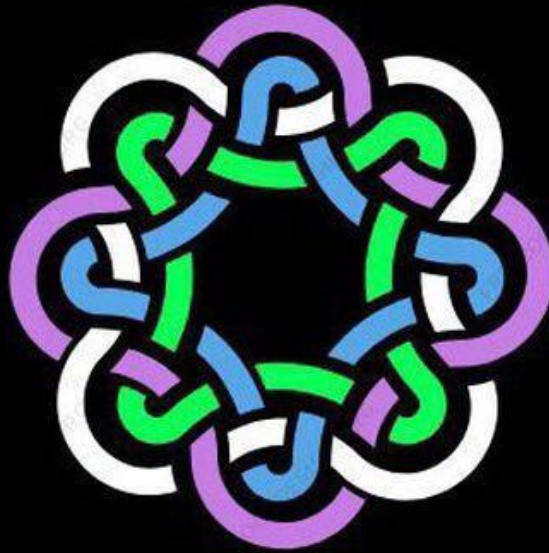


# WHITE PAPER

Ver. 3.7



Xentimentum

Recently updated on October 6<sup>th</sup> 2018  
Xentimentum Inc

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## Abstract

To overcome the limitations of blockchain projects, Xentimentum(XTM) project that is configured to effectively complement both the reliability and scalability of current blockchain is launched. XTM project is mainly focusing on reliability, permanence, speed, transparency and interoperability. In addition, XTM is applied to medical IoT and it supports the connection and data exchange between countless devices in real time without delay and the data can be stored and used safely and transparently without any risk of hacking. XTM is utilized in many industries such as Artificial intelligence, Medical information, Drug manufacturing, Medical Devices and Health care IoT to provide safe access to stored medical information which written on blockchain. Based on the written information on blockchain, XTM platform help users implement application that will provide you with the convenience and benefits of your life.

## I. Xentimentum token Distribution

Symbol : XTM(Xentimentum)

Token Type : ERC – 20 / 0x2440D0Ab14686ea821DDC440b63C95809a8CCbAF

Total Supply: 50 Billion(it can be changed based on the market situation)

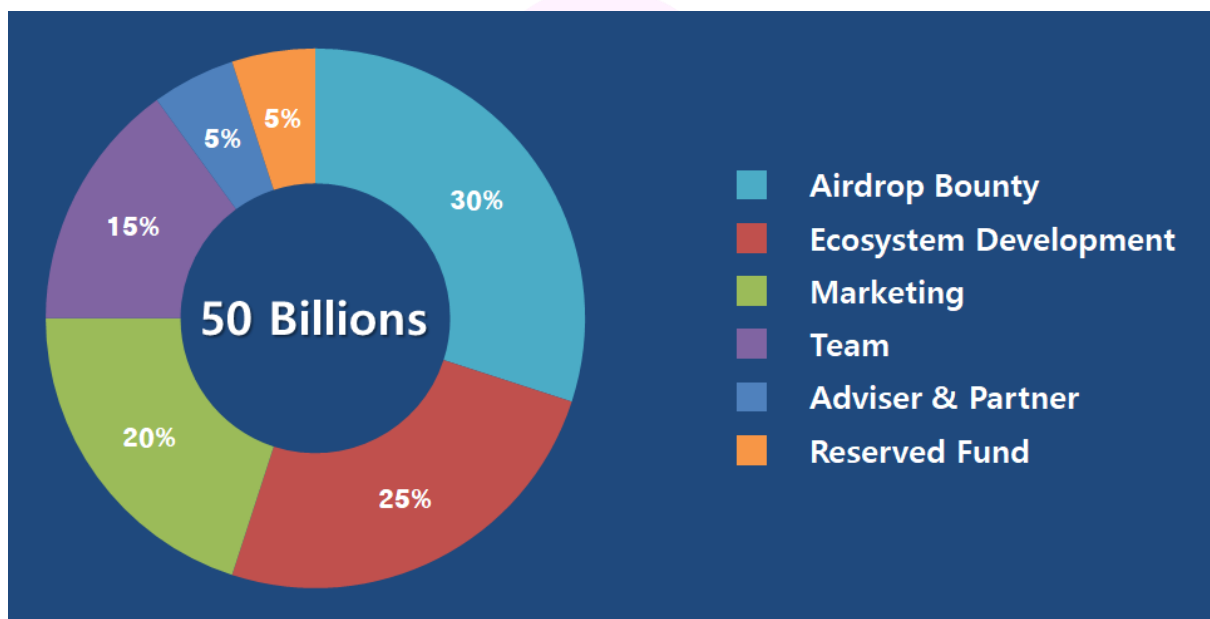


Figure1: Token Distribution

## II. What is XTM?

### 1. Background of XTM

The first blockchain technology introduced to the public by Satoshi Nakamoto in 2008 became widespread worldwide through the implementation of the peer to peer electronic cash system Bitcoin. Bitcoin was the first project to use blockchain technology. The blocks contain transactions from various networks, each of which is formed to interact with the back and forth clock and create a connected chain structure. The individually connected structures provide an immutable data repository named and distributed by the blockchain. These blockchain ecosystem enables data exchange between contributors. This blockchain also records all data used, making it a transparent shared note. Later, the block chain called Ethereum was created, and the second generation of the block chains appeared. These second-generation blockchains can complete the desired process by executing code rather than by recording transactions that were previously used, and can be demonstrated by a technology called Smart Contract.

