

STORAGE DEVELOPER CONFERENCE



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BY Developers FOR Developers

A **SNIA** Event

AI & Blockchain The Emerging Duets

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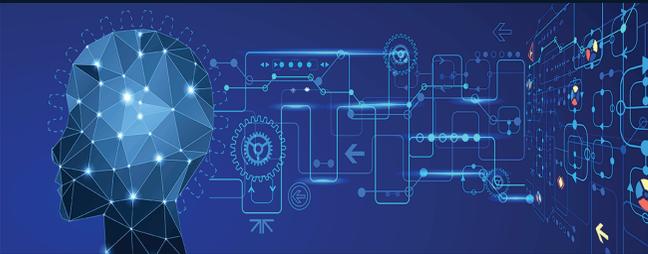
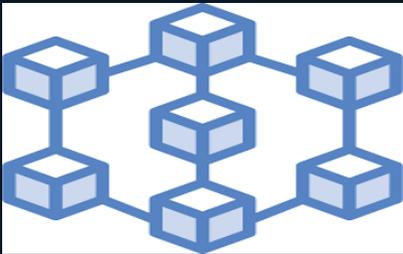
Agenda

AI & Blockchain – The Emerging Duets

- Introduction
- Blockchain Features
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- Blockchain Market
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- Blockchain ,Smart Contracts
- Decentralized Storage
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- Artificial Intelligence
- AI,ML,DL,FL
- AI Market
- Federated Learning
- Challenges
- AI & Blockchain Combination
- Applications/Useases
- Summary & Discussion
- About MSys

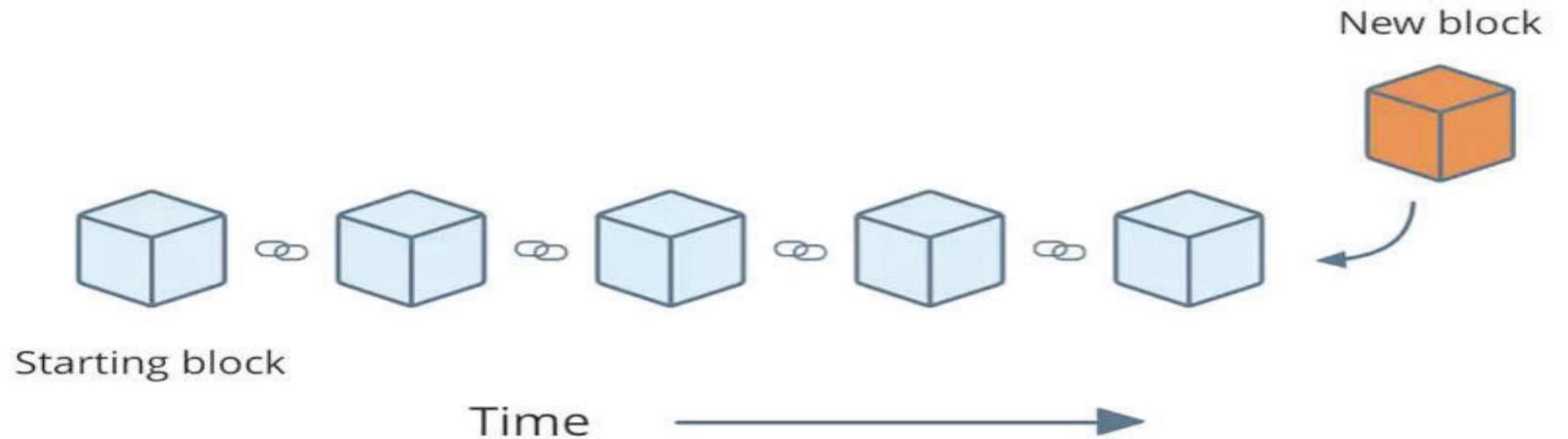
INTRODUCTION

Blockchain , Decentralized Storage & Artificial Intelligence .



Blockchain

Basics, Ethereum, Smart Contracts & Web3.0



Blockchain is decentralized, distributed and public digital ledger which records transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the consensus of the network.

Blockchain could be the most significant development in the storage and sharing of knowledge since the advent of the internet itself.

Blockchain Applications

Why use blockchain ?

Blockchain revolution is posed to create the backbone of a layer of the internet for transactions and interactions of value are often called the “Internet of Value”.

Blockchain in Legal

Smart Contracts stored on the blockchain track contract partners ,terms, transfer of ownership, and delivery of goods/services without legal intervention.

Blockchain in Supply Chain

By utilizing a distributed ledger, companies within a supply chain gain transparency in to shipment tracking ,deliveries, and progress among other suppliers where no inherent trust exists.

Blockchain in Government

Blockchain offers promise as a technology to store personal identity information, criminal backgrounds, and “e-citizenship.” authored by biometrics .

Blockchain in Energy

Decentralized energy transfer and distribution are possible via micro transactions of data sent to blockchain validated and re-dispersed to the grid ,while securing payment to the submitter.

Blockchain in Food

Using blockchain to store food supply chain data offers enhanced traceability of predict origin ,batching , processing, expiration, storage temperatures and shipping .

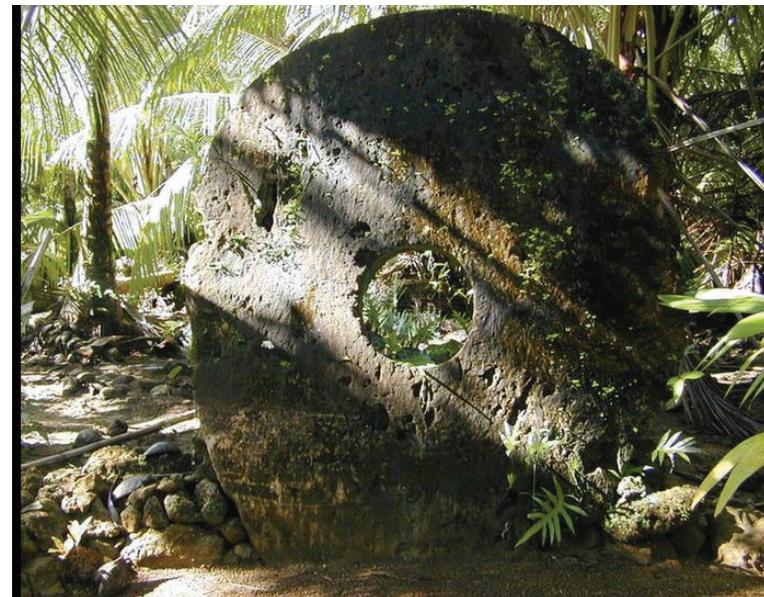
Blockchain in Retail

Secure P2P market place can track P2P retail transactions, with product information, shipment, and bills of loading input on the block chain, and paying via Bitcoin.

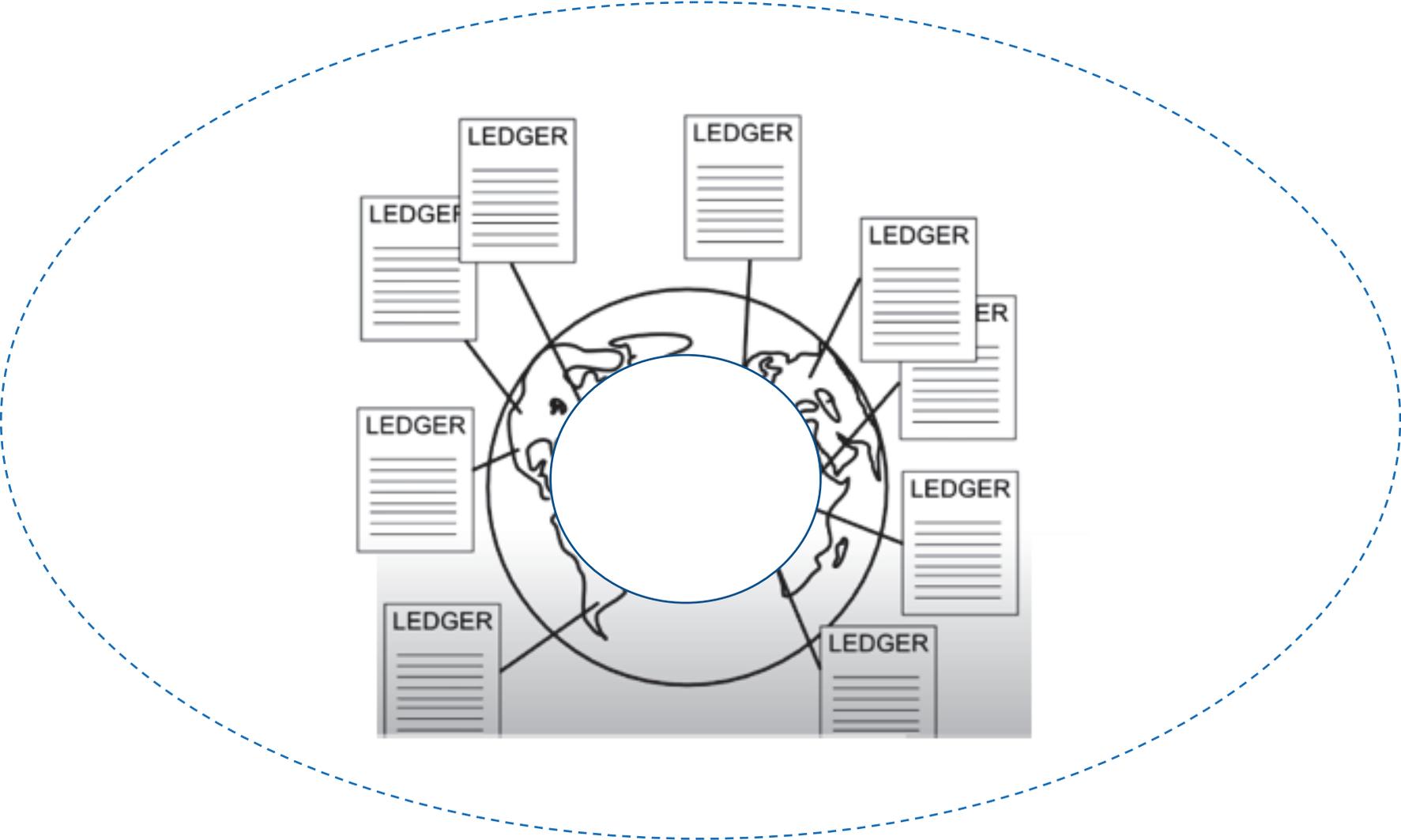
Blockchain in Healthcare

Electronic medical records stored in a blockchain ,accessed, and updated via bio metrics ,allow for the democratization of patient data and alleviate the burden of transferring records among providers.

Yapese Stone Money Quarries in Palau, Micronesia

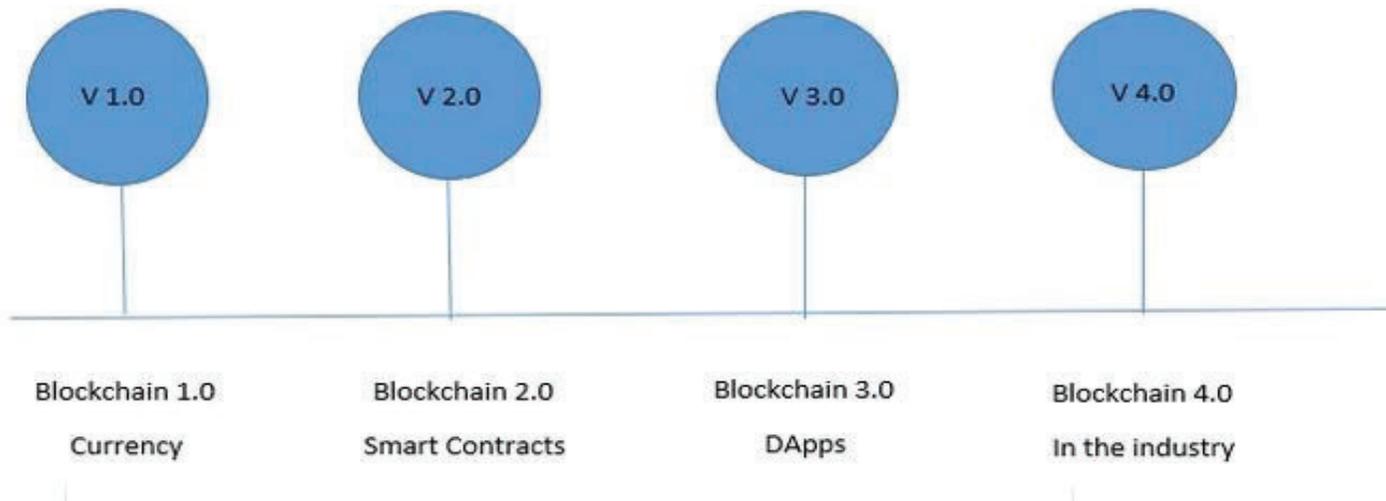


Mental 'DECENTRALIZED LEDGER'



Blockchain History & Evolution

Blockchain is created by Satoshi Nakamoto in 2008 to serve as the public distributed ledger for bitcoin cryptocurrency transactions.



- Automation, enterprise resource planning, and integration of different execution systems are the key features of Industries.
- Industrial revolution demands the highest degree of trust and privacy, Blockchain comes here for the rescue.
- Blockchain is useful in Financial transactions, Supply chain management, condition-based payments, IoT data collection, health management, and asset management.

Blockchain

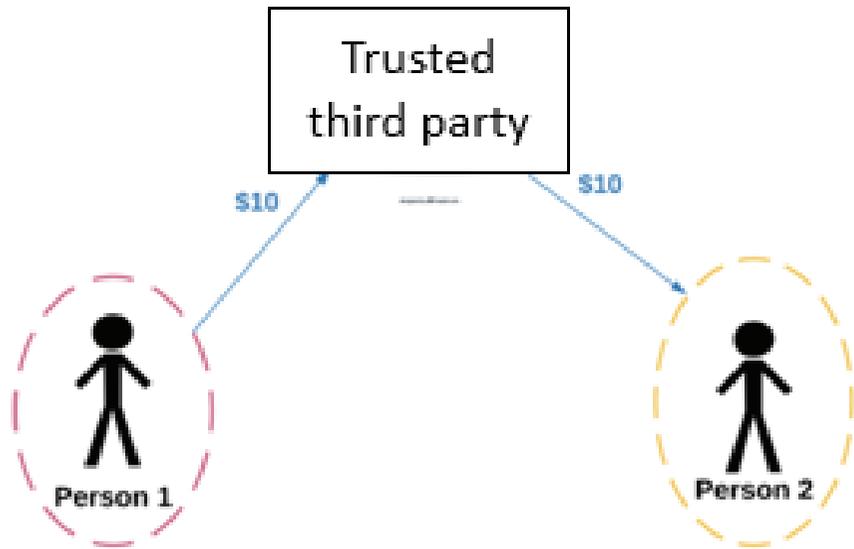
Decentralization, Immutability, Transparency ..!

Greater trust, Greater security, More efficiencies ..!

