Television Commerce Global

Smart IP Cloud TV Interactivity Service

(Interactive TV Commerce)

Version 2.0

Trion Corporation Inc.

home page: https://tcgcoin.net

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TCG Token

Smart IP Cloud TV Interactivity Service

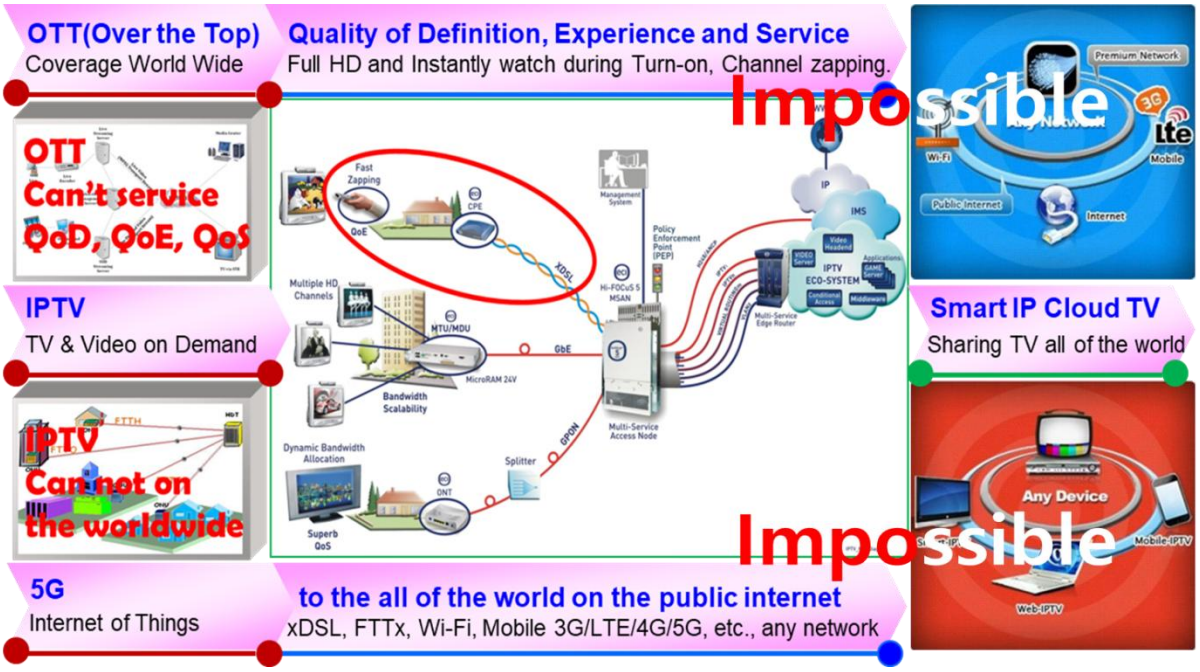
1. Overview

In the digital multimedia era, IPTV (Internet Protocol TV) services have been created in all countries around the world due to the global demand for television channels and multimedia. It is a service that allows users to watch TV channels and multimedia anytime, anywhere without any restrictions on time and space through various terminals including Internet-connected PCs, smartphones, smart TVs, set-top boxes and mobile devices. In the past, it was very inconvenient to share digital multimedia with TV channels because there was a barrier between countries, but now various languages of each country are being translated and translated in real time through computer artificial intelligence, and it is also quite a long time ago that shopping things around the world online.

<Figure: Definition of IPTV(Internet Protocol Television) Service>

In response to these times, several developed countries are providing IPTV services that improve quality and service based on digital TV-level picture quality. Korea also has been provided with IPTV services since 2018, but currently, if all IPTV services are available through the public Internet, they cannot meet the quality,

quality and service of digital TV, and therefore only Internet service users who provide premium networks with speed and quality can watch IPTV services provided by the company, and IPTV services from other companies are not available. Of course, it is actually an intranet service, not the Internet, because it is a local service that is more difficult to watch in other countries.

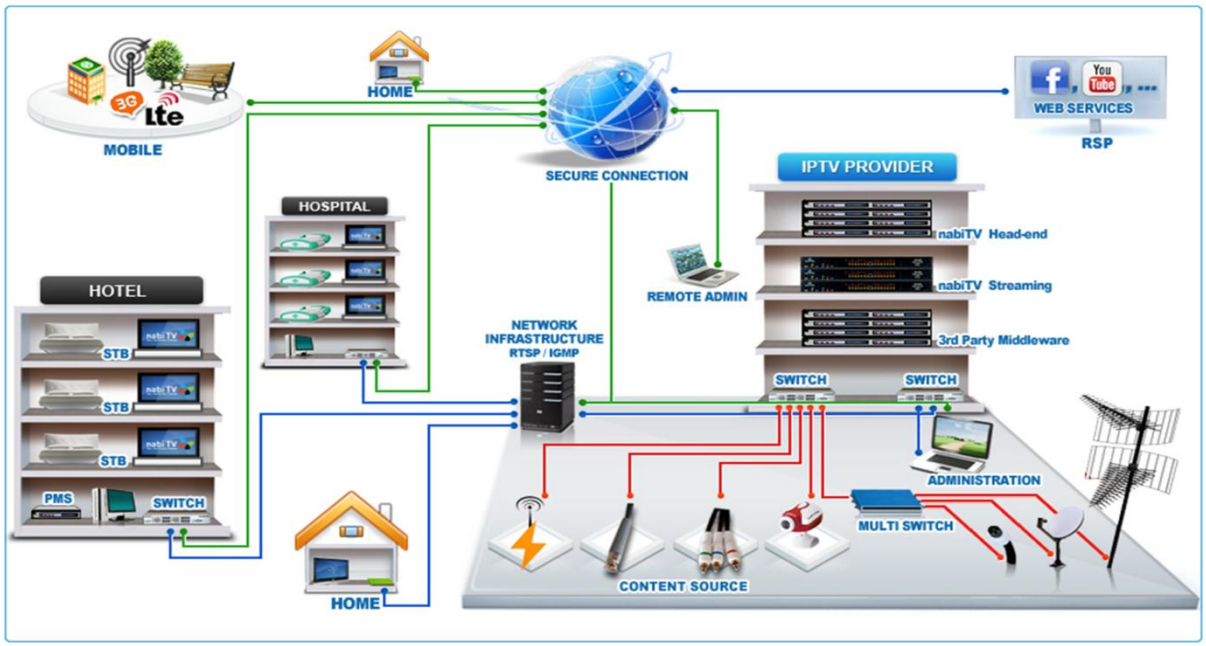


<Can't QoD, QoE & QoS of digital TV level on the public internet>

<IPTV service to their own internet subscribers only in Korea of 3 ISP>

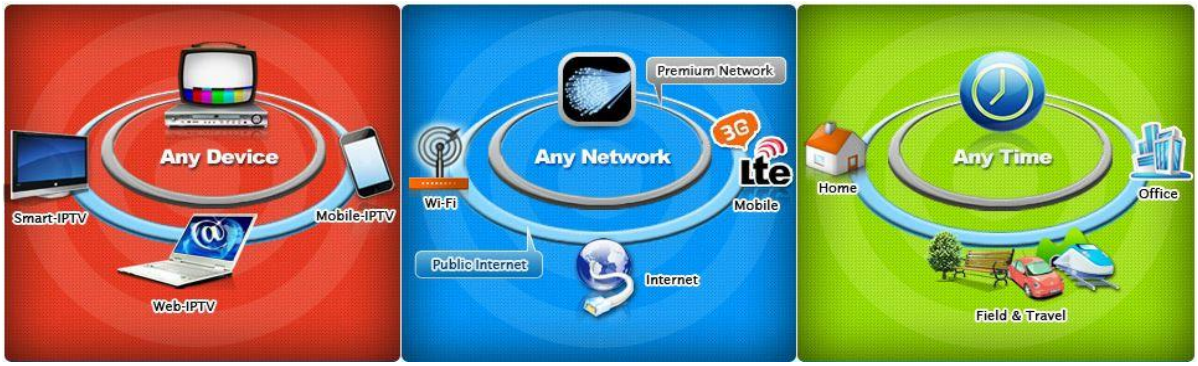
Therefore, we have developed and completed the Smart IP Cloud TV Platform,

which has digital TV-level quality, quality and service through various terminals using public Internet connection anytime and anywhere in the world, and thus has already been recognized for its performance and quality in Southeast Asian markets with poor communication environment.



<Our Smart IP Cloud TV Platform achieved QoD, QoE & QoS on the public internet>

Our own unique technology, Smart IP Cloud TV Platform, make OTT/IPTV services that satisfy the quality and quality of digital TVs not only within high-speed and high-quality premium networks but also on the public Internet in poor speed and quality environments can be viewed anywhere, anytime through a variety of devices including PCs, Smart Phone, Smart TV, Set-top Box and Mobile Devices.

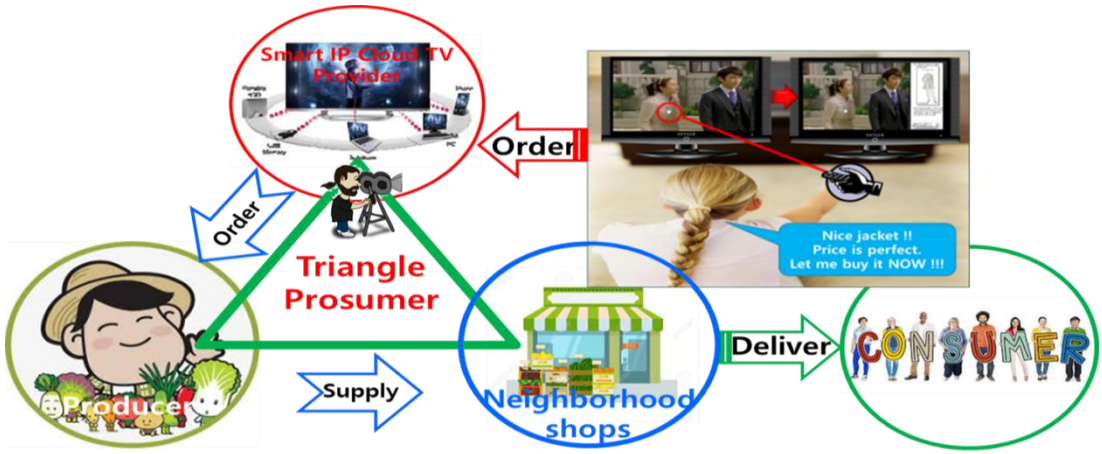


<Our OTT/IPTV can be able to service various devices at anytime and anywhere>

This allows various information to be provided to advertisers by converging with new concept advertising techniques that implement digital multimedia content or direct and indirect advertising of TV broadcasts in the form of CPX (Click Per X = Cost Per Click, Cost Per Action, and Cost Per Link) like Internet advertising.

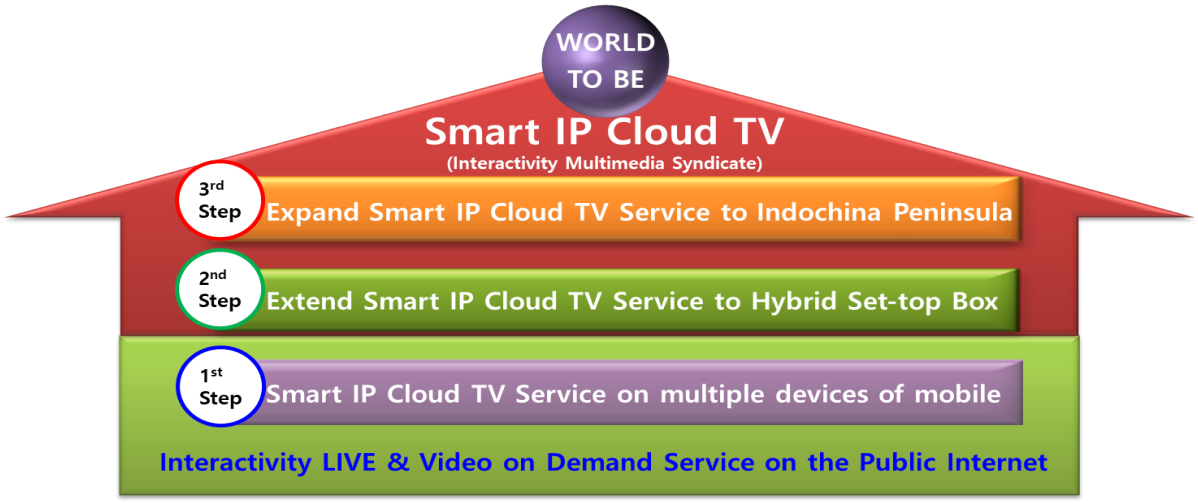
<Interactive TV on-screen advertisement of Smart IP Cloud TV Platform>

Our platform innovatively even offers a shopping service where viewers buy these direct and indirect advertising products at once. Thus, although it is difficult to build a premium network, there is a strong demand for digital multimedia, and we are providing Smart IP Cloud TV Interactivity Service, starting with countries with a certain level of purchasing power, and now we want to expand the service around the world.



<Interactive TV on-screen commerce of Smart IP Cloud TV Platform>

Our Smart IP Cloud TV Interactivity Service provides TV channels and digital multimedia content from each country, as well as TV channels and digital multimedia content from around the world, while maximizing the effectiveness of advertising through audience participation in direct and indirect advertising products of content and TV broadcasts, as well as **"Interactive TV on-screen advertising services"** that providing advertisers with a wide range of information, including regionally, age and response, and some of the advertising revenue generated is paid to viewers that are become from Consumer to Prosumer as a new subject for industries. Direct and indirect advertising products can be purchased at once and delivered on the same day, as well as paid with tokens compensated for **"Interactive TV on-screen shopping services,"** which provide thorough pre- and post-service. In our Smart IP Cloud TV Interactivity Service, it is used not only for viewing costs, but also for payment of goods and services from advertisers using this service. And further this service will be expanded to all areas of the real economy.



<Starting from Thailand to expand to the worldwide service>

Our innovative services began in Thailand and expanded to Indochina Peninsula countries and Asia-Pacific countries, and by moving beyond the Middle East, Africa and South America to North America, our Smart IP Cloud TV Interactivity Service will be the service that everyone in the world wants, and people around the world will be with us. To this end, subscribers of our Smart IP Cloud TV Interactivity

Service can obtain rewards, make it easier to use for payment of subscription fees and shopping, while at the same time providing TCG Token, a decentralized block chain-based encryption currency, as a means of saving and investment. Of course, this will also be expanded to be a monetary instrument of the real economy.