Many of the traditional blockchain projects used the POW algorithm. However, the POW algorithms had many inefficient problems such as electricity consumption and monopolization that experts point out, and the rapid development of artificial intelligence and quantum computer technology has made the POW algorithms no longer safe from hacking. And if we don't solve the most important problem that traditional blockchains, scalability growth, you can't use it industrially. Thus, while blockchains require high processing speed (TPS) with complete stability and increased scalability to be recognized for their industrial value. However, these elements to evaluate the excellence of the blockchain are complementary, so any increase in performance or efficiency will result in another less efficient like balloon effect..

XTM is a blockchain that effectively complements both reliability and scalability and have the solutions applicable to the above issues. In particular, XTM provides a platform for interaction

of IoT devices that must be used in order to be used in connection with blockchain technology. These XTM platforms can be applied in the field of health care, where practicality is a priority, enabling numerous devices to connect and exchange data in real time, and keeping medical data safe and transparent from the risk of hacking.

## **2. XTM for Blockchain, Medical Device with A.I. , Health Care IoT**

According to the leading management consulting firm McKinsey & Company, the utilization of IoT medical devices is expected to generate an annual revenue of 1.1 trillion dollars by 2025. Also, the future health care sector will evolve from disease treatment-focused to disease prevention-and post-disorder care. In addition, technological development of IoT and medical device development are accelerating with synergy effect. Therefore, it is predicted that there will be huge growth in the healthcare IoT market.

At present, the medical information system is operated under the individual system with only medical institution. However, by using block-chain technology, it is possible to insert / combine each piece of information into a unit of a block chain to make it possible to move a lot of data more easily, and data distributed in several small units are more secure Allows you to archive and move data.

XTM not only makes it possible to use all the information of various organizations on one platform and use all the information easily and safely at any time according to the user's needs, but also medical devices and wearable health care equipments are greatly developed due to the introduction of the Internet of things, IoT. XTM is designed to be used in a variety of healthcare equipment such as drug manufacturing, logistics management and distribution, artificial intelligence used in medical devices, and wearable devices..

In addition, XTM enables medical institutions to quickly respond to patient needs, and the device enables timely response to changes in the patient's condition. Furthermore, with the

introduction of home medical devices, XTM provides a 'Connected Monitoring Solution' that allows the medical institution and the patient himself to monitor his / her condition at all times.

The Connected Monitoring solution under development centered on Johns Hopkins Hospital in USA is a new IT solution that can easily check the patient's living space such as emergency room, hospital room, ward, etc. from the medical institution through tablet PC and smart phone. The use of these devices is directly related to the safety of the users, so they must be operated based on high reliability, transparency, accessibility and interoperability. Therefore, the XTM platform develops more sophisticated block-chain technology that facilitates patient personal information exchange beyond simply logistics and manufacturing, and enables more services to be built on the basic target of IoT technology combined with medical devices.

### **3. The value of XTM**

The IoT market and smart medical devices are rapidly expanding the market, but with the limitations of low-availability systems and the growing volume of data, the cost for the network is increasing. Currently, there is a lot of data on the medical network, such as HIPAA information, and most of the data is stored on the workstations without locks.

Also, administrators are paying too much for managing these networks. The XTM project is used for IoT devices and provides a protocol that allows a large amount of data to be safely moved and utilized at high speed. Based on the technology of XTM, the design and block chain is used in industries such as medical information, pharmaceutical manufacturing, management and logistics, artificial intelligence medical devices, healthcare IoT and etc. This is the project which value to stability, consistency, rapidity, transparency and interoperability.

#### **>Stability**

Medical device IoT exchanges critical information from hospitals, manufacturers, and users, so security is a top priority for medical industry. Sensitive data that is directly linked to an individual's life can be exploited for crime, requiring the highest level of stability. XTM encrypts information and distributes it in many small blocks to prevent hacking fundamentally. In addition, the patient can reconstruct his entire data into one large block safely and freely whenever they want to use it.

#### **>Artificial intelligence**

XTM, which can evolves by it self, can help users by deriving optimal conclusions based on user data. XTM incorporates artificial intelligence technology to provide personalized service and information based on countless calculations and statistics. To protect life in emergency situations, XTM can operate and stop the device based on user data AI block chain system.



### **>Consistency**

Transactions stored in XTM are permanently immutable, and data in XTM can be processed and reacted continuously by IoT applications that can be monitored all the time. This allows XTM to demonstrate a clear on / off effect on life-critical medical devices IoT. In addition, XTM is able to work on stable devices, so it can show continuous effects regardless of time.