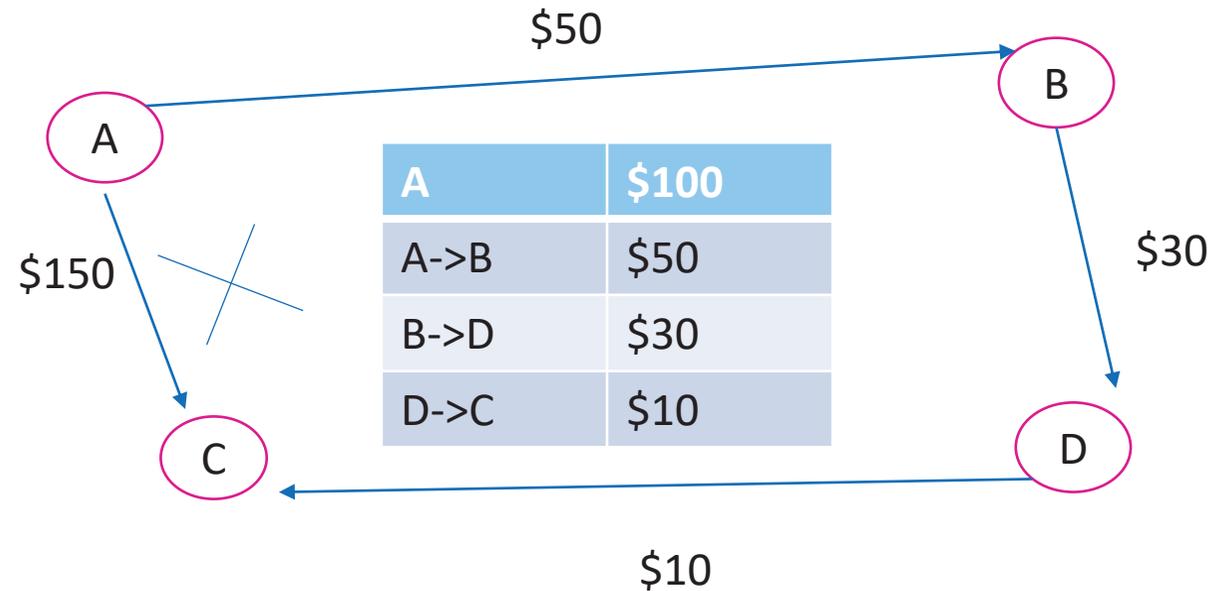
Blockchain could be the most significant development in the storage and sharing of knowledge since the advent of the internet itself.

Blockchain Technology : Cryptography + Proof of Work + Decentralized networks

Distributed Ledger, Mining



Bitcoin is digital currency
Blockchain is the technology



Open , public, distributed Ledger
Miners are special nodes which can hold ledgers
Miners compete each other for validating new transaction

Public-Key Cryptography

Public key cryptography uses

1. A set of public keys visible to anyone and
2. A set of private keys visible only to the owner

The private key generates a “digital signature” for each blockchain transaction that a user sends out.

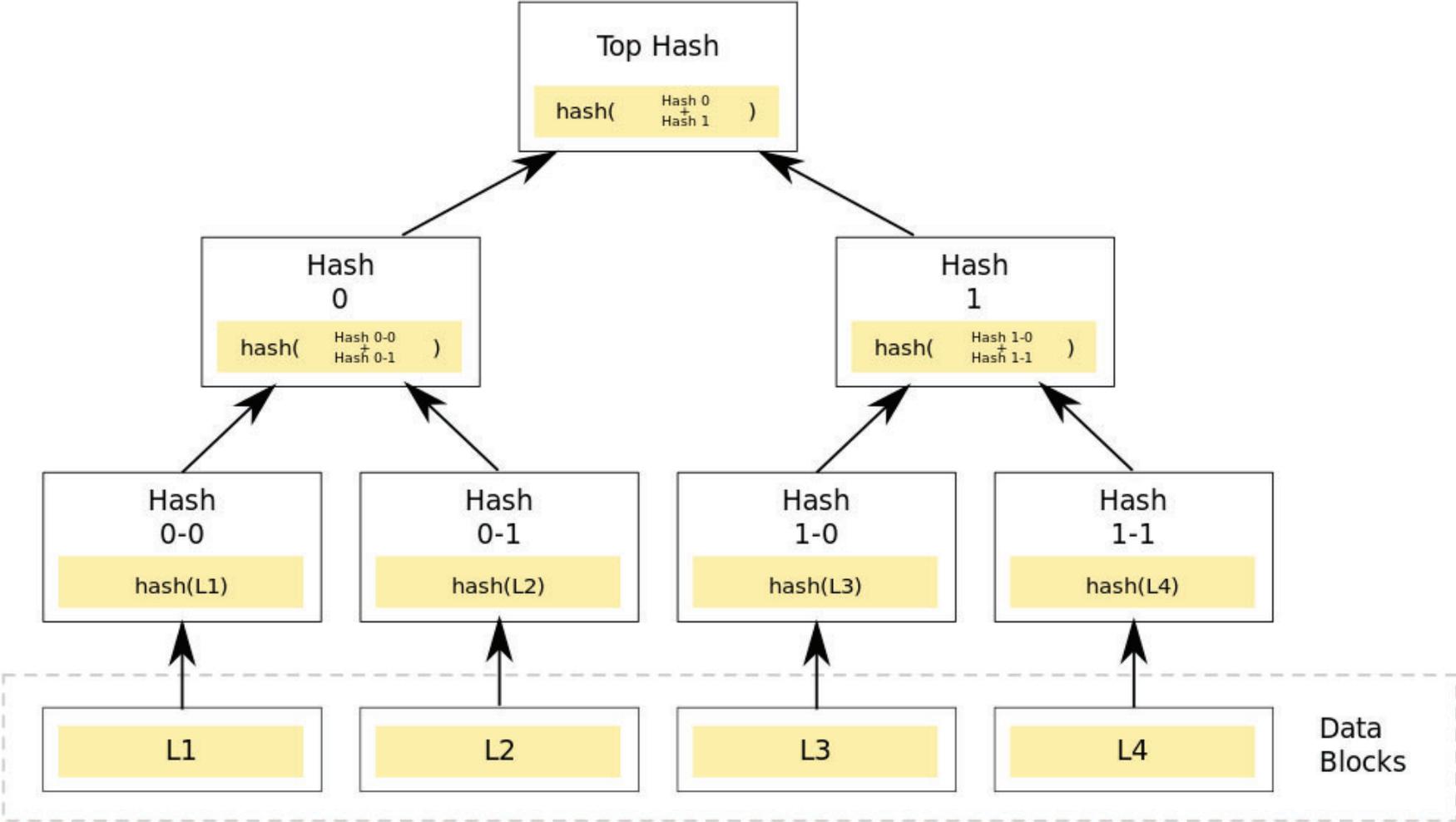
The signature ensures authenticity by

1. Confirming that the transaction is coming from the user and
2. Preventing the transaction from being altered by anyone once it has been issued.

Changing the transaction message in any way will cause verification to fail.

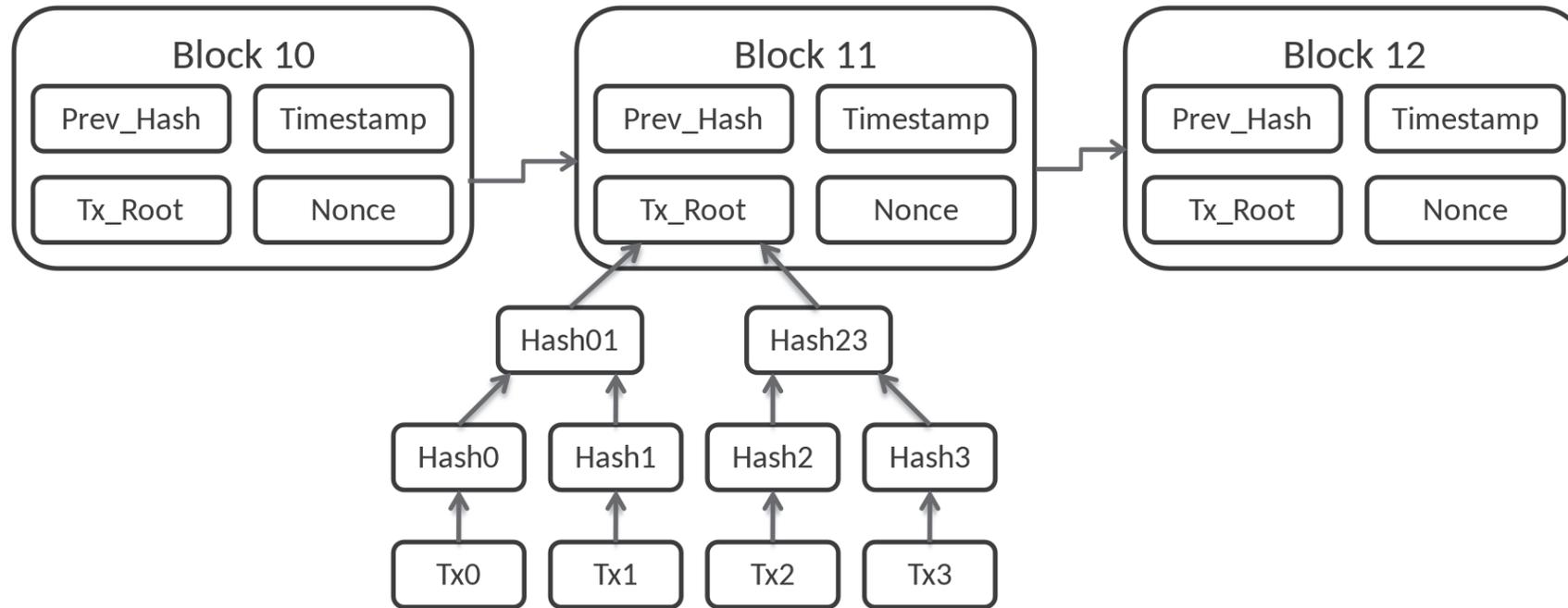
Public-key cryptography helps us authenticate users in a peer-to-peer system.
To ensure **no double spending**, we need to validate who has what.

Merkle Tree



An example of a binary hash tree. Hashes 0-0 and 0-1 are the hash values of data blocks L1 and L2, respectively, and hash 0 is the hash of the concatenation of hashes 0-0 and 0-1.

Blockchain ..



A block is a bundle of records. For example, a Bitcoin block contains all the Bitcoin transactions that take place in a 10-minute interval (Tx_Root in the above diagram); the record for each transaction contains the sender, the recipient, the amount of Bitcoins transferred, and the time. The timestamp records when the block is created

Source: <https://en.wikipedia.org/wiki/Blockchain>

Consensus , Mining, Minting

“**Consensus System**” — which allows us to preserve a digitally shared truth.

Consensus protocol makes sure that every new block that is added to the Blockchain is the one and only version of the truth that is agreed upon by all the nodes in the Blockchain.

Mining is an activity that involves recording and confirming the legitimacy of transactions on the blockchain. Proof of work (**PoW**)

Minting - Creating new crypto coins using a proof-of-stake (**PoS**) consensus algorithm.

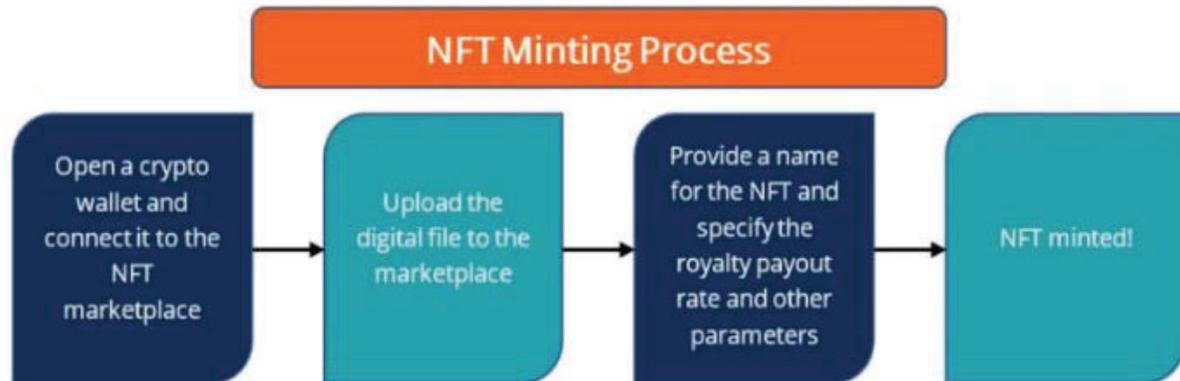
Public-key cryptography helps to authenticate users in a peer-to-peer system.

Consensus Mechanisms

1. Proof of Work (PoW)
2. Practical Byzantine Fault Tolerance (PBFT)
3. Proof of Burn (PoB)
4. Proof of Capacity
5. Proof of Elapsed Time
6. Proof of Activity
7. Proof of Weight
8. Proof of Importance
9. Leased Proof of Stake.

Crypto currency - Proof of Ownership - NFT

- Non Fungible
 - Indivisible
 - Transferrable
 - Fraud proof
 - Programmable
- Show it off
 - Art galleries
 - Digital frame
 - Physical print
 - Online galleries
- Proof of ownership
 - Decentraland (digital land)
 - Online games (rare items)
 - Domain names
 - Collateral in DeFi (eg. NFTfi)



Non-Fungible Token (NFT)

Non-fungible tokens (NFTs) are cryptographic assets on a blockchain with unique identification codes and metadata that distinguish them from each other.

NFT cannot be traded or exchanged at equivalency. This differs from fungible tokens like cryptocurrencies, which are identical to each other and, therefore, can serve as a medium for commercial transactions.

- NFTs are unique cryptographic tokens that exist on a blockchain and cannot be replicated.

- NFTs can represent real-world items like artwork and real estate. "Tokenizing" these real-world tangible assets makes buying, selling, and trading them more efficient while reducing the probability of fraud.

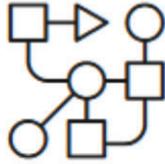
- NFTs can also function to represent individuals' identities, property rights, and more.

- Collectors have sought NFTs as their value initially soared, but has since moderated.

Features of Blockchain



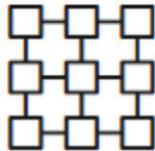
Types of Blockchain



Public blockchains are public, and anyone can join them and validate transactions.



Private blockchains are restricted and usually limited to business networks. A single entity, or consortium, controls membership.



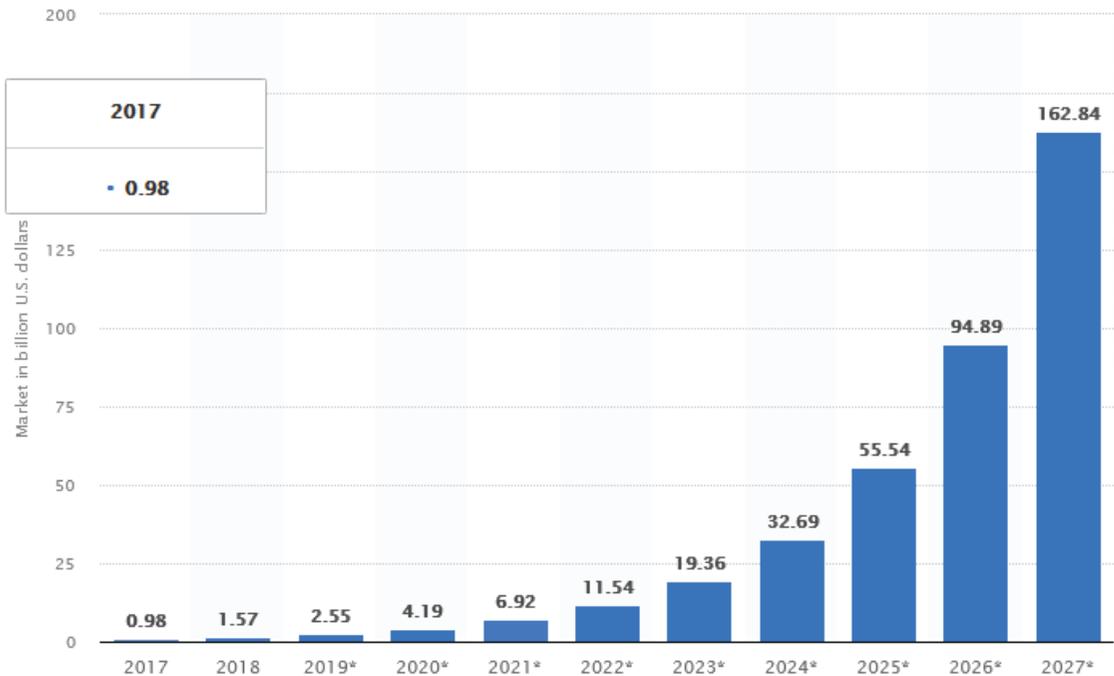
Permissionless blockchains have no restrictions on processors.



