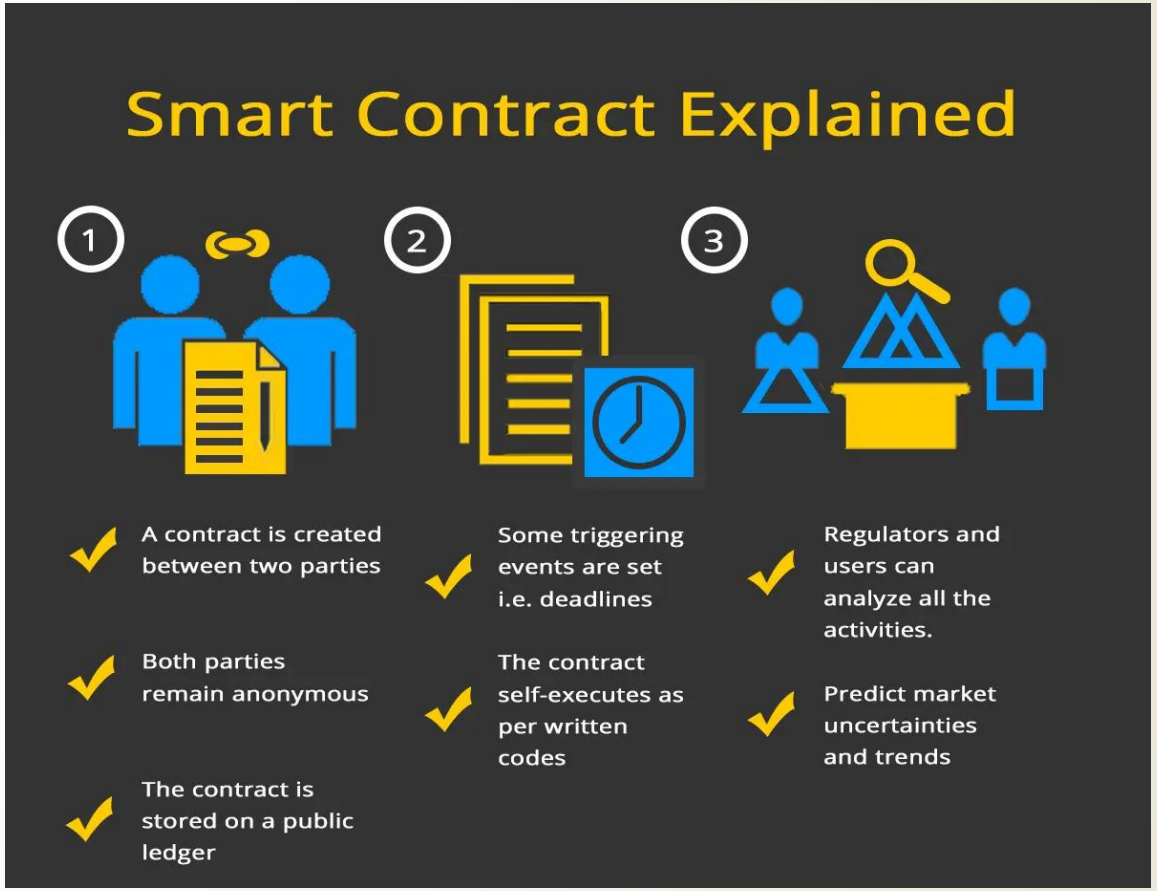
Part 2: Smart Contract

By Abdelhak Lefilef

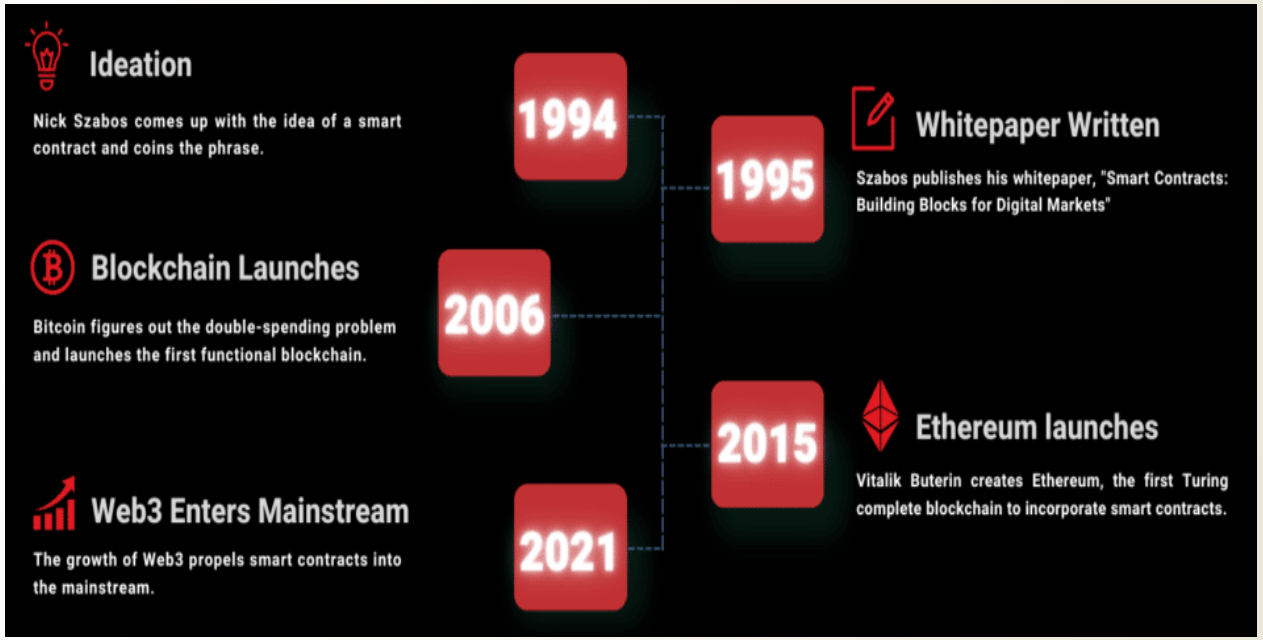
What’s the smart contract?

- A smart contract is a self-executing contract in which the conditions of the buyer-seller agreement are directly written into lines of code.
- The code and agreements therein exist across a distributed, decentralized blockchain network.
- Transactions are trackable and irreversible, and the code controls the execution.