### **> Rapidity**

XTM is able to produce track results up to 300 M TPS in the current technology development stage. This is the highest level of processing speed among existing block-chain projects, and is approximately 10,00 times faster than the VISA platform's 24,000 TPS. Therefore, XTM can scan users quickly based on their personal information, and allows for immediate control. In order for transactions to be fast in the block chain, it is necessary to draw conclusions based on the linked blocks and arrive at a consensus process. XTM builds this consensus process into Directed Acyclic Graphs.

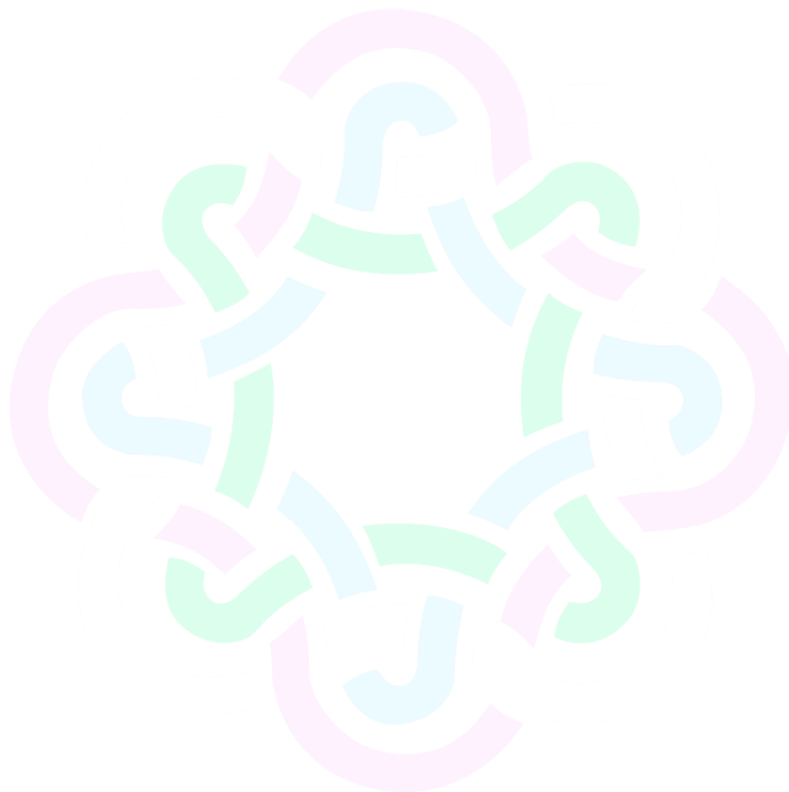
### **>Transparency**

XTM makes it possible for anyone to know how, when, how, and what information, who, and why they use medical devices and medical data in a transparent way, so that they can be controlled within XTM. Because the stored data in the block chain is immutable, it can be validated at any time via the API, so XTM can not only prevent malicious access, but also can easily control large users.

### **>Interoperability**

XTM allows you to freely connect multiple applications based on your basic data, medical device data and all information. IoT sensors that do not use the same communication protocol often fail between two different IoT sensors. However, XTM which based on a block chain provides a platform that allows transactions to be made at

any time and available to any application and to communicate with each other. XTM will continue to advance the development of medical devices based on its high degree of scalability and freedom, and will be able to provide more diverse health management systems.



## 4. Technology design of XTM

### >DAG

XTM uses Directed Acyclic Graphs, a directional but noncircular graph, as a way to connect block chains more quickly and effectively. This DAG algorithm has a high degree of freedom and scalability not only in directionality but also eliminates unnecessary circulation and has a low commission. In addition, unlike existing block chains, there are huge advantage for using DAG algorithm is DAG algorithm can process various data at high speed than existing blockchains. In other words, this DAG technology, which does not generate blocks in the block chain but leaves only a chain, is a way of verifying one unit with another unit. Due to DAG algorithm, there is little fee to process the chains and it can speed up the whole process.