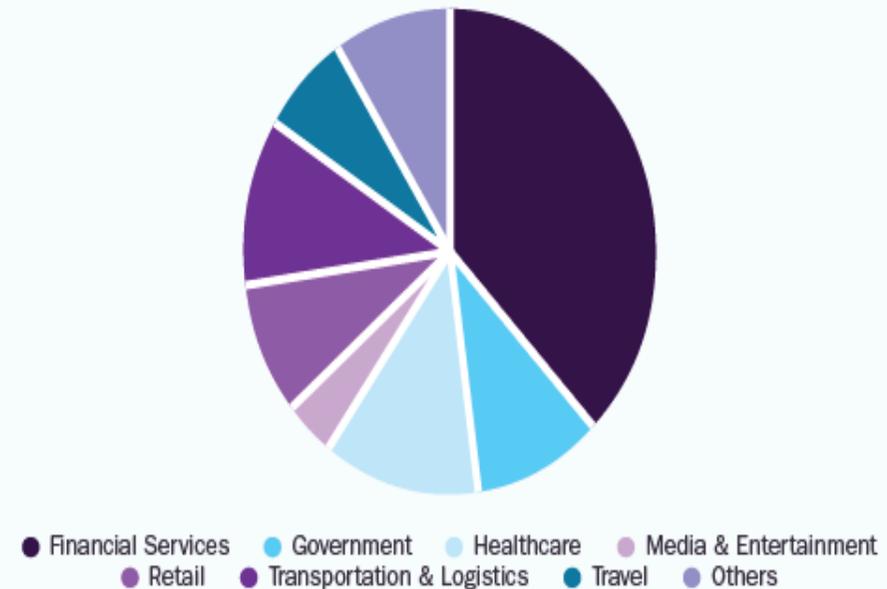
Permissioned blockchains are limited to a select set of users who are granted identities using certificates.

Blockchain Market

The blockchain market size is rising globally at a CAGR of 56.3% during the forecast period 2022 to 2029. The market is projected to grow from USD 7.18 billion in 2022 to **USD 163.83 billion by 2029**.



Global Blockchain Technology Market
share, by end use, 2021 (%)



\$5.92B
Global Market Size,
2021

Source:
www.grandviewresearch.com

Consortium Blockchain



A consortium blockchain is a **type of semi-decentralized network in which members are not granted to a single entity**. Instead it is granted to a group of individuals or 'nodes'. It offers network security that public chains don't.

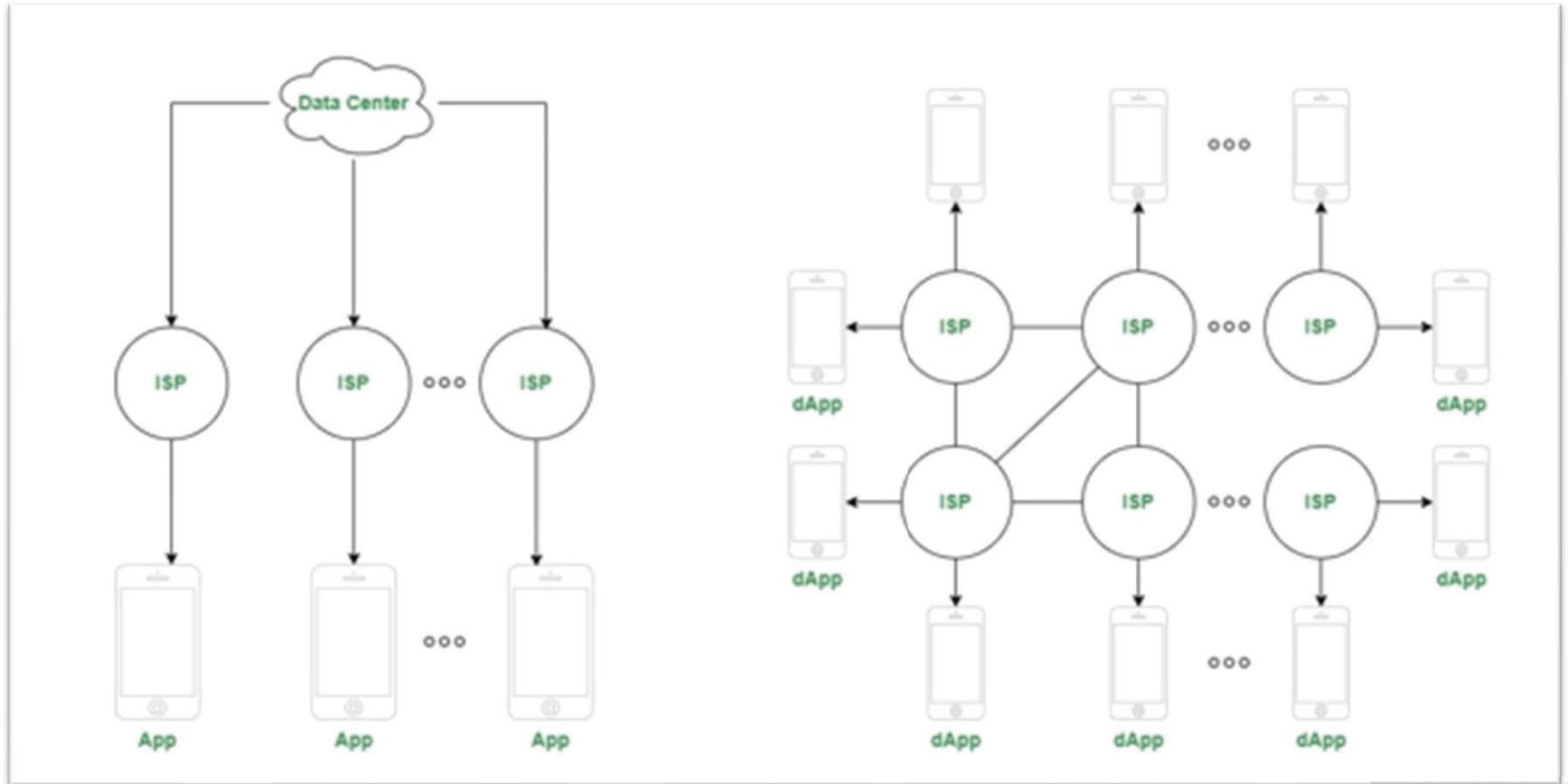
Types of Blockchain Technologies

	Public (permissionless)	Private (permissioned)	Hybrid	Consortium
ADVANTAGES	<ul style="list-style-type: none"> + Independence + Transparency + Trust 	<ul style="list-style-type: none"> + Access control + Performance 	<ul style="list-style-type: none"> + Access control + Performance + Scalability 	<ul style="list-style-type: none"> + Access control + Scalability + Security
DISADVANTAGES	<ul style="list-style-type: none"> - Performance - Scalability - Security 	<ul style="list-style-type: none"> - Trust - Auditability 	<ul style="list-style-type: none"> - Transparency - Upgrading 	<ul style="list-style-type: none"> - Transparency
USE CASES	<ul style="list-style-type: none"> ■ Cryptocurrency ■ Document validation 	<ul style="list-style-type: none"> ■ Supply chain ■ Asset ownership 	<ul style="list-style-type: none"> ■ Medical records ■ Real estate 	<ul style="list-style-type: none"> ■ Banking ■ Research ■ Supply chain

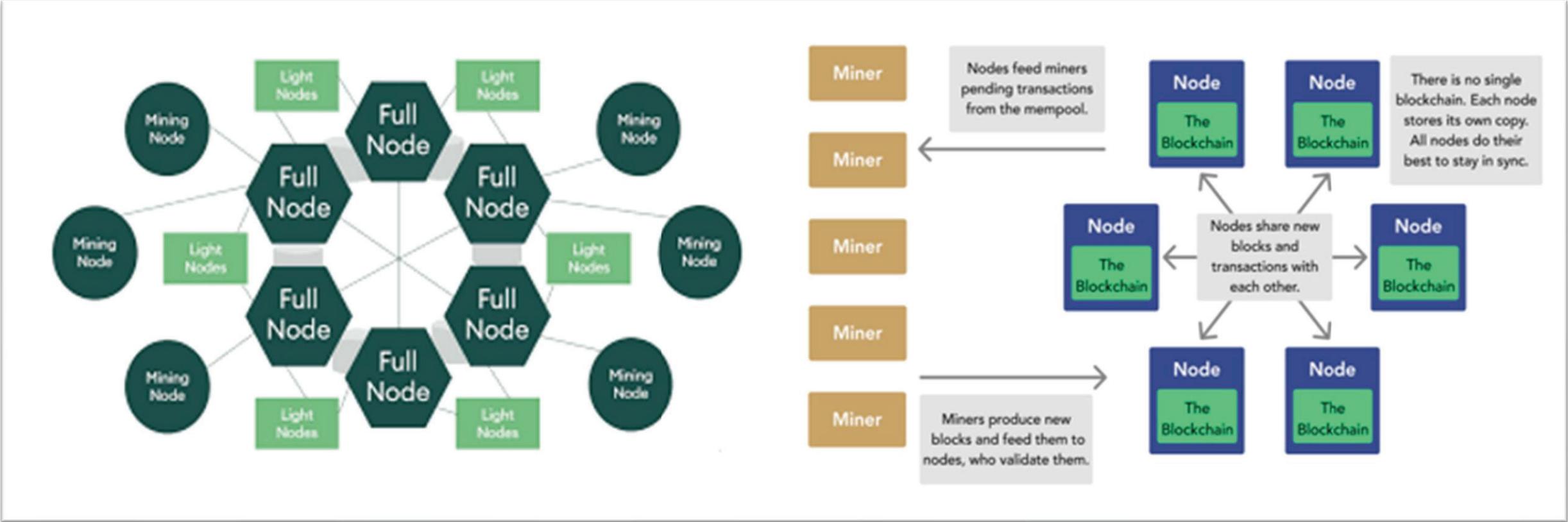
DApps

Decentralized application (**DApps**) runs on P2P n/w based on blockchain
-resistant to attacks and have high fault tolerance , Tokenized ownership and Identity management.

Normal application (**App**)



Bitcoin Network Interactions

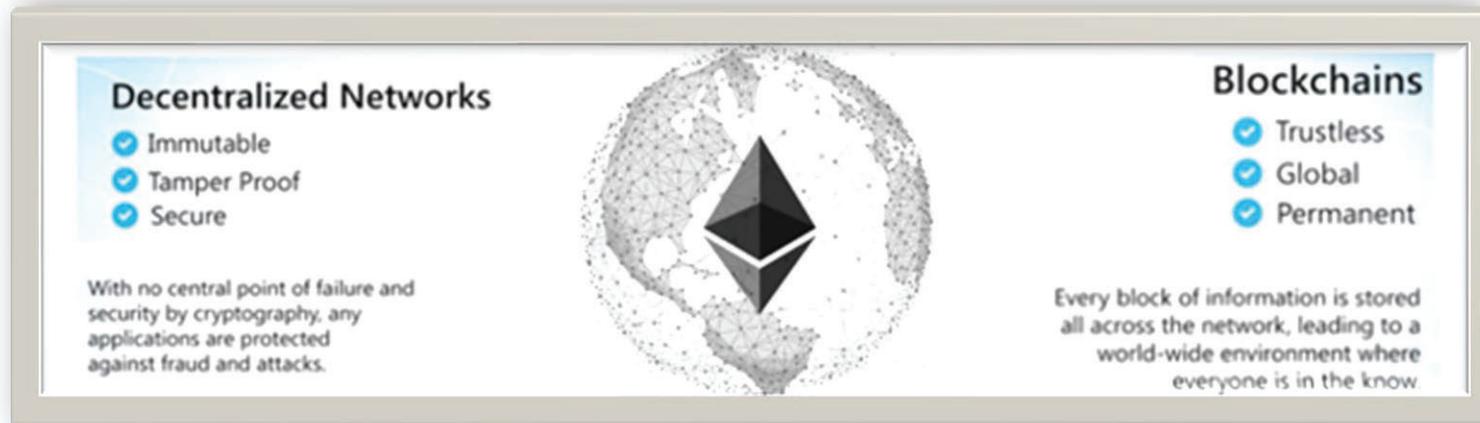


Ethereum - Infrastructure of DApps

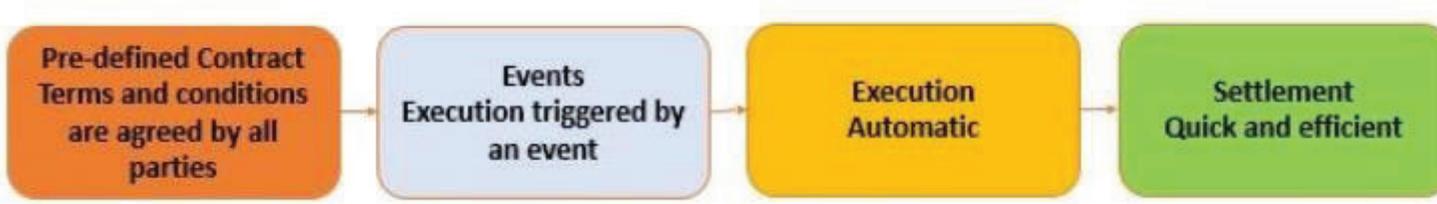
Ethereum is a decentralized, open-source blockchain with smart contract functionality. Ether is the native cryptocurrency of the platform.

Among cryptocurrencies, Ether is second only to Bitcoin in market capitalization. Ethereum was conceived in 2013 by programmer Vitalik Buterin.

Ethereum makes building decentralized applications easier than ever. Instead of needing to launch a new block chain for every dapp, you can build thousands of applications on top of Ethereum's platform.