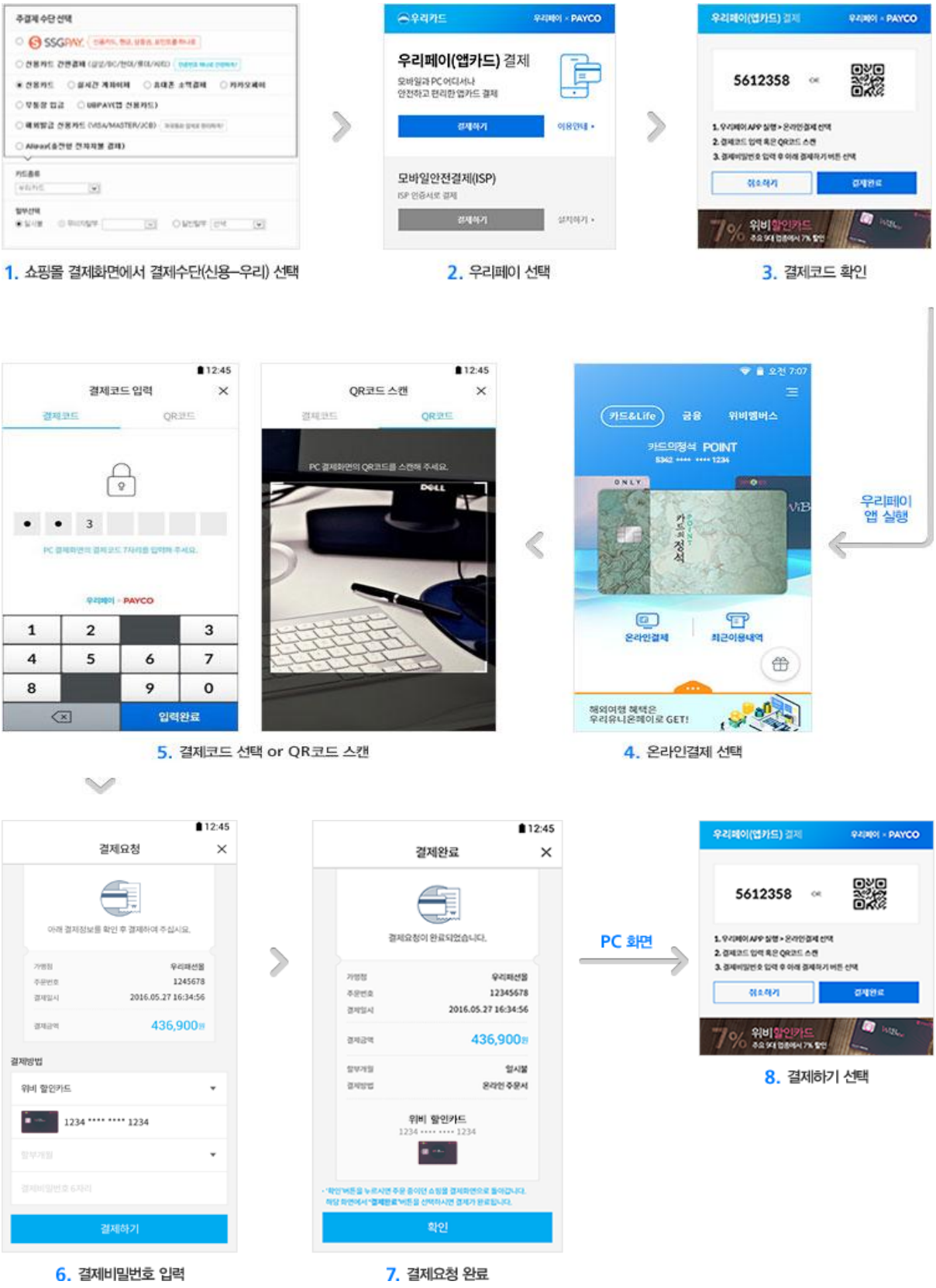
2. Business Background

2.1 Comparison with Example

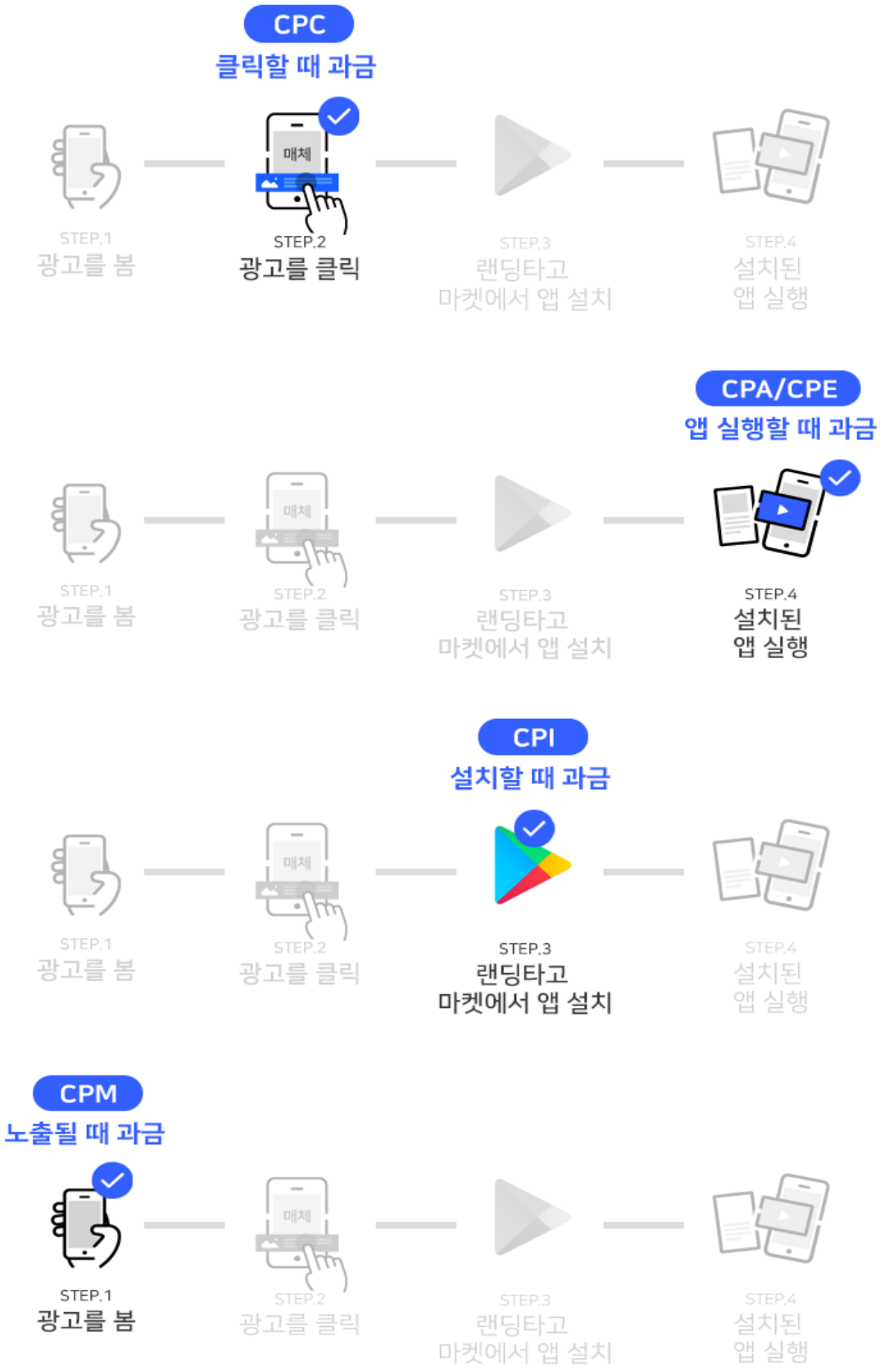
You already know about the IPTV service and OTT services such as Netflix,

<OTT(Over The Top) service providers of international with Korea>

and you're probably already using Internet shopping and TV home shopping like Amazon. And in the use of these services, you will be annoyed and exhausted by the experience of complex procedures to pay for your subscription or commodity prices.

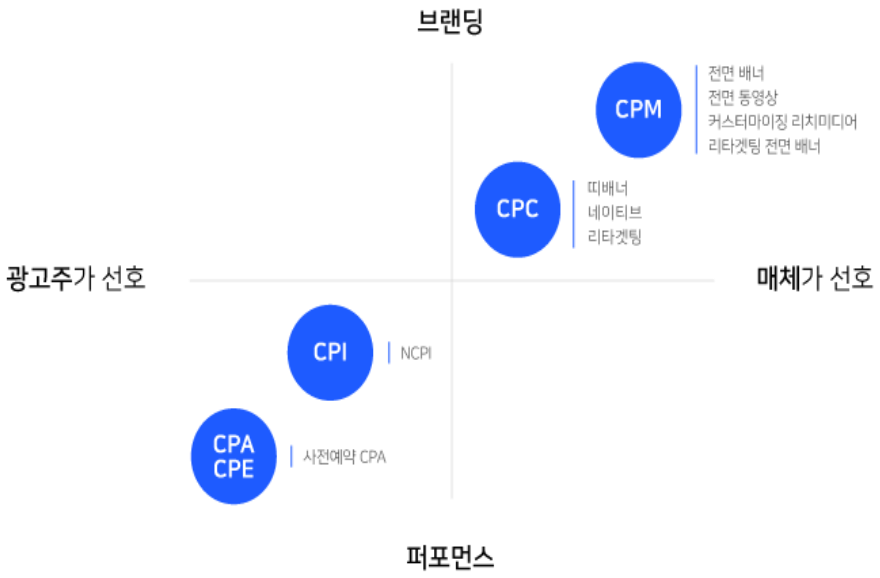


<Complicated payment procedures for online shopping>



<Various on-line advertising models of CPX styles>

In addition, you may have had experience receiving rewards by responding to CPA/CPC/CPL ads in CPX techniques on Internet Web pages, and may have experienced the complex processes of receiving rewards and the reality of being unable to be linked as a means of payment when purchasing goods and services in the real economy.



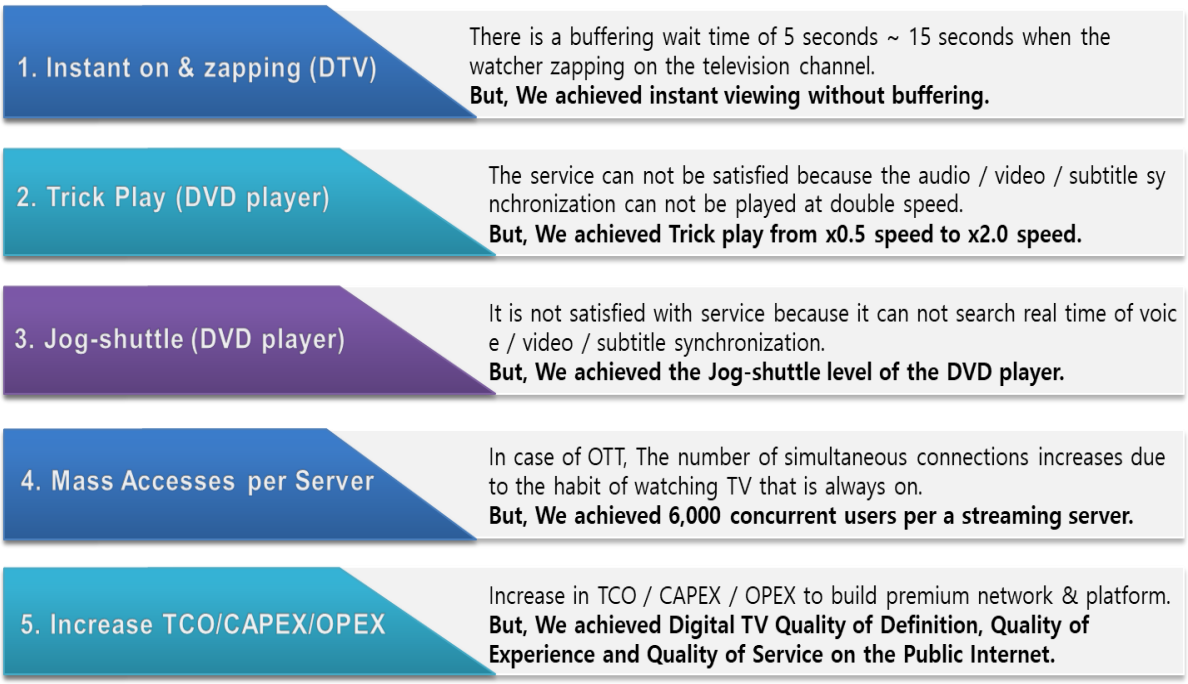
<Preference for various advertising models of CPX styles>

Through **Smart IP Cloud TV Interactivity Service**, which integrates all of the aforementioned services into a single service, we provide **"OTT/IPTV Service"** of digital TV level quality and quality satisfaction and service satisfaction, while providing **interactive TV on-screen advertising services** that integrate direct and indirect advertising with CPX advertising techniques on web pages, and **interactive TV on-screen shopping services** that combine Internet shopping on TV home shopping.

TCG provides one-stop service for the revenue and payment required to use these services. In addition, TCG creates new and potential areas through the expansion into the means of payment in the current real economy and good results of saving and investing.

2.2 Problems

Except for Korea and some of the developed countries, most countries are unable to provide IPTV services due to environmental limitations of the Internet infrastructure and Internet service industries, and even OTT services that do not achieve digital TV-level image quality, quality and service satisfaction are not properly available. In a public Internet environment where speed and quality are not guaranteed, people have to wait 5 to 15 seconds for buffering to watch digital multimedia, which is lower than SD quality, experience video and voice breaking every 10 minutes, and non-face-to-face education is emerging as a global culture of reluctance to contact people due to viruses such as COVID-19, but these countries are being discriminated against because they cannot upgrade their Internet infrastructure overnight.



<User requirements of the IPTV/OTT(Over the Top) service>

In addition, the United States, where Amazon's Internet shopping services are active, cannot find convenience stores within a radius of a few kilometers, and the spread of Internet shopping to people around the world has long begun to destroy local commercial rights, threatening local jobs, and overpackaging packages are

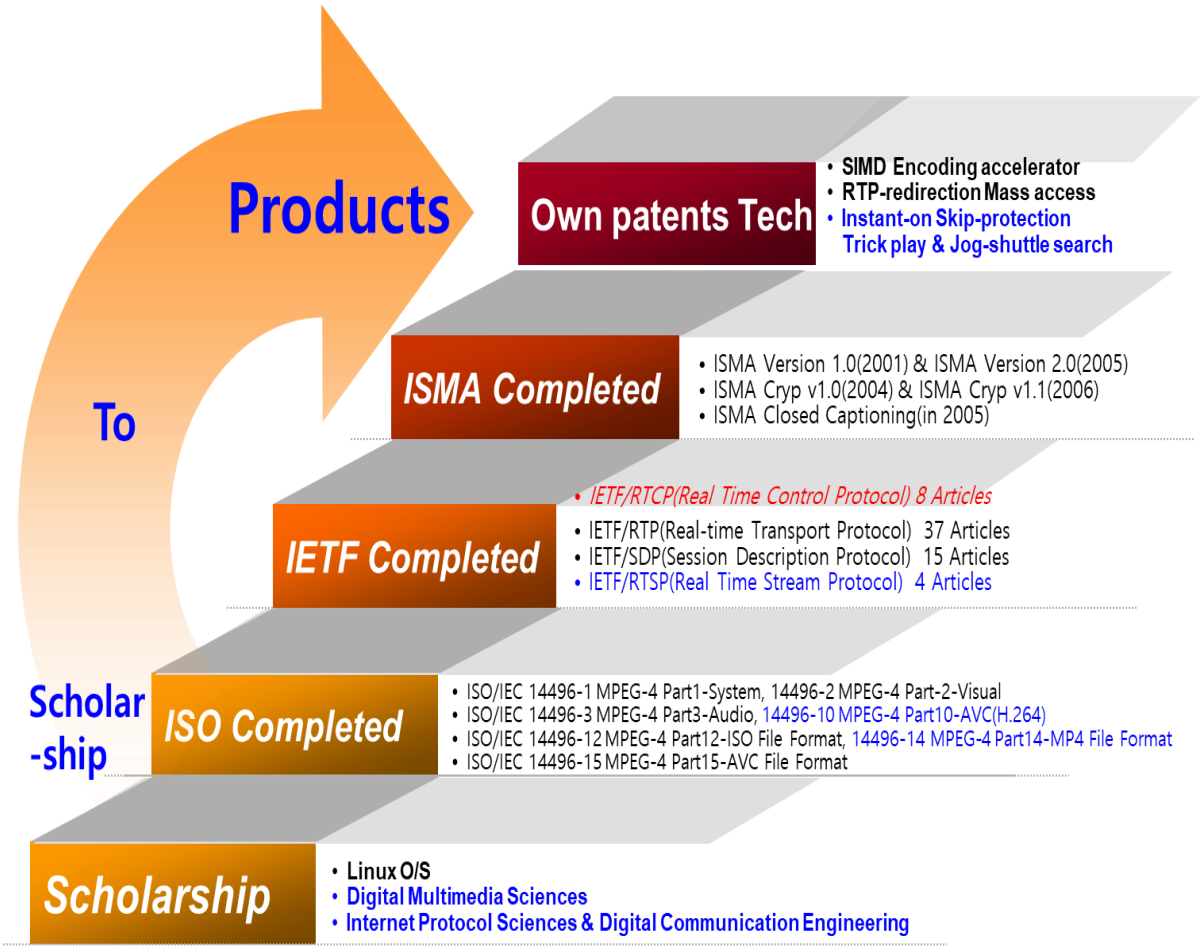
poised to become garbage and cover the planet, and are tired of the lives of deliverymen due to poor working conditions and incomes that fall short of the minimum cost of living. Also, high private education costs have forced their children to live a warlike life where they cannot have dreams and can't predict the future.

