

Introduction:

Abstract: *Blockchain holds immense importance in the future of mankind and in the technologies of tomorrow. These future technologies which include AI and IoT will drastically reduce the marginal cost involved in the production of goods and services we used in our daily lives. However, these futuristic technologies are incomplete without blockchain because they require collaboration to learn and share data and energy collectively in a decentralised framework. The goal of Clan 5 is to develop an integrated ecosystem to facilitate these futuristic systems.*

Introduction:

Blockchain is not a new technology as it is widely orated by the self-proclaimed pundits around the world. We have had blockchain for the past 30 years scattered in bits and pieces, we were sitting on the gem for all this while. The saying is as true as it gets, only the eyes of a lapidary can differentiate a gem from mere stones, and differentiate they did, an anonymous person or group of persons, in the wake of the 2008 financial crises, out of pure ingenuity merged all the scattered pieces to create the first blockchain application widely known as Bitcoin. A blockchain based cryptocurrency. This lit an inevitable spark.

Satoshi Nakamoto recognized the sole root cause of all problems in our modern world. Big Powerful Intermediaries (BPI) which inevitably accumulate unparalleled hegemony and decentralisation is the only solution.

Blockchain is meant to be a concept of true peer to peer technology where users do not have to rely on big and inefficient middlemen who act as the TRUST functions. Cryptocurrency is an answer to the ancient global banking industry that's utilizing 200-year-old technology (double entry book-keeping) in the modern era of the internet and governed by a self-centered motive of only profit with a disregard of the benefit of the larger human family. Using the current centralised model, transactions are quick to process but behind the scene, it takes anywhere between 5 to 15 days for a transaction to settle. Meanwhile, in the process the financial industry benefits through your money, in this case referred to as "float". To add salt to the wound, banks and remittance services charge remittance fees of anywhere between 7% - 15% of the transaction amount. Despite all those happy advertisements on the billboards, there are currently 3 billion people who do not have a bank account thus, excluded from the basic human right of accessing financial services. Even though we have made leapfrogging advances in technology such as the widespread accessibility of the internet and smartphones (computers), people are still excluded from the financial industry because it is simply unfeasible - unprofitable for the big banks.

Banks have not bothered to think of an innovative solution to accommodate this problem because banks are profitable and successful. They do not feel the necessity and this is perhaps the reason for their ignorance. However, innovation is an inevitable force, call it the evolutionary law of natural selection. By implementing blockchain technology, the entire business model of banks was reinvented using a new type of currency, the CRYPTOCURRENCY. And in an instance, the whole problem of financial exclusion is solved in a snap and now anyone, anywhere in the world can access world-class financial services on their smartphone. Sceptics may argue, why can't we walk down the street and buy groceries with it anywhere in the world? Like all DISRUPTIVE

TECHNOLOGIES, blockchain technology is no different. There is a ton of room for significant improvement in the space of blockchain/DLT and it is just a matter of time.

With cryptocurrencies, we are just getting started and are a far cry from even scratching the surface. Blockchain technology will disrupt many industries by radically changing business models to better suit the creators and producers.

DECENTRALISED APPLICATIONS are the next giant leap forward for the world of the 21st century. Current business models in particular are going to undergo radical disruption. In the digital world we live in, all we require to open a business is an application which enables both the value creator and customer direct access to each other. Almost all business models can be accommodated in an application nowadays. However, current commercial applications are exploiting both the value creators and customers and earning billions of dollars in the process. Earning Billions of dollars is not the main concern, exploiting value creators and customers is the main concern. Just to shed some light, Uber on average charges drivers anywhere between 20% - 25%. YouTube takes about 45% of the revenues from creators. To make matters worse, they collect private data from users on an unprecedented scale and use it to sell users targeted Ads. On many instances this data has fallen into the wrong hands and these parties make unscrupulous use of it. And for your information, all intermediaries are in no way liable for the damage caused to individuals because we all agreed to the terms and conditions.

Using decentralised applications, we can cut the need for intermediaries on a record scale and reduce the marginal cost to almost zero. Imagine paying 20% less for your taxi fare or from the value creator perspective, receiving 20% more for service offered. The same notion applies to all other applications which follow a similar business model. Services like facebook which rely on ads as their primary source of income have been notoriously invading privacy of the users to increase efficiency of their ad systems. Use of decentralised systems coupled with access control will provide the users the control they need.

Implementation of these applications reduces the marginal cost of goods and services - marginal cost is the source of revenue for intermediary businesses - while increasing productivity to an unimaginable extent because it gives value back to the core creators who make a true contribution to society. The external and indirect effects of an almost zero marginal cost extent to a point where it reduces our global carbon and waste footprint to regulate global warming. Here is an example; we all want food which is organically grown and raised. However, in the current system full of powerful intermediaries that have ties with distribution channels, individual farmers are disincentivized from growing organic food. The intermediaries all care about scale and productivity even though it comes at a greater cost such as soil degradation, increase in carbon emission and inhumane treatment of animals which ultimately leads to changes in our climate patterns causing disastrous climate change in long-term.