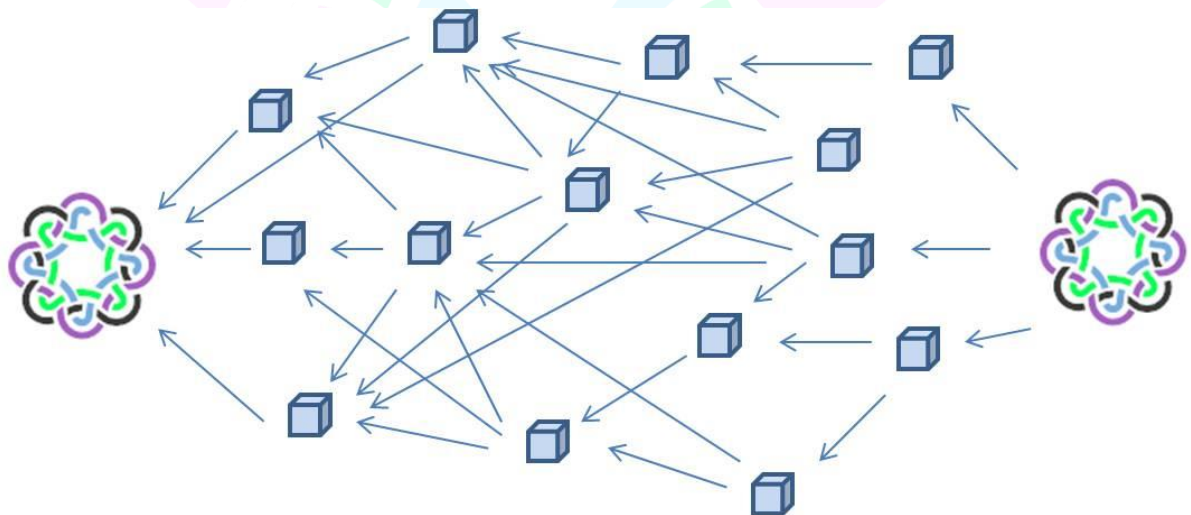
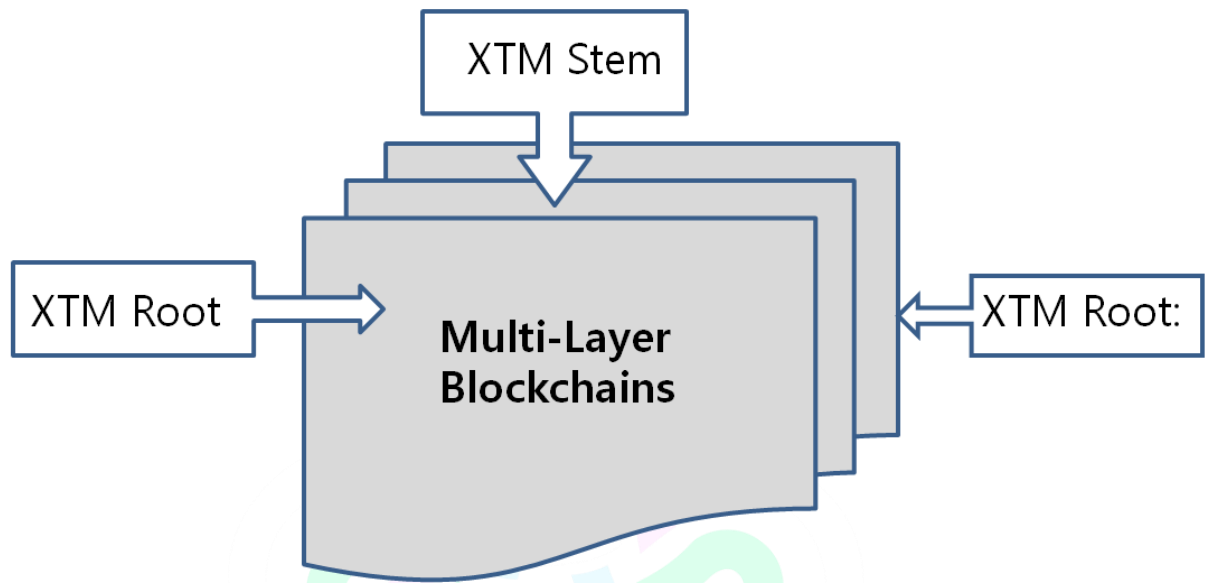


Figure 2: DAG Algorithm

### >Multi-Layer Blockchains

The XTM consists of three layers, enabling faster and more accurate blockchain operation.



**Figure3: Multi-Layer Blockchains**

#### **The First layer: XTM Root**

XTM Root is a distributed system that can securely store and protect the medical data to be written in XTM by dividing it into many blocks with its own encryption technology. In order to overcome the small amount of total usable data that existed in existing block chains, Root layer provides block storage by providing separate storage space. It also minimizes the amount of data used in the block chain, increasing processing speed and minimizing cost.

#### **The Second Layer: XTM Stem**

The Stem layer of XTM re-decrypts the password entered at the XTM Root layer and connects the various applications used in the medical devices with built-in XTM platform.

Therefore, user-friendly environment is created to make it easier for medical institutions or users to acquire and operate the information they want.

### The Third Layer: XTM Leaf

The XTM Leaf layer is physically linked to the actual medical device and collects and analyzes user data. The Leaf layer contains the A. I protocol and collects all the small leaf(data) and analyzes it with big data(tree) like a tree with many leaves.

### >Blockchain Optimization System

XTM, which is directly connected to the safety of users and deals with important information, is always updated and designed to evolve. In addition, XTM is always designed to detect and prevent multiple hazards, make optimal choices at all times, and change itself. In conclusion, XTM can collect and optimize the user's data and derive the best response for various situations.

### > Optimal Results Derivation and Prediction System Utilizing Medical Device Results

Conventional result derivation methods are controlled by uniform input and output. This can drastically reduce the amount of time it takes to get a conclusion, but there are problems that cannot always reflect changing circumstances and various variables.