<The actual situation of courier workers driven to death due to excessive labor>

<The global village is becoming a pile of garbage with disposable parcel packaging>

2.3 About the Platform

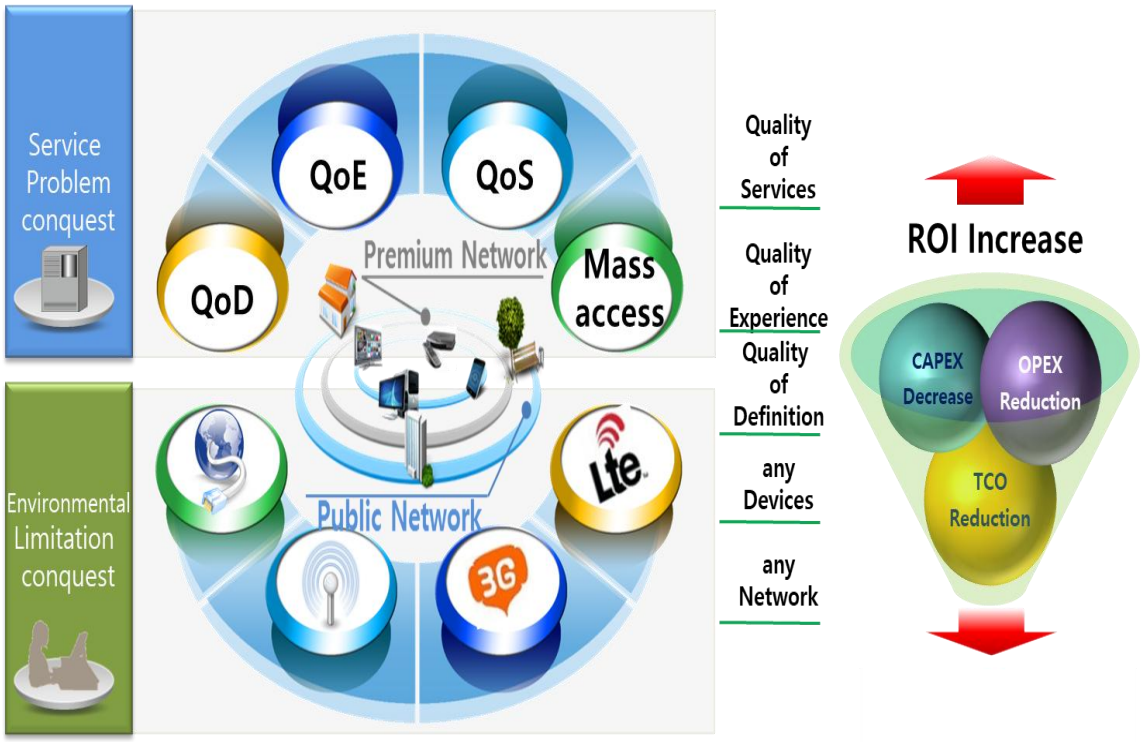
Today's IPTV services have established premium networks that require significant investment to meet the quality, quality and service of digital TV. We have developed our own unique and innovative Smart IP Cloud Platform TV based on the technology accumulated by contributing to the establishment of ISMA (Internet Streaming Alliance) in cooperation with scientists and technicians in the establishment of the ISO/IEC, IETF in our pioneering academic research and related fields, in response to the needs of viewers who want these services to be implemented on the public Internet, where speed and quality is not guaranteed.



<Step-by-step application technology for viewers' service satisfaction>

We solved the aforementioned problems, as well as the quality satisfaction and quality satisfaction and service satisfaction of the digital TV level in the public Internet, as well as the current premium network's IPTV service, VTR-level service

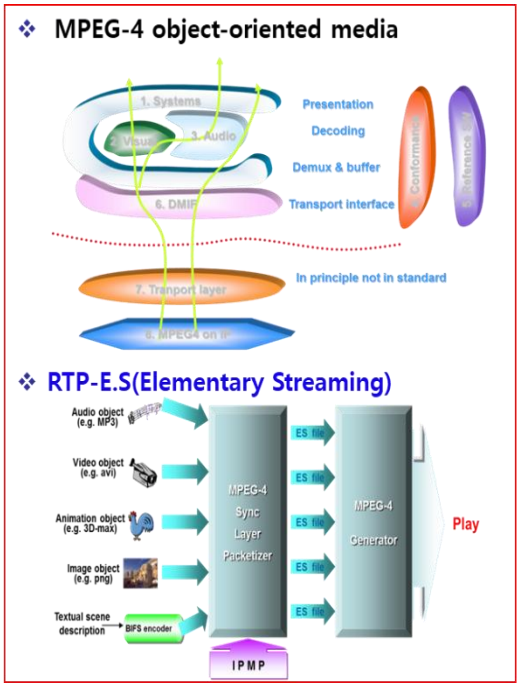
in the broadcast playback and navigation, DVD player-level video and voice synced on the Internet, distribution playback and voice synchronized jog-shuttle level of video and voice, as well as service satisfaction, as well as the service operator's platform construction and operating cost and maximization of profitability.



<Quality of Definition, Q of Experience & Q of Service on the public Internet>

By transferring the current IPTV service to transfer each object that constitutes digital multimedia in a composite of two types, such as images and audio, by not taking advantage of the characteristics of each object that MPEG-4-based digital multimedia has, the viewer does not recognize the particular object of the image even if the viewer does not recognize it, we have a technical problem in the image and the limitations of the object-centric interactive TV service does not provide an object-centric interactive TV service. Select the transmission technology of the mountainous Elementary Streaming method to ensure the quality by reliably transmitting without loss of image quality without loss of image quality in the real-time transmission through the public Internet that speed and quality is not guaranteed, and instant viewing and voice without the need for buffering latency,

the video is synchronized, the speed playback and voice. We have created our own unique and innovative Smart IP Cloud TV Interactivity Service, which realizes interactive TV on-screen advertising and shopping.

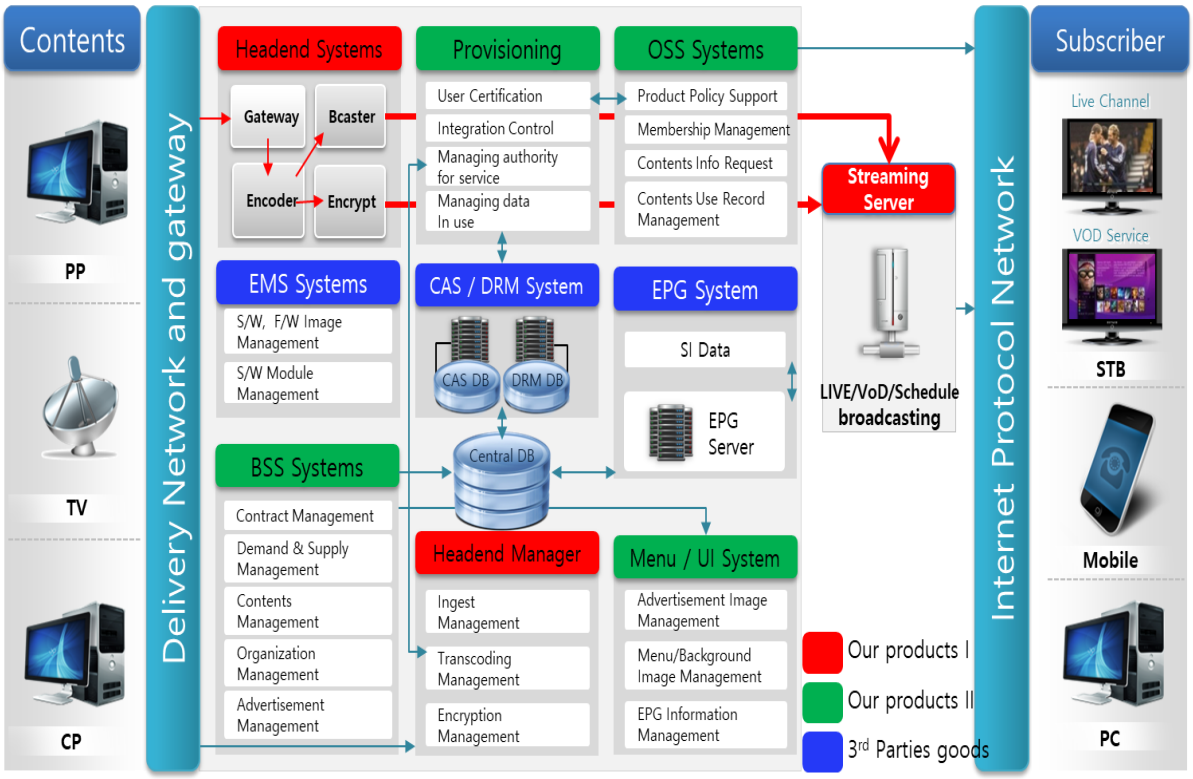


<Object-oriented interactive TV on-screen shopping>

Our innovative Smart IP Cloud TV Interactivity Service's "Interactive TV On-Screen Advertising Service" allows subscribers to monetize, allowing them to use it as a currency for watching tv broadcasts and digital multimedia content around the world that provides quality satisfaction and service satisfaction at the digital TV level, thus moving subscribers to Prosumer's location, allowing them to enjoy the same cultural life regardless of the gap between the country and the poor. Our own specialized "Interactive TV on-screen shopping service" provides goods and services in stores within a 10km radius where subscribers are located, so that the company provides goods and services, as well as the day delivery, and at the same time, to create local jobs and revitalize the area, while providing a high-quality service of engineering technology and pre-post-service, such as installation, not just delivery, and stable jobs and sufficient wages to create a human economy, not only in the educational field of children, but also for human rights.

2.4 Platform Technology

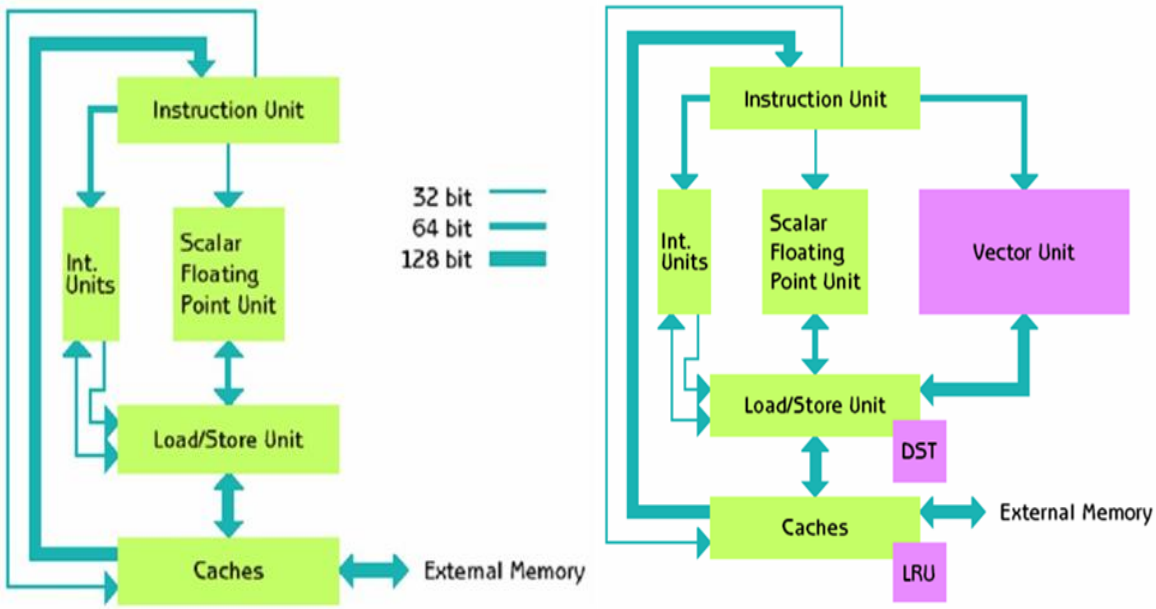
Our innovative Smart IP Cloud TV platform enters multimedia sources, compresses them into digital multimedia, packetizes them, transmits them over the Internet to streaming servers located in remote Internet data centers (IDCs), and cuts live and on-demand broadcasts to digital TV-level, full HD buffers on the public Internet at the request of global viewers connected to the Internet. In addition, while existing on-demand broadcasts support VTR-level distribution and navigation, even in premium networks, we have innovative technologies that are DVD-level voice and video on the public Internet. It consists of a core shearing system (Headend Systems), which combines technologies that enable real-time exploration of images, voices, and subtitles at the level of a jog-shuttle where subtitles are synchronized, as well as a middleware that adds convenience to services and supports various additional services.



<Architecture of the Smart IP Cloud TV Platform>

Our differentiated headend system requires expensive, high-performance systems that meet both ISO and IEC and ITU international standard technical

specifications in compressing multimedia, while also being encoded to transmit digital multi-media to a public Internet with limited speed and bandwidth. In particular, in the case of real-time broadcasting, expensive exclusive equipment (Encoder) must be used to ensure high quality, so the total cost of ownership (TOC) of service providers can only be increased, but our innovative patent technology guarantees high quality even in laptops.



<Scalar Floating Point vs Single Instruction Multiple Data>

In the Finite field called TTM (Tame Transformation Method), these patented technologies are transposed by the rational number of structures that are given through addition and multiplication that meets the law of algebra. So, the two methods of this transposition can rather be combined in a complex way. However, it is possible to infer about their effectiveness and the complexity of analysis, and the Tame Transformation Method is based on the combination of these replacements.

- Arithmetic Infinite Fields

A field is a collection of objects that define the performance of addition and multiplication. These practices require that the general nature of addition and multiplication satisfy the execution of real number.

1. Exchange law (x+y=y+x) and combination law ((x+y)+z=x+(y+z);

2. There are numbers 0 and 1. All numbers x , x+0=x and x*1=x)

3. The reciprocal of addition (there is x+y=0 y for all x);

4. Non-zero numbers have the reciprocal of multiplication (there is y that is all x !=0 xy=1)

The field is defined by a set of variables with two symbols (0,1) and by the following execution.

0+0=0, 0+1=1, 1+0=0, 1+1=0 and, 0*0=0, 0*1=0, 1*0=0, 1*1=1

Mark the above fields as Z_2, and this is a Boolean execution.

0=false , 1=true +=XOR , * = AND. That is, Z_2 is a field with 0 and 1.

A field with an element of 2^k can also be created, and if k is 8, each yaw in the field can be combined with an 8-bit (1 byte) value. Because it is 28=256, the generation of 256 components proceeds as follows.

Considering a polynomial with a coefficient in Z_2 with an order smaller than 8, the coefficient in each paragraph of the polynomial is zero or one.

For example, $X^7 + X^3 + 1 = 1*X^7+0*X^6+0*X^5+0*X^4+1*X^3+0*X^2+0*X^1+1*X^0$

With eight possible coefficients, each can be 0 and 1. So there are 28=256 different polynomials of this type.

Adding coefficients to them can add polynomials.

For example,

$(x^7+x^3+1)+(x^6+x^3+x^2+1) =$

$1*x^7+0*x^6+0*x^5+0*x^4+1*x^3+0*x^2+0*x^1+1*x^0+$

$0*x^7+1*x^6+0*x^5+0*x^4+1*x^3+1*x^2+0*x^1+1*x^0 =$

$1*x^7+1*x^6+0*x^5+0*x^4+0*x^3+1*x^2+0*x^1+0*x^0$

The relationship between bytes and polynomials is very simple, and bits in bytes are simply the coefficients of polynomials.

Therefore, can write as a follows, because 10001001= $1*x^7+0*x^6+0*x^5+0*x^4+1*x^3+0*x^2+0*x^1+1*x^0$

10001001 + 01001101 = 11000100

If you think that addition is just XOR between two bytes, you'll sense that it can be computed very quickly.

Considering that one-byte XOR combined with another is the opposite, adding a fixed byte B in (A XOR B) XOR B=A " is a substitution of possible values of 256 of 8 bits.

The addition becomes more complex, adding a polynomial of less than 8 is a polynomial of 14th order.

The coefficient of this polynomial requires 15 bits to be stored.

We need multiplication to think of the multiplication of two 8-bit values to the other 8-bit values.

This can be done by the eighth formula, which has the remainder of the multiplication polynomial when divided by the formula. We do not define here what cannot be divided. We have such a polynomial in the example of our addition.

$(x^7*x^3+1)*(x^6*x^3*x^2+1) = x^7*(x^6+x^3+x^2+1)+x^3*(x^6+x^3+x^2+1)+(x^6+x^3+x^2+1)$

$= x^{13}+x^{10}+x^9+x^7+x^9+x^6+x^5+x^3+x^6\_x^3+x^2+1$

$= x^{13}+x^{10}+x^7+x^5+x^2+1$

$= (x^8+x^6+x^5+x+1)*(x^5+x^3+x+1)+(x^6+x^5+x^4+x^3)$

or $(x^7+x^3+1)*(x^6+x^3+x^2+1) = x^6+x^5+x^4+x^3 \mod(x^8+x^6+x^5+x+1)$

In this field, polynomials other than each zero have the reciprocal of multiplication. So multiplication by non-zero field elements is the substitution of a possible value

of 256 in the field.

Written by bytes is 10001001*01001101 = 01111000, and because there is a possible value of 28 for the number of squares on the left, all 2^8*28-2^{16} can be calculated in advance.

Each entry in the table is a single byte containing the results.

So the multiplication of byte a and b is simply multi-application_table [(a << 8)+b]

- Fast Linear Algebra Infinite Fields

The two main linear algebra vector include additions and scalar multiplication. If these are fast, **the standard technique allows for fast matrix-vector multiplication. Standard technique is a fast matrix We now analyze how this basic execution is executed with SIMD.**

The addition in this field is only bitwise exclusive-or, so the quick addition is obvious. For example, if a,b,c is an unsigned char pointer assigned to a 16-byte boundary and n is a multiple of 16, we can simply record as follows:

(void)

finite_field_vector_addition (unsigned char *a,

unsigned char *b,

unsigned char *c,

int n)

{

int i

vector unsigned char *vec_a = (vector unsigned char *) a;

vector unsigned char *vec_b = (vector unsigned char *) b;

vector unsigned char *vec_c = (vector unsigned char *) c;

```
for(I = 0; I < n; I + = 16)

        vec_c++ = vec_xor (*vec_a++, *vec_b++);

}
```

The fast scalar multiplication is rather subtle.