Smart Contracts



SMART CONTRACTS	FEEES & GAS	Ethereum	VS	Bitcoin
Self Executing Letter Strict Immutable Difficult to Secure	"Hour of labor" to run a contract You bid on the price of gas Predefined for each action	 Decentralized super computer Contracts		 Decentralized payment system Value

A full node is a **program that fully validates transactions and blocks**
 All full nodes are smart contract wallets

Full Nodes – Geth, Mist, Parity

Light Nodes

- Partial blockchain copy
- Low memory requirements
- 3rd party reliance
- Easier to operate

THE DAO

"Ethereum connects people directly through a powerful decentralized super computer"

ETHEREUM FEES

Unit	Min Value	Max
wei	1 wei	1
Kwei (kilwei)	1k1 wei	1,000
Mwei (megawei)	1M1 wei	1,000,000
Gwei (gigawei)	1G1 wei	1,000,000,000
Bwei (billionwei)	1B1 wei	1,000,000,000,000
ether	1 ether	1,000,000,000,000,000

Gas used * Gas bid

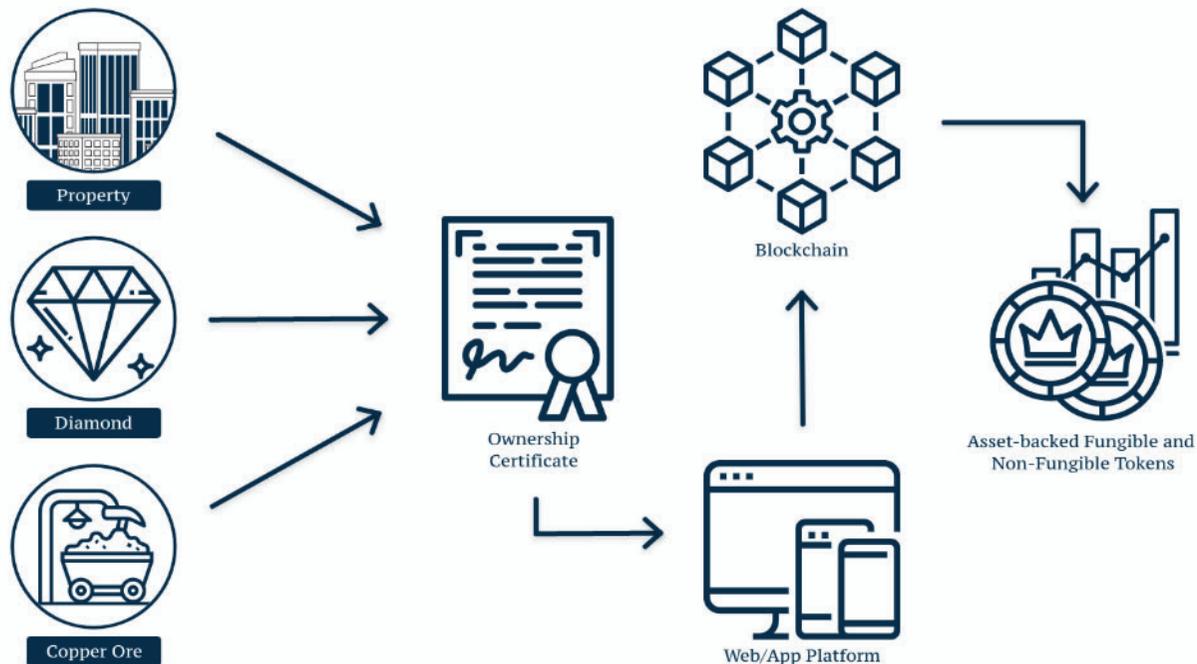
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Hours of labor * Wage per hour

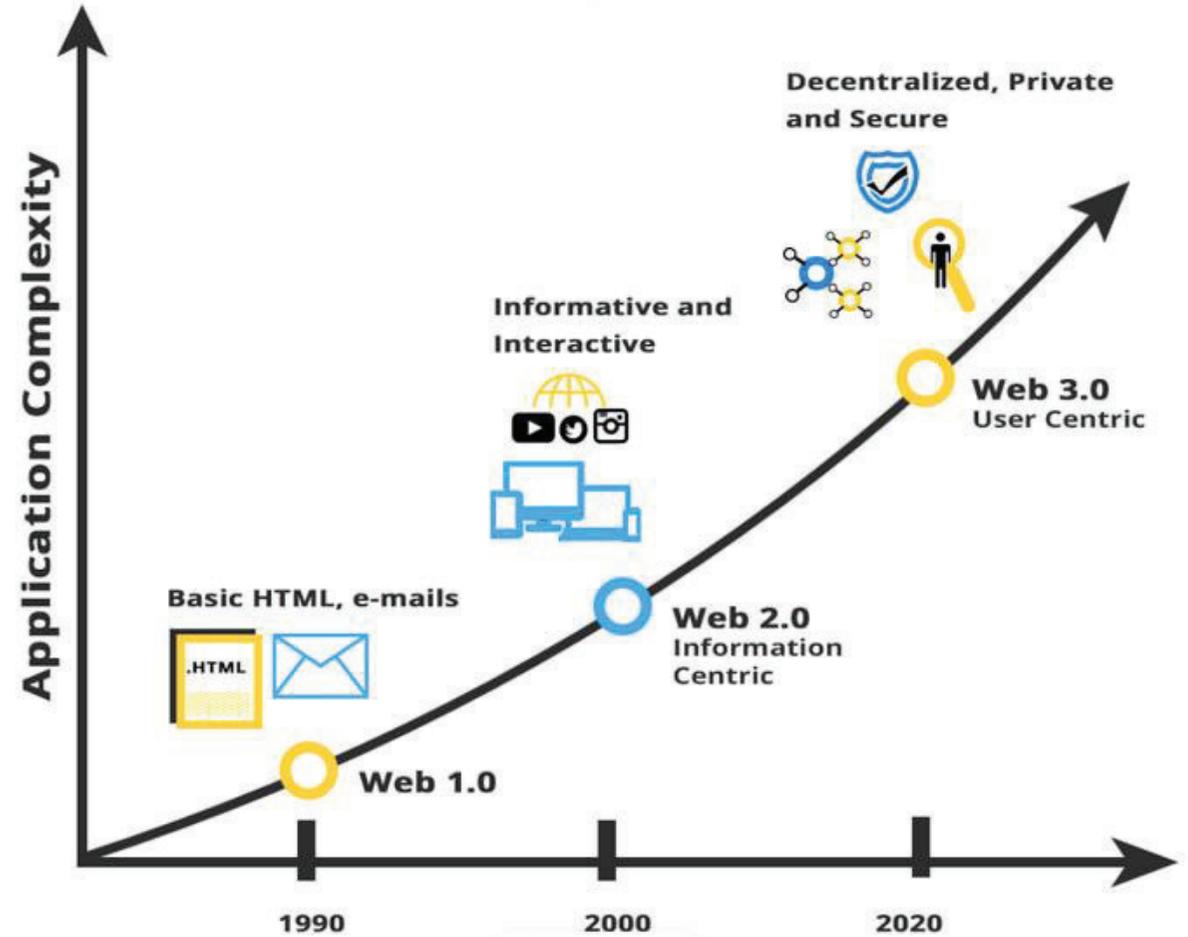
Tokenization of Assets

Asset tokenization is the process by which an issuer creates digital tokens on a distributed ledger or blockchain, which represent either digital or physical assets.

Benefits of tokenization increased liquidity, faster settlement, lower costs and bolstered risk management. From exotic assets like artwork, sports teams and racehorses to traditional assets like bonds, real estate, venture capital funds and commodities, **almost every asset class** can be tokenized.

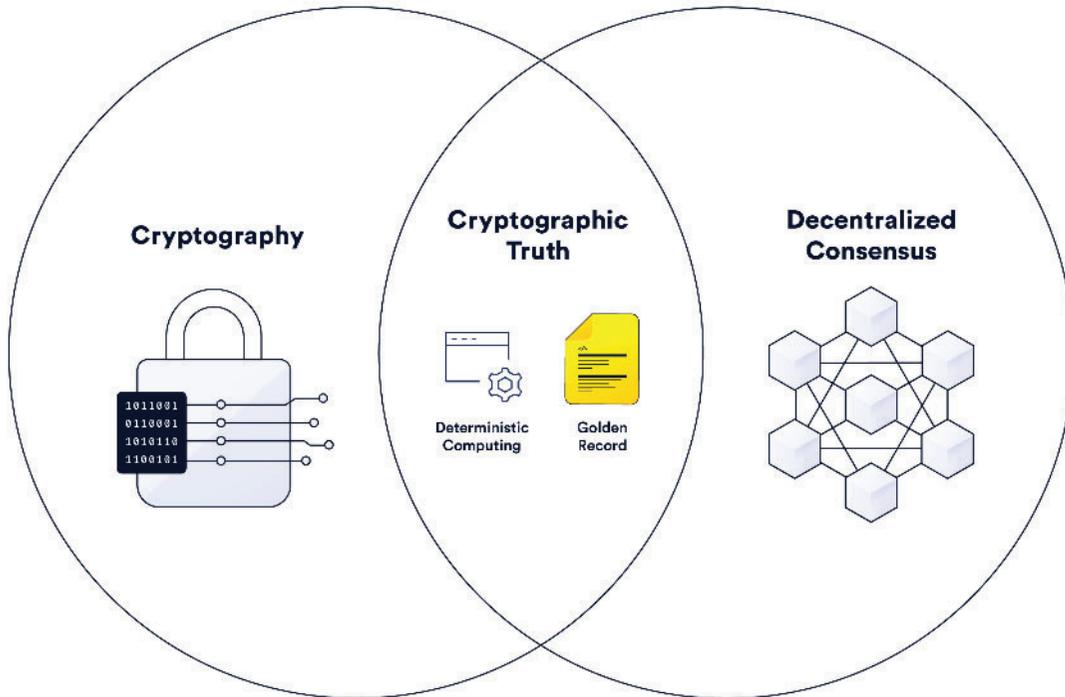


Web 3.0

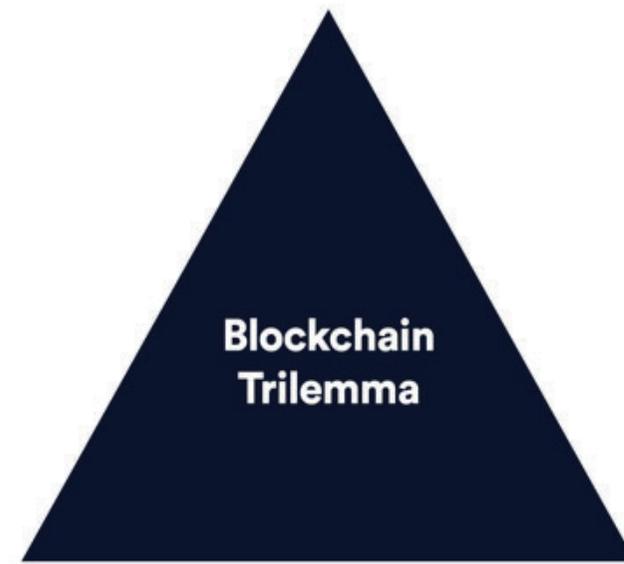


The Evolution of the Web, source: hackernoon.com/the-evolution-of-the-web-will-be-powered-by-blockchain-technology-stack-626ce3f828c7

Blockchain Scalability: Execution, Storage, and Consensus



Scalability
the number of computations the network can process per second



Security
the amount of resources required to corrupt network consensus

Decentralization
the number of full nodes participating in the network

chain.link

Decentralized Storage

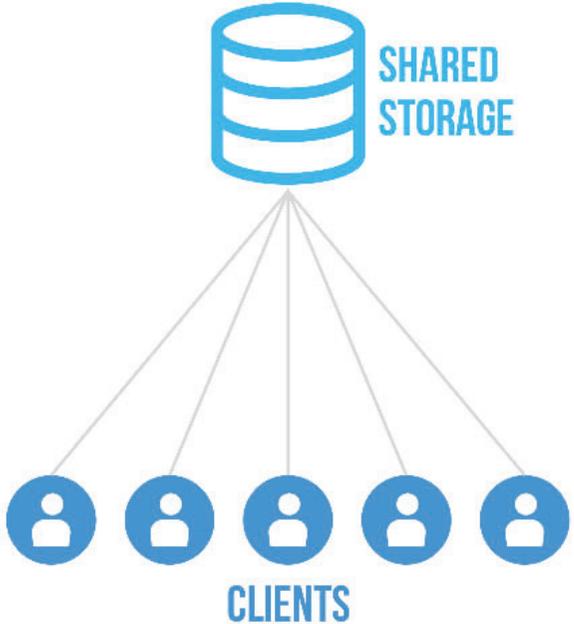
ipfs,filecoin,sia,storj



Data is encrypted and stored across multiple locations, or nodes. Individuals or organizations that share their extra disk space for a fee. Only the data's owner holds the private encryption key; storage providers cannot access the data. They use blockchain to track storage transactions .

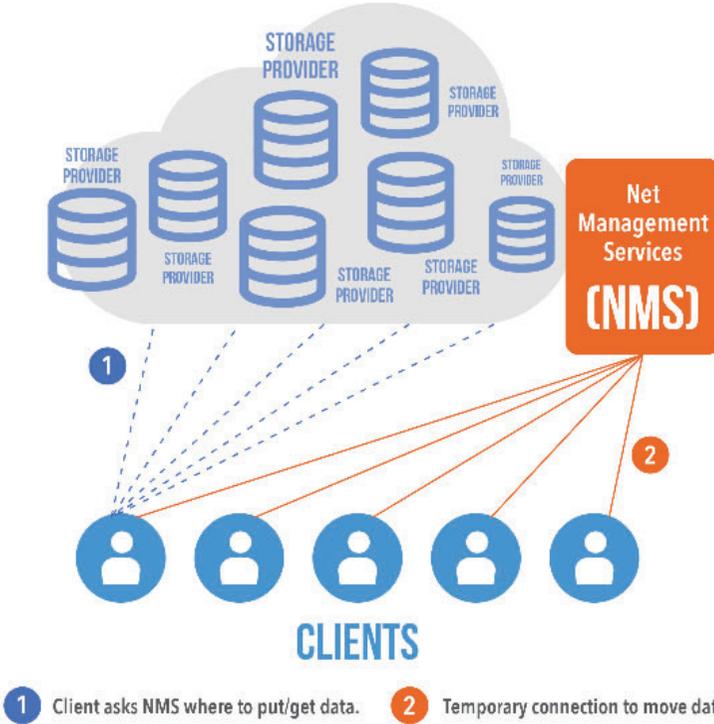
Decentralized Storage

TRADITIONAL SHARED STORAGE



Source: GigaOm 2021

DECENTRALIZED STORAGE



1 Client asks NMS where to put/get data. 2 Temporary connection to move data

PRODUCT	BLOCKCHAIN	CRYPTOCURRENCY
Arweave	No	Arweave (AR)
BitTorrent	Yes	BitTorrent Token (BTT)
Filecoin	Yes	Filecoin (FIL)
Safe Network	No	Safecoin (MAID)
Sia	Yes	Siacoin (SC)
Storj/Tardigrade	Yes	Storj (STORJ)

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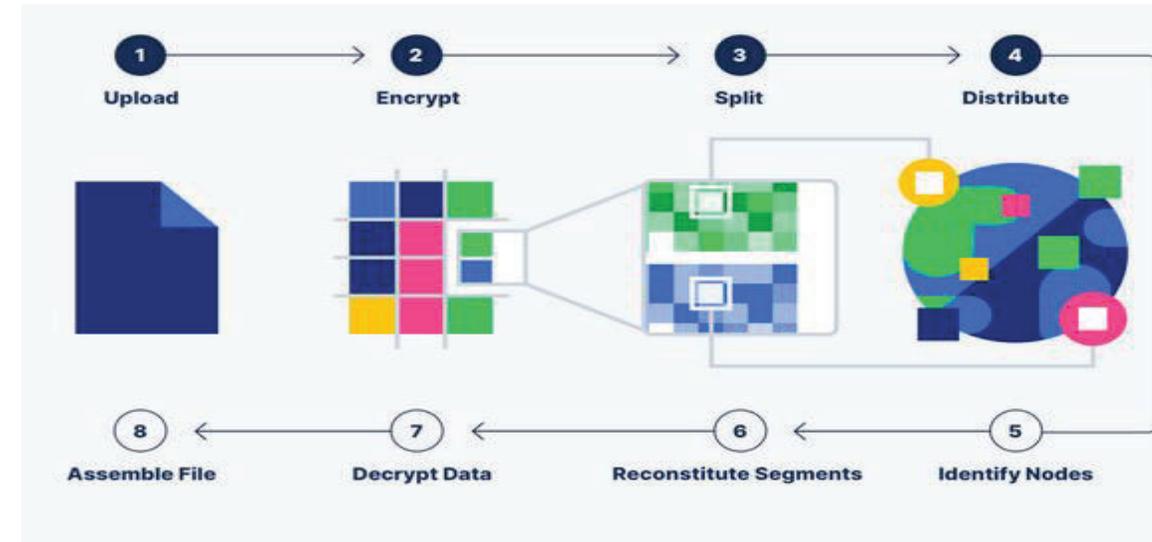
Decentralized Storage ..