To emphasize the point once again, the potential of decentralised applications is limitless and it will be the responsibility of entrepreneurs, value creators and customers to take the necessary step in utilizing the potential of decentralised applications which are possible through blockchain technology. Clan 5 is on the quest to make this possible by its innovative approach to blockchain/DLT technology.

INDUSTRY STANDPOINT:

Before discussing about Clan 5 it is imperative to understand the current state of the blockchain industry.

There have been many promising companies such as Ethereum, IOTA, Cardano and many others which allow us to build decentralised applications. However, all these companies are focusing on limited scale technologies which in itself are not enough to deliver useable and reliable decentralised applications. Just like blockchain before Bitcoin, all these technologies are scattered around in bits and pieces. And companies which are focusing on developing decentralised applications such as La'Zooz – a decentralised ride sharing application - are not able to do so because they do not have access to the right platform that provides them with essential tools to do so.

The reason is because everyone is missing the larger picture. Platforms like Ethereum are limited in functionality and not scalable to support truly decentralised applications. They all lack prudence in their design and development. To successfully deploy a decentralised ride sharing application, developers need to build payment systems, identification systems, integrate smart A.I capabilities all from scratch because it is not available in the platforms. In-fact, Ethereum earns most of its revenues through companies that raise money from ICOs.

Eos.io is another promising platform start-up which has raised a staggering \$1 billion plus in ICO proceeds. But just like any other company it is yet to show any considerable results, not even one application has been developed on Eos so far. And claims of ABFT have not been backed up by solid proof.

Hashgraph has recently been the word of the mouth, however, conducting tests on closed servers in a controlled and reliable environment such as the AWS systems is very different from a public setting which has many uncertain elements such as bandwidth constraints, processing power variation, CPU differentiations and so on which have to be accommodated.

In their own context all these companies show promise to build the ultimate platform for decentralised applications but the same thing is happening over and over again. Prof. Albert Einstein wisely said, “The definition of insanity is **doing the same thing** over and over again but **expecting different results**.”

How Clan 5 came into being and what difference Clan 5 strives to make:

After facing numerous challenges while using existing platforms to build our own systems and decentralised applications, we studied a large number of blockchain platforms and realised that we were not the only ones facing difficulties, everyone else was facing similar problem because there were vital parts that were missing hence resulting in a gap in the mass adoption of blockchain technology through decentralised applications and autonomous systems.

After 1.5+ years of rigorous digging and testing, we devised an entirely new approach to address the common problem thus, Clan 5 was born.

Clan 5 is an **integrated ecosystem** built using advanced blockchain technology to simplify the development of **autonomous systems** and **decentralised applications**. Decentralised applications and autonomous systems cannot run on the old dilapidated and centralised software and hardware infrastructure of yesterday. Blockchain means decentralisation, and a truly decentralised environment consists of supplementary systems which provide essential services that support each other. One of the best example of a such a system is our own planet Earth. It is a decentralised system and life on earth depends on an ecosystem that works in a cyclical manner. For a seed to grow into a fruit bearing tree, it requires water, air, sunlight, soil, pollinators among many other things, just soil is not sufficient. And nature has certain rules which all life on earth have to respect. A Blockchain ecosystem that is able to support decentralised applications and autonomous systems is not any different.

One might question, aren't **there many such projects out there already?** **The reality is No!** In our year and a half long study, all projects we studied **fell short in one area or the other.** **What Clan 5 is building is an enormous undertaking and even though, there are many mature projects at present, we do not view them as our rivals.** **Blockchain is a new technology and the other projects are an opportunity for us to learn from so we can avoid some of the pitfalls and not spend time solving problems which have already been solved and available for use.** **Rather we can focus on building new solutions while improving the current ones.** **These are some of the features we are planning to implement in our core ecosystem.**