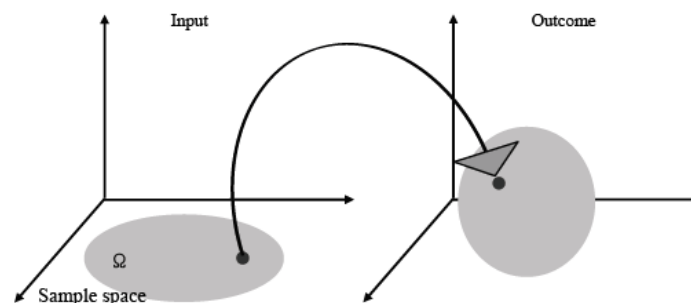


Figure4: Normal Result Derivation [1]

However, XTM statistically analyzes the data by using the functional data derived from the medical device in the following equation. When this infinite number of user data accumulates, the data value of the user's present situation and future progress is derived. The average of the data values obtained can be obtained from the following equation.

$$\mu_X(t) = E[X(t)] = \int_{-\infty}^{\infty} x f_X(x, t) dx$$

The auto covariance function is as follows.

$$\begin{aligned} C_{XX}(t_1, t_2) &= E[(X(t_1) - \mu_X(t_1))(X(t_2) - \mu_X(t_2))] \\ &= \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} (x_1 - \mu_X(t_1))(x_2 - \mu_X(t_2)) f_{XX}(x_1, x_2; t_1, t_2) dx_1 dx_2 \end{aligned}$$

The autocorrelation function is as follows.

$$\begin{aligned} R_{XX}(t_1, t_2) &= E[X(t_1)X(t_2)] \\ &= \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} x_1 x_2 f_{XX}(x_1, x_2; t_1, t_2) dx_1 dx_2 \end{aligned}$$

These derived data are stored in a blockchain and are used by XTM to create function expressions for optimal conclusions. By analyzing samples close to infinity, this will lead to future developments. When the number of derived data increases, highly reliable results are obtained.

Above functional expressions are used as a function to recommend the optimal method.

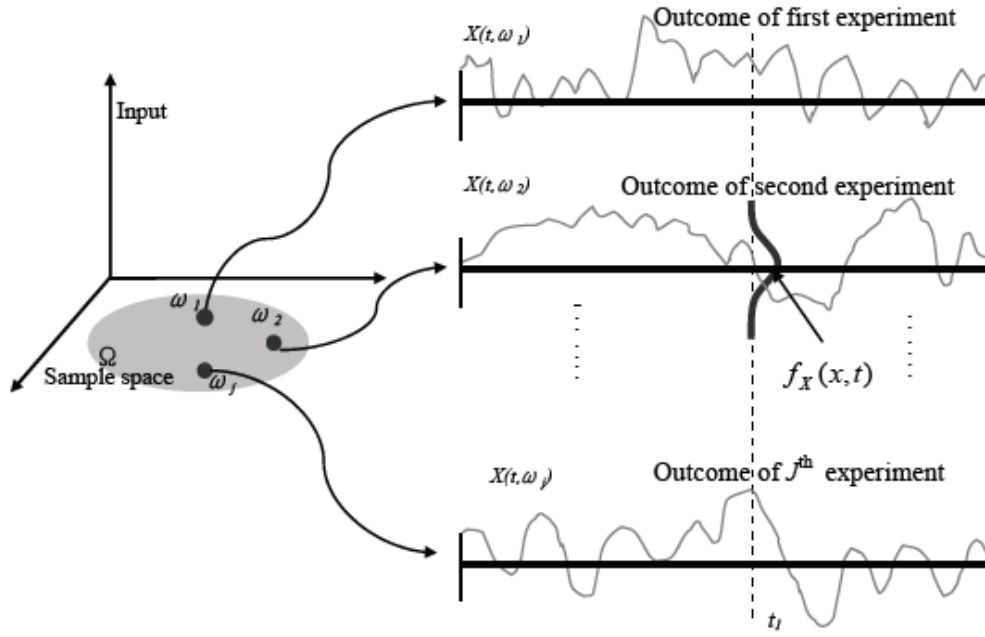


Figure5: XTM Result Derivation Model [2]

$$S_I^2 = \frac{1}{\hat{n}-1} \left\{ \sum_{i=1}^{\hat{n}} I^2(u_i) - \hat{n} \left[ \frac{1}{\hat{n}} \sum_{i=1}^{\hat{n}} I(u_i) \right]^2 \right\}$$

#### > Derive optimal results using MCS

XTM can derive the average output function using the function written above. The resulting function draws a constant graph, which is configured to predict your current vital situation and future. Using these predictive graph functions and the MCS method introduced in the A.I robot called 'AlphaGo', XTM can help users to select the best conclusions or to automatically turn on / off medical devices and applications by judging XTM chain in case of emergency.