- A storage solution cheaper than cloud storage
- To safely store sensitive information
- Faster upload and download speeds (depends on nodes)
- More security from cyber attackers
- 24*7 availability with zero downtime
- More control over your data and personal information

Factors to consider for Decentralized storage

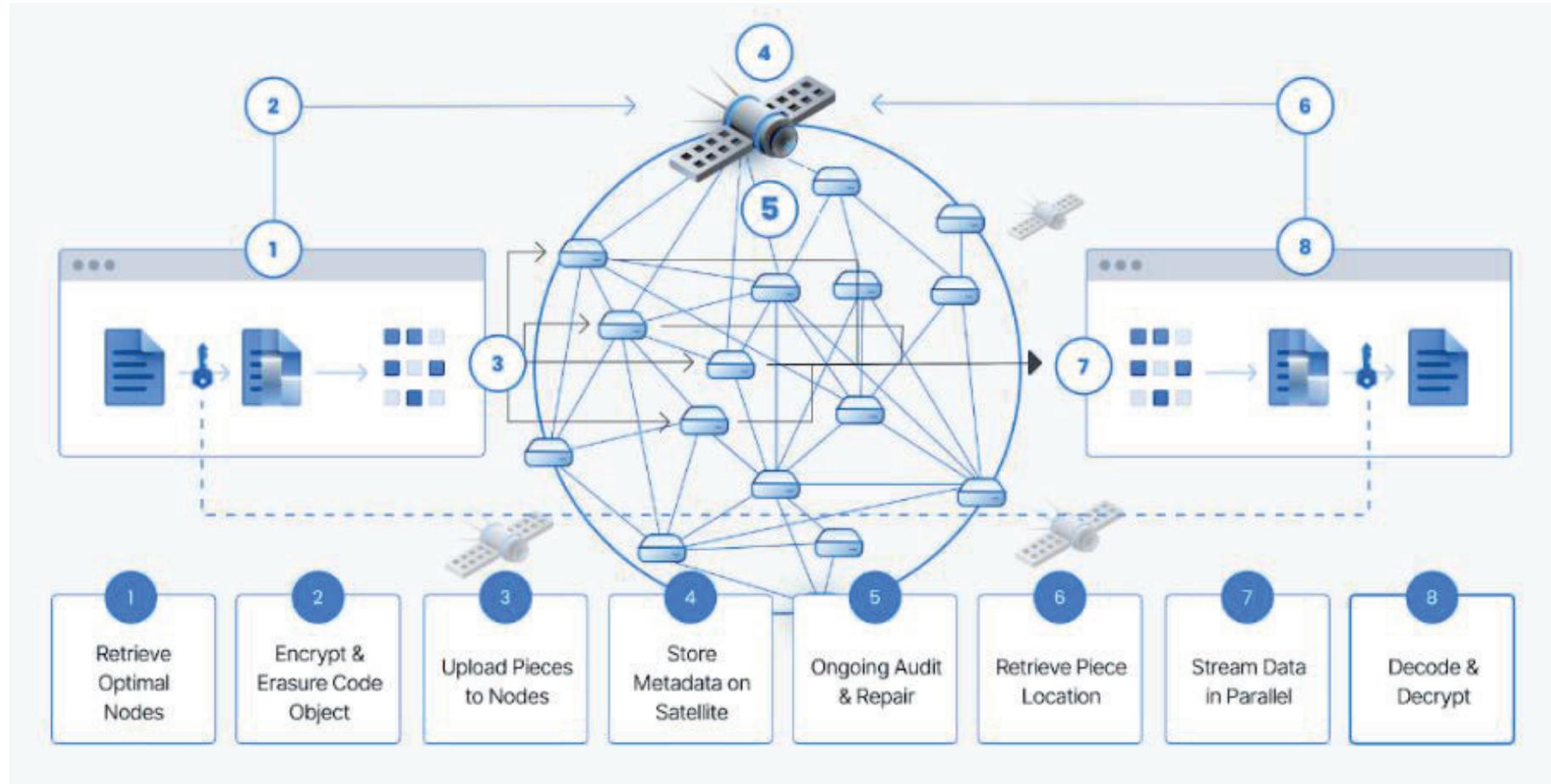
- Persistence mechanism / incentive structure
 - Data retention enforcement
 - Decentrality
 - Consensus
- **Ethereum itself can be used as a decentralized storage system**, and it is when it comes to code storage in all the smart contracts.

- Ethereum was not designed for large storage. The chain is steadily growing to TB ranges and lacks feasibility .
- The cost of deploying this much data to Mainnet would be prohibitively expensive due to gas fees. So we may need a different chain or methodology to store large amounts of data in a decentralized way



Decentralized Storage ..

- Storing of files in a big datacenter vulnerability to outages and attacks.
- Storing on thousands of distributed Nodes all across the globe and users use it like AWS S3 storage.
- Example



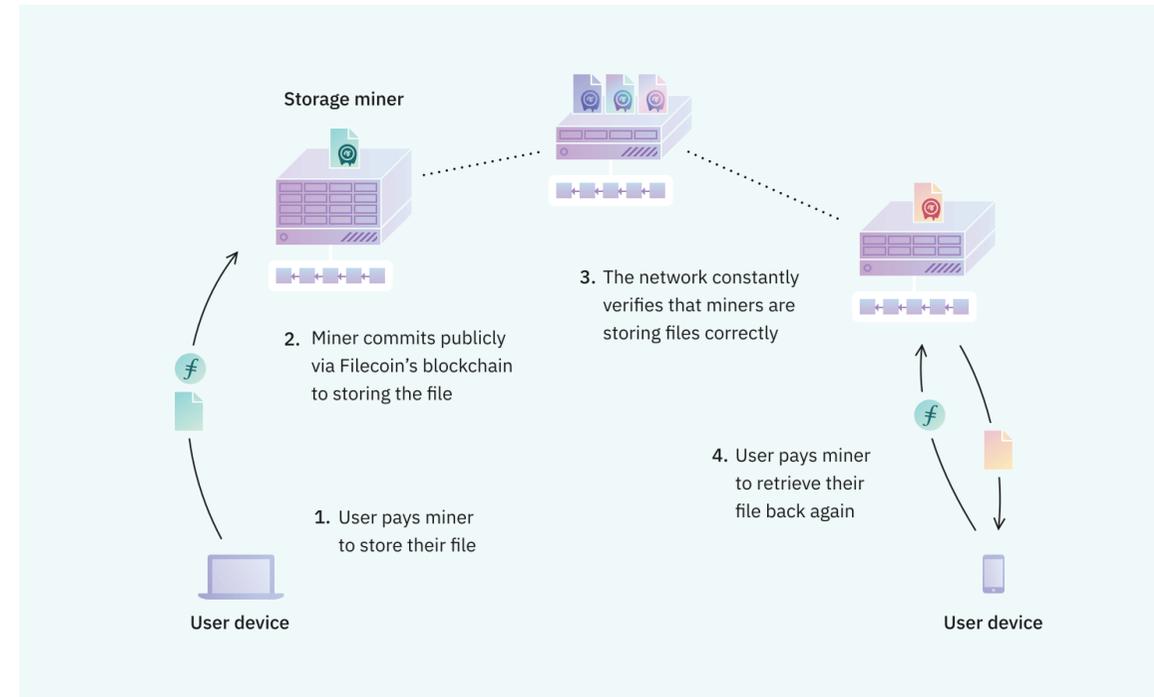
Source: storj/tardigrade.io

Filecoin

Filecoin is a block-chain based digital storage system
Filecoin builds on Inter Planetary File System (IPFS) and relies on miners to provide storage on a decentralized network.
By utilizing a peer-to-peer storage system instead of cloud storage platform, data is protected from a central point of failure, rising storage costs and monitoring.
Users pay cryptocurrency FIL to store their files.

“Miners,” or storage nodes, earn FIL to store the files.
Filecoin is a peer-to-peer network that stores files, with built-in economic incentives to ensure files are stored reliably over time.

Addresses some of the limitations of using HTTP for distributed storage.



Source: filecoin.io

IPFS

The InterPlanetary File System (IPFS) is a peer-to-peer “decentralized cloud and file system for the blockchain environment”.

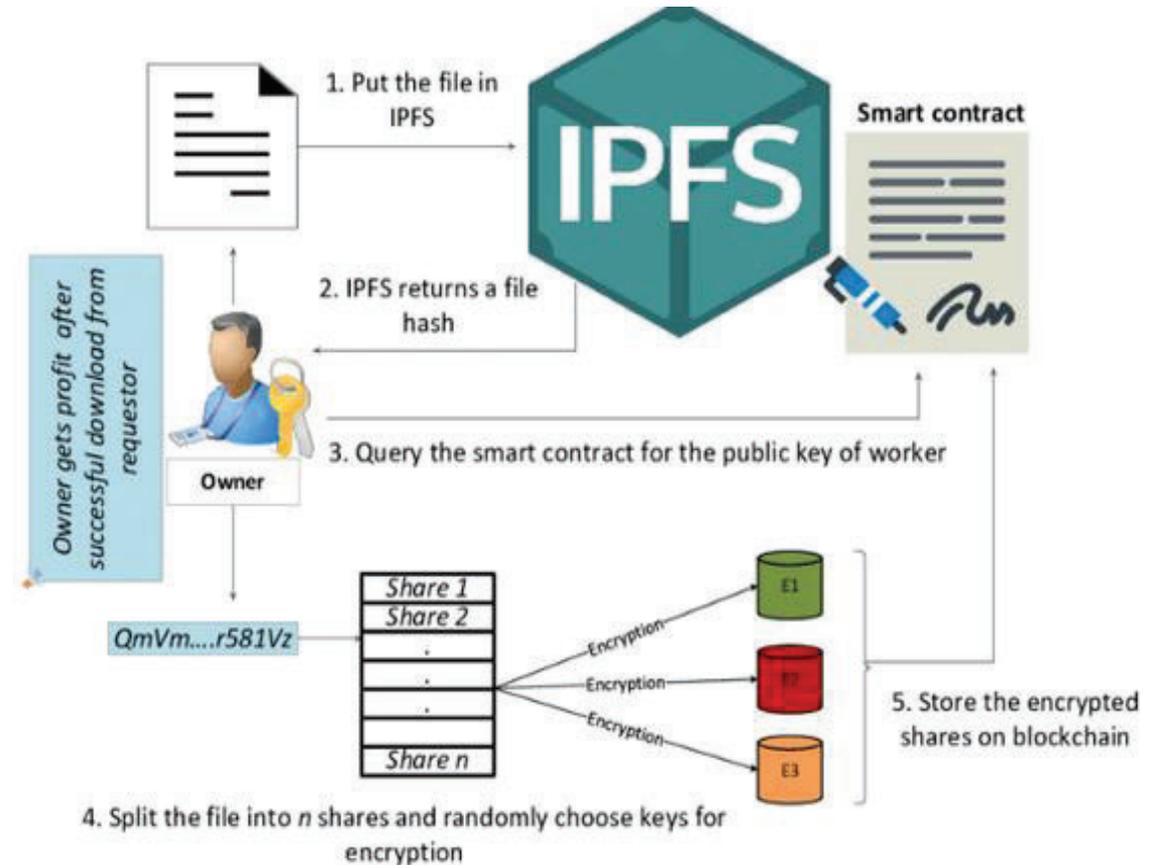
Although the protocol doesn't use blockchain technology directly, IPFS can host, manage, and share data suitable for storing on a blockchain.

Storage

When we add content to IPFS network, the data is split into chunks of 256Kb, each chunk will have its own hash, the chunks are then distributed to various nodes or network.

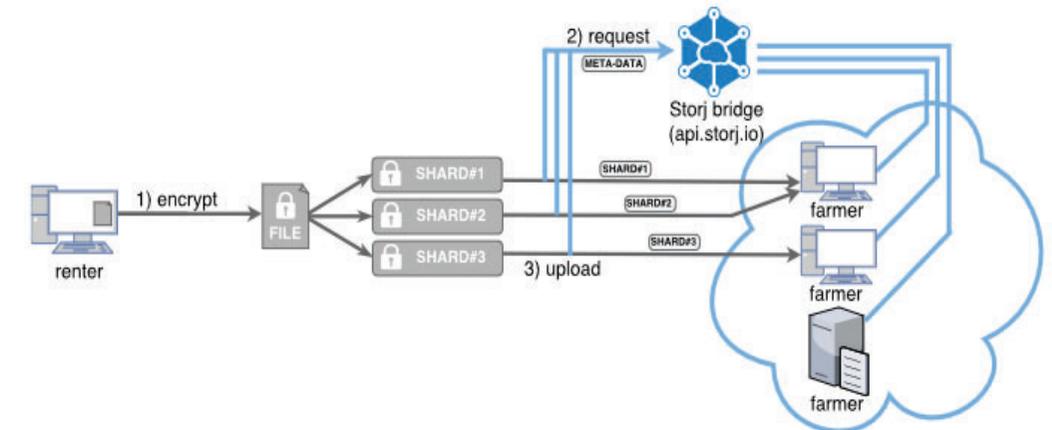
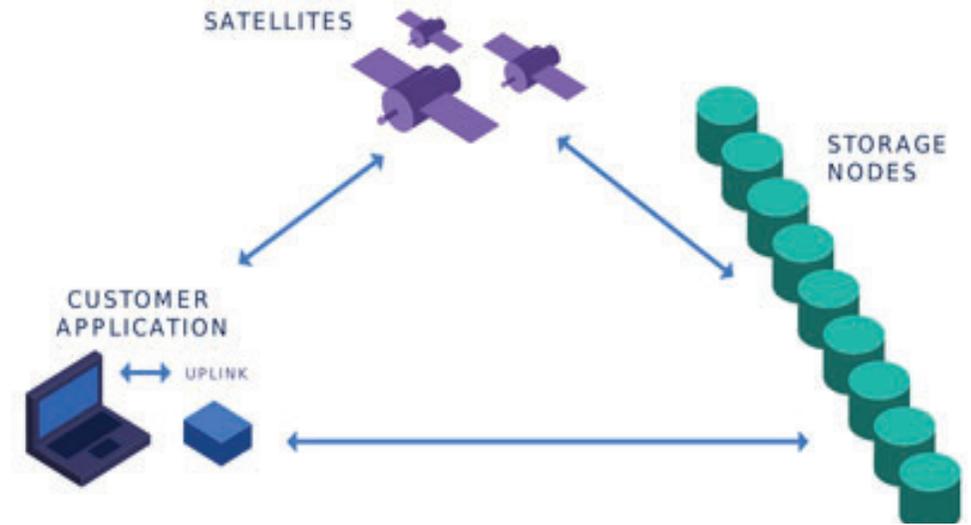
Retrieval

On IPFS network file is being identified by its hash, once user requests a file, the request traverses to nodes where the hash is existing using DHT. If the data points to other chunks, even they are searched in the same way, once all chunks are obtained, all of them are simply concatenated to obtain the main object.



