Blockchain Technology
UNIT-5

DEPARTMENT OF CSE

R V College of Engineering

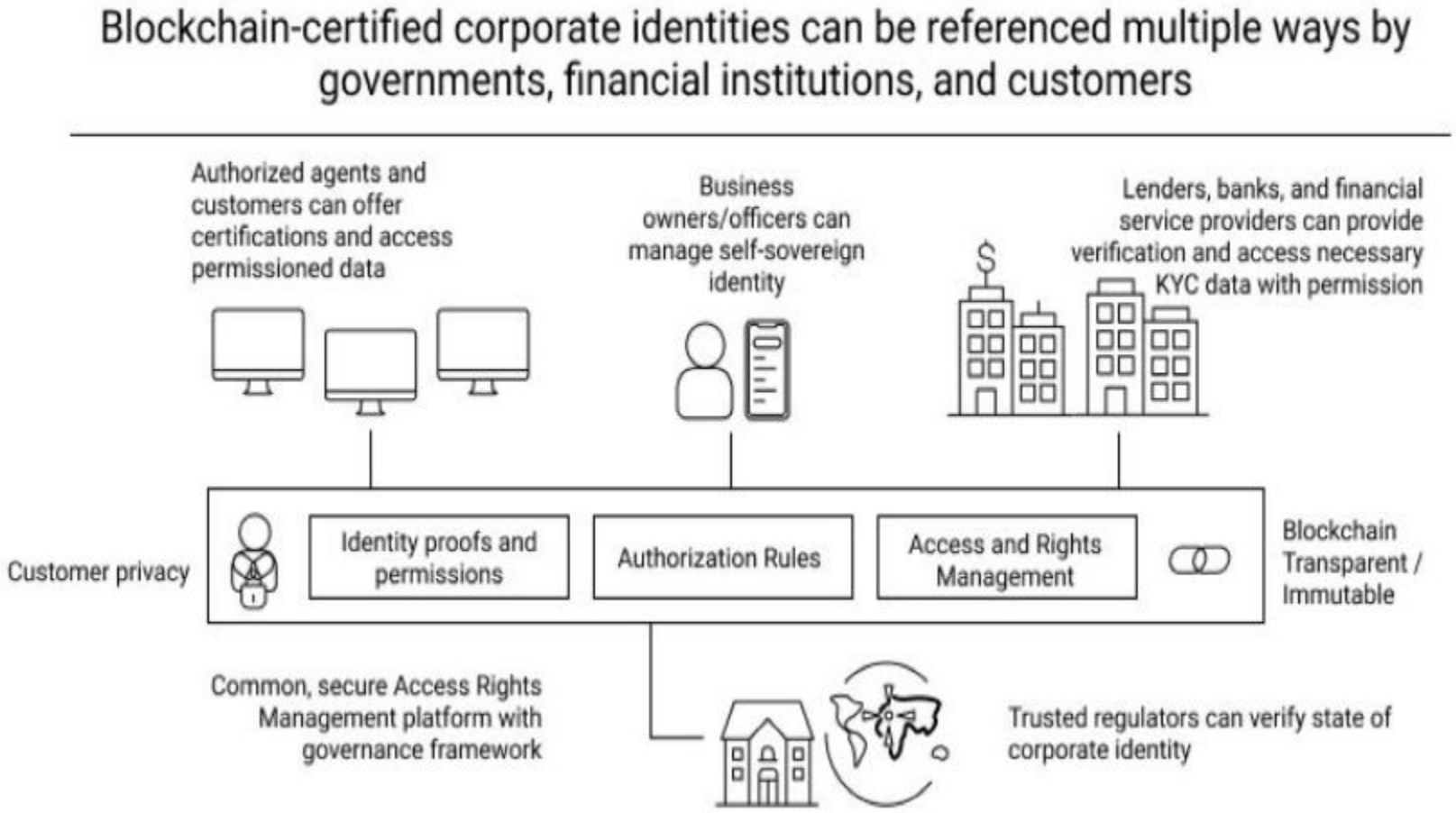
Cross-functional Blockchain Use cases

- Identity Management
- Asset Tracking
- IOT Integration

Identity Management

- As it turns out, the application of blockchain for identity is one of the biggest use cases being developed today and it cuts across many different industries.
- While Bitcoin and other token networks are often built on pseudonymous transfers of value, where accounts are known but their owner identity is not, the ability to transact unique goods online through blockchains also opens up the ability to transact around the verifiability of a given identity as a piece of value itself.
- Identity and access management (IAM) attempts to validate an identity and allow it to be referenced and managed repeatedly without revealing all these details.