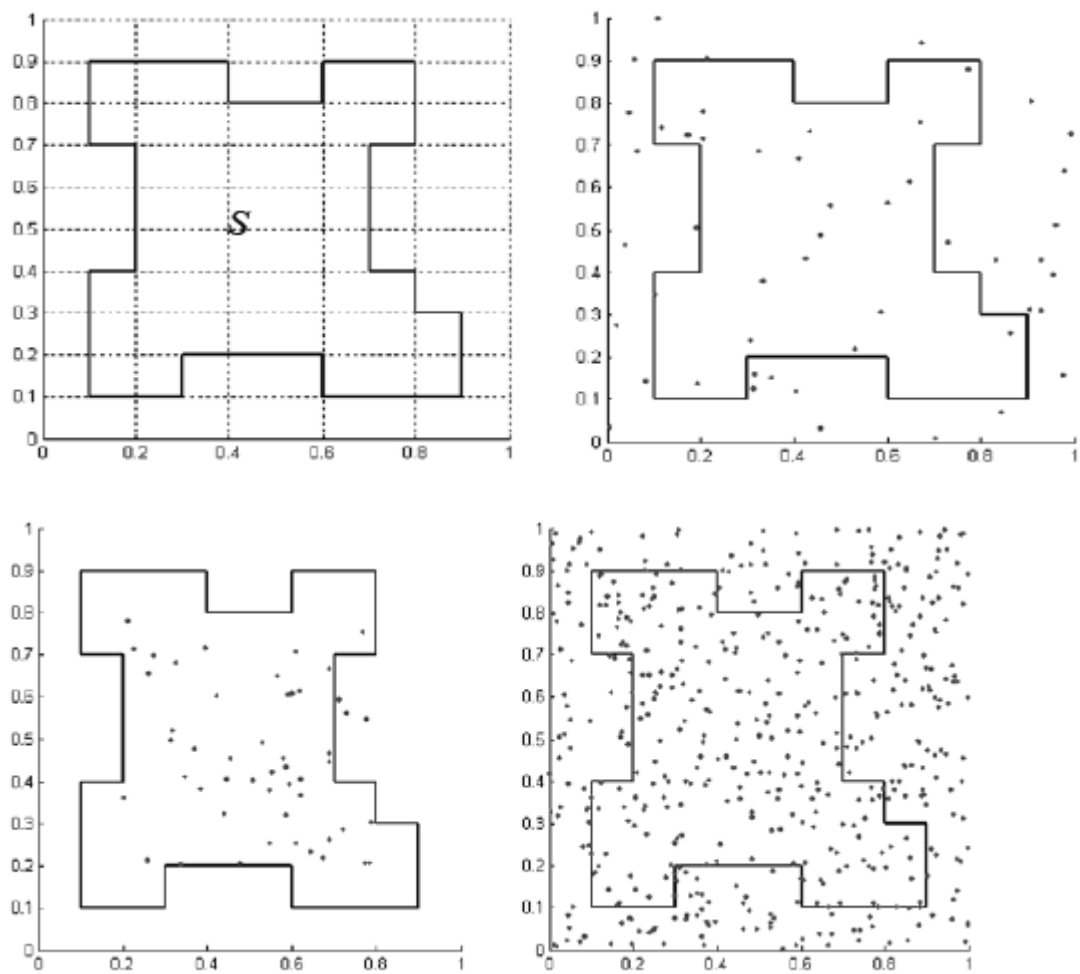


Figure 6: MCS Optimization [3]



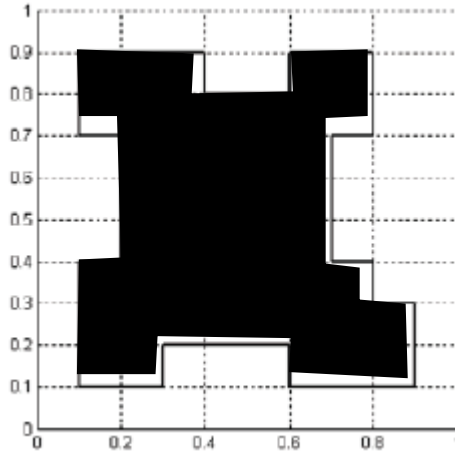


Figure 7: XTM Optimization Result after MCS

For reference, MCS utilizes a large number of random inputs (data) on a certain function into a computer. The result inside the function is called success and is represented by 1. At the same time, the result on the outside is referred to as failure, and the result is set to 0, and an infinite number of data is analyzed. Then we collect the functions shown as 1 separately. The functions obtained through this process are instantiated as shown in the figure above.

The function formula of the instantiated data can be derived again by the formula below.  $P_f$  is the probability that the result will be 1; When  $g(X) \leq 0$ , it can be obtained as follows.

$$P_f = P[g(X) \leq 0] = \int_{g(X) \leq 0} f_X(X) dX$$

$$P_f = \int \dots \int I[X] f_X(X) dX$$

When  $u_n$  is a random number of a uniform distribution function and  $n^{\wedge}$  is a number of independent random numbers, the sample dispersion function is obtained as follows.

$$S_I^2 = \frac{1}{\hat{n}-1} \left\{ \sum_{i=1}^{\hat{n}} I^2(u_i) - \hat{n} \left[ \frac{1}{\hat{n}} \sum_{i=1}^{\hat{n}} I(u_i) \right]^2 \right\}$$

The results obtained by assigning random data are purely statistical results based on only a multitude of data and are not biased towards either side. If you repeat many operations to get more accurate and safe values, you can have higher accuracy. As a result, these results are re-written back to XTM to indirectly support device users, and in the event of an emergency, XTM enables direct device operation based on optimal results.