Here we have y= αx where α is scalar (so the elements of the field having 256 elements) and x is the vector of n element in the same field.

Again we assume that n is a multiple of 16. So each element is yi=α*xi, 0≤n<n, and x is written in the form of a bit expression as follows.

$\alpha*x_i$ = α*abcdefgh = α*(0000efgh+abcd0000) = α*0000efgh+α*abcd000

Of course * is multiplication in finite area. And + is the addition in the same field, 이다 is a fixed value, and there are only 16 possible values for α*00efgh. So αx00000000=0000000000, α*00000001=α, ... α*0000111.

Similarly, there are possible values of exact 16 at α*abcd0000. So for each of the 256 different values of α, we have 16 different values.

Low products α*00efgh,efgh=000000, 0001, ...,111 and 16 other high products, h*abcd0000, abcd = 0000,0001,...,11111 can be calculated in advance.

In our scalar multiplication function, by recording the value of α and loading two 16-byte tables into the SIMD vector unsigned char variable, multiplication by α, which is the low part of x_i, can only be identified by a low-part multiplication table.

The vectors replacing the instruction vec_perm found in the SIMD instruction set are ideal as indexes for small byte tables. Typically, you can have 16 simultaneous indexes from 32-byte tables, which can be specified by a single vector unsigned char register.

Then, a 32-byte table can be specified by two vector unsigned char registers. Five lowest bits of each index byte are used as an index of 32 bytes. Since we use an

index in a 16-byte table instead of a 32-byte table, we specify the same 16-byte vector unsigned char register for each half of the 32-byte table. Since the same table can use both the first 16 bytes and the second 16 bytes of the 32-byte table, each x_i low part has the additional advantage of having the fifth bit of each unmasked index.

For the high-part search we need to shift each element x_i to the right by four bits for the purpose of the vec_sr_Altivec instruction we use, and the function fully transmitted is as follows.

```
Vector unsigned char low_products[256];

vector unsigned char high_products[256];

/* Initialize low products and high products tables. */

(void)

finite_field_scalar_multiplication(unsigned char alpha,
unsigned char *x,
unsigned char *y,
int n)

{

int i

vector unsigned char *vec_x = (vector unsigned char *) x;

vector unsigned char *vec_y = (vector unsigned char *) y;

vector unsigned char low = low_products[(int) alpha];

vector unsigned char high=high_products[(int) alpha];

for(i=0;i<n;i+=16,vec_x++,vec_y++)
```

```
{
vector unsigned char l,h
l=vec_perm(low,low,*vec_x);
h=vec_perm(high,high,vec_sr(*vec_x,(vector unsigned char )(4)));
*vec_y=vec_xor(l,h);
}
}
```

Here we assume again that a is a multiple of 16, and x,y is allocated 16 bytes.

- Performance of SFP & SIMD

We focus on the encryption process, which is slower than the decoding process using the private key, in comparing SIMD processing-capable programs that encrypt data using scalar and TTM.

The TTM processing procedure is block cipher. If the input block has the length of m-byte and the output block has the length of n-byte, the special cipher is $n \geq m+36$.

The Public key consists of two parts, an entry consisting of n-lower trigonal matrices A_i with each m x m size in a field with 256 elements of the Matrix key, and a n-vector $v_i$with a length of m with an entry in the field of 256 elements of the Vector key has an entry in the field of 256 elements. When an input block-x consisting of m bytes is given, the Ith byte of the output is calculated as follows:

$$x^T*(v_i+A_ix)$$

x^T indicates the binary value of column vector x. And x*y is a dot product of x and y. The private key consists of two matrices. One is the vector of m*m, the other is n*n, and the other is the length m. The number of bits in the private key is m^2+n^2+m multiplied by the number of bits in each keyentry. It has been proved

that using 8 bits for each entry in the Public key and Private key can bring a more cryptologically secure system than using 4 bits.

In a simple example, m=28 and n=64 so private keys $(28^2+64^2+28) * 4 = 19{,}632$ bit, require ability based on higher mathematics. However, all this ability requires at least more 2^{90} execution than is declared cryptographically secure. So, we limit it to a 4-bit key entry. This attempt provides a significant increase in throughput in the vector operation outline in the previous item. Now we use just one vector exclusive-or for one vector load, one vector substitution, and 16 scalar multiplication execution. The results of our experiment showed that the scalar program for well-structured TTM encryption required about 2.56 cycles per addition and multiplication in the Motorola 7400 (PowerPC G4) processor. Multiplication according to addition is compiled into two load constructions and one exclusive-or operation. Thus, it was shown that a certain amount of construction-level parallelism is utilized by the program, and the scalar performance of TTM encryption encrypts a single input block, with the formula of the result defined as follows.

$$2.56*(m(m+1)/2 + m)*n \text{ cycles}$$

Our first examples have m=28 and n=64. Here, Ai and vi , i=1,...64, together with high product and low product tables and temporary storage, **all achieved near-perfect speed improvement of 14.9 times in scalar code suitable for 23kbyte L1 data cache on the PowerPC G3/G4 process.** Output block 64/28=2.29 times the size of the input block of this code. This is an extension of this code. The actual number required to encrypt larger m and n, which increases in two dimensions from m, was clearly derived from the formula provided above. On the other hand, larger input blocks and encoded n=m+36 are inferred to have smaller expansion factors. So, by experimenting with the speed of encoding with 36 bytes of input block and 72 bytes of output block, the expansion factor is two, and the 36/72 code is even more difficult. In fact, we calculated it in 36/80 code because SIMD register is 16 bytes long. And we wanted the size of the output block which is multiplying the SIMD register area. The 80 half-byte matrix factor is again required

to fill the Public encryption key with 40 bytes that are not divided by 16. Finally, unlike our previous example, the public key by this code is not suitable for multiple-cation tables, temporary storage we use, and L1 data cache with input and output blocks. This results related to the performance of the SIMD code, which brings only 8.4 times the speed increase in scalar code, are caused by the cycling of L1 cache.

The L1 cache on Motorola 7400 is the latest and least used data line-related in L1 cache as 32 kbytes and eight-way archive, and it is entered temporarily by using the lvxl construction that loads the vector register while checking it and the data that wanted to reside in the L1 cache was a matrix key (the block). **This significantly reduced the level of cache thrashing and resulted in 11.1 times faster speed improvements in scalar code. And the 12.3x speed increase is more impressive when configured in 36/80 code. This is because the scalar program is slower while the SIMD program is running at the same speed. As a result, SIMD technology that efficiently uses MMX, MMX Ext, SSE, SSE Ext**, and embedded in the computer's central processing unit can handle 50,000 bits per second of data, giving the expectation that 1080P-level IPTV content with a bandwidth of 9Mbps (9,437,184 bit/sec) can be trans-coded in 5 seconds for one second, and the above 400MHz shows the above. The is also available on portable terminals.

For internet streaming of digital multimedia generated based on high-definition and high-speed digital multimedia compression technology, ISMA v1.0 & v2.0, ISMA Cryp, ISMA Closs, and RTP, SDP, RTSP, RTCP, and ISMA(Internet Streaming Media Alliance) specifications are used. In order to fully implement the ed captioning and overcome the technical limitations of these specifications, we succeeded in producing patented technology products that support the quality and service of digital TV level not only in premium networks but also in public internet where speed and quality are not guaranteed..

■ RTP : Real-time Transport Protocol, International Standard about the method to transfer streaming data over the network, as communication protocol for the transmission of mass multimedia in real-time

■ Nov 1995 IESG(Internet Engineering Steering Group) : IETF Announced the each codec standards .

■ Background appear

-. As the upper UDP protocol, It was developed to enable the mass transmission even though it is less confidential protocol.

■ Feature :

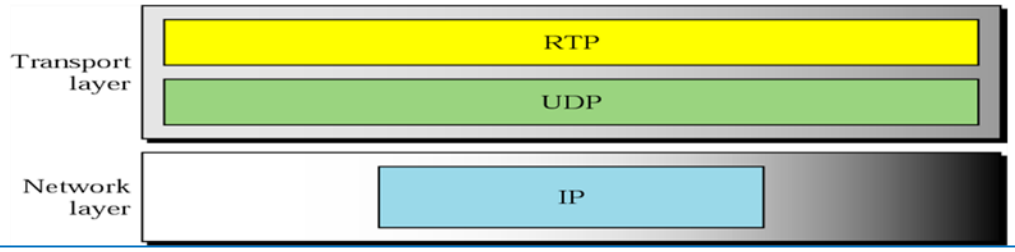
-. Achieve QoS/QoE by minimizing buffering time with one-way mass data and fast data transmission.

. RTP itself can not guarantee the quality and reliability, RTSP/RTCP combination improves the quality and reliability

. Achieve high-quality multimedia streaming services by providing the synchronization function of time information and media.

-. RTP can not be encapsulated in IP packets, so encapsulating data in UDP datagrams on application layer transmits as packet. .

. RTP is used with Layer3 and Layer4. It has less dependence on lower protocol and uses even-number port.



<Real-time Transport Protocol of ISO technologies apply to our platform>

Technology specifications of Real-time Transport Protocol (37 Cases, more details, www.ietf.org)

p. RFC 2862 RTP Payload format for Real-time Pointers
p. RFC 3016 RTP Payload format for MPEG-4 A/V Streams**(Updated 6416)**
c. RFC 3095 Robust Header Compression: Framework & four profiles: RTP/UDP/ESP/uncompressed**(3759, 4815)**
c. RFC 3243 Robust Header Compression: Requirements & Assumptions for 0-byte IP/UDP/RTP Compression
c. RFC 3409 Robust Header Compression: Lower layer guidelines: RTP/UDP/IP Header Compression
p. RFC 3640 RTP Payload format for Transport of MPEG-4 Elementary Stream**(Updated 5691)**
p. RFC 3984 RTP Payload format for H.264 Video**(Updated 6184)**
t. RFC 3550 A transport protocol for real-time application**(Updated 5506, 5761, 6051, 6222)**
t. RFC 3551 RTP Profile for A/V Conferences with minimal control**(Updated 5761)**
p. RFC 3558 RTP Payload format for Enhanced Variable Rate Codecs(EVRC),Selectable Mode Vocoders(SMV)**(4788)**
t. RFC 3711 The Secure Real-time Transport Protocol(SRTP)**(Updated 5506)**
p. RFC 4103 RTP Payload for Text conversation
c. RFC 4170 Tunneling Multiplexed Compressed RTP(TCRTP)
p. RFC 4348 RTP Payload format for the Variable-Rate Multimode Wideband(VMR-WB) Audio CODEC**(Updated 4424)**
p. RFC 4351 RTP Payload for Text conversation interleaved in an audio stream
p. RFC 4352 RTP Payload format for the Extended Adaptive Multi-Rate Wideband(AMR-WB+) Audio CODEC
c. RFC 4362 Robust Header Compression: A link-layer assisted profile for IP/UDP/RTP**(Updated 4815)**
t. RFC 4383 The use of timed efficient stream Loss-Tolerant Authentication(TESLA) in SRTP
p. RFC 4867 RTP Payload format and File storage format for the Adaptive Multi-Rate(AMR) and Adaptive Multi-Rate Wideband(AMR-WB) Audio CODEC
c. RFC 4995 Robust Header Compression Framework
p. RFC 5188 RTP Payload format for Enhanced Variable Rate Wideband Codecs(EVRC-WB) and the media subtype updates for EVRC-B CODEC.
p. RFC 5219 A more Loss-Tolerant RTP Payload for MP3 Audio
c. RFC 5225 Robust Header Compression ver.2: Profiles for RTP/UDP/IP/ESP/UDP-Lite

<Specifications of the RTP of ISO technologies apply to our platform>

■ SDP : Session Description Protocol , International Standard about the definition of real-time multimedia session which provides the information needed by the users for participating multimedia sessions on the internet.

■ RFC2327(4566) : MMUSIC(Multiparty Multimedia Session Control) Working Group

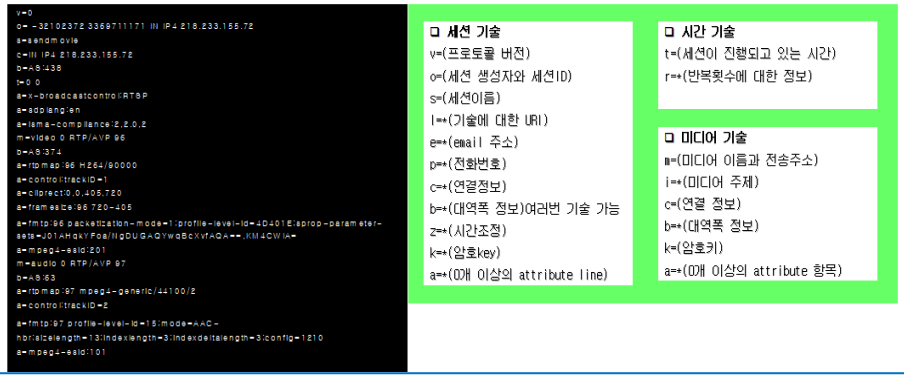
■ Background appear

-. Needed functionality of providing and transfer information in order to Client participate in the session

■ Feature : Foundation for expansion of concurrent access user number by mass transfer and port Redirection through instant play and multiplex port.

-. SDP file notices produced file through Parser program by real-time broadcasting. It is produced as soon as Viewer selects contents and provided to Client. It helps Client to play without analyzing the media information.

-. Expand the accommodate availability by Redirection RTP port to 10,000 ~ 65,000 UDP port.



<Session Description Protocol of ISO technologies apply to our platform>

Technology specifications of Session Description Protocol (15 Cases, more details, www.ietf.org)

. RFC 3388 Grouping of media lines in the Session Description Protocol(SDP)(Obsoleted 5888)
3407 The Session Description Protocol Simple Capability
3556 The Session Description Protocol Bandwidth Modifiers for RTP Control(RTCP) Bandwidth
3605 Real Time Control Protocol(RTCP) attribute in Session Description Protocol
4566 The Session Description Protocol
4568 The Session Description Protocol Security Descriptions for media streams
4570 The Session Description Protocol Source filters
4572 Connection-Oriented media transport over Transport layer security(TLS) protocol in the SDP
4574 The Session Description Protocol Label attribute
4583 The Session Description Protocol Format for binary floor control protocol(BFCP) streams
4796 The Session Description Protocol Content attribute
5159 The SDP Attributes for Open mobile alliance(OMA) broadcast(BCAST) service & content protection
5432 Quality of Service(QoS) mechanism selection in The Session Description Protocol
5547 The Session Description Protocol Offer/Answer mechanism to enable file transfer
5888 The Session Description Protocol Grouping Framework

<Specifications of the SDP of ISO technologies apply to our platform>

Technology specifications of Real Time Streaming Protocol (4 Cases, more details, www.ietf.org)

. RFC 2326 Real Time Streaming Protocol 1.0 up to RTSP 2.0
4567 Key management extensions for SDP and RTSP
6064 SDP & RTSP Extensions defined for 3GPP packet switched streaming service & multimedia BCAST

<Specifications of the RTSP of ISO technologies apply to our platform>

■ RTSP : Real Time Streaming Protocol , International Standard about the method to control VCR and flow of streaming data on network for receiving and transmitting multimedia, as application layer protocol performing media transmission on real-time

■ April 1998 IETF : Real Networks, Netscape communication, Columbia University.
RTSP Ver. 1.0(RFC2326), RTSP Ver. 2.0

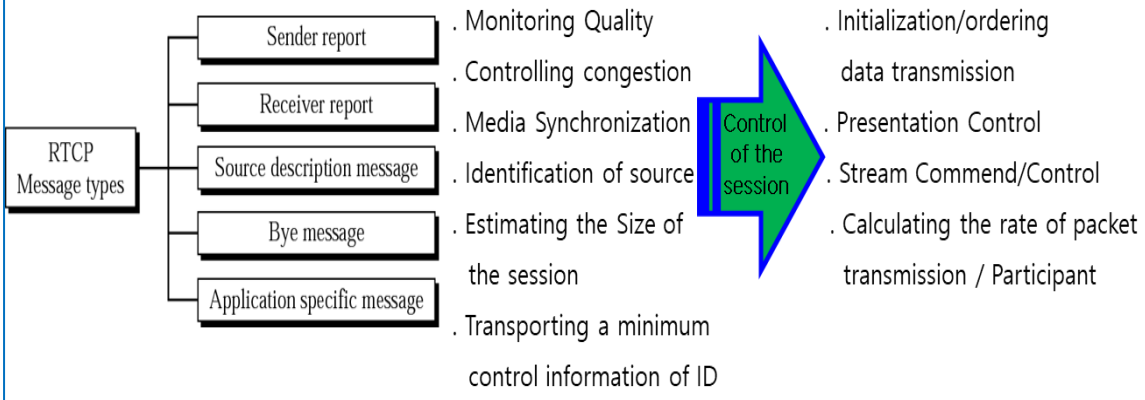
■ Background appear
-. TCP is safe for transferring data but the slow speed is problem.
-. UDP can be alternative but packet loss and violation of the order affect the quality of media .
-. Require real-time protocol that can replace TCP and UDP for real-time applications.