Identity use case for corporation



Contd…

- The previous figure shows an example of how an identity use case might work for a small business or corporation.
- The business would have its own verified smart contract stored on the blockchain which would possibly contain financial and sales data along with the rules governing access to this data by key partners, customers, government agencies, etc.
- Access to their data would be controlled by the small business owners themselves so that only the relevant data could be viewed by the right entity. This identity smart contract could be linked up to other smart contracts to create a more extensive application like in a supply chain.

Contd…

- Anywhere where a proof of ID is needed, such as in healthcare, subscription services, or bookings, a blockchain application may improve the efficiency of the identity sharing and management process.
- A large number of identity projects are currently underway. An example is the uPort identity framework meant to create a persistent identity for people, organizations, or objects (or bots) using the Ethereum network. Another example is the Civic Secure Identity Ecosystem, and a third is Sovrin. Newer proposals, such as the ERC-720 hope to create standards for identity management in the Ethereum network. Each of these is focused in a different way on a concept called **self-sovereign identity**.

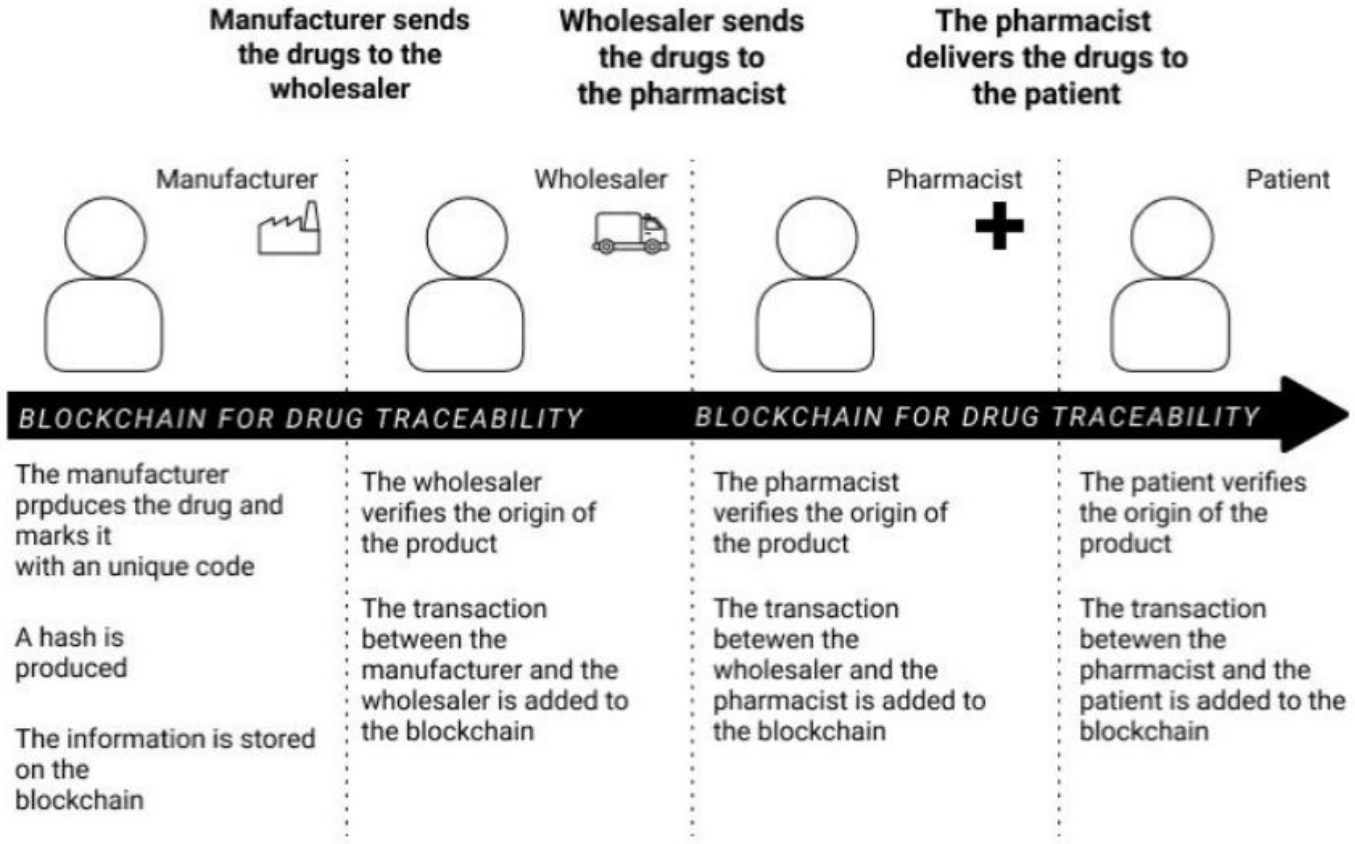
Contd..