## 5. Use Cases

### >Use in medical devices

1) Chronic diseases such as hypertension and diabetes

- Important in the management of chronic diseases is the change in blood pressure and blood sugar

- 1 ~ 2 month cycle to visit the hospital, based on the measurements at the time of admission

- Hyperglycemia due to hypertension in the clinic or ingestion of food before admission

- It is recommended to record in a note by self, but only few are actually recorded.

- Automatic storage and big data build-up on device during self-measurement through IoT

2) Arrhythmia

- Arrhythmia is important in ECG at the time of symptoms

- However, in most cases, it is difficult to visit the hospital in case of a symptom.

- There are currently 24hrholter monitoring devices but they are not widely used in real life.

- Portable devices through IoT can be easily recorded when symptoms become common

- Real-time monitoring of high-risk arrhythmia and helping you to take immediate action in emergencies

3) Analysis of sleep / health / exercise patterns through Smart Watch

- Sleep quality and pattern analysis through smart watch / phone / app

- Analyze heart rate, exercise, and calorie consumption while exercising

- It is possible to form and manage big data by combining IoT with these fields.

### **>Use in actual hospitals**

#### **1) Visiting Major hospital due to serious illnesses and emergencies**

- One of the first things doctors need to know when they first visit a large hospital are emergency illness is their history, current medications, allergies and etc.
- In the current healthcare system, such information that mentioned above is not shared between hospitals.
- It is not a problem if the patient knows precisely and detail about his or her past history. But, if the patient has no consciousness or memory of the patient is incorrect, errors in the decision of future treatment may occur.
- One of the major complaints of doctors working at a real university hospital is that they have to rely on inaccurate memories or scour past records of other hospitals for the patient's past history and status
- In the future, if all information about the patient's condition is recorded on the blockchain and accessible in a uniformized method, more rapid / accurate / efficient access and treatment of patients will be possible

#### **2) Patient Care**

- In case of general hospitals, 24 hours care is not possible in reality
- With the application of IoT, it will be possible to monitor patients in the general hospital room for 24 hours at existing stations, which will bring considerable advantages in terms of the care of hospitalized patients.

### 3) Diagnosis Aid

- Except for a considerable portion of physicians' judgment and discretion, the application of A.I. in radiology is expected to provide more accurate and prompt diagnosis
- A.I. can help to detect abnormal lesions after establishing hundreds or millions of databases
- In addition, it is expected that robot surgery combined with more advanced IoT technology will enable more detailed, faster and more effective surgery.

### 4) Patient tracking

- It is important to treat emergencies of specific diseases, but it is also important to track the progress of the disease
- In the present situation, it is difficult to observe the progress unless the patient wants to return to the hospital.

It is anticipated that it will be possible to carry out progress tracking more easily and efficiently through IoT