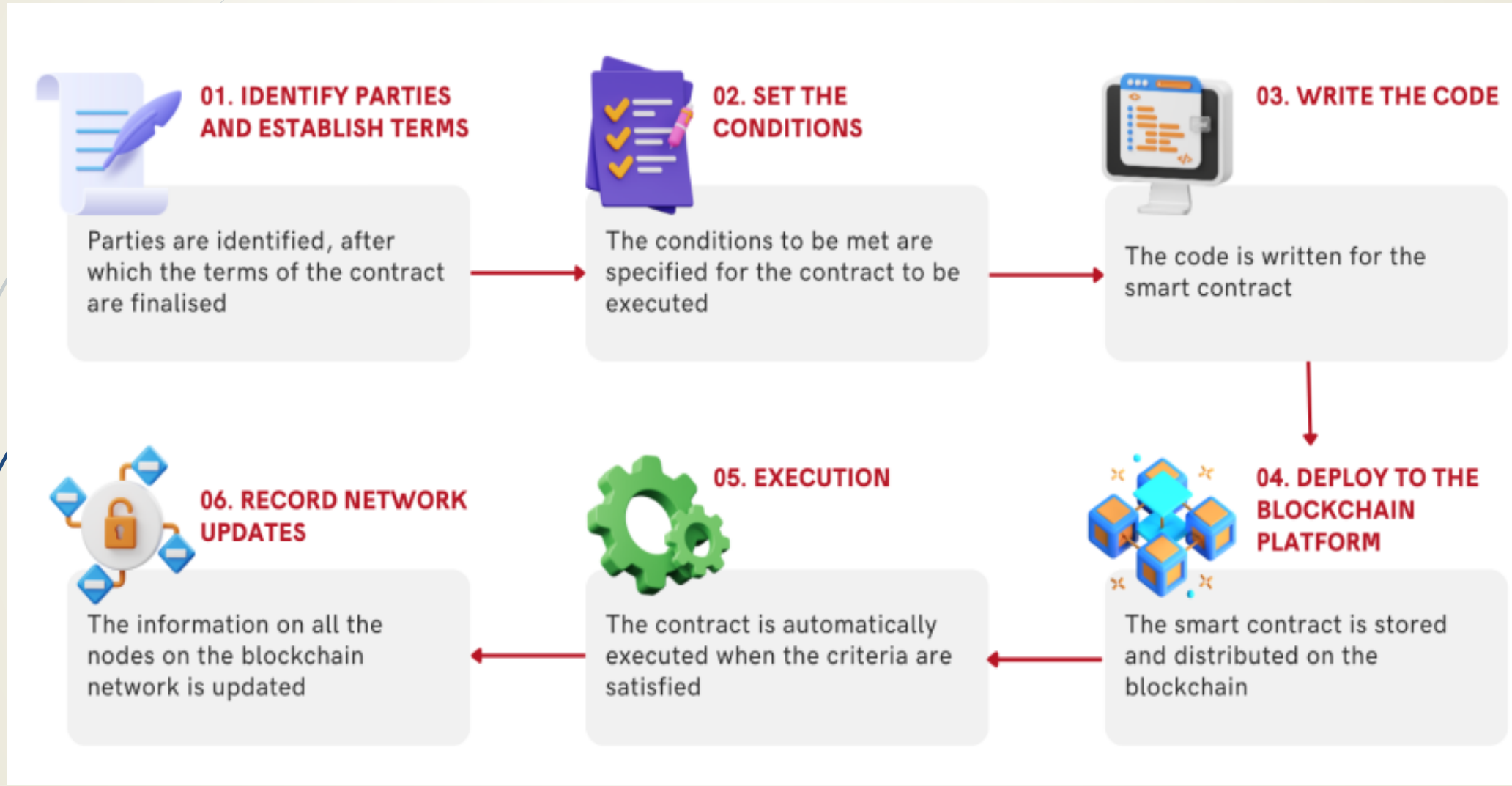


The history of the smart contract?

- The word “smart contract” seems to have been developed with the advent of blockchain. However, did you know that the concept of “smart contract” was first introduced several years before the appearance of blockchain.
- Smart contracts were invented by computer scientist and cryptographer Nick Szabo in the 1990s, years before blockchain technology was created.



How is the smart contract working?



How is the smart contract working?

1- Identify parties and establish the terms of the agreement

In the first step, the parties involved in the agreement should be identified, after which the contract terms are finalized. The terms, obligations of parties, and standards for executing the contract are all described here.

2- Set the conditions

The second step involves specifying the conditions to be met for the contract to be executed. These conditions are rules or criteria that must be satisfied to validate the contract.