- **self-sovereign identity:** The idea here is that users have control over their personal information while potentially sharing parts of their information across a variety of industries. It's a way to have a portable identity online that represents different credentials that you can grant permission for others to view or reference. Credentials could be anything from a driver's license or diploma from a university, to an airline ticket.

Asset Tracking

- Any time you have an asset worth tracking like artwork, real estate, conflict-free gemstones, degrees and certifications, or pharmaceuticals, you can make a case for using a blockchain application.
- The way a provenance blockchain use case would work is that the producer or original owner of the asset would register the asset on the blockchain.
- The asset has to be labeled with a unique code that can be verified by any of the other participants in the blockchain network.
- n the case of the diamond provenance application, over forty different measurements are taken of each diamond that will provide a fingerprint of the diamond for later verification.

Provenance application for drug traceability



Contd..

- In the drug traceability blockchain shown in Figure, every time a stakeholder – such as a wholesaler, pharmacist, or patient – touches that particular drug, it can be verified and the new transaction data can be added to the blockchain.
- All kinds of information about the asset can potentially be shared with this type of blockchain. And the information would be transparent to the network participants.
- Given the huge amount of fraud and forgeries across all industries the cost savings could be immense.
- However, because it is a complex use case involving many participants, it may take more time for these types of applications to catch on.