Storj

- Storj is a decentralized storage system where users rent redundant drive space and earn tokens.
- Every file is encrypted, split into pieces, and stored on a global network of nodes, making less possibilities to data breaches and downtime .
- Storing data on infrastructure composed of a network of thousands of storage nodes operated in a zero-trust environment.
- Delegated authority to create access grants to protect against Ransomware type attacks.
- Before uploading a file to the network, Storj encrypts files using AES-256-GCM symmetric encryption and then breaks them down into 80 pieces, all spread across diverse geographies and ISPs. Doing so ensures that no unauthorized user gets access to your data. Retrieving a file, however, requires only 29 pieces.



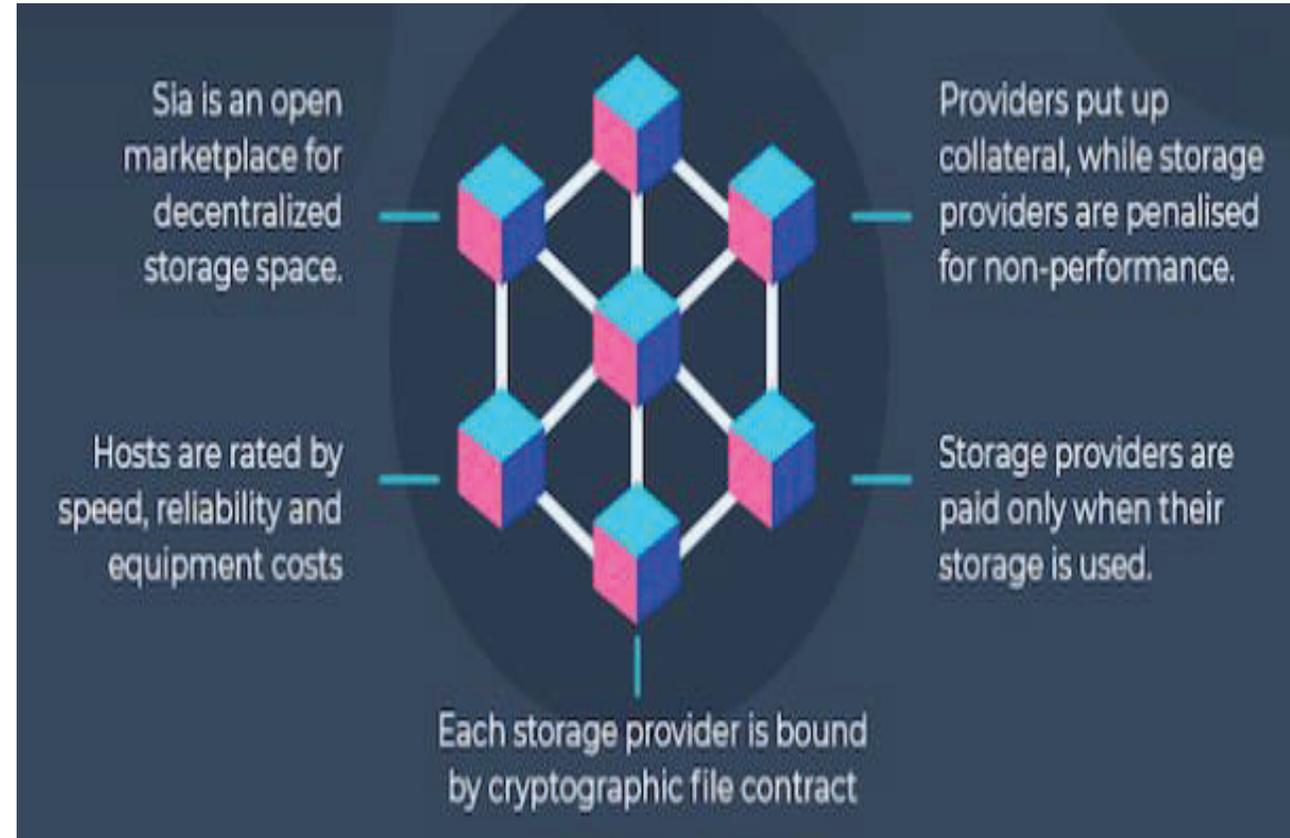
SHARDING PROCESS

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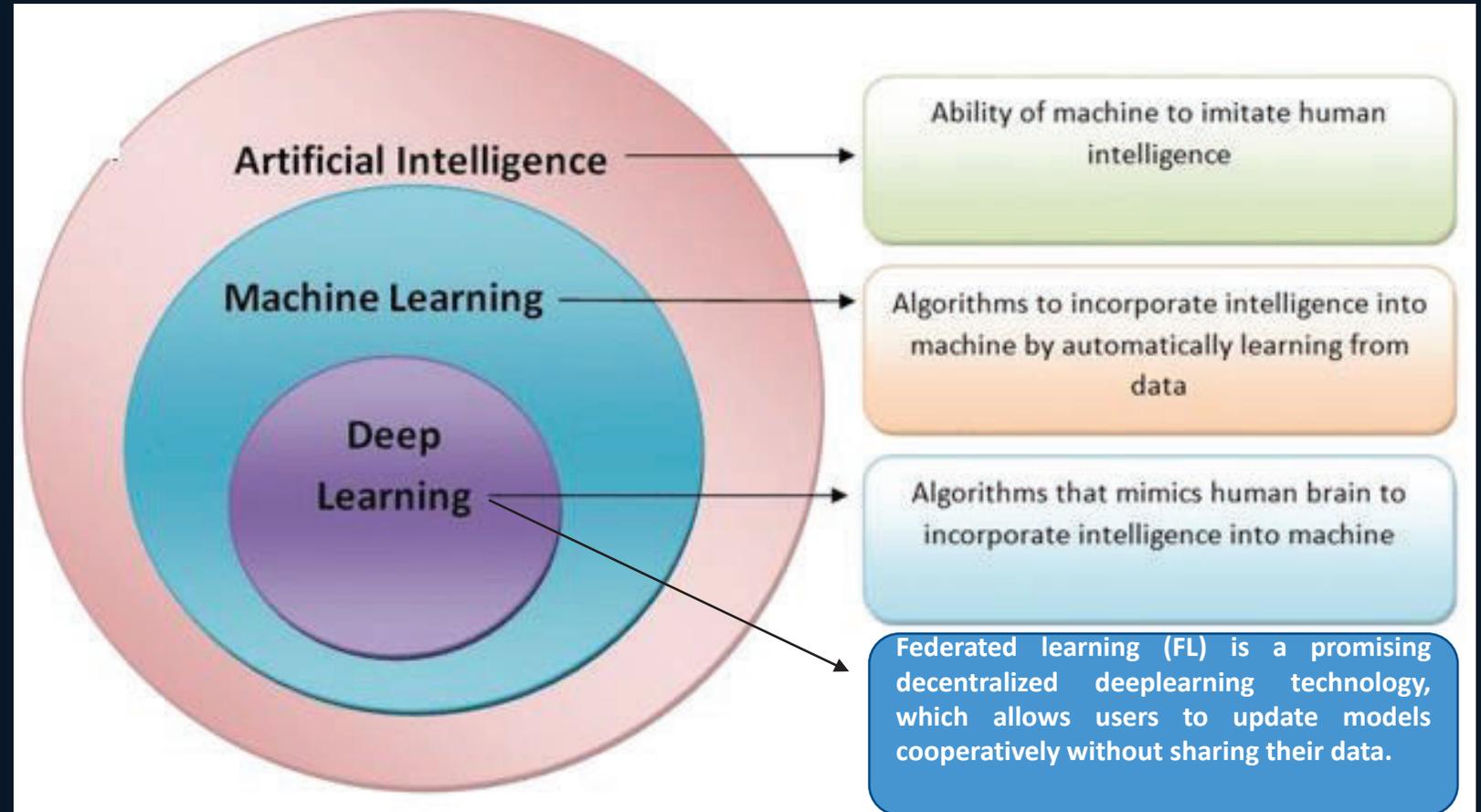
Sia

- Sia is an open-source cloud storage company that utilizes file sharding to store data. It works on the proof-of-storage (PoS) mechanism where verifiers issue challenges to renters to prove that they are indeed storing the data.
- Sia miners can monetize their extra unused storage space and earn rewards in the form of Siacoin (SC)—the native utility token of the Sia platform.
- In contrast to Storj, the supply of siacoins is not fixed and can be minted indefinitely. Siafunds are the other component of Sia's unique two-coin system that incentivizes the investors of the Sia network.
- Sia is currently **one of the top decentralized data storage platforms**. The Sia blockchain offers simple and easy-to-use cloud storage in addition to content sharing facilities.
- Sia allows anyone with spare hard drive space to earn a passive income with crypto using the Sia platform.
- Siacoin (SC) is **the native cryptocurrency for the Sia blockchain platform**. Siacoin serves as a way for customers to pay hosts for renting storage space.
- The Sia project is meant to create a distributed, decentralized network for cloud data storage.



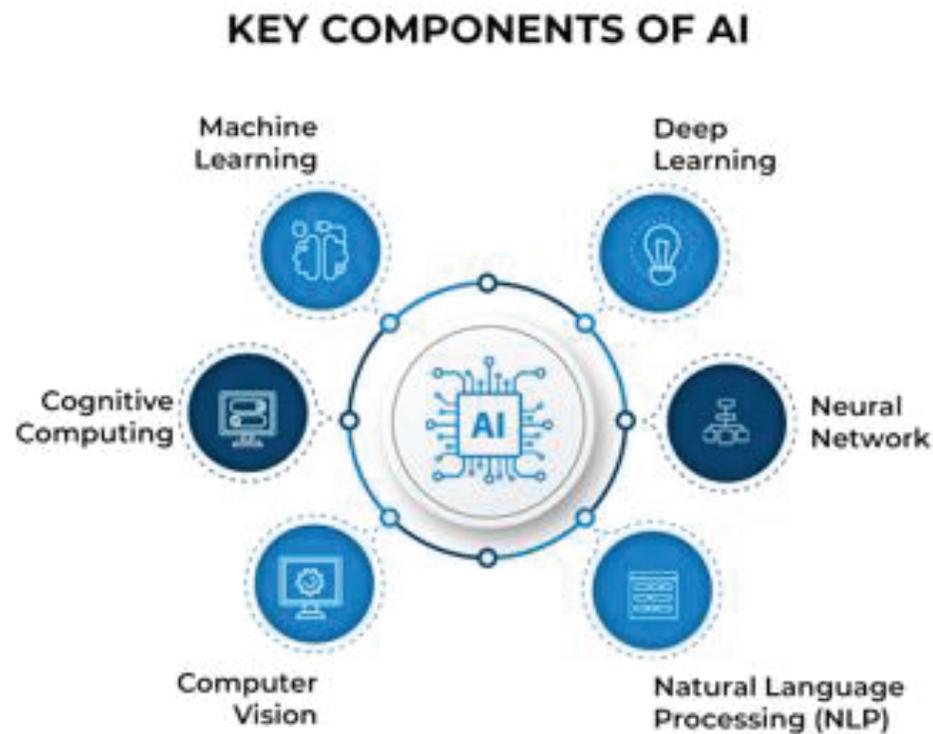
Artificial Intelligence

AI,ML,DL and FL



What is AI?

The power of a machine to copy intelligent human behavior



ARTIFICIAL INTELLIGENCE

A program that can reason, sense, act as well as adapt

MACHINE LEARNING

Algorithms where the performance improves as they are exposed to more and more data over a period of time

DEEP LEARNING

This is the subset of machine learning where multi-layered neural networks learn from vast

EXAMPLES..

Human vision Vs Computer vision



What we see

0	3	2	5	4	7	6	9	8
3	0	1	2	3	4	5	6	7
2	1	0	3	2	5	4	7	6
5	2	3	0	1	2	3	4	5
4	3	2	1	0	3	2	5	4
7	4	5	2	3	0	1	2	3
6	5	4	3	2	1	0	3	2
9	6	7	4	5	2	3	0	1
8	7	6	5	4	3	2	1	0

What a computer sees

Smart Vehicles

manufacturer products consumer products

Our Vision. Your Safety.

rear looking camera forward looking camera side looking camera

EyeQ Vision on a Chip **Vision Applications** **AWS Advance Warning System**

Road, Vehicle, Pedestrian Protection and more

News

- Microsoft Advanced Technologies Power Vision Cars World First Collision Warning With Auto Brake System
- Volkswagen Collision Warning with Auto Brake Helps Prevent Rear-end

Events

- Police at Lone Auto Parts, Texas, USA
- Police at SIMA, Las Vegas, NV



Robotics

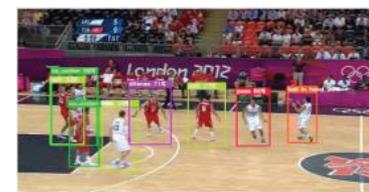
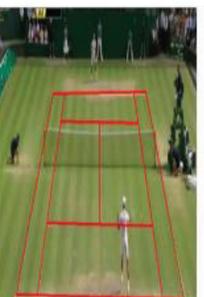
Industrial Robots



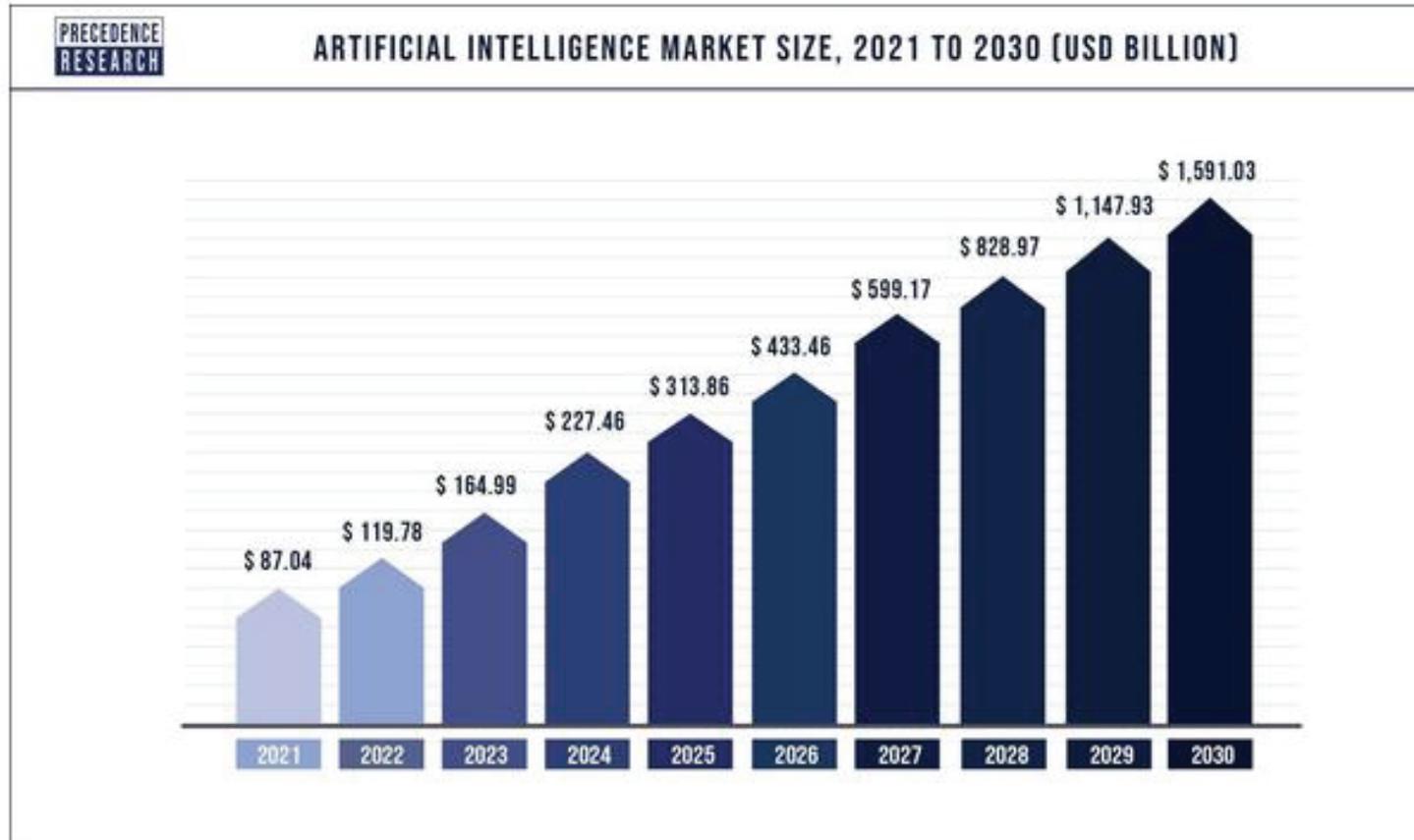
Mobile Robots



Sports



AI Market



US\$ 87.04 billion in 2021 and it is expected to hit US\$ 1,597.1 billion by 2030 with a registered CAGR of 38.1% from 2022 to 2030.