3- Write the code

Thirdly, the code has to be written for the smart contract. This code specifies the exact steps for a contract to be automatically executed once the conditional parameters are met.

How is the smart contract working?

4- Deploy to the blockchain platform

In the fourth step, the smart contract is stored on the blockchain and replicated among its participants to validate the contract code.

5- Execution

Once consensus is reached and the network participants complete verification, the fifth step, execution, begins. The contract is automatically executed when the predetermined criteria are satisfied.

6- Record network updates

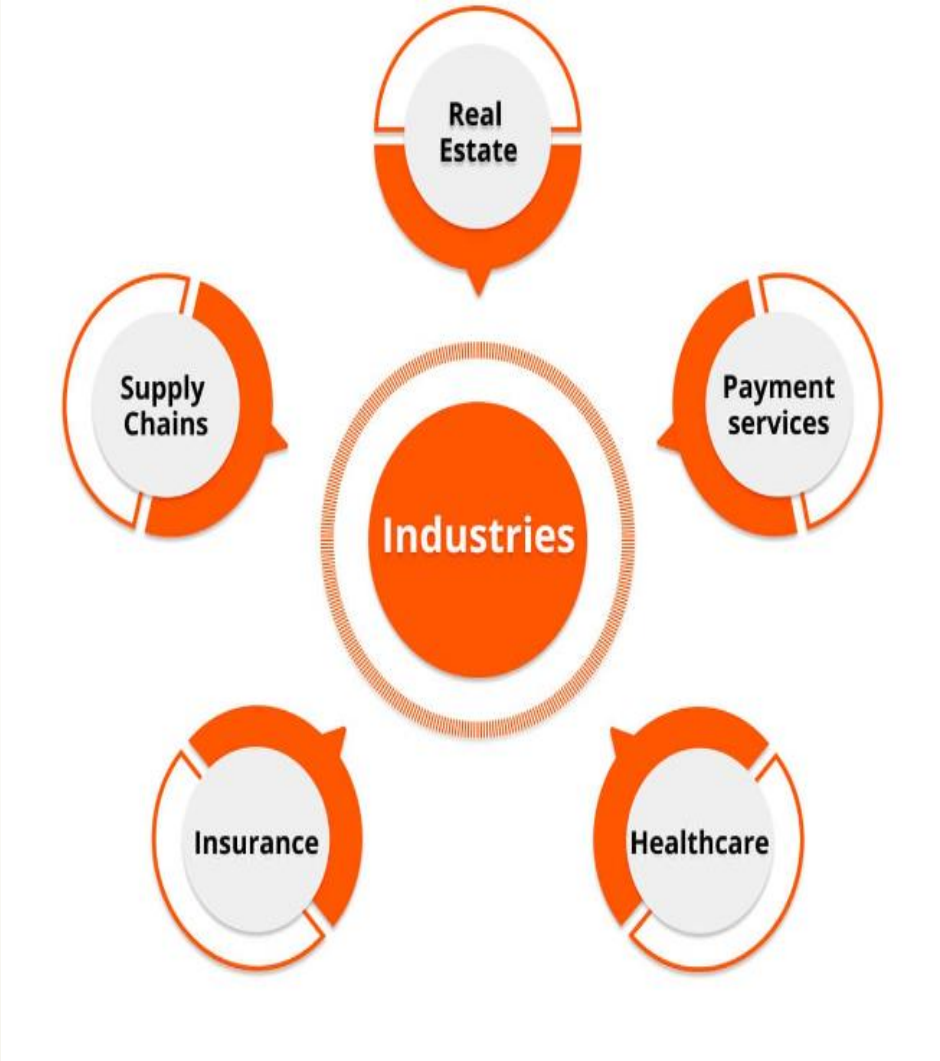
Lastly, in the sixth step, after the smart contract's execution is complete, the information on all the nodes on the blockchain network is updated. Once recorded and verified, this information cannot be changed or deleted, making it immutable.