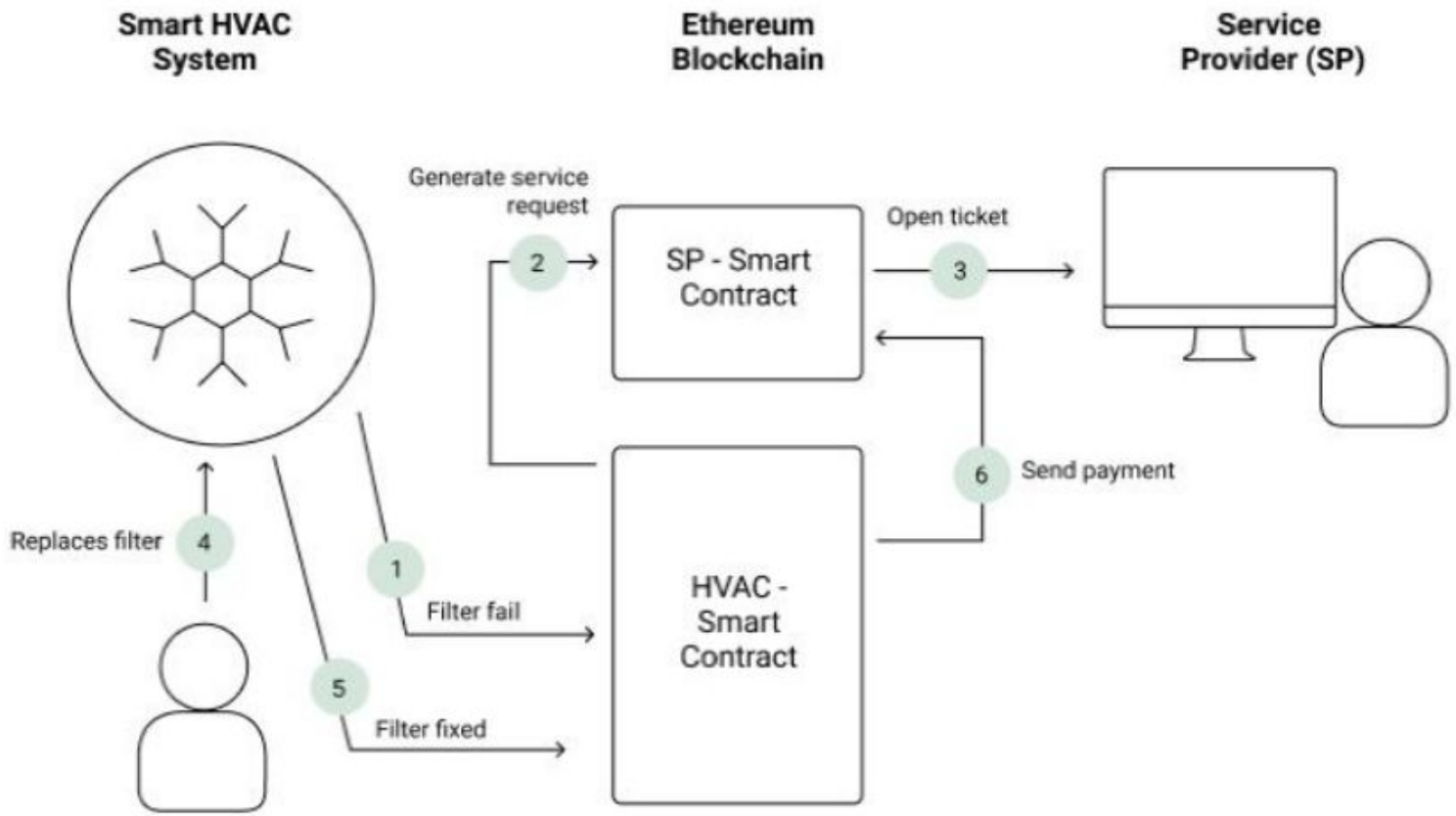
Internet of Things (IoT) Integration

- A little more futuristic, but potentially even more groundbreaking, is the idea that blockchain could be used to link up all the “smart” objects coming our way.
- Everyone has seen smart objects like their smartphones and smart thermostats and lights in their homes. However, intelligence is being added to cars, farm machinery, medical devices, guns, and even refrigerators! Making an object “smart” involves connecting it to the Internet and giving it some computer memory and processing power.
- The problem with this scenario is that these devices have security issues and are susceptible to being hacked. They also will overwhelm the current networks with the huge volume of data they could generate.

IOT Integration

- Enter blockchain. This makes it a good fit to solve some of the problems of the IoT.
- The encryption and verification features of blockchain makes it much more difficult to hack devices connected together on a blockchain. And since it is distributed, if one server on the network goes down, it won't cripple the entire network.
- Another important advantage of running IoT projects on a blockchain network is the ability to process smart contracts.

HVAC service IoT on blockchain use case



- In the HVAC use case above, when the filter in the Smart HVAC System breaks, it can refer to its smart contract to contact the appropriate HVAC service provider in order to get service.
- After dispatching a technician who puts a new filter in, the smart system again refers to the contract for payment terms and a payment is transferred to the service provider.
- There are IoT use cases associated with Supply Chain Automation, automobiles, and many more scenarios.