Artificial Intelligence..

Main Characteristics of AI

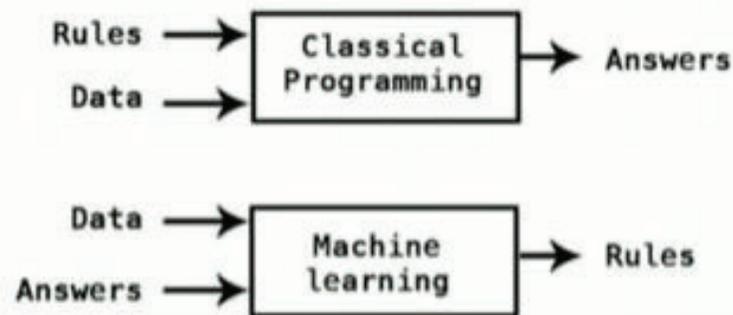
- Feature Engineering.
- Artificial Neural Networks.
- Deep Learning.
- Natural language processing.
- Intelligent Robotics.
- Perception.
- Automate Simple and Repetitive Tasks.
- Data Ingestion.

Top Common Challenges in AI

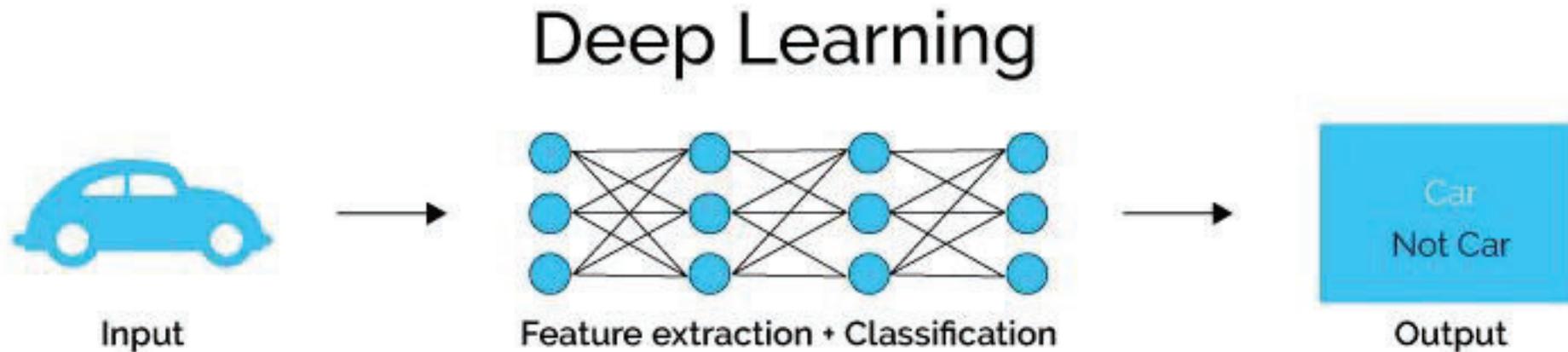
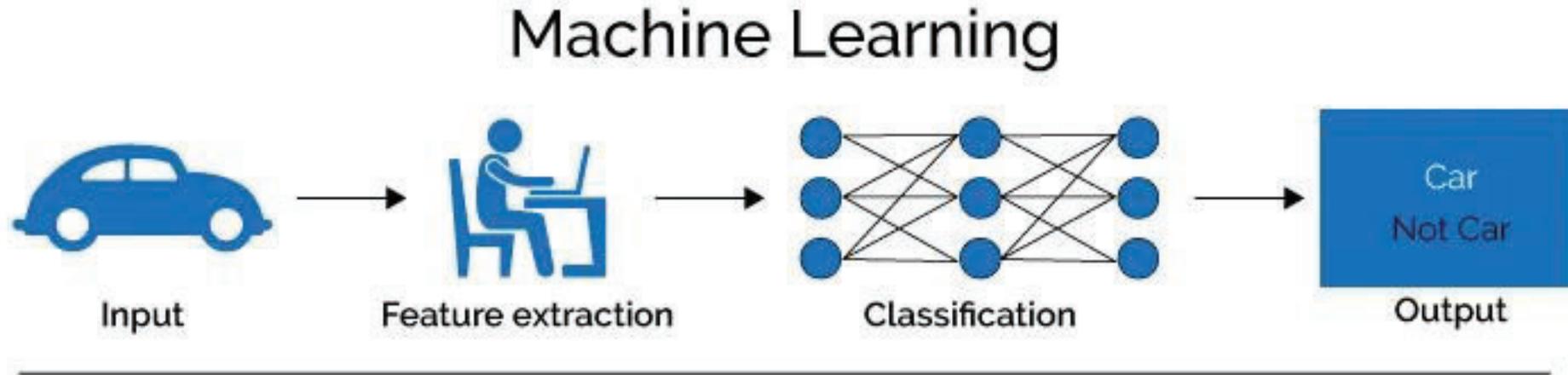
- Computing Power. The amount of power these power-hungry algorithms use is a factor keeping most developers away.
- Trust Deficit.
- Limited Knowledge
- Human-level.
- Data Privacy and Security.
- The Bias Problem.
- Data Scarcity.

Centralized Machine Learning

Centralized machine learning is all about creating an algorithm using ‘training data’ — sample data, to identify patterns and trends in it. The machine then uses the algorithms to ‘learn’ such patterns and identify them in bigger chunks of data similar to sample data.

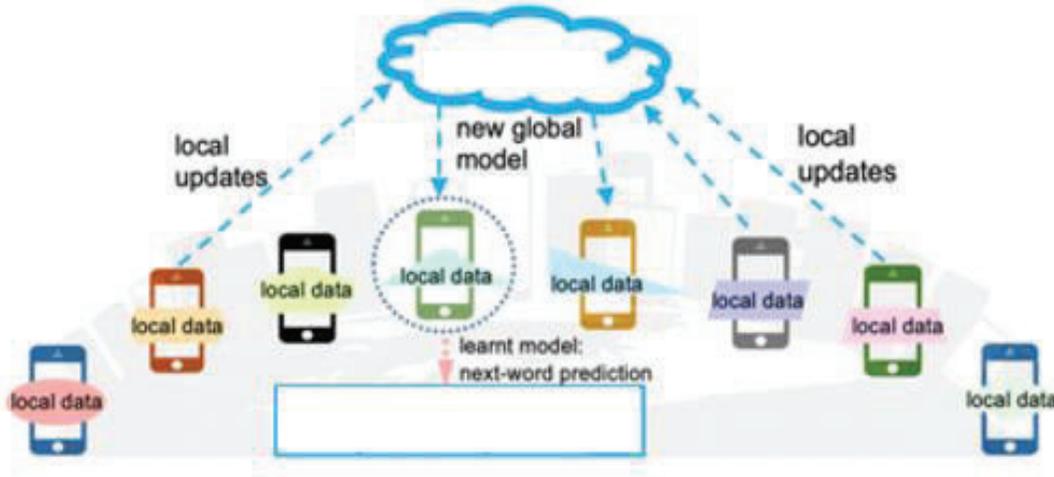


ML and DL



source : semiengineering.com

Federated Learning



Performance and scalability

How do we (re)design algorithms and frameworks to work well for federated learning?

Security

How can we make the system robust to dishonest members and external threats?

Decentralized computation & trust

Can we do federated learning efficiently without a third-party trust provider?

Federated learning (Collaborative learning) is a machine learning technique.

- That trains an algorithm across multiple decentralized edge devices or servers holding local data samples, without exchanging them.
- Enables multiple actors to build a common, robust machine learning model without sharding data.
- Allows to address critical issues such as data privacy, data security, data access rights and access to heterogeneous data.
- Its applications are spread over a number of industries including defense telecommunications, IoT, and pharmaceuticals.
- Federated Learning for the task of next word prediction on mobile phones . Devices communicate with a central server periodically to learn a global model . FL helps to preserve user privacy and reduce strain on the network by keeping data localized

Federated Learning..

Can data live at the edge?

Data processing is moving on device:

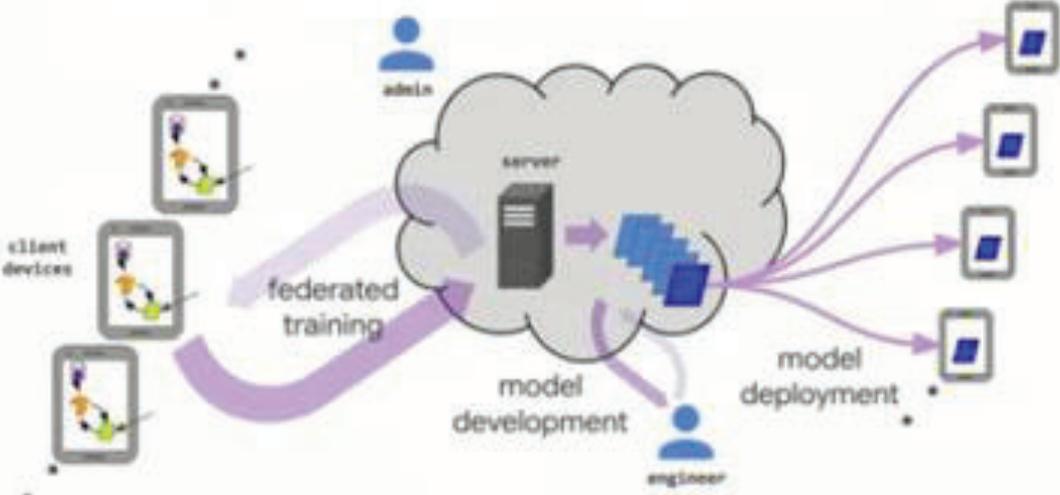
- Improved latency
- Works offline
- Better battery life
- Privacy advantages

E.g., on-device inference for mobile keyboards and cameras.

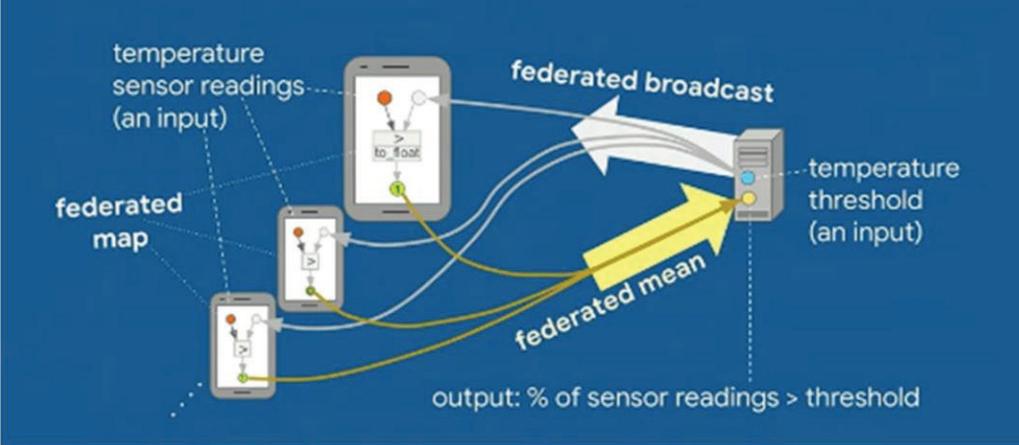
Federated learning is a machine learning setting where multiple entities (clients) collaborate in solving a machine learning problem, under the coordination of a central server or service provider. Each client's raw data is stored locally and not exchanged or transferred; instead, focused updates intended for immediate aggregation are used to achieve the learning objective.

In ML world, the approach to model training is centralized. Centralized training requires data to be stored at a central location or a data server, thereby limiting access and also raising security concerns.

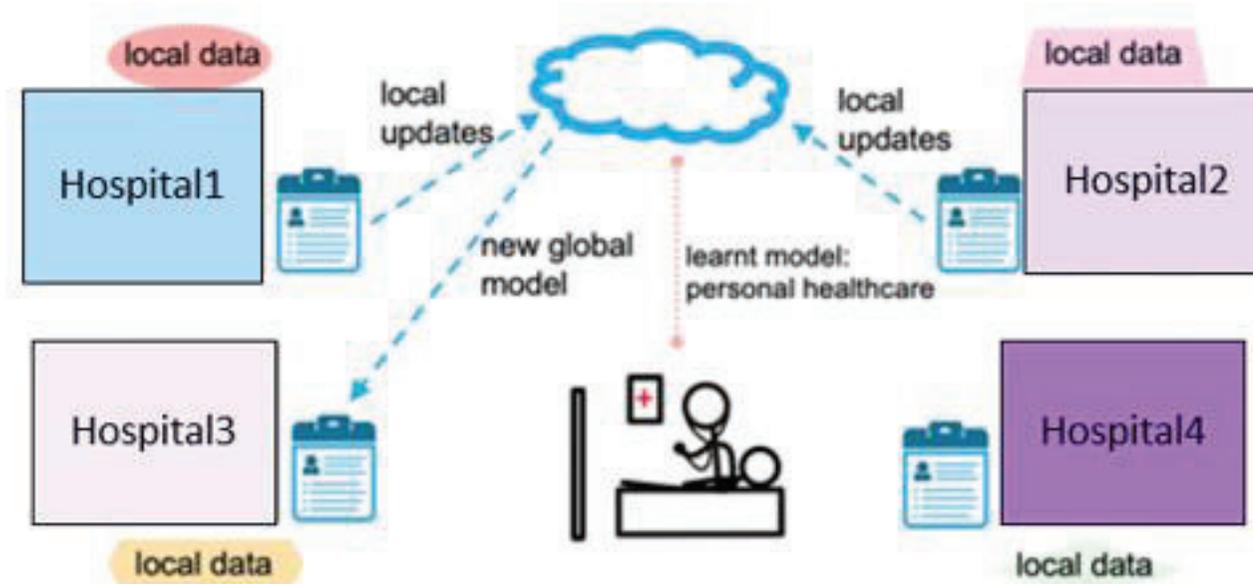
Cross-device federated learning



Example federated computation



Federated Learning ..