■ Feature :
-. Achieve QoS/QoE by controlling network overhead and Jitter(delay in arrival time). RTSP controls both-way real time flow and improves data reliability of RTP transmission.
. If the loss factor is big, reduce the transmission rate and if it is small, increase by detecting packet loss in real time.
. When the Client Buffer is Over flow, reduce the transmission rate and under flow, increase the rate.
-. Achieve QoS by realizing Play, Rewind, Fast forward, Pause and Result, as VTR on the Internet

<Real Time Streaming Protocol of ISO technologies apply to our platform>

■ RTCP : Real time Control Protocol, International Standard about the method to real-time control multimedia streaming between the client and server , as a non-connection protocol based on UDP Layer rather than RTP

■ 1997 IETF : RFC 4571
■ Background appear
-. Need accessory RTP protocol to complement the problem of unidirectional RTP
■ Feature :
-. Achieve QoS/QoE by Seamless and high-quality media services through exchanging and evaluating QoS information between Server and Client



-. Using efficient network by control the network traffic increasing by varying the frequency of transmission depending on the number of the log-ins and limiting the size of RTCP packet less than 5%
-. RTCP uses an odd number after RTP and the request for RTCP control uses TCP.

<Real Time Control Protocol of ISO technologies apply to our platform>

Technology specifications of Real Time Control Protocol (8 Cases, more details, www.ietf.org)

, RFC 3611 RTP Control protocol Extended reports(RTCP XR)
4571 Frame RTP and RTP Control protocol(RTCP) packets over connection-oriented transport
4585 Extended RTP profile for Real Time Control Protocol(RTCP) based feedback(RTP/AVPF)(Updated 5506)
4586 Extended RTP profile for RTCP based feedback: Results of the Timing rule simulations
4961 Symmetric RTP/RTP Control protocol(RTCP)
5093 BT's extended network quality RTP Control protocol(RTCP) extended reports(RTCP XR XNQ)
5124 Extended secure RTP profile for RTCP based feedback(RTP/SAVPF)

<Specifications of the RTCP of ISO technologies apply to our platform>

ISMA are quality of service and experience of IPTV on the public network

■ Detail how to stream over public IP network(5 Cases)

ISMA Version 1.0(2001) : MPEG-4 SP& ASP
-. Profile 0(for Mobile), Profile 1(for Internet P.C & S.T.B)
ISMA Version 2.0(2005) : H.264/MPEG-4 AVC Video, HE-AAC Audio
-. Profile 2(HE-AAC@L2, stereo-AVC main & baseline@L2-1.2Mbps),
-. Profile 3(AAC@L4, 5.1-AVC main@L3-3.7Mbps) – for SD(Standard Definition)
-. Profile 4(AAC@L4, 5.1-AVC high@L4-15Mbps) – for HD(High Definition)
These are relevant with all fields (Encode, Transport, and Play), and complement all fields of deficiency points of RTSP/RTP/RTCP/SDP ISO, and achieve enhanced service of QoS & QoE in public network

■ Specifies an end to end Encryption system for ISMA 1.0, 2.0 streams(2 Cases)

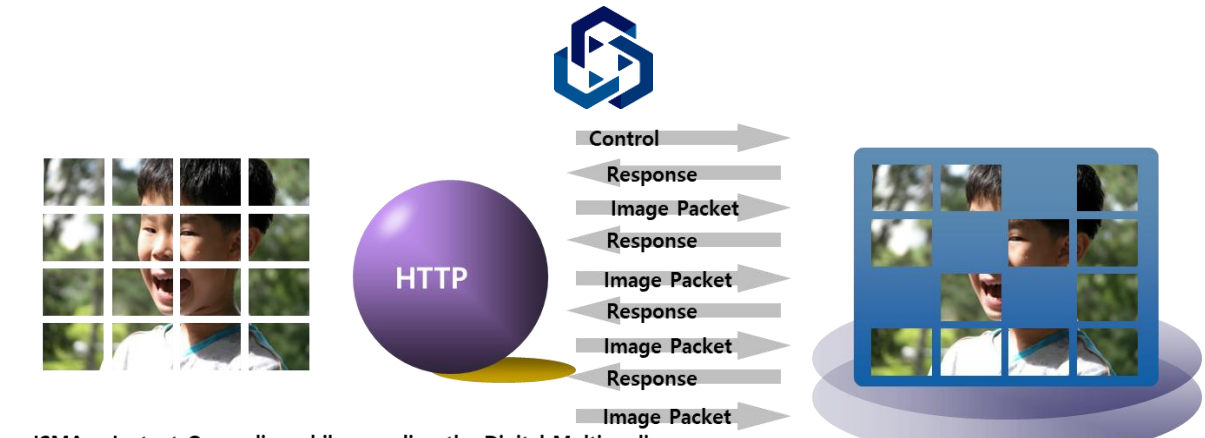
ISMA Cryp Version 1.0(in 2004) for ISMA 1.0,
ISMA Cryp Version 1.1(in 2006) for ISMA 2.0

■ Specifies how to carry closed caption data as a third stream over IP network(1 Cases)

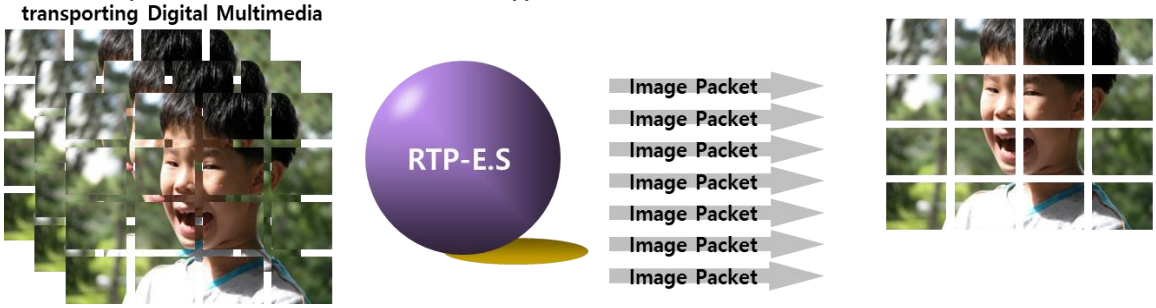
ISMA Closed Captioning(in 2005)

ISMA is a result of effort for preparing the Internet Streaming Media Public Standard, and is a nonprofit organization, which CISCO System, IBM, Kasenna, Philips, Sun Microsystems participated in Dec, 2000, and later Apple Computer participated as well.

<Specifications of the Internet Streaming Alliance apply to our platform>

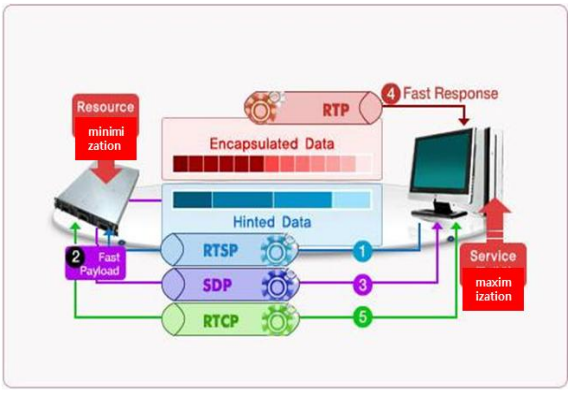


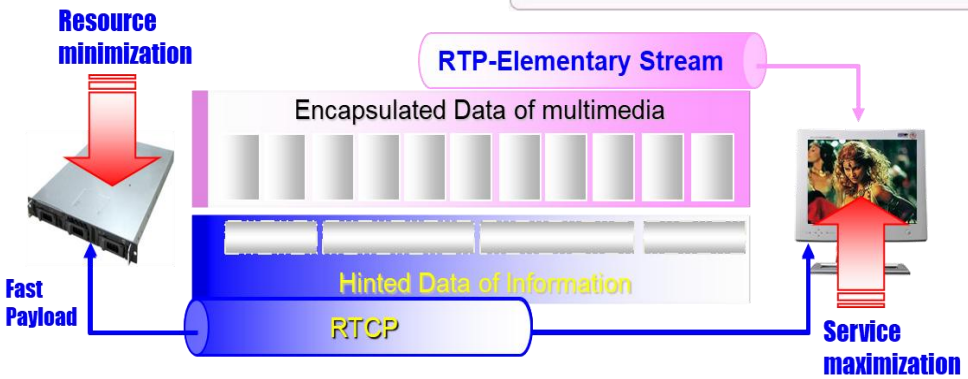
- ISMA + Instant-On applies while encoding the Digital Multimedia
- RTP-Elementary Stream applies while transporting Digital Multimedia
- RTP Multiple Port(#6950 ~ #6999) Transmission applies while transporting Digital Multimedia



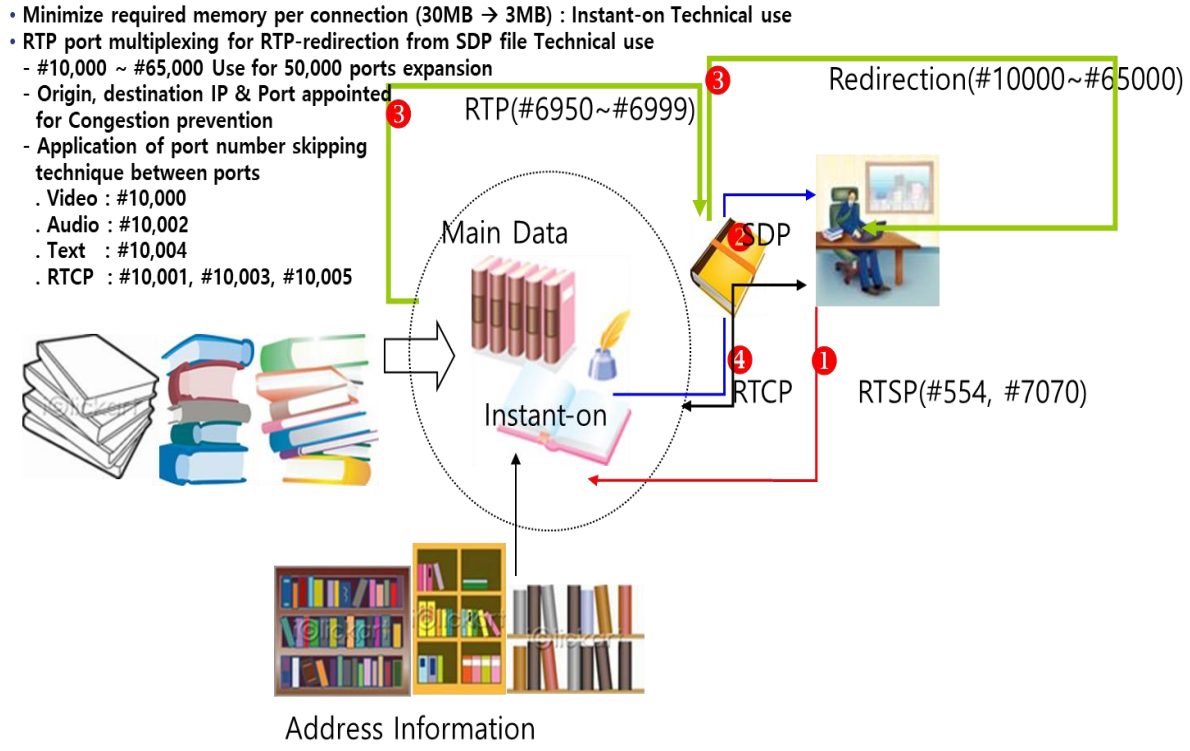
<Instant-on patent technology for need not buffering times>

- Instant-on + RTP-E.S/SDP/RTSP/RTCP applied
  - Real-time Streaming Port : RTSP(#554, #7070)
  - Extracts & Applies Multimedia HDD Address : SDP file
  - Mass Storage Transport Multi Port : RTP(#6,950 ~ #6,999)
  - Interactive Real-Time Control Port : RTCP(#RTP + 1)
- i-frame Skip-Protection skill applied with no additional bandwidth



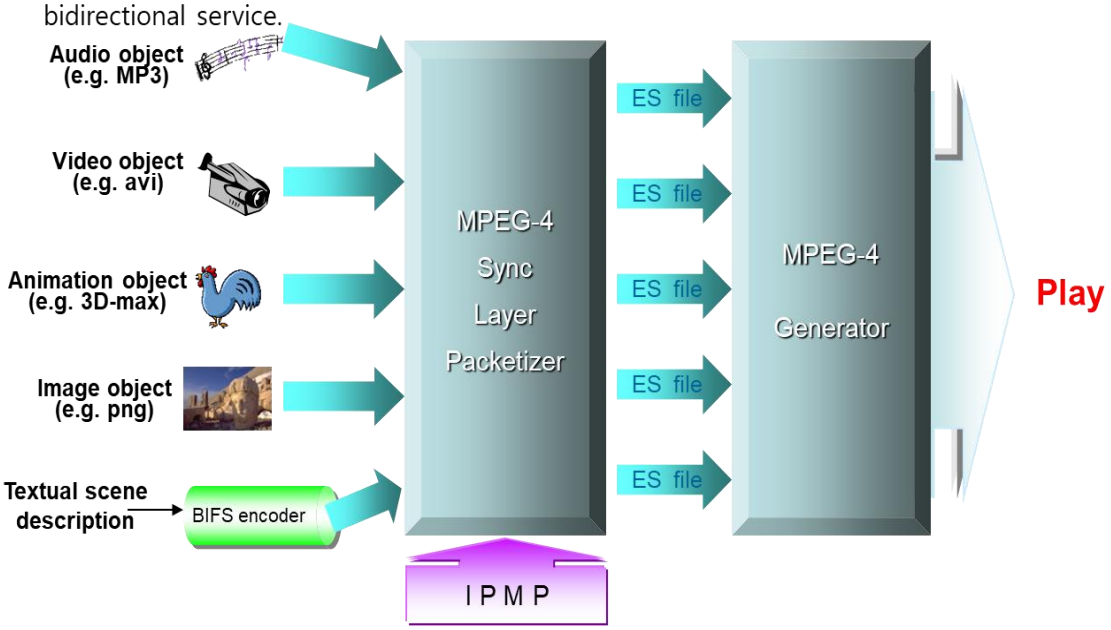


<Skip-Protection patent technology for Jog-shuttle like DVD player>



<RTP-Redirection patent technology for mass access of concurrent users>

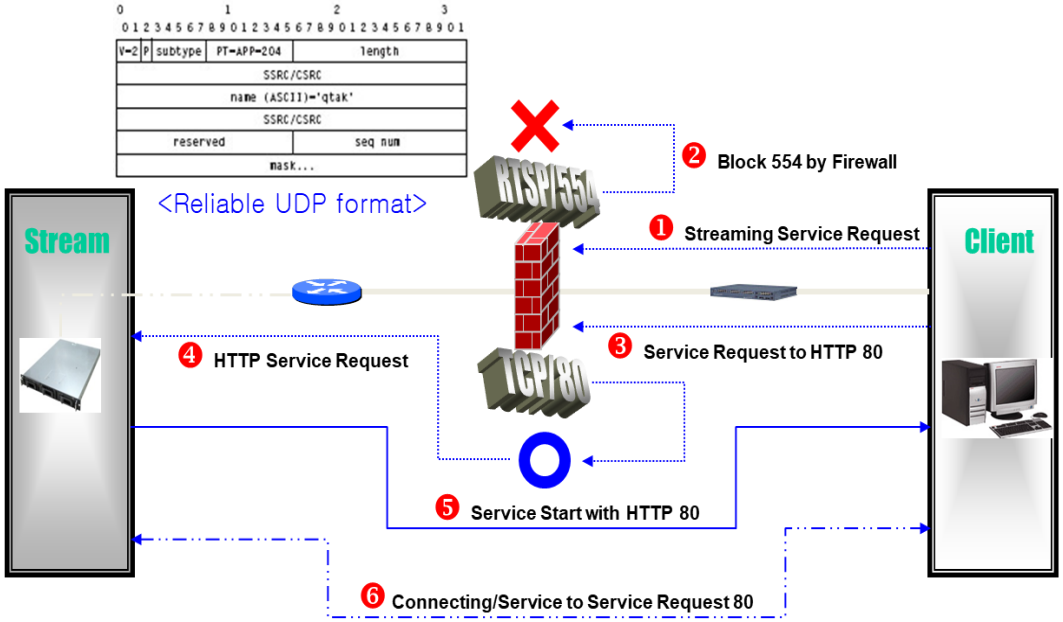
■ E.S? : It is a method of transmitting each element of multimedia through a separate RTP port, which enables more data to be transmitted per unit time at a higher speed than TS (Transport Streaming) that alternately transmits video and audio packets, and object-oriented two-way service It enables to implement and provides various advantages such as reduction of network overhead by not having to create a separate network block for bidirectional service.