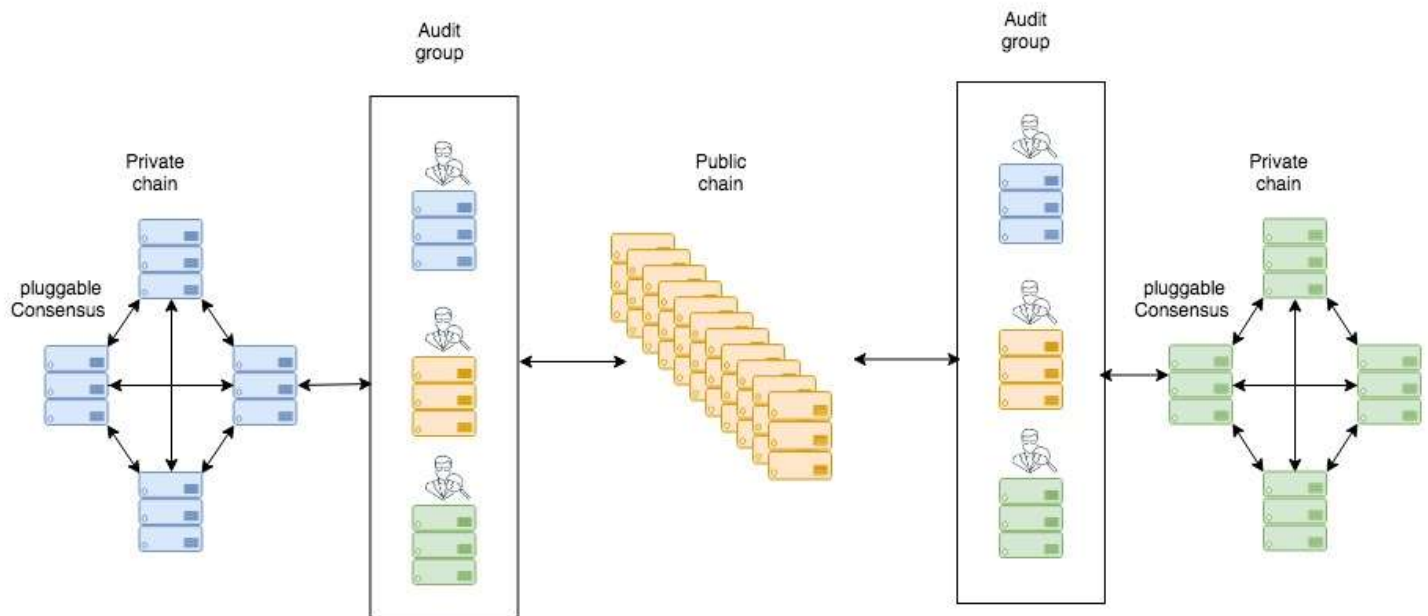
The Solution

Hybrid Ledger Architecture:

There is a divide in blockchain community between the public and private ledger system. Organisations in general prefer to use private ledgers while individuals and early adopters of blockchain prefer public ledgers and as a result die-hard fans have emerged, causing short sightedness. Football fans who vouch strongly for individual football players like Ronaldo or Messi forget to enjoy what matters most, the game of football. When it comes to blockchain, individuals in many cases, especially in respect to their private data such as browsing history are better situated using a private ledger. Therefore, at Clan 5, we took the approach of evolution, the law of natural selection. Both private and public ledgers have their respective advantages and disadvantages and we are fusing both public and private ledger systems together to create a hybrid ledger architecture (HLA). This approach allows us to utilize blockchain technology to the fullest. It creates a whole new framework, where it is a decentralised system on a micro-level, which is what we all want, whereas, on a macro level, it is unified so that every participant can share and exchange information and data with each other without relying on a central intermediary. You can think this as a forest comprised of several species of trees which are interconnected to each other via their roots. These trees communicate in an asynchronous manner. There is documented evidence that when a tree is cut, nearby trees send out a warning signal. These trees also share nutrients and other minerals. The HLA framework is no different.

The illustration below depicts how the Hybrid Ledger Architecture (HLA) functions.

There are 3 main parties in the Clan 5 Ecosystem. Owners of private ledgers, Miners vested in the public ledger and third are the authenticators of transactions and data that is posted from the private ledgers to the public ledger if allowed and required. To become a part of the audit group, there is some criteria that has to be met. The audit group which is selected on a random basis validates transactions assigned to it on again a random basis wherein the audit group is unaware of the origins of the transactions. The audit group thus cannot collude to favor certain transactions over another and this ensures integrity in the system.



The Art of Consensus:

The whole concept of blockchain technology is to reach an agreement with everyone else on a particular transaction. And that is where consensus algorithms come in play, they eliminate the need for a central point of control.

Many different consensus algorithms have been proposed in the blockchain community. Bitcoin's Proof of Work is the oldest and the most robust because hackers would need to spend enough money to buy hardware that would overpower 51% of the current miners, that in itself would cost billions of dollars to do and would outweigh the reward. However, PoW has significant drawbacks because it limits the bitcoin network to about 7 tpx. It also results into a lot of wasted electricity which could otherwise be put to productive use.

With Clan 5, we have carefully considered the concept of consensus algorithms, the intricate details and its root level importance. After great deliberation, we arrived at a new consensus mechanism which is practical and most advanced. It best suited Clan 5's unique HLA.

There is a different paper which dives into the intricate details. This section of the introduction paper will briefly articulate on how PoA consensus mechanism will be implemented within the Clan 5 ecosystem. Proof of Audit (PoA) will work by validating transactions on private ledgers and post them on the public ledger of Clan 5. Proof of Audit uses machine learning to process meta data from individual private nodes to make the consensus process hardware resources are implemented to carry out machine learning (ML) and as a reward, miners receive Clan 5 tokens.