Hospital data, personal data, fog and edge data are huge, and sending to cloud is hard. Federated Learning helps here.

Federated learning – Personal healthcare via learning over heterogeneous electronic medical records distributed across multiple hospitals.
Federated learning allows individual hospitals to benefit from the rich datasets of multiple non-affiliated hospitals without centralizing the data in one place.
Overcomes critical issues such as data privacy, data security, data access rights, and access to heterogeneous data.

Challenges in Federated Learning

- Efficient Communication across the federated network.
- Managing heterogeneous systems in the same networks.
- Statistical heterogeneity of data in federated networks.
- Privacy concerns and privacy-preserving methods.

FL Applications/Usecases

- Edge computing
 - Health care
 - Internet of Things
 - Internet of Vehicles
 - Anomaly detection
 - Smart city
 - Financial fraud identification
 - Visual object detection
 - Fog computing
-
- **It can be seen that FL is prominent in industrial applications for privacy-sensitive data and the processing of non-IID data.**
 - Conventional machine learning (ML) needs centralized training data to be present on a given machine or datacenter.. This is expected to remove barriers in a range of sectors including healthcare, finance, security, logistics, governance, operations, and manufacturing.
 - The healthcare, finance, and other institutions where data sharing is prohibited require an approach for training ML models in secured architecture.
 - Recently, techniques such as federated learning (FL), MIT Media Lab's Split Neural networks, blockchain, aim to address privacy and regulation of data.

There are differences between the design principles of FL and the requirements of Institutions like healthcare, finance, etc., which needs blockchain-orchestrated FL having the following features: clients with their local data can define access policies to their data and define how updated weights are to be encrypted between the workers and the aggregator using blockchain technology and also prepares audit trail logs undertaken within network and it keeps actual list of participants hidden.

AI and Blockchain UseCases

- **Blockchain –Decentralized infrastructure, Immutability of data and transparency of network,**
- **AI – Predictive Analytics and Decision making,**
- **IoT – network of connected devices with sensors**

UseCases

- 1) Smart city Infrastructure -Combination of AI and Blockchain technologies to improve [logistics tracking](#), [real-time failure detection](#) and data and device [authentication](#).
- 2) Fake document detection - Scanning of or fake articles, references, websites, social media pages and even memes to ensure that content is truthful and credible
- 3) Authenticity of Artworks - Artificial intelligence and blockchain to certify and verify works of art in real-time.
- 4) Cybersecurity and maintaining blocks - blockchain acts as a cybersecurity tool for digital ledgers and using AI to control the process of building and maintaining the blockchains
- 5) reward-based data sharing marketplace - encourage users to share their data, enables data purchasers in the advertising, education, entertainment and pharmaceutical industries to access a larger data pool.
- 6) Combining Ai and blockchain to create a platform for intelligent AR and VR avatars. The combination of AI, blockchain and VR helps to create more personal and social experiences in a virtual world.
- 7) AI-powered data exchange platform, real-time mapping tool, an insights dashboard and blockchain for autonomous vehicle can quickly absorb, interpret and safely store data
- 8) Using AI to give healthcare professionals blockchain-based access to medical intelligence and insights.
- 9) Union of AI and IoT include predictive analytics for manufacturers, remote patient monitoring for healthcare workers
- 10) **Integration of Edge computing (IoT), Blockchain, AI for distributed security mechanism, payment solutions.**

Demo & Discussion

Demo

Peer A

Block: # 1

Nonce: 26486

Tx:	\$ 25.00	From:	Darcy	->	Bingl
	\$ 4.27	From:	Elizat	->	Jane
	\$ 19.22	From:	Wickl	->	Lydia
	\$ 106.4	From:	Lady	->	Collin
	\$ 6.42	From:	Charl	->	Elizat

Prev: 00000000000000000000000000000000

Hash: 000049015089c7b64125575f5cf78fa3d2bba

Mine

Block: # 2

Nonce: 82590

Tx:	\$ 97.67	From:	Riple	->	Lamb
	\$ 48.61	From:	Kane	->	Ash
	\$ 6.15	From:	Parke	->	Dalla
	\$ 10.44	From:	Hicks	->	Newt
	\$ 88.32	From:	Bisho	->	Burke
	\$ 45.00	From:	Huds	->	Gorm
	\$ 92.00	From:	Vasqi	->	Apon

Prev: 000049015089c7b64125575f5cf78fa3d2bba

Hash: 0000f843c73a7b3f5f3af6b7a4f5690a377326

Blockchain

fa9b916eb9078f8d98a7864e697ae83

015ce2a08b61216ba5a0778545bf4d

Block: # 4

Nonce: 35990

Data:

Prev: 0000b9015ce2a08b61216ba5a0778545bf4d

Hash: 0000ae8bbc96cf89c68be6e10a865cc47c6c4f

Block: # 5

Nonce: 56265

Data:

Prev: 0000ae8bbc96cf89c68be6e10a865cc47c6c4f

Hash: 0000e4b9052fd8aae92a8afda42e2ea0f1797

Block: # 1

Nonce: 59396

Data: hi

Hash: 0000d742711b9c79c3464eaacdafa0153206221aead749612b48f22475a96f912

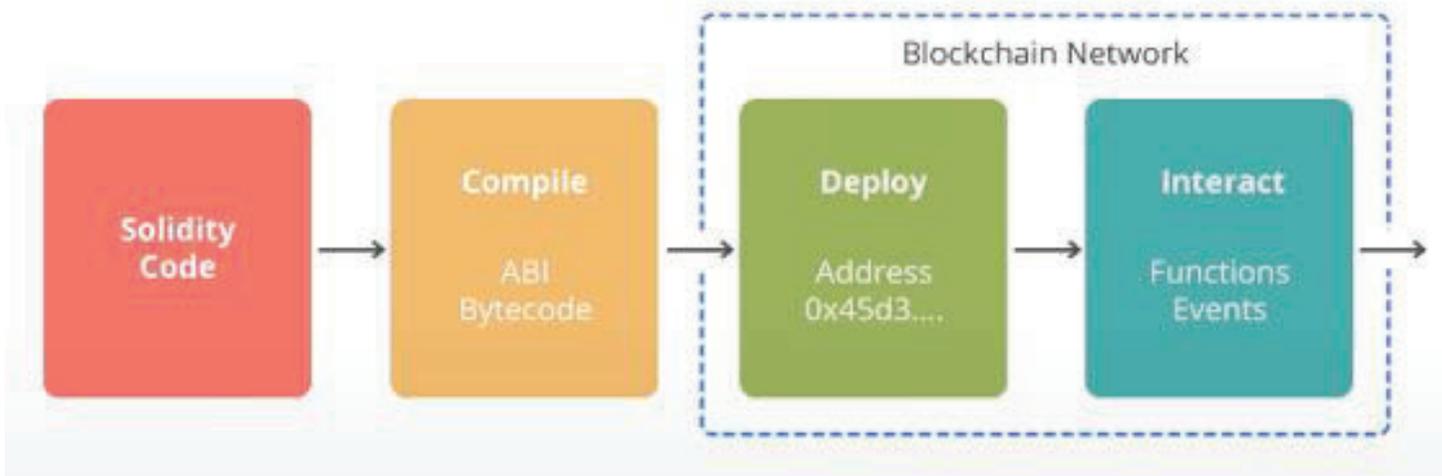
SHA256 Hash

Data: |

Hash: e3b0c44298fc1c149afbf4c8996fb92427ae41e4649b934ca495991b7852b855

[andersbrownworth](http://andersbrownworth.com)

DEMO - Smart Contracts Life Cycle - Solidity



Solidity code is compiled to a bytecode and is deployed to the network of nodes.

Deployed code can be interacted by calling functions using the contracts address.

Create and Deploy your Smart Contract using Hardhat

- Step 1: Connect to the Ethereum network
- Step 2: Create your app (and API key)
- Step 3: Create an Ethereum account (address)
- Step 4: Add ether from a Faucet
- Step 5: Check your Balance
- Step 6: Initialize our project
- Step 7: Download Hardhat
- Step 8: Create a Hardhat project
- Step 9: Add project folders
- Step 11: Connect Metamask & Alchemy to your project
- Step 12: Install Ethers.js
- Step 13: Update hardhat.config.js
- Step 14: Compile our contract
- Step 15: Write our deploy script
- Step 16: Deploy our contract

Alchemy –dev smart contract to local dev to block chain, api

Metamask – virtual wallet to interact with ethreum blockchain.

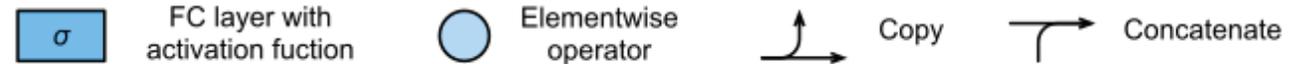
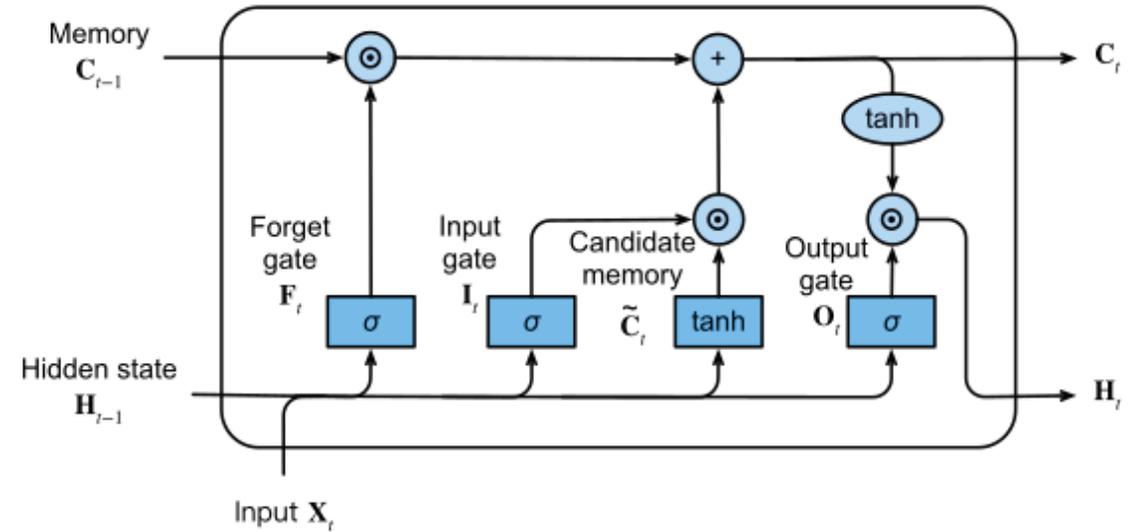
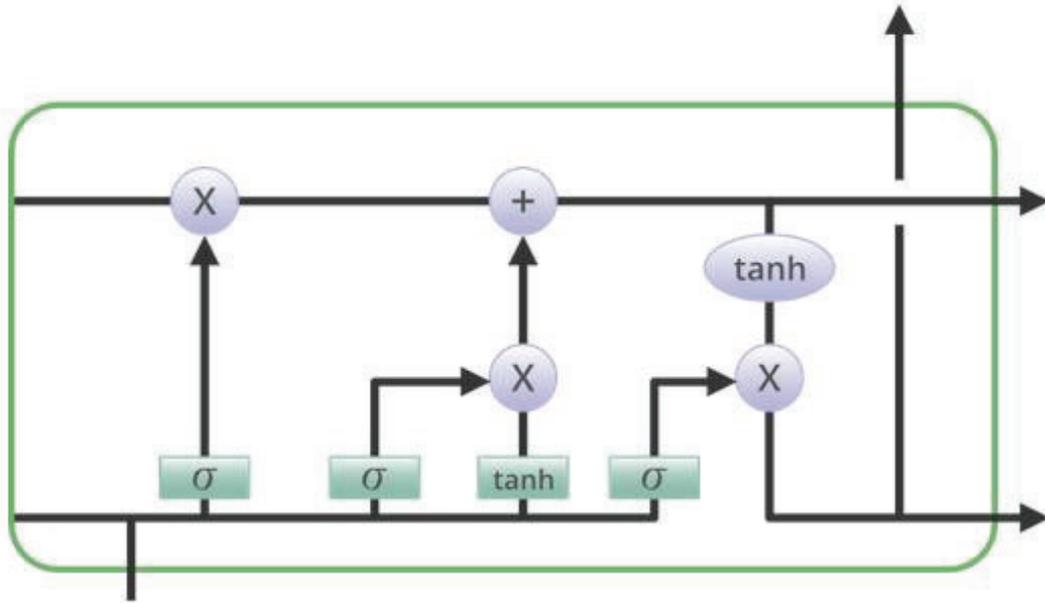
Metamask is virtual identity in Blockchain world.

Hardhat to test deploy scripts that talk to Alchemy.

Verify in Etherscan.

Request for Ropsetn testnet Ether.

Artificial Intelligence LSTM & Transformers.



Long short-term memory (*LSTM*) is an artificial neural network used in the fields of artificial intelligence and *deep learning*.

Both *LSTMs* and *Transformers* are great at modeling sequential information. Hence, they can also be applied to **Time Series Forecasting** cases

The transformer neural network is a **novel architecture that aims to solve sequence-to-sequence tasks while handling long-range dependencies with ease.**

AI & Blockchain The Emerging Duets Q&A



Please take a moment to rate this session.

Your feedback is important to us.

mkottilungal@msystechnologies.com

[linkedin.com/in/helloashar](https://www.linkedin.com/in/helloashar)

Appendix

Abstract

AI & Blockchain - The Emerging Duets

Abstract

In this session I will start with identifying the current problems in Artificial Intelligence as data exists in most industries/edge in the form of isolated pockets with privacy constraints for sharing the data for training an AI model. While transferring data from edge storage to a centralized cloud for training -many problems arise. Performance issues, cost and security or regulatory compliance are some of them. I'll then walk through detailed features of federated learning combined with Blockchain to solve the above mentioned problems . Next I'll explain the advantages of modern consortium blockchains which require decentralized data storage for validating transactions securely with examples of some of the decentralized data storage platforms across a global P2P network and some of the inherent problems related to storage size and distribution.I will explain the idea of combining AI and Blockchain for mutually benefiting solutions and how they overcome challenges in each - block chain to use for consensus and decision making in AI as well as AI for optimizing storage and overcoming challenges in Blockchain - with a careful grouping of storage/transactions . I'll also showcase some of the use cases with merits of the above approach to future digitization and automation - performance and security challenges.

Learning Objectives

- Learn Blockchain features of decentralization, immutability, and transparency
- Federated learning techniques in AI/DL and challenges
- Show features of decentralized storage ipfs, FileCoin, Sia, Storj, and discuss issues
- Discuss Mutual benefits of combining AI and Blockchain with some of the use cases

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- Data Science
- Big Data Analytics
- AI/ML, Cognitive Services

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- FinTech and Loyalty
- Sales/Engineering Enablement
- Contingent Hiring