<Interactivity Elementary Streaming patent for interactivity TV service>

In addition, our services, which are broadcast on the public Internet to Real Time Streaming Protocol (RTSP) for digital TV-level image quality, quality satisfaction and service satisfaction, have problems that cannot be reached by clients using the router and firewall, as many Internet users connect and use firewalls for security purposes. However, there is nothing in the way of us achieving challenging R&D and technological innovation. Rather, whenever these barriers blocked us, technological innovation took place.

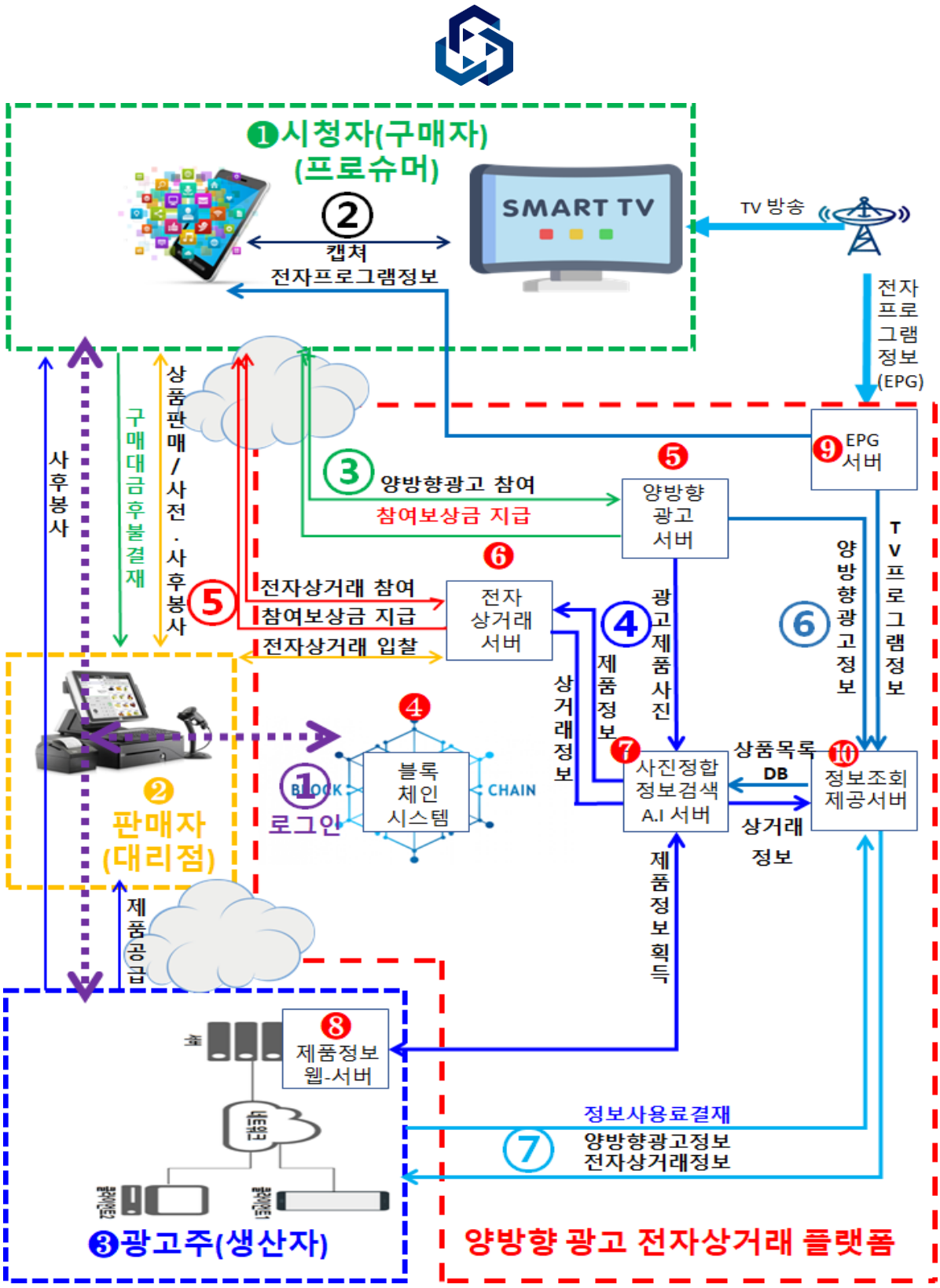
■ Firewall tunneling : RTSP uses 554 and 7070 port but most of client in company are protected by a firewall. The blind spot may be issued because the firewall is basically opened only 80 port so it is essential to adopt Reliable UDP (HTTP Tunneling) Technology.



<Reliable UDP patent technology for Passover firewall & router>

2.5 Service Technology

Our service is, using mobile phones and communication networks (Internet), a two-way service that combines one-way direct television advertising and indirect advertising with two-way Internet advertising formats to acquire information about the target audience and information about the effectiveness of advertising, and in connection with this, it implements e-commerce for direct and indirect television advertising products, which has been registered as a service patent (Patent No. 10-2321149).

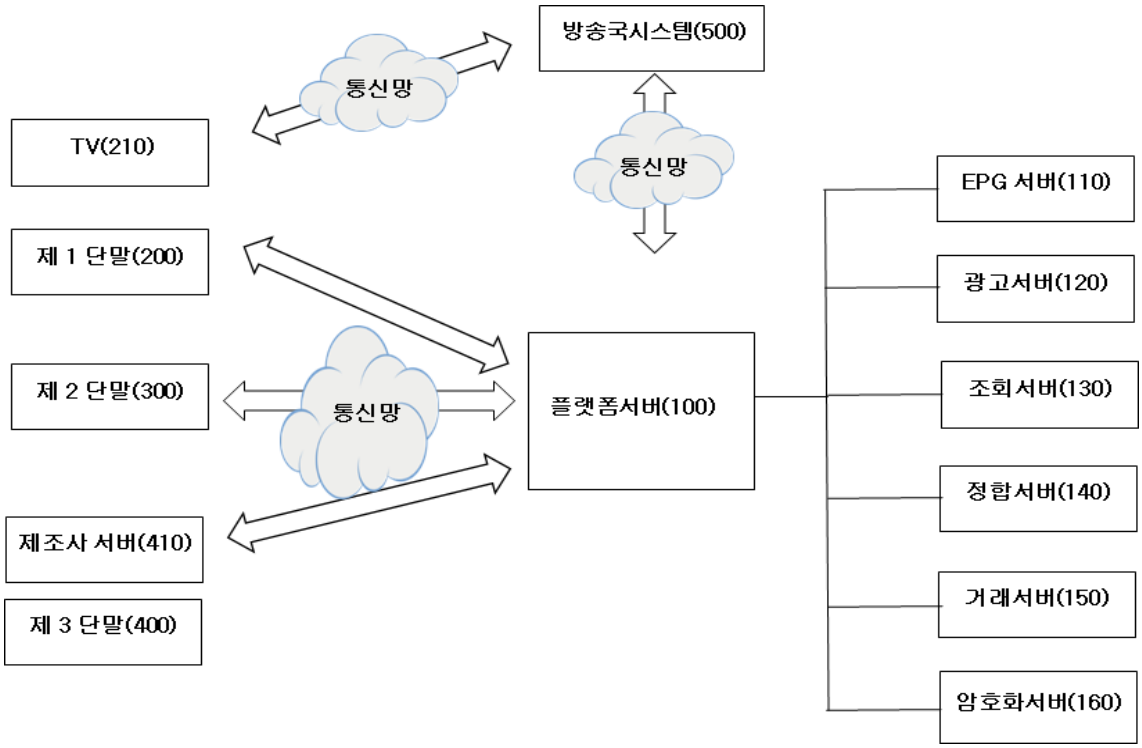


<Structure of this service for which a service patent has been registered>

As various products have been produced and distributed, efficient advertisement becomes a significant factor for attracting sales of them. Recently, the activities online and with mobile devices have become common and online/mobile ads have been regarded as major marketing means accordingly. In the meantime,

personal information is easily accessible online. Although personal information is used for customized ads, customers must take the risk of privacy violation. With this condition, it is necessary to pay extra attention to the factors such as reliable ads, privacy protection, efficient marketing and so on.

Therefore, the technologies for protecting privacy, obtaining trust between users and matching consumers and advertisers are needed to activate e-commerce. For this, mutual authentication technology, e-cash exchange technology based on block-chain encoding and A.I. database technology that provides marketing information for consumers are needed..



<Structure diagram of this service for which a service patent has been registered>

The present a broadcasting system, a TV set that receives commercials by the above broadcasting servers and networks, and the 1st terminal and 2nd terminal, manufacturer's server and platform server that transmit information using wired and wireless communications networks.

The 1st terminal includes following stages: detecting channel information being viewed through the above TV set, obtaining advertising images being viewed

through the above TV set and transmitting the detected information and the obtained images to the platform server.

The platform server includes following stages – obtaining corresponding broadcasting information by communicating with the broadcasting system by using the transmitted channel information, detecting objects from the advertising images by using the information in the transmitted images, detecting information for product recommendations using the objects from the images, obtaining product information that agrees with the extracted product by using wired or wireless communications networks, transmitting the product information to the 2nd terminal through wired or wireless communications networks and transmitting the price information of the product to the 1st terminal and platform server – and provides e-commerce system and method by using two-way ads that transmit the purchase information to the 2nd terminal and the platform server.

Two-way interaction advertisement, E-commerce system and method to solve the above problems are followings:

As for the two-way interaction advertisement, E-commerce system and method including a broadcasting system, a TV set that receives commercials by the above broadcasting servers and networks, and the 1st terminal and 2nd terminal, manufacturer's server and platform server, the 1st terminal detects the channel information displayed on the TV; The 1st terminal obtains advertising information from the displayed channel on TV; The 1st terminal transmits the detected channel information, advertising information and the location information of the 1st terminal to the platform server; The platform server obtains the corresponding broadcasting information by communicating with the broadcasting system by using the transmitted channel information; The platform server amends the channel information, comparing the channel information and the advertising information with the broadcasting information; The platform server extracts objects from the advertising image by using the information in the transmitted images and the product information with the object information; The platform server obtains product information that agrees with the extracted product by wired or

wireless communications networks; The platform server transmits the product information to the 2nd terminal through wired or wireless communications networks; The 2nd terminal transmits the bidding information of corresponding product(including product name and price) to the 1st terminal and platform server; The 1st terminal transmits the purchase information based on the received bidding information to the 2nd terminal and platform server, detects the channel information and extracts the carrier waves of using frequency of the received advertising image information; Pilot signals are extracted by the extracted carrier waves; The lower side and the upper side of using frequency are extracted by the pilot signals; Channel information is detected, comparing the lower and upper sides of the using frequency and the frequency bandwidth of digital and cable TV.

Also, the 1st terminal transmits the input purchase postscripts from the users to the platform server; The platform server creates categorized advertising information with the postscripts and channel information from the 1st terminal; The created categorized advertising information is transmitted to the manufacturer. And creating the categorized advertising information covers, extracting the user information including the channel program information and viewing time/location of the 1st terminal by using broadcasting information transmitted from the broadcasting system; extracting the preferred product and manufacturer information from the postscripts transmitted from the 1st terminal; creating database on the categorized advertising information by using the user information and preferred product/ manufacturer information.

Also, extracting the product information covers identifying viewing channel information by using the time when the advertising information is transmitted and the extracted user information from the 1st terminal; verifying the product information, comparing with the program information.

Also, transmitting to the 2nd terminal includes transmitting the obtained product information by using the location information of the 1st and the 2nd terminals with the priority of the separation distance of the two terminals. transmitting to the 1st terminal and platform server characterizes displaying both the product and price

information together which are included in the bidding information.

Also, the platform server sets the 1st terminal, 2nd terminal, manufacturer's server and the wired/wireless-communication-network channels and includes authenticating steps by the identifiers. And the identifiers only uses x-coordinate of the x and y coordinates which are formed in the elliptic-curve function on the two dimensional plane that are created with the private and the public key generative software. The correlation equation of the x and y coordinates is $y^2 \bmod p = (x^3 + 7) \bmod p$.

To solve the problems, Two-way Interaction Advertisement, E-Commerce System extracts the carrier waves of the using frequency of the advertising image information that are transmitted to the TV, extracts the pilot signals with the carrier waves, extracts the lower and the upper side of using frequency by using the pilot signals, detects the channel information by comparing the both sides of using frequency with the bandwidth of digital and cable TV channels and obtains the advertising information displayed on the TV. The 1st terminal transmits the information of the channels, advertising images and location to the platform server; The platform server obtains the broadcasting information that are corresponding with the channel information by using the transmitted channel information, amends the channel information comparing the information of channel and advertising images with the obtained broadcasting information, extracts the object information of the advertising images by using the transmitted advertising information, extracts the product information with the information of the object, obtains the product information by identifying the matching product from the manufacturer's server through wired/wireless communications networks and transmits the product information to the 2nd terminal through the wired/wireless networks. It includes the 2nd terminal that transmits the corresponding bid information to the 1st terminal and the platform server. The 1st terminal transmits the purchase information of the bidding to the 2nd terminal and the platform server, the purchase postscript is transmitted from the user of the purchase to the platform server, and the platform server extracts the user information that includes the

information of channel program and viewing time and location by using the channel and location information transmitted from the 1st terminal and the broadcasting information transmitted from the broadcasting system. Then, the postscript from the 1st terminal leads to extract the information of the preferred product and manufacturer and the categorized advertising information including the information of the user and the preferred product/manufacturer is transmitted to the manufacturer's server.

Also, two-way interaction advertisement and e-commerce platform server receive the channel information and the location of the 1st terminal from the 1st terminal that obtains the channel information displayed on TV, the corresponding broadcasting information is received from the broadcasting system, the EPG server transmits the location information of the 1st and 2nd terminals and the broadcasting information to the inquiry function server; the advertising server receives the displayed advertising information from the 1st terminal and transmits it to the inquiry function server; the inquiry function server amends the channel information comparing the channel information and the advertising information with the received broadcasting information, extracts the object information from the advertising image, extracts the product information from the object information and transmits the product information to the corresponding server; the corresponding server obtains the product information through the manufacturer's server and wired/wireless communications networks and transmits the product information to the advertising server; the advertising server transmits the product information to the 2nd terminal through wired/ wireless communications networks; the transaction server receives the bidding information that includes the product and price information from the 2nd terminal and also receives the purchase information from the 1st terminal; on receiving the purchase information from the 1st terminal to the transaction server, the encoding server sets the 1st/2nd terminals and wired/wireless communications networks channel and authenticates the identifier; the advertising server extracts the user information including channel program and viewing time/location of the 1st terminal, also extracts the information

of the preferred product/manufacturer from the purchase postscripts that are received from the 1st terminal and creates the database. The inquiry function server utilizes the user information and the time when the advertising information is received from the 1st terminal to identify the viewing program information and verifies the product information comparing with the channel program information. The advertising server uses the locations of the 1st and 2nd terminals to transmit the transaction information to the 2nd terminal by prioritizing the 2nd terminal that has the closer separation distance. The encoding server utilizes the private/ public key generative software to use x-coordinate of the x and y coordinates which are formed in the elliptic-curve function on the two dimensional plane. The correlation equation of the x and y coordinates is $y^2 \bmod p = (x^3 + 7) \bmod p$, which creates the identifier.

The advantages and features of this Service and the methods to achieve them are clearly indicated on embodiments described later with attached drawings. Yet the Service is not confined to the embodiments, and it can be incarnated in different forms. Rather, the embodiments are provided to make what is stated thorough and complete and to convey the ideas of the service sufficiently.

The terms that are used on this application is not intended to confine the Service, but to give the specific explanations. The singular expressions indicate plural ones if not clearly different from the context. The terms like "include" or "contain" on the application are to designate features, figures, stages, components, parts or the all combined to existence. They should be not understood as excluding one or more features, figures, stages, components, parts or the all combined.

Every term used in the application including technical and scientifical terms have the same meanings with what is understood among the people in the related fields as long as they are differently defined. The terms that are used commonly as defined in dictionary are comprehended to the contexts. Unless they are clearly stated on this application, they should not be understood as ideal or overly formal.

The following gives detailed descriptions of the embodiments with drawings.

Drawing 1 shows the overall system of the two-way advertisements and e-commerce system. Referring to Drawing 1, the e-commerce system constitutes the platform server(100), the 1st terminal(200), the 2nd terminal(300), the 3rd terminal(400), broadcasting system(500).

The platform server(100) constitutes EPG server(110), advertising server(120), inquiry function server(130), corresponding server(140), transaction server(150) and encoding server(160) and they be physically or logically composed.