Functional Area Blockchain Use Cases for Business

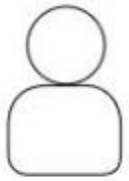
- Finance
- Marketing/Sales
- Supply Chain Management
- Accounting
- Human Resources

Finance

- The big elephant in the blockchain world is finance. Since its inception, Bitcoin was designed to disintermediate central banks and banking institutions.
- Bitcoin represented a new way of transacting value without the need for a third-party bank to function as a guarantor of the transaction. This was the first use case for blockchain.
- Blockchain technology is being used in financial services for interbank transfers, cross-border payments, share trade processing and settlement, and trade finance.
- The qualities of blockchain can make all of these processes more efficient, secure, faster, and transparent. And doing all of these with significant cost savings.

KYC use case for Banking

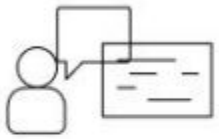
1



Customer Approaches Bank

An individual or corporate customer approaches a bank to open an account.

2



Bank queries the shared KYC platform

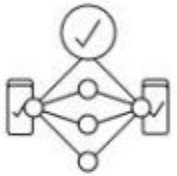
With the customer';s consent, bank staff can extract relevant information from the shared KYC platfom.

3

Validates with trusted sources

Customer information extracted from the shared KYC platform is validated with government registries, tax authorities and credit bureaus.

4



Updates on shared KYC platform

New customer information from the validation process is updated on the shared KYC platform.

5

Completes the KYC Process

The KYC process is completed. Banks can store a record of the validation process and results for regulatory reporting.

Contd..

- One simple use case is found by applying the Identity Management concept to opening an account at a bank.
- If you have ever tried to open a new account at a bank, you know that it can take a lot of time and paperwork. And at the end of this, you will have to wait 3-5 business days to access any funds you deposit.
- Using a shared KYC (Know Your Customer) Platform, a person or even a corporate customer can consent to share with the bank all the relevant information needed to open a new account.
- Since the customer information has already been validated by credit bureaus, tax and government agencies, the bank can process their account quickly.
- The KYC records for the customer are then updated and stored again on the KYC platform. This way all parties can track their relevant information and get real-time updates and the customer knows that it was done in a highly secure manner.

Marketing/Sales

- There are many fertile areas within marketing and sales for blockchain use cases. Some activity is already occurring around social marketing, content management, marketing management, e-commerce and marketing analytics.
- The most active area within the marketing function for blockchain is certainly in the advertising area. This is because of the relatively large number of middlemen in the digital media supply chain and its lack of transparency
- The digital media supply chain involves a complex network of agencies, platforms, exchanges and publishers who provide very little value for every dollar spent by the brand being advertised.
- The industry is full of undisclosed “fees” and techniques such as domain spoofing and bot traffic. This makes the process of getting paid very long and drawn out since there is no transparency or one source of truth.