One of the key USPs of Clan 5 is its HLA framework which involves both private and public ledgers. In such a framework, the users of private ledgers are at a liberty to choose a tailored consensus mechanism that best suits the consensus needs of that particular ledger network. This makes practical sense because every business functions in a unique way due to differing business models and daily activities therefore, one generic proof of consensus algorithm will not be suitable for all types of the users in the ecosystem. For example, let's look at a decentralised microservice application which allows users to track the source of their goods (vegetables, meat or diamonds), in such a scenario using proof of work does not give the needed results, therefore, the developing community of the application might decide to develop their own consensus mechanism which specifically allows users to track the origin of their goods and is much more resource efficient. Thus, a new consensus mechanism, proof of origin will be invented and used on that particular private ledger.

This is true for every user, both individual and organizational. Each private ledger will have its own consensus mechanism, situated to fit its needs.

The Clan 5 hybrid ledger architecture has been designed to consider all the benefits that blockchain offers. For example, a public ledger allows for tamper proof records that cannot be changed or erased. Using the HLA, Clan 5 enables private ledgers to have a temper proof and immutable record of all transactions.

This will be done using PoA. PoA consensus algorithm will reconfirmed transactions done in the private ledger at a certain time interval and create a unique hash of the transaction with a time and approval stamp. This hashed and encrypted file will be stored on the main Clan 5 public chain. In case transactions need to be revisited after years, in this case only a comparison and matching of the hash will need to be done. If a deeper manual inspection is required, this process will just make it easier to trace the transaction.

Tapping into the future, AI & IoT.

The future of computing technology is limitless and there are two technologies that are unarguably going to be a driving force in the coming 5 years. These are Artificial Intelligence (AI) and Internet of Things (IoT) technologies. However, just like the current scenario decentralised applications these technologies are incomplete without a proper blockchain ecosystem.

In the 21st century, data is the new oil and IoT technology will be a key data entry point. IoT is all about integrating smart sensors on everyday devices such as bulbs, refrigerators, locks, clothes, bed and wrist devices. All these smart turned appliances and devices will collect raw

data which can then be analysed using advanced Artificial Intelligence Technology. AI/ Machine Learning (ML) is the refinery that analyses this raw data into useful metadata which can then be used to empower you with accurate suggestions backed using factual data so that you can make better decisions.

However, the current state of economy is such that 2 or 3 big giant companies control almost 90% of the global data in centralized databases which cannot be accessed by non-members. In most cases this data is used to deliver targeted ads. Users are literally exploited because storing all your eggs in one basket is never a safe strategy. In cases of hacks, such as the recent Facebook Cambridge Analytica hack, the data of 50 million users was compromised and used to interfere in national elections. In response, all that the responsible party had to say was “We are sorry.” There have been even more severe breaches, such as the Equifax hack where social security, bank account numbers and other personal details have been leaked, leading to adverse financial consequences for individuals. And at a certain point the responsible party did not even take responsibility for its negligence.

The responsible parties can decide not to take responsibility because when creating an account, we all ignorantly agreed to the “terms and conditions.”

We the users have been subject to such unfairness due to a lack of a better substitute. Kindly take note of the term “Better”. Tesla the car company has been able to successfully challenge the status quo consisting of giants that are century old because they build a car that is 100 times better than existing cars. And they made it electric. At Clan 5 we want to leverage on blockchain technology and create the best possible alternative platform solution as a competitive substitute to existing centralised platforms. And empower the developer community to create true decentralised applications.

Because Data is very important, we have carefully taken it into account therefore we propose a new approach to the challenge of data privacy and security. With the Clan 5 ecosystem we want to empower users with the tools to take back control of their own data.

AI

Users can then use the native AI assistant application, to make their lives better by automating many trivial tasks which would otherwise take up an ample amount of time.

A.I technology is matured to an extent where virtual assistants which, we have for so long fancied in movies can be developed. Then, why is no one else not doing that? The answer is, due to lack of enough oil - our own personal data used as input by the A.I. software. Currently we as consumers do not have our personal data in our control. Instead we have giant companies that store it on their own servers in a segregated manner across their respective platforms. Our social data is stored on the servers of a social media company, our shopping history is stored on an e-commerce company's server, and so forth. Presently available assistants are generic and cannot accurately customize themselves to the needs of an individual user due to lack of holistic data, both offline and online, and lack of access to personal sensors which can collect offline activity

data. Their range of services and information will be restricted to the data collected about you by the specific service providing company i.e. the e-commerce companies and so on.

Clan 5 will leverage on blockchain technology and its HLA platform to make A.I powered Virtual Assistant into a reality.

Every user will have universal AI and IoT applications by default on their private ledger which will empower users with the tools to implement the power of smart sensors and machine learning to their personal life or businesses. All of this, without relying on intermediaries which would provide these services only in exchange for data and which would be used to sell targeted advertisements

5 Universal Applications:

What makes Clan 5 an ECOSYSTEM are these 5 core applications which will be available by default to handle essential services such as Payments, Smart Identity Verification, Smart device and Sensor Integration, Machine Learning powered Virtual Assistant, Easy to Deploy Mining Software (virtual or physical) so that the developers' community can focus their resources and energy on making great autonomous systems and decentralised applications.