What Are the Four Major Parts of a Smart Contract?

- It depends on the blockchain and how it is programmed. Generally speaking, smart contracts have state variables (data), functions (what can be done), events (messages in and out), and modifiers (special rules for specific users). Some may have additional elements depending on what they are designed to do.

Smart Contract Uses

- **Real Estate :**Real estate smart contracts are altering the process of buying and selling apartments.
- **Payment Services:** Digital contracts can handle many loan servicing functions, such as collecting and disbursing payments, tax authorities, and insurance companies.
- **Healthcare:** Digital contracts can encode all medical data and information into electronic health records.
- **Insurance:** The present insurance system is expensive and lacks trust among parties and stakeholders. Using digital assets for insurance instead of generating massive paper agreements may solve this problem.
- **Supply Chains:** Smart contract technology may be attached to a product from the moment it is put into a truck or carried to its destination, as well as from other crucial points in the supply chain and procurement automation.



Benefits of smart contracts

- Security
- Real-time execution
- Transparency
- Savings

Security

- Smart contracts run on the blockchain and are known for their security. In a blockchain, all transactions are encrypted, making them incredibly difficult to hack.
- The data is stored in blocks that are linked to all previous and subsequent blocks, forming a chain that is immune to alterations. Hackers would have to modify the entire chain to change a single record.

Real-time execution

- When conditions are met, the smart contract is executed almost immediately and simultaneously for all parties involved across the network. Because of their digital and automated nature, smart contracts eliminate paperwork and errors.

Transparency

- As the information and logic in the contract are shared among all network participants, an environment of trust and transparency is created.

Savings

- As there is no need for an intermediary in a smart contract, commissions or fees are eliminated, and delays are eliminated, resulting in reduced costs.

Limitations of smart contracts

- Human error
- Permanent
- Unreliable

Human error

- A smart contract is a computer program that requires a programmer to code the terms and conditions of the contract. Since humans develop them, they are susceptible to human errors such as misinterpretation and omission.

Permanent

- Smart contracts that are coded correctly do not create any issues. However, problems arise when there are errors or flaws in the contract's coding, as they cannot be changed.

Unreliable

- Unreliable inputs into the contract could lead to false or non-execution. Most attorneys cannot read smart contracts, as sophisticated coding knowledge is required to read and write them.

Smart contract

vs

Traditional contract

Smart Contracts	VS.	Traditional Contracts
Smart contracts are self-executing agreements. When specific conditions and terms are met, the execution of smart contracts takes place automatically.	Automation	Traditional contracts cannot be automatically executed. They entirely rely on manual involvement for verification of the conditions.
Smart contracts are totally transparent. All the parties involved in the transaction are capable of viewing the terms of the contract at all times.	Transparency	The level of transparency in traditional contracts is questionable. Therefore, in the case of traditional contracts, there exists a possibility of disputes or disagreements.
The speed of implementing smart contracts is high, as they are automated and there is no involvement of intermediaries. This enhances the overall efficiency during execution.	Speed	The speed in traditional contracts is significantly low in comparison to smart contracts. One of the main reasons for this is the involvement of intermediaries or third parties.
Smart contracts are immutable. After the execution of a smart contract has taken place, it is not possible to make changes to it. It is a unique trait of smart contracts that strengthens its level of security.	Immutability	In the case of traditional contracts, there exists no immutability. As these contracts are paper-based, there is a chance that someone may make modifications or changes to them.
Smart contracts are highly cost-effective. The cost-effectiveness is due to the quick execution capability as well as the absence of third parties.	Cost	In the case of traditional contracts, the cost is higher than that of smart contracts. The reliance on intermediaries automatically adds to the cost.