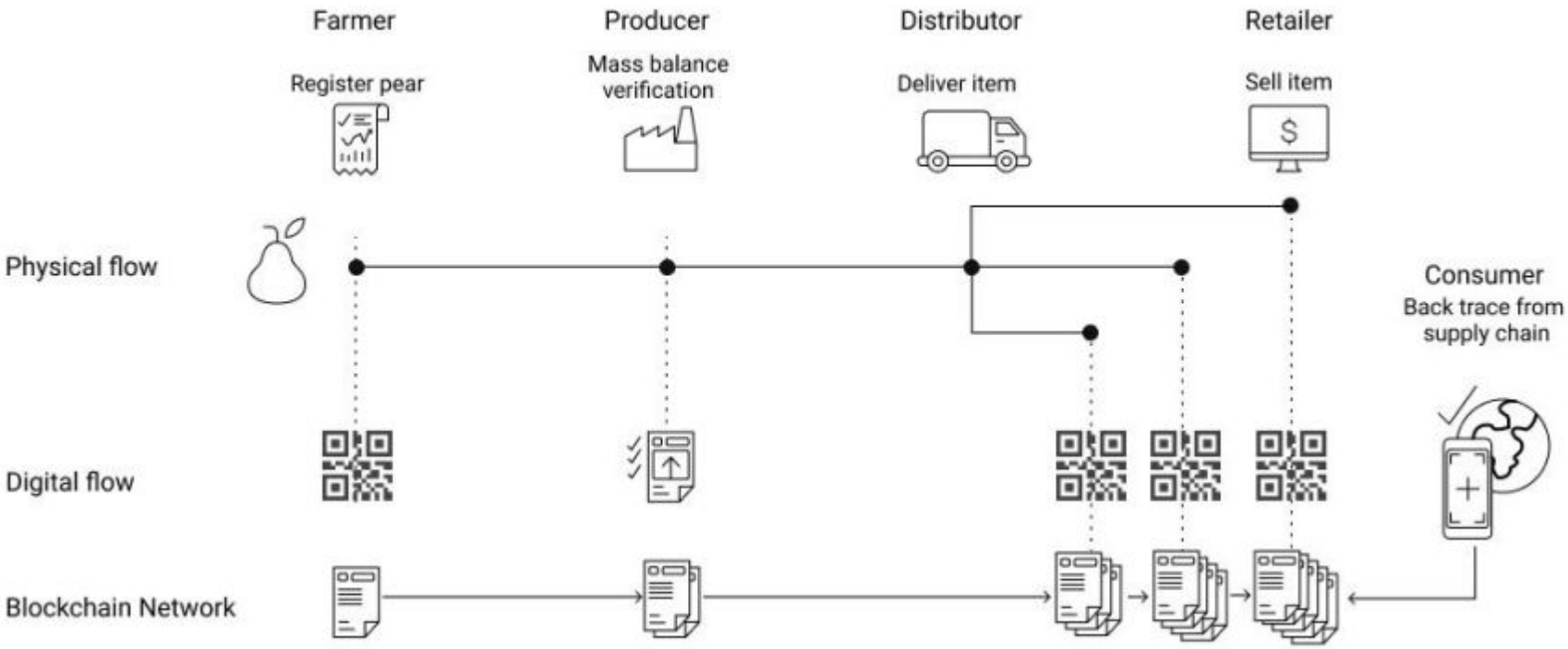
Marketing and Sales

- With the built-in transparency and verifiability of blockchain, some companies such as AminoPay are using it to try and clean up the fraud and waste built into the digital media supply chain.
- They have developed their own native token to help speed up the payment processing for the vendors on their supply chain.
- The transparency built into the network also helps to reduce discrepancies and also the number of disputes. They are now in the process of rolling this application out to the advertising world.

Supply Chain Management (SCM)

- One of the most complex areas for blockchain applications is in Supply Chain Management (SCM) and Logistics.
- With the increasing globalization of commerce, supply chains may involve dozens of transactions across multiple countries and currencies. There is a general lack of transparency and it can require many sets of complex documents and payments.
- When disputes arise over the terms of service and/or payments, it is very difficult and time-consuming to handle these since no one knows for sure what the other party did. Food supply chains are a particular example of this complexity.

Blockchain for food supply chain



- This application records where every piece of pork came from, how it was processed and shipped.
- Given the transparency and verifiability built into blockchain, there are fewer disputes since all of the supply chain partners have access to the same copies of the blockchain records.
- The products are scanned and verified along each step of the chain. These records come in handy when there is a food recall and the retailers need to quickly ascertain the exact source of a specific item.
- The ability to quickly pay each supply chain partner using digital tokens on the chain also helps to reduce the costs and complexity of using bankers in multiple countries and currencies.
- Frequently there are dark holes in supply chain networks that cross many enterprises, since they do not share databases or relevant information that could make supply chains more responsive or efficient.

Accounting

- Interestingly, since the core of blockchain revolves around a distributed ledger, blockchain technology aligns very well with accounting functions.
- All of the Big Four accounting firms are racing to figure out how it will impact them and their clients. The last revolution in accounting takes us back to the invention of double-entry bookkeeping in the Renaissance.
- This was a huge improvement in that it provided a way for managers within the organization to check the figures and make sure they were correct. However, the numbers could be manipulated and entered fraudulently, so external stakeholders required that the ledger be audited by independent agencies.