These Universal Applications essentially have 2 target users, first are the developers and second are the everyday users. Developers will use them as API integrations in Dapps and relevant autonomous systems and everyday users can will use them as they are, through a simple application interface.

Below are the 5 Universal Applications:

1. SWAID (Wallet & SMART ID):

Any blockchain platform is incomplete without two basic services, namely, Wallet and Identification. On the Clan 5 platform both Wallet and ID are integrated into one to make it compliant.

Wallet:

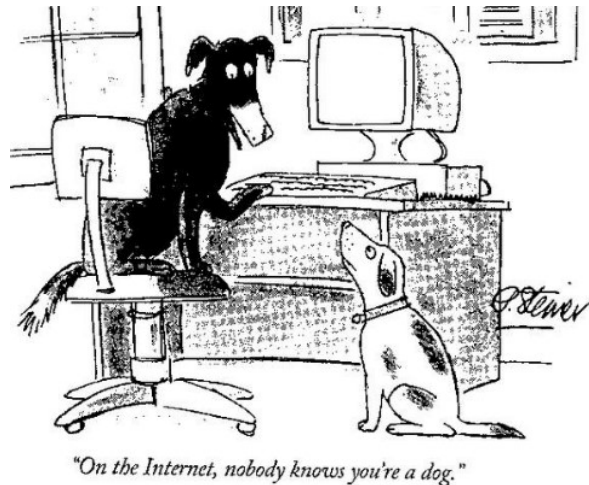
Wallet application will handle transactions on the entire ecosystem. At a core level, Mr. Mandela in Uganda can use the wallet app to send money to Lee in S. Korea at almost 0 cost, peer to peer. Wallet will allow the 3 billion unbanked people to take part in the global financial system.

On a more sophisticated level, developers will use it as the payment gateway solution in the form of an API.

Wallet API can be embedded on a private ledger or public ledger of a car sharing application to handle all the payments. And then at a 12/24-hour time interval, the transactions will be

reconfirmed using the PoA algorithm and be posted to the larger public ledger. This way, transactions can also be compressed to before being recorded permanently on the public ledger this saves storage space and keeps the public ledger light.

Smart ID:



"On the Internet, nobody knows you're a dog" - by Peter Steiner and published by The New Yorker on July 5, 1993.

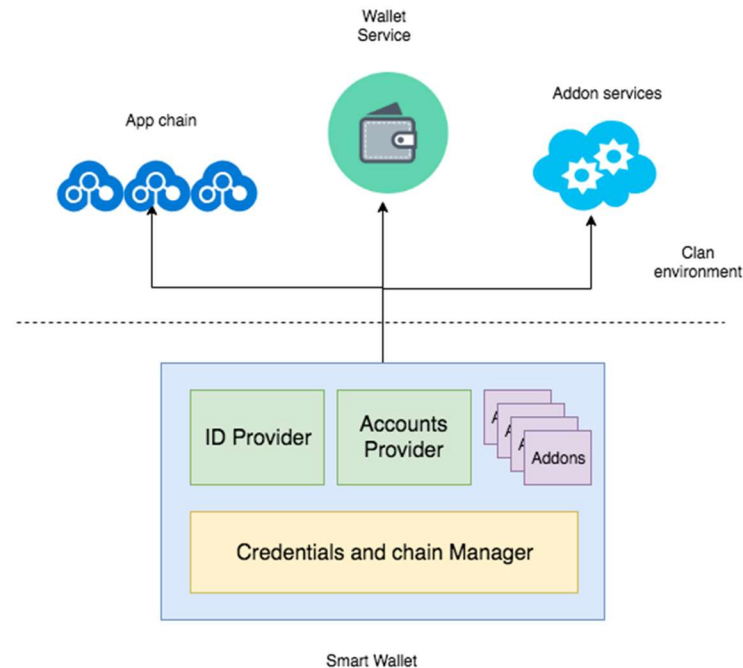
The 25-year-old adage is applicable up to this day despite all the technological progress. We are dependent on intermediaries for confirmation of our identity. In many applications and websites, you must have seen sign up/in using "Google/Facebook". These companies store your login credentials for you and in case of any breach in the servers, it will be your data at stake, and they will not be responsible because you agreed to the terms and conditions.

A lot of prudence was taken in understanding the important implications of identity data in the future. Human beings will not be the only ones who will need identification, IoT devices will need to have unique identification numbers which will be closely associated with their human owners.

A default Smart ID application will be available by default to users of Clan5 Ecosystem. This application will store personal information for users on their private chain. Furthermore, users can permit other applications to access this information for a limited period of time until the user is using the service.

For example, when Mary visits a new hospital, she will have her medical records stored safely on her private ledger which she can access her Smart ID application and share it with the hospital for a limited period of time, until she seeks medical help from that particular hospital. However, the hospital can request to have ownership access to the data in case its required for research purposes; One the other hand, Mary can now monetise her health records.