The 1st terminal(200) can be private PC, smart phone or server. They can have long distance communications with the platform server(100), the 2nd terminal(300) and the 3rd terminal(400) through wired/ wireless communications. As short distance communications are also available through Bluetooth, wireless LAN, ect, it also allows the communications with TV(210).

Also, the 1st terminal(200) can film videos including input-output method and camera and install and process app-software as it contains storing method. Especially, it can install and process frequency recognition software, e-wallet software, encoding software and application software. Besides, it can contain the composition applied to the general smart phones and servers.

Also, as Feral Communications Commission(FCC) officially recognizes CR(Cognitive Radio) device operation on the frequency bands(White Space) that are remained after converting to digital TV, IEEE 802.11, IEEE 802.15 and IEEE 802.16 standardization groups use this frequency bands and the 1st terminal(200) can also contain the software and hardwares for the bands.

In this regard, the 1st terminal(200) does not mean one single terminal but the representative one from more than one terminals. Normally, the 1st terminal means viewers or the ones used by them but it is not limited to the extent.

The 2nd terminal(300) can be a personal PC, smart-phone or server, it can communicate long distance with the platform server(100), the 1st terminal(200), the 3rd terminal(400) and wired/wireless telecommunications and short distance with a

bluetooth, wireless LAN, Zigbee and ect so it can communicate with TV, too.

Also, the 2nd terminal(300) can film videos including input-output method and camera and install and process app-software as it contains storing method. Especially, it can install and process frequency recognition software, e-wallet software, encoding software and application software. Besides, it can contain the composition applied to the general smart phones and servers.

As Feral Communications Commission(FCC) officially recognizes CR(Cognitive Radio) device operation on the frequency bands(White Space) that are remained after converting to digital TV, IEEE 802.11, IEEE 802.15 and IEEE 802.16 standardization groups use this frequency bands and the 2nd terminal(300) can also contain the software and hardwares for the bands.

In this regard, the 2nd terminal(300) does not mean one single terminal but the representative one from more than one terminals. Normally, the 2nd terminal means the one used by sellers but it is not limited to the extent.

The 3rd terminal(400) can be a personal PC, smart-phone or server, it can communicate long distance with the platform server(100), the 1st terminal(200), the 2nd terminal(300) and wired/wireless telecommunications and short distance with a bluetooth, wireless LAN and ect so it can communicate with TV, too.

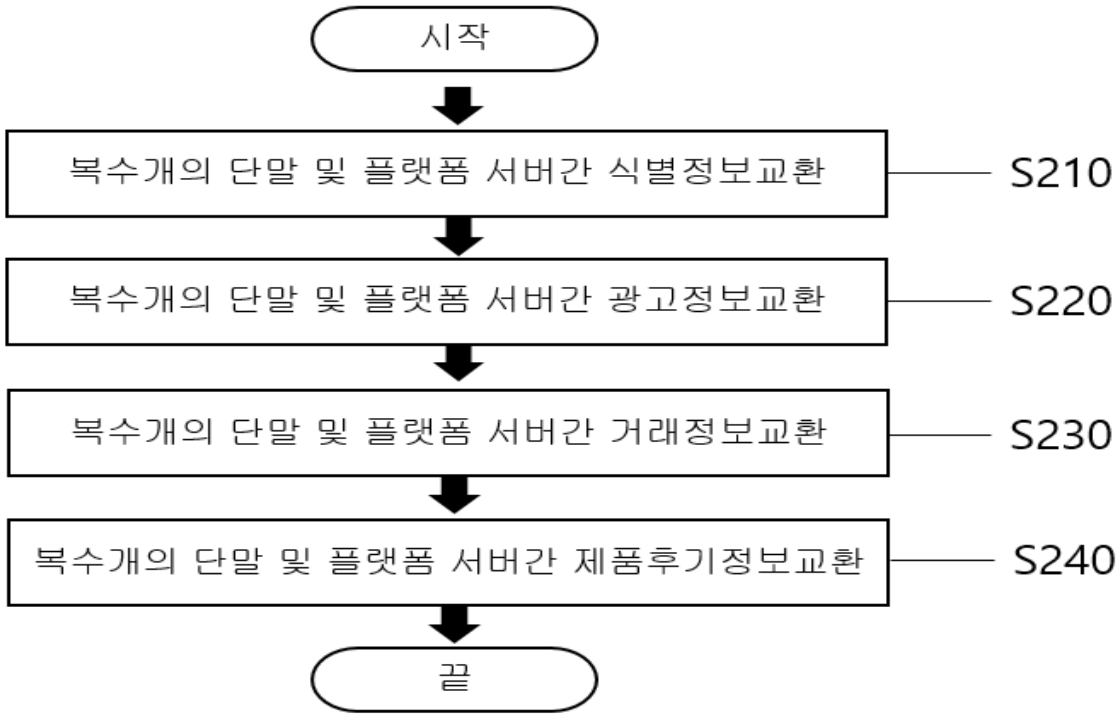
Especially, it can install and process frequency recognition software, e-wallet software, encoding software and application software. Besides, it can contain the composition applied to the general smart phones and servers.

In this regard, the 2nd terminal(300) does not mean one single terminal but the representative one from more than one terminals. Normally, the 3rd terminal means the one used by manufacturers or advertisers but it is not limited to the extent.

Also, the 3rd terminal(400) can be replaced with the server in a case of mass data process, it is designated as manufacturer's server(410).

The broadcasting system(500) contains the server, antenna, etc used in broadcast

stations for transmitting broadcasting information, it provides broadcasting information and then provides broadcasting and advertising images to TV(210) through broadcasting communications networks. The broadcasting information here means generally EPG information(Electronic Program Guide), it can include general services that are provided from broadcast stations such as channel information, time-based broadcast programs, etc. TV(210) generally contains digital or cable televisions, it can communicate with near terminals through wired/wireless local area networks. Local area networks include bluetooth, wireless LAN and Zigbee. Also, TV(210) contains the entire equipment that can receive broadcast signals transmitted from broadcasting system(500) including a TV set, antenna on cable set-top box or cables from cable broadcasts.

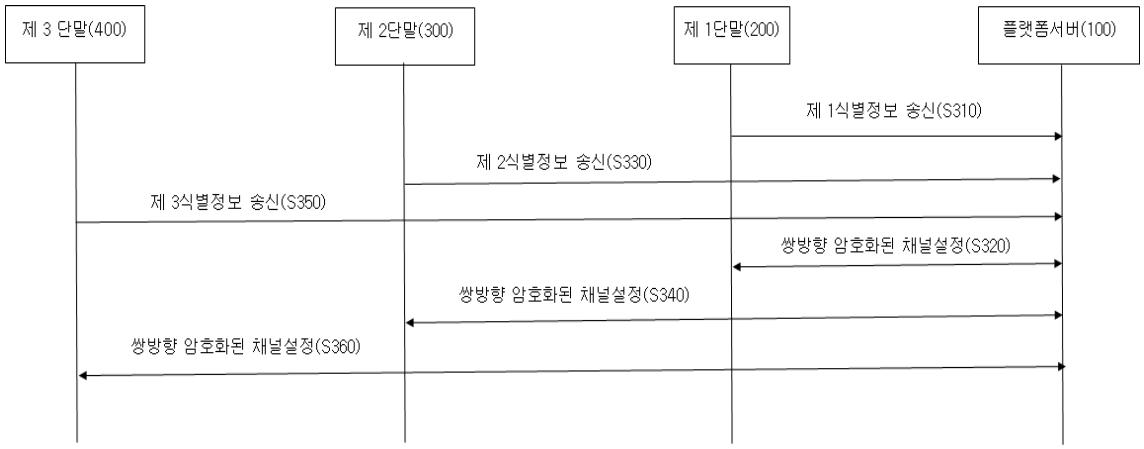


<Drawing 2**. E-commerce flow chart of e-commerce system>**

Drawing 2 is a flowchart that shows the e-commerce process of the e-commerce system. Drawing 3 is a detailed flowchart showing the information exchange between multiple terminals and platform server. Regarding Drawing 2, it contains the exchange of identified information between the multiple terminals and platform server(S210), the exchange of advertising information between multiple terminals and platform server(S220), the exchange of transaction information

between multiple terminals and platform server(S230) and the exchange of purchase -postscript information between multiple terminals and platform server(S240).

In Drawing 2, the detailed flow of S210 shows: when the 1st terminal(200) transmits(S310) the 1st identified information to the platform server(100), the platform server(100) uses the 1st identified information to set(S320) the two-way encoded channels between the 1st terminal(200) and platform server(100). When the 2nd terminal(300) transmits(S330) the 2nd identified information to platform server(100), the platform server(100) uses the 2nd identified information to set(S340) the two-way encoded channels between the 2nd terminal(200) and platform server(100). Also, when the 3rd terminal(400) transmits(S350) the 3rd identified information to platform server(100), the platform server(100) uses the 3rd identified information to set(S360) the two-way encoded channels between the 3rd terminal(400) and platform server(100).



<Drawing 3**. E-commerce process of e-commerce system>**

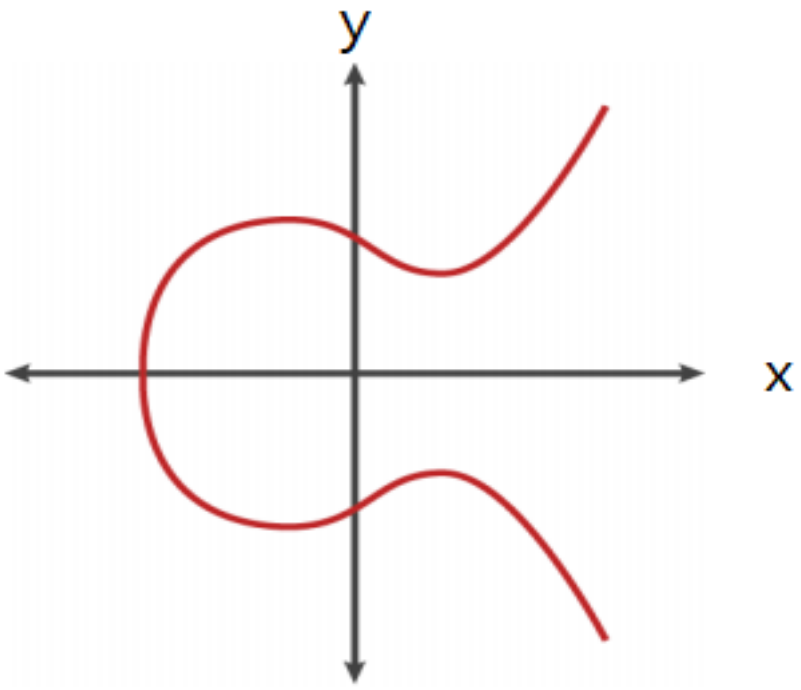
The 1st, 2nd and 3rd identified information here uses the identifiers to set the information for user-authentication of the 1st, 2nd and 3rd terminals, which includes the identifiers' information.

The user-authentication creates the private and public keys and uses the x-coordinate, one of the private keys, as the cross-check method. In details, the pseudo random generator, the prior art, is used to create the private key within the range of (2^{256} - 1) numbers which are represented as non-duplicated 256-bit

long, 64-hexadecimal numbers, then create the public key.

An elliptic-curve multiplication is applied to create the public key by using the private key, and the elliptic-curve multiplication is expressed as S=k*G, which is a formula for finding a S value by adding G k times. S is the public key, k is the private key and G is the constant coordinate, the normal coordinate(x, y) for creating the public key(S). In the invention, the normal (0, 7), also known as secp256k1 established by NIST(US National Institute of Standards and Technology) is applied , the operator "*" is not the general multiplication but the multiplication on the elliptic-curve. That is, k, the private key, cannot be calculated by back-calculating the S value(the public key). Hereby safety is secured as the private is not disclosed while anyone can share the public key as the identifier.

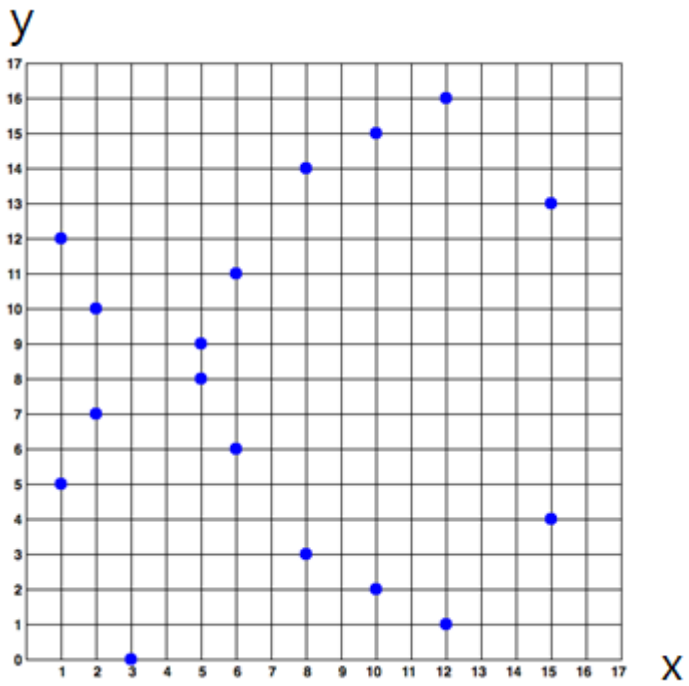
The x value is only used as the public key by calculating the public key (x, y) values, adding the numbers of private key created by calculating the constant coordinate (0, 7) by using the elliptic-curve multiplication. It is because it can save storage space and the y value can be calculated by the elliptic-curve multiplication if needed.



<Drawing 4. **elliptic-curve function graph that creates the public key based on the private key**>

In Drawing 4, the graph is the elliptic-curve graph by the elliptic-curve function equation, $y^2 \bmod p = (x^3 + 7) \bmod p$ which is defined as secp256k1 by NIST(US National Institute of Standards and Technology) that creates the public key based on the private key.

In the equation the mod p means that the curve is on the finite field of decimal degree p and can be expressed as F_p. The value of P is 17 calculated by $2^{256} - 2^{32} - 2^9 - 2^8 - 2^7 - 2^6 - 2^4 - 1$, as defined by the secp256k1 standards.



<Drawing 5. **A graph that shows x and y coordinates on the elliptic-curve function graph according to the mod p value**>

Hereby, when the maximum value of (x, y) coordinates is 17, the mod p value respectively, one x value has two symmetrical y values. Hence, when the x value is 1, the y values are 5 and 12, 2 is to 7 and 10, 3 is to 0, 5 is to 8, 6 is to 11, 8 is to 14, 10 is to 2 and 15, 12 is to 1 and 16 and 15 is to 4, 13. So the value of the curve(0, 7) is equal to the constant (0, 7) of the elliptic-curve multiplication, the field value is 17 as the mod p value is on the elliptic-curve function graph. Therefore, the calculated value by the elliptic-curve multiplication contains 2 y values per 1 x value which leads two coordinates on the elliptic-curve function graph. It is expressed as decimal numbers, if the mod p and one (x, y) coordinate

is expressed as hexadecimal number p is 115792089237316195423570985008687907853269984665640564039 457584007908834671663 and the (x, y) value is expressed, it can be (49790390825249384486033144355916864607616083520101638681403973749255924539515, 595741321618999000458620864939210157800321752917558073992840077210503412973 60), and when it is calculated by $y^2 \bmod p = (x^3 + 7) \bmod p$, the value is calculated as 0, which verifies that the (x, y) coordinates is one of the points on the elliptic-curve graph of secp256k1 standards.

The (x,y) coordinate of S, which is calculated by inputting "f8f8a2f43c8376ccb0871305060d7b27b0554d2cc72bccf41b 2705608452f315" to the elliptic-curve multiplication, S=k*G is (6e145ccef1033dea239875dd00dfb4fee6e3348b84985c 92f103444683bae07b, 83b5c38e5e2b0c8529d7fa3f64d46daa1ece2d9ac14 cab9477d042c84c32ccd0). It is presented as 130-digit hexadecimal numbers and takes up 65 bytes.