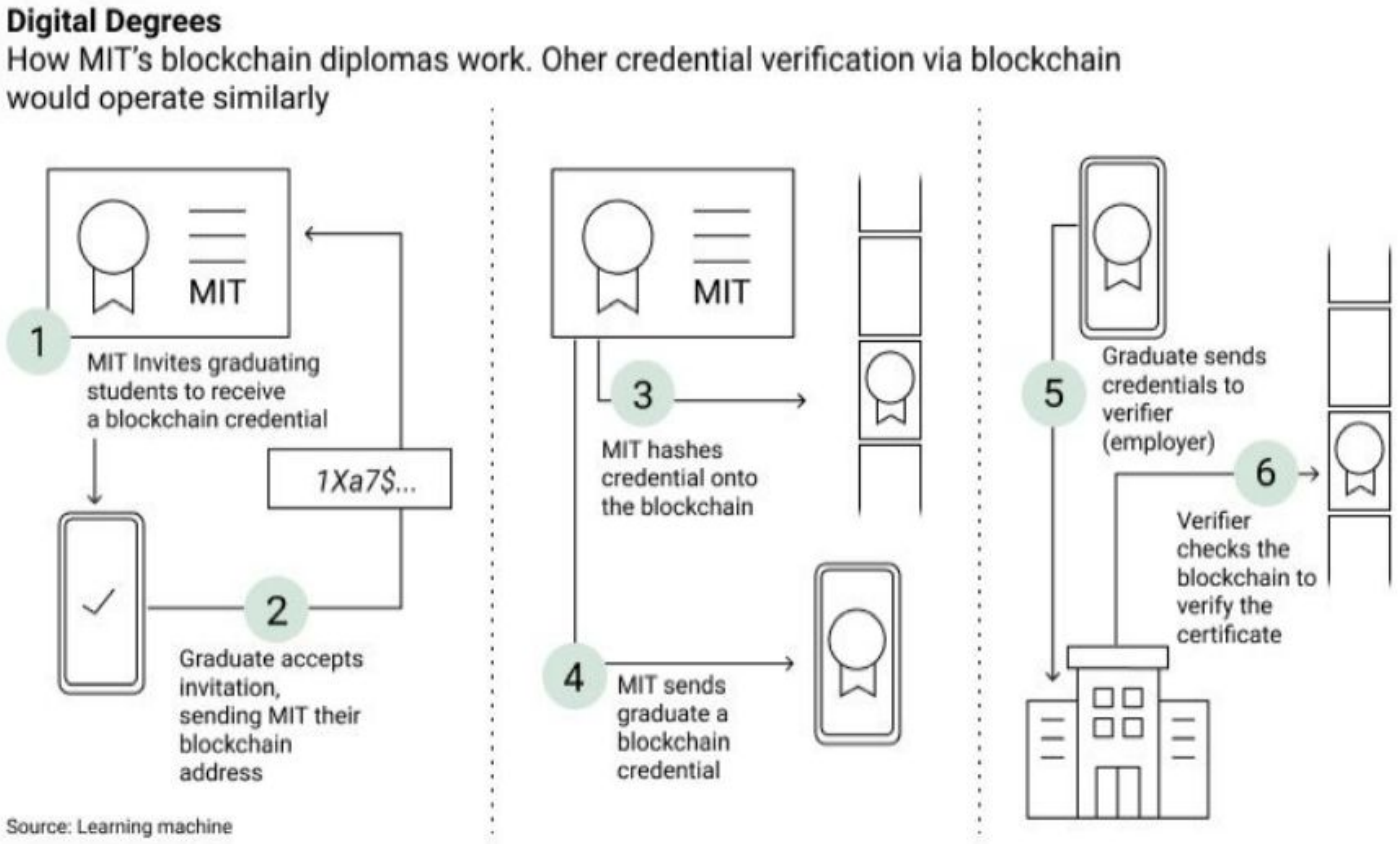
Accounting

- This spawned a whole new industry of audit accounting which can be a very expensive, and time-consuming process.
- Now imagine that your company has access to a new kind of ledger. One that cannot be altered or corrupted once the transactions are entered and that is continuously updated and verified in real-time.
- The distributed ledger behind blockchain may represent this next great leap in ledger technology. By entering each transaction between company A and Company B in a joint ledger running on blockchain, the process of verifying and encrypting this data performs a kind of digital notarization. This means that much of the auditing of standard transactions could be audited and the price of performing audits would decrease.