This smart ID application will be part of your Wallet. This way you control the access to your credential and application with which you share your personal information. For example, if you



want to buy movie tickets using a provider like PVR. Clan 5 community would have built an addon using which you can buy tickets and share information like cell phone number to receive details.

2. A.I:

AI, also referred to as machine learning is becoming more and more prevalent. A virtual assistant can manage all your digital activities for you. For example, booking a flight ticket or even booking a cab, all of this can be done by a virtual assistant on your phone.

In the current state of AI, we have generic AI assistants that are based on a centralised cloud where they access specific data collected by that particular service provider like Google or Apple. Data collected may include basic data such as, user profile and other minor details. At no point does that AI have full access to your IoT devices and data of your daily life. Maybe Google does, but it is still not accurate and complete. Data available to a particular AI assistant is divided between various companies/service providers. Users currently do not have control of their own data and therefore cannot deploy it for their own use.

With the Clan5 AI virtual assistant we are revolutionising traditional AI assistants and bringing the power of machine learning to your handset so you can use it to make your everyday lives easier. The application leverages on your private database which stores your entire data for you in a private virtual or physical node. And instead of using a generic prefixed name, here you get to assign a custom name to your AI assistant. Furthermore, this AI will have access to your IoT devices which will enable it to analyse the raw data for you locally.

The machine learning aspect is also linked to the public chain wherein users are incentivised to share learned meta data to the larger public cloud. This will allow collaborative sharing in a decentralised framework at a massive scale and enable machine learning to progress at an unparalleled rate. For example, your autonomous car will be able to carry out machine learning based on the data it collected throughout the day, and share learned meta data to other autonomous cars through the public cloud and vice versa. A single car will be learning collectively by leveraging on each other's journey.

3. IoT:

Internet of Things is the technology of interconnected devices that communicate with each other over the internet and collect data using advanced sensor technology. These devices can range from everyday home appliances like washing machines, toasters and digital locks to autonomous vehicles and drones. It is predicted that by the year 2020 there will be 20 billion connected devices on the internet. But with the current state of the internet which does not have a trust layer and void with security flaws, these devices can be compromised. Especially, the centralised server databases to control connect and control these billions of devices can prove to imprudent because if the servers of a particular company are breached, hackers could obtain control over millions if not billions of smart devices simultaneously and use command them to cause chaos. For example, take autonomous vehicles connected to one cloud and this cloud is breached, hackers can control your car and cause unimaginable chaos all around the world.

Using a centralised technology frame work for IoT technology would be keeping all your eggs in one basket. Recently, Tesla servers were hijacked by hackers to mine cryptocurrency.

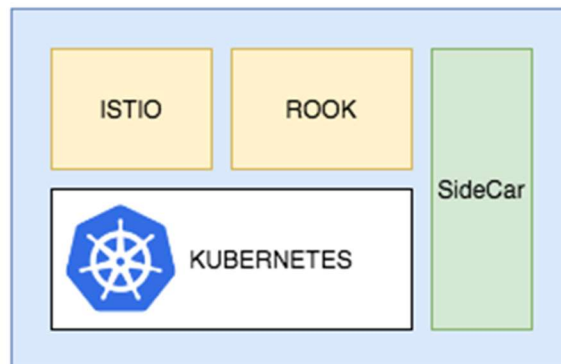
IoT technology can use blockchain technology and its unique decentralised framework technology be safe and reliable to use.

IoT Hub is one of the 5 universal applications that users receive on their devices. Users can access and control their personal appliances, devices and even autonomous vehicles through the application. The devices will be connected to the private ledger of the specific user to which only the user will have full access thus increasing the security and safety. This private ledger can be linked to the public ledger in case data sharing is required for the larger good of the world while maintaining the privacy of the users. And referring back to the AI assistant, that application will be where the machine learning will happen.

4. Chief Deployer:

The Chief Deployer is the initialising software which will be the backbone of the Clan 5 ecosystem. The chief deployer will provide a framework to create, deploy, manage and monitor decentralised applications and autonomous systems on the blockchain. Using the Chief Deployer, configuring a private node and setting up a ledger will be as easy as installing a software.

For the everyday users, this will enable a simple user interface through which they will be able to monitor their resource consumption through a task manager like interface.



5. Projects:

With the advent of internet, the world is evolving into one human family. However, years since the birth of the internet, transfer of value from party A to party B had not been possible without a central intermediary.

In case of investments for an individual, the central intermediaries are investment banks and mutual funds which are more often than not confined to the country they operate in. The available investment opportunities for an individual are only as good as the country in which he or she resides in. For so long, only the privileged few – millionaires and billionaires – had access to investments opportunities throughout the world.

But using blockchain all of this is about to change. All individuals, whether it be Mr. Abdullah from Iraq or Ms. Nakamoto from Japan will be able to invest and save disposable income in a company operating in Africa where the economies are just beginning to see growth similar to that of the Asian era.