To use it as the identifier that has e-wallet address and compatibility for mutual transmission of the cryptocurrency, from the following 4 codes which are settled by SEC1(Standards for Efficient Cryptography 1)

Prefix	Meaning	Length (bytes)
0x00	Point at Infinity	1
0x04	Uncompressed Point	65
0x02	Compressed Point with even Y	33
0x03	Compressed Point with odd Y	33

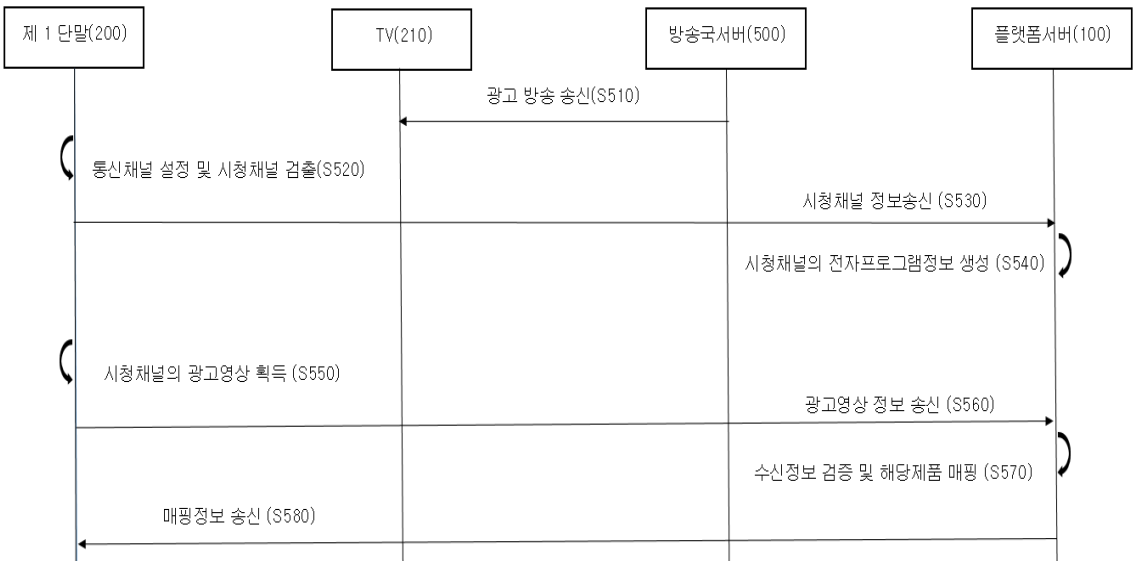
code 0x04, 04 + X-coordinate(32 bytes/64 hex) + Y-coordinate(32 bytes/64 hex) is applied and the (x, y) coordinate can be expressed as 046e145ccef1033dea239875dd00dfb4fee6e3348b84985c92f103444683bae07b83b5c38e5e2b0c8529d7fa3f64d46daa1ece2d9ac14cab9477d042c84c32ccd0.

As two y values are created for each x value by the calculation for one private key,

from the x value, 046e145ccef1033dea239875dd00d fb4fee6e3348b84985c92f103444683bae07b83b5c38e5e2b0c8529d7fa3f64d46daa1 ece2d9ac14cab9477d042c84c32ccd0, 046e145ccef1033dea239 875dd00dfb4fee6e3348b84985c92f103444683bae07b is used as the public key so that it can save storage space and make sure the public key is not forged by calculating the y value with the elliptic-curve multiplication and verifying that the coordinate exists on the graph.

In the invention, the private and public keys are created by the same algorithm stated above and the public key is used for log-in information and crypto transmission and the private key is used for confirmation and digital-signature.

Also, when the password is forgotten and the application is re-installed, new password would be created or the existing data would be restored instead of asking the name, registration number and phone number for identification. And one private key can only create one public key and use it as the account address so that it can be used as personal identification and passwords for users.

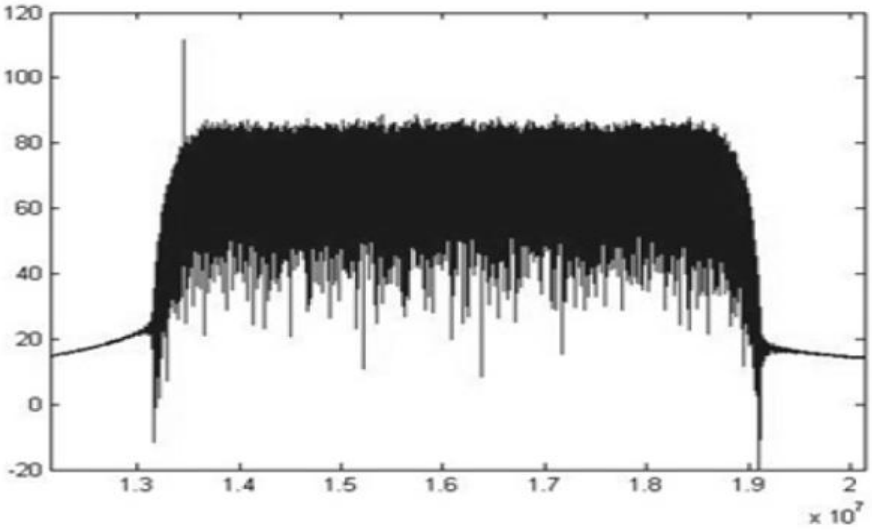


<Drawing 6. **A detailed flowchart of exchanging advertising information between the 1st terminal and platform server**>

Drawing 6 is the detailed flowchart of exchanging advertising information between the 1st terminal and platform server. Seeing the Drawing, the broadcasting system(500) uses communications networks to transmit(S510) the advertising broadcasting information to TV(201). The advertising broadcasting information

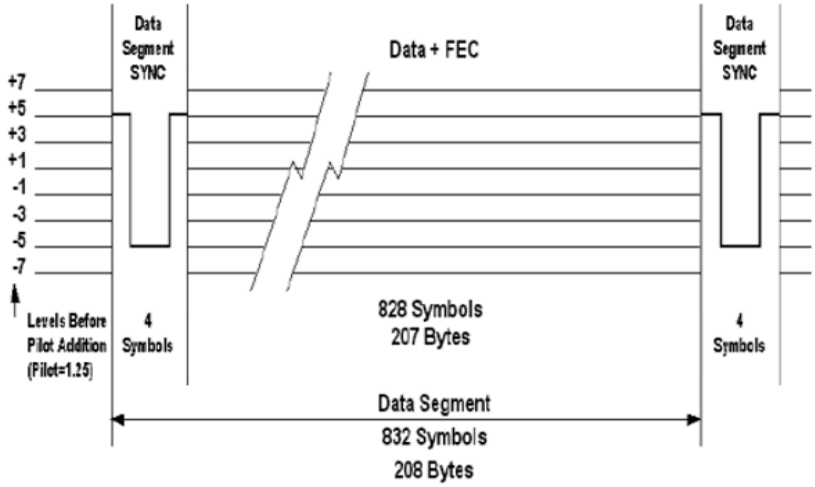
here includes common image information. The TV(210) uses the received information to display the images in real time.

At the moment, the 1st terminal(200) uses the TV(210) and wired/wireless communications to detect(S520) channel setting and viewing channel. The channel setting is done between the 1st terminal(200) and the TV(210), which is applied the known technology.



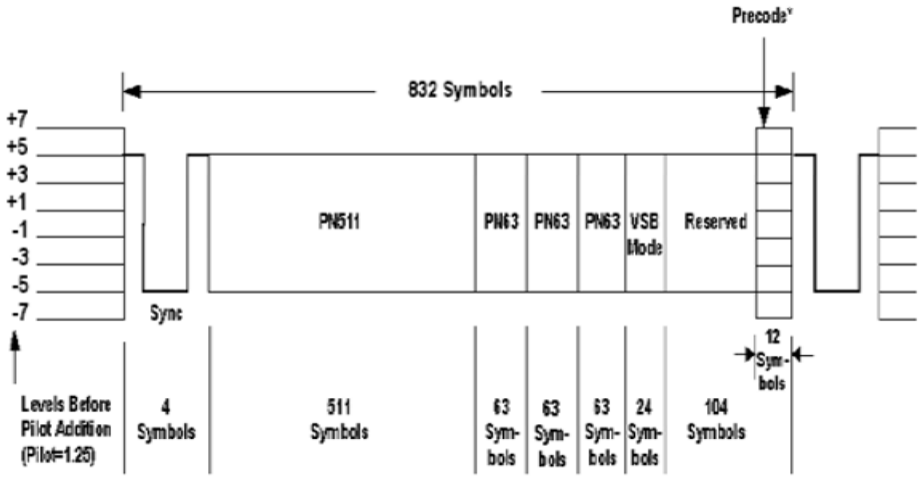
<Drawing 7**. outline of the digital TV broadcasting signals>**

Drawing 7 is the outline of the digital TV broadcasting signals.



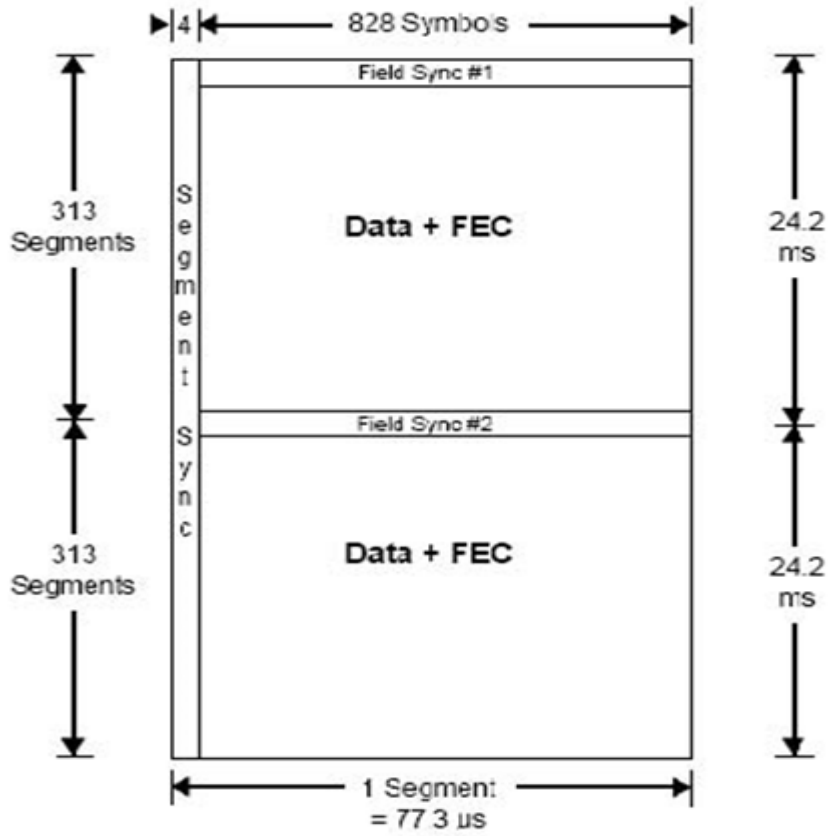
<Drawing 8**. the frame structure map of the digital TV broadcast signals>**

Drawing 8 is the frame structure map of the digital TV broadcast signals.



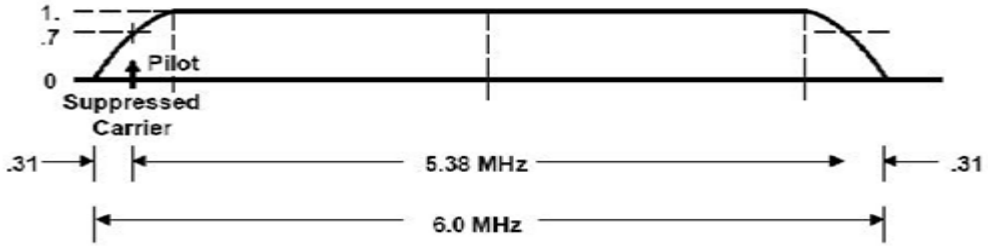
<Drawing 9**. he detailed structure map of the frame structure of the digital TV broadcast signals**>

Drawing 9 is the detailed structure map of the frame structure of the digital TV broadcast signals.



<Drawing 10**. the detailed structure map of the frame structure that is the ATSC standards on digital TV broadcasting**>

Drawing 10 is the detailed structure map of the frame structure that is the ATSC standards on digital TV broadcasting.



<Drawing 11**. the location map of the Pilot signals on the ATSC standards of the digital TV broadcast signals>**

Drawing 11 is the location map of the Pilot signals on the ATSC standards of the digital TV broadcast signals. Drawing 12(omitted) is the digital TV broadcast channels and frequency bands. Drawing 13(omitted) is the digital TV broadcast channels and frequency bands. Drawing 14(omitted) is the digital TV broadcast channels and frequency bands. In reference to Drawing 7 to Drawing 14, How to detect the viewing channel(S520) is described.

ATSC(Advanced Television System Committee) as the commercial standard is applied to digital and cable TV signals. For using frequency, 19.28Mbps of data is transmitted on 6MHz channel for digital TV and 38.56Mbps of data is transmitted on 6MHz channel for cable TV.

The frame structure of viewing-channel signals of digital and cable TV goes through randomizing the input data and encoding bug-fixing and then it is composed as binary data structure for transmitting data packet.

The detailed frame structure consists of two fields, each field is composed of 313 data segments. The first segment of the 313 date fields is assigned to the synchronizing signal which synchronizes among fields. The rest 312 segments are assigned to the synchronizing signals which synchronize among the data and segments.

The 312 segments are composed of 832 symbols. The first 4 symbols out of 312 have the synch-signals among each segment. The rest 828 symbols have data-transmitting packets, FEC(forward error correction), which is bug-fixing packets. The 828 symbols are modified to 8-leveled signals, 8VSB(Vestigial Side Band) and

then transmitted.

During modifying 8VSB, the 8 level symbols and field synch-signals modify single carrier to suppressed-carrier.

During the process, most of the lower sideband is removed so transmitting power spectrums, except the transition region of 620KHz which creates power spectrum having square root raised cosine response, are flattened. At the moment, the pilot signal, one of the synch-signals is inserted to the frequency 310KHz away.

One complete segment is composed of 832 symbols and among them the first 4 symbols are segment-synchro signals and the rest 828 are composed of data and extra symbols. The segment-synchro is 2 level(±5) and the same synch pattern is repeated regularly at 77.3μs interval.

For example, segment synch-signal and field synch-signal are defined as the random values of –5 level and +5 level, and after matching the segment synch-signal and field synch-signal with the symbols, 1.25 is added to the –5 and +5 levels and create the pilot carrier.

Based on the location of the pilot signal of the certain frequency band signal and the energy distribution, frequency can be measured in a week environment at short period. Also, certain frequency band signal can be ATSC(Advanced Television System Committee) frame structure.

The pilot signal detection technology can be applied the pilot spectrum detection technology whish is based on FFT(Fast Fourier Transform). The signal frame of digtal and cable TV viewing channel includes pilot signals and it demodulates the pilot signal to the baseband, goes through filtering by using Low-pass of 40KHz(± 20KHz) and then the length of the pilot signal that is downed sampled to 1/400 and then detected through the FFT procedure is flexibly changed depending on the detection cycle. The signal detection is conducted by comparing the maximum and threshold values of FFT-resultant pilot signal. If the adding value of all the detected length of the pilot signal is larger than the threshold value, the frequency

channel is defined to be being viewed.

The threshold value can be set by using Constant False Alarm Rate(CFAR) algorithm.

TV(210) receives the broadcasting signals from the broadcasting system(500), the received signals include viewing channel frequency and additional carrier, or pilot signal. The 1st terminal(200) detects the carrier that is generated from the received broadcasting signals and then detects the pilot signal included in the carrier.

The received carrier, $y_n(k)$ by 1st terminal(200) is represented as $y_n(k) = h(k) \otimes s(k) + n(k)$ and C0; $y_n(k) = n(k)$ respectively. Here, C0 is the arithmetic expression of lower band frequency and C1 is the arithmetic expression of upper band frequency. Also, '$h(k)$' is impulse response of wireless channel and '$\otimes$' is convolution, which is an arithmetic operator finding a new function by multiplying one function and the invert-shifting value of another function and doing integral, $n(k)$ shows Additive White Gaussian Noise(AWGN) which has the average of 0 and the variance of σ_N^2. The pilot signal is detected by removing the signal noise from the detected carrier.

Supposing the wireless channel of the received carrier as Gaussian channel, the probability density functions(PDF) of C1 and C0 are $f_{Y_n}(y|C1) = \frac{1}{\sqrt{2\pi\sigma_N^2}} \exp(-\frac{(y-\mu_s)^2}{2\sigma_N^2})$ and $f_{Y_n}(y|C0) = \frac{1}{\sqrt{2\pi\sigma_N^2}} \exp(-\frac{y^2}{2\sigma_N^2})$ respectively. μ_s is the average value of the viewing channel frequency.

Also, the results of signal processing and local-deciding of the received signal are used to decide the existence of the viewing channel(frequency).

The signal used for local decision can be shown with $y_U = \sum_{n=1}^{N} \hat{y_n}$ and $\hat{y_n}$ is the result of local decision.

Therefore, the PDF of y_U in C1 and C0 can be represented $f_{Y_U}(y|C1) = \frac{1}{\sqrt{2\pi\sigma_U^2}} \exp(-\frac{(y-\mu_U)^2}{2\sigma_U^2})$ and $f_{Y_U}(y|C0) = \frac{1}{\sqrt{2\pi\sigma_U^2}} \exp(-\frac{y^2}{2\sigma_U^2})$ respectively. μU and σ_U^2 are the average and variance of $\hat{y_n}$, detecting the channel

by detecting the frequency used as the threshold value.

In reference to Drawing 12 to 14, the signal detection is conducted by comparing the maximum value of the squared value of the pilot-signal