Benefits of using Blockchain for Auditing

- There are other useful benefits of blockchain for auditing. First, the immutability of the data on a blockchain makes it much easier to prove the integrity of the records. And the transparency of the blockchain makes it easier to trace the audit trails. This data can also be used by other external stakeholders for banking, tax and governmental actions. The fact that it is trusted and verified already will make these reporting processes much more efficient

Human Resources



MIT's degree validation blockchain use case

- It has been suggested that blockchain may help to make LinkedIn or other platforms obsolete by validating resumes, degrees and job skills.
- MIT's degree validation use case was one of the first to propose blockchain for this purpose. They are now using this for their own graduates, and this model is expanding to other universities.
- Given the unknown number of fake degrees and certificates out there, this could be a gamechanger in the HR space.

Use Cases for Specific Industries –

- Insurance
- Real Estate
- Healthcare
- Energy

Insurance

- The verifiability, transparency and security of blockchain technology make it ideal for a variety of insurance functions. These use cases include: Health insurance, Fraud detection, Reinsurance Property and casualty insurance.

Real Estate

- If you have ever purchased a house you probably know how inefficient and expensive it is to go through with the transaction. From the endless inspections to the title transfer and insurance, there are quite a few middlemen involved and it adds significantly to the overall cost. In fact, the cost of purchasing real estate can be between 1.5-2.5% of the total value of the property. This is enough to discourage many potential investors.
- if there were a permanent record of real estate ownership using blockchain technology, there would be no need for title insurance and title searches. Transferring the title would be a simple matter as well, possibly involving smart contracts. This kind of universal property identifier is probably many years from being implemented.
- Besides paying your rent or mortgage with a cryptocurrency, real estate can also be tokenized. Tokenization of an asset such as real estate means that its value can be linked to a digital token. This makes for some interesting possibilities for investors. Smaller investors can micro-invest in real estate projects by buying the token linked to a project.
- AirBnB and VRBO have revolutionized the property rental world by making it much easier for people with extra rooms to rent them out to travelers. These companies have opened up this industry by providing services for secure payments and search algorithms.

Healthcare

- From the pharmacist to the hospital to the physician and insurer, it is difficult to share important data among all these different systems.
- From the pharmacist to the hospital to the physician and insurer, it is difficult to share important data among all these different systems.
- At the center of any healthcare system is the patient record. In the past, patients did not have any control over their own data and it was bought and sold without much thought.
- With the introduction of blockchain, patients can control who has access to which pieces of their health records. Your acupuncturist doesn't necessarily need to know about your cholesterol levels. On the other hand, a patient could want the opportunity to sell their personal data to a pharmaceutical firm, participate in a study or trial using their data, or even offer access to genetic information for research.
- A major proposal along these lines has been submitted by scientists from MIT. They are proposing a blockchain-based system for medical records that would be called MedRec that would help all of the disparate healthcare systems out there to exchange data.

Contd…

- It would be a private blockchain built on the Ethereum platform, using smart contracts to set up protocols for sharing patient data.
- It would be a private blockchain built on the Ethereum platform, using smart contracts to set up protocols for sharing patient data.
- The system intends to be much more secure and flexible, and the data should 329 be even more accurate and comprehensive since it will all be verified and stored in one place.

Energy

- Several groups around the world are looking to innovate on the energy marketplace. LO3 in Brooklyn is leveraging the technology to store, buy, sell, or use energy at the local level using microgrids as well as legacy infrastructure hooked up to smart meters.
- In a different direction, the Australian blockchain startup Power Ledger (POWR) has a token, built on the Ethereum platform that allows individuals to buy and sell excess renewable electricity from other individuals and companies.
- Disintermediating local or national utility companies is quite a big deal, but part of the excitement is also about the secondary markets for green or solar energy.