Similarly, companies and organisations will not need to depend on central intermediaries such as investment banks for funds to finance their projects. This can be compared to project bonds, without the central intermediaries. With this, not only start-ups but also reputable companies can take advantage of peer to peer technology.

The one aspect this is still is not considered is the mining algorithm/ consensus algorithm. The projects part of clan5 takes care of that by providing a pluggable system to added your own mining and consensus algorithm. The A.I system which we are planning to build is based on this plugin system.

Interconnectivity between the applications:

The 5 core applications are independently powerful because of the breakthrough services they offer. For example, the Wallet App alone has the potential of onboarding the 3 billion unbanked users worldwide and revolutionising the entire payments and banking industry just by 3 taps on a smartphone screen. The Smart ID application solves the ID crises faced by many countries and empowers users to control their own data. The AI and IoT app is the pillar that bridges the speculated potential of the technologies of tomorrow and makes them possible today. These applications can further support specific decentralised applications built on the Clan5 ecosystem so that the developing community of these applications can focus on their primary goal – connecting drivers to fares in case of ride sharing app – without worrying about the reliability of payments, ID and Machine learning aspects which are essential and delicate functions of such a decentralised application that end up diluting their focus.

However, the true potential of these applications is unleashed when they work in collaboration with each other. *“One finger cannot lift a pebble.”*

The 5 applications will work in collaboration with each other. Users’ wallet address will be linked with their ID application. Regulators consider KYC rules strictly and by linking wallet addresses to the owner’s personal identification it will solve the problem of KYC. Furthermore, IoT devices and automated systems which will have their own unique ID will be linked to the owner ID. In case of automated vehicles, owners who choose to share their vehicles during idle hour will be able to receive payments to their wallets directly as soon as the trip is completed.

AI and IoT collaboration. This is something that has not been envisaged by any other blockchain company. Data is the fuel that feeds AI technology so that AI can serve you with ingenious analytics which will enhance decision-making capabilities. And IoT technology is the missing block in the puzzle that will feed AI the useful data autonomously. An oil well is not capable of processing and refining the crude oil into petrol, gasoline and other consumable products. Just how crude oil has to be sent to a refinery for processing, data too will need to undergo a similar path. The closer the refineries, the better the economic efficiency. To place this in context, ARM the chip architecture company is working on a project called “Trillium” to bring machine learning to smartphone and smaller devices. This means, there will be millions or billions of small scale efficient refineries (data miners) on devices.

Why interconnectivity and integration?

There is no doubt that the future is going to be decentralised and connected. Unlike the centralised systems we have been using up to this date where there is a dependency on intermediaries which ultimately put individuals at a disadvantage, the future looks bright due to blockchain technology.

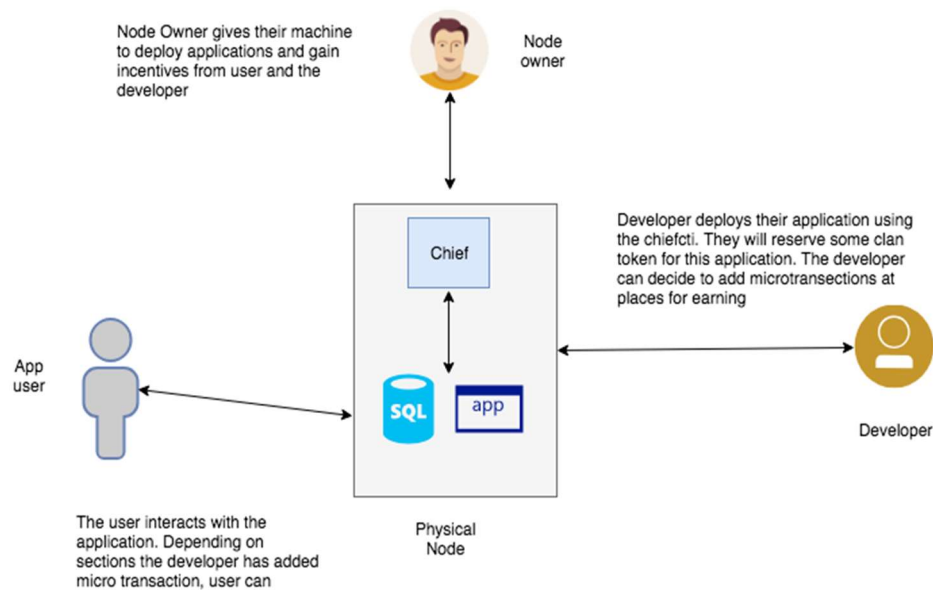
However, autonomous systems and decentralised applications cannot accomplish much independently. Independently, they can only do a limited range of tasks. For example, a smart fridge will only be able to record and inform the owner that milk is running out and that he or she should consider restocking milk. Or, when arranging for travel, a generic search tool can only