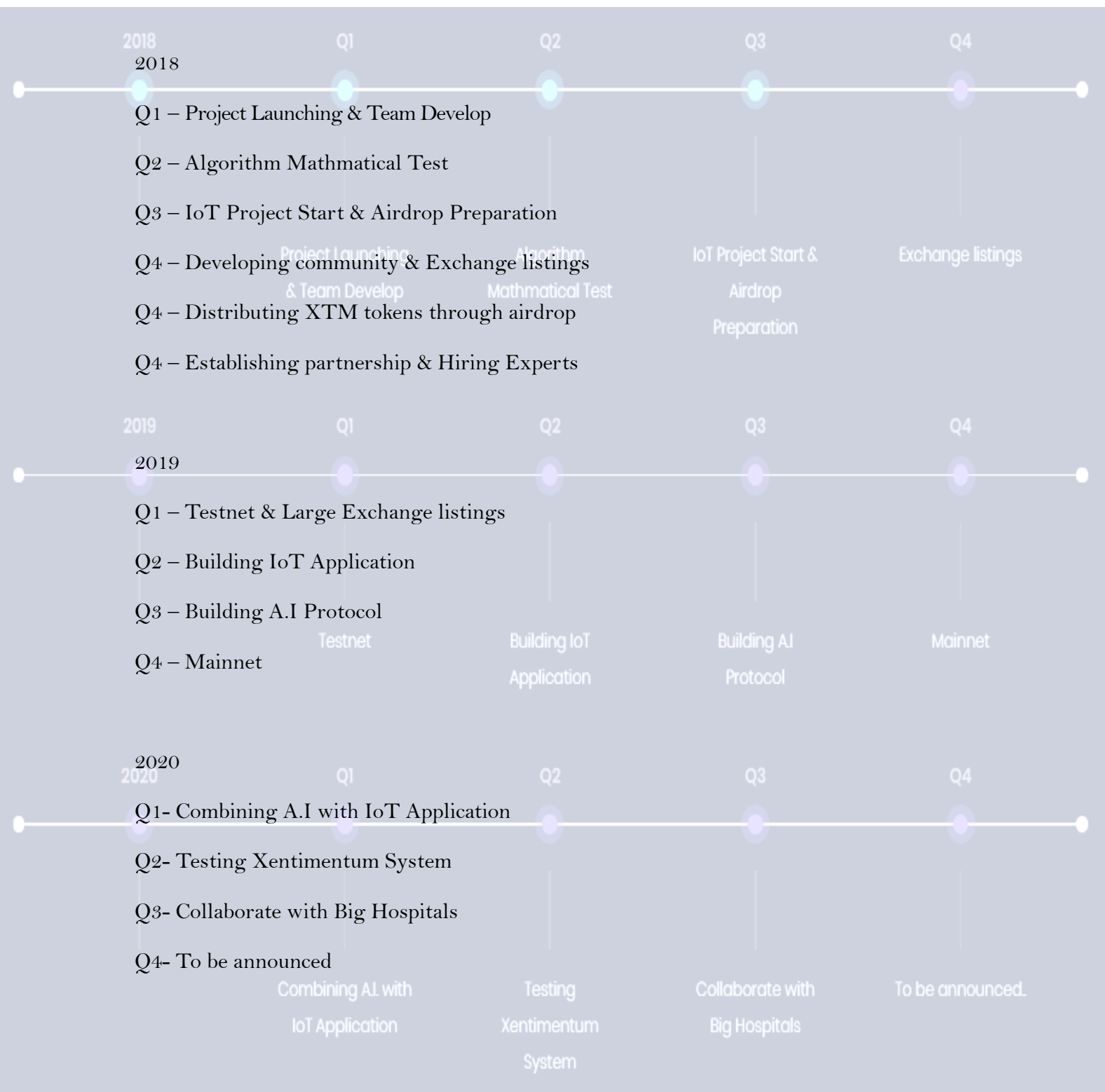
### >Sharing medical information

- In order to obtain current medical information, it is necessary to acquire information from a doctor through an acquaintance or to rely on a search through a portal web site
- It is possible to access accurate and objective medical information when constructing big data by an application combining IoT.

### III. Conclusion

Our quality of life in the present age is directly connected with the development of technology. Based on the above-mentioned features of XTM in the rapidly evolving technology, XTM will present the technical standard of the new cryptography era. It will increase the convenience of users applied in the medical IoT field and improve the security and accessibility of medical data. XTM's ultimate goal is to contribute to the advancement of modern technology and enrich human lives through one advanced block-chain project, XTM.

## IV. Roadmap of XTM



## V. Team profile of XTM

### **Tailor Jeong**

Core Blockchain Developer

6 years Experience in Blockchain industry as Computer Engineer

Arizona State University



### **Brandon Bae**

Blockchain & A.I. Developer

Georgia Institute of Technology

Seoul National University



### **Manish**

Blockchain Consultant

Technology Evaluator

Patent attorney





**Dr. Lee**

Medication Distribution Manager

Pharmacist

Purdue University. Dept. of med. Drug distribution



**Dr. Chang**

Medical Device Operator

Medical Doctor, Trained at Yonsei University



**Venta**

Blockchain Marketer

B2B Online Marketing Expert



**Marcus Jacob**

Core Developer

Core Application Developer



## VI. Advisory profile of XTM

### Patrick Baik

Health Care System Manager

Business & Health Care management

Johns Hopkins University



### Daniel

General affairs Manager

Branding identity master



### Victoria

Training & Gym Manager

Sports & Physical Education Expert

Health Care Consultant



## VII. XTM Community

Airdrop form : <http://bit.ly/2NwvBq0>

1. Homepage : <https://xentimentum.com/>
2. Twitter : [https://twitter.com/XTM\\_official](https://twitter.com/XTM_official)
3. Telegram official community : [https://t.me/XTM\\_official\\_group](https://t.me/XTM_official_group)
4. Telegram official announcement : [https://t.me/XTM\\_official\\_channel](https://t.me/XTM_official_channel)
5. Medium: <https://medium.com/@xentimentum>

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## *LIMITATIONS OF LIABILITY AND LEGAL NOTICE*

*The Xentimentum team (including shareholder management companies in general) is a member interested in Xentimentum, and here we disclose a detailed description of the platform and team that XENTIMENTUM is planning. Tokens issued by the XENTIMENTUM team are not financial instruments such as certain securities, legal currencies (dollar, pound, euro, yen, etc.) and therefore do not guarantee specific value. The current token laws are flexible, but there is a possibility that laws or regulations, such as token possession and transaction regulation, taxation, or transaction prohibition, are subject to change. In that event, the XENTIMENTUM team will not be held responsible for any kind of damages such as unexpected damage, loss, or liability arising from changes in laws and regulations. Tokens can be affected by unexpected circumstances such as success of business plans, price trends, other market trends such as foreign exchange market and stock market, natural disasters, war and regulatory changes. Tokens owned by token holders are likely to result in fraudulent transmissions due to account information leakage due to cyber attacks. However, the XENTIMENTUM team assumes no responsibility for this. The XENTIMENTUM team does not endorse the information at the time of writing this Whitepaper or any future information not yet determined. The XENTIMENTUM team does not represent or endorse the accuracy or responsibility of any professional law, accounting, financial or technical aspects of this white paper. All actions and consequences of the Token Holder and the Potential Token Holder's decisions shall be at the discretion and responsibility of the Token Holder and Potential Token Holder self. Therefore, the XENTIMENTUM team shall not be liable for any kind of damages such as unexpected damages, losses, debts, etc. that may arise from this Whitepaper.*