provide you with a list of flights to your destination in order of price or other parameters but nothing further than that. You still have to do the dirty work of going out and buying milk and restocking it in your fridge and in the case of flight tickets, you would normally scroll through an extended list of listings and finally settle for the cheapest or earliest flight ticket. Restocking milk might consume anywhere in-between 15 mins to 2 hours depending on the accessibility of a nearby store. And by the time you finish buying milk, you realize that you also bought 10 other things which you did not plan. After all we are humans. An average person spends about 10-20 hours to plan, organise and book a normal 1-week vacation. This normally includes booking flights and so on. These are just two examples of independent services run by autonomous systems. The reason so much time is spent on doing such tiny tasks in the age of AI is because we do not have an individually customized virtual assistant that can handle such redundant tasks for us and we end up wasting vital amounts of our time on such trivial things.

Clan 5 wants to create a world where a virtual assistant can link to your smart fridge and automatically place an order for supplies, after your permission of course although you can choose to automate it entirely. In a business scenario, let's take the example of a restaurant, the virtual assistant can keep track of which supplies are needed most on certain days by learning the most ordered items off the menu and creating an accurate statistic backed probabilistic model which would save the restaurant money in extra inventory and reduce wastage of food. Tons of food is wasted each year. Coming back to traveling, with a custom virtual assistant you can delegate the job of booking your vacation or tickets and within seconds, it will be able to scan websites for you present a suitable itinerary for you, just like you travel agent does except much cheaper. It does this more efficiently because unlike normal humans, it doesn't scroll and read each line like a person, instead it crunches huge chunks of data from thousands of websites and gets back to you with the best options. If you like the deal, then all you have to do is confirm and due to the connectivity to your wallet, it will easily facilitate the payment seamlessly.

These feats of technology cannot be achieved without a trust layer over the current basic internet model where identity itself is a cause for concern. The second important aspect is ability to have accessibility to integrated interconnectivity between humans and their devices. Through the Clan 5 ecosystem we will be able to deliver such seamless connectivity and make this a reality.

When a user consisting of a family of people or corporations and organisations can only deploy a customised virtual assistant which allows them to take advantage of these 5 applications on a custom private ledger where their private information is safe from hackers. In the Clan 5 ecosystem all private ledgers will be connected to the main public ledger through the unique consensus algorithm, Proof of Audit (PoA).



Conclusions:

At the end of the day, blockchain is just a technology, a tool that we as humans invented to make the world a better place and empower us with new capabilities. It is this hunger of constant exploration and improvement that leads to breakthrough innovations. Fundamentally, it is this trait that distinguishes us from other animals. *Man is a tool using Animal.* -

Currently, there are 3 notable issues which the blockchain space faces; first is the daunting problem of scalability, secondly the unprecedented regulations and scepticisms from authorities and third the lack of a concrete blockchain platform built with the end user in mind, using which the masses can be tap into the potential that blockchain holds.

The first problem is addressed by Clan 5 and other blockchain start-ups which have demonstrated high throughput and transaction speeds. It does not seem to be the challenge. Regulation and restriction in certain countries might prove as a hurdle however this is just a matter of time. The third problem seems to be the most significant. Ethereum is too geeky and complicated for the average user today and so is the case with other similar projects.

Great scientist Albert Einstein wisely said, **"The definition of genius is taking the complex and making it simple."** And making things simpler is the most challenging part. At Clan 5 we understand the importance of simplicity to the developer and end user. Complexity in blockchain is hindering the mass adaptation of blockchain technology because everyone is not an expert in computer science.

Development of web based decentralised applications will become easier and simpler for developers with the availability of readymade universal applications which can be used as APIs by developers. Anyone will be able to set up a hardware node and mine using the **Chief Deployer** that will make it as easy as installing a new software package on your computer. Similarly, there are many other smaller aspects within the ecosystem that will have a simple user interface.

Taking a step outside the blockchain space, there are larger problems in the world that Clan 5 aims to address. Some of them include, privacy, data protection, unnecessary and inept central intermediaries, global warming resulting from unaccountability and lack of software integration among other key issues.

Clan 5 has taken into account the larger picture and will build precise solutions to the above issues which will ultimately empower the end users and place them in control. Right now big tech corporations have an upper hand on the users because of their monopolistic nature. The establishment works on a centralised framework and it is this centralised way of working which has proven inefficient and unfair where the users are the scape goats in cases of failure.

If we continue to drift in the current direction we are bound to be exploited and the individual will be easily overlooked by the vast corporations with profit as the sole motive. The future of the world depends on how well we are able to craft a solution using blockchain technology which appeals to the masses and is better by a factor of 20 when compared to existing centralised solutions.

By proposing an integrated ecosystem that is distributed, secure and user empowering Clan 5 aims to play a small role towards the betterment of the world through blockchain technology. We all have to ask ourselves, do we want a world filled with incumbent giants that stifle innovation and promote red tape or do we want to build a world that is open, distributed, interconnected and considers social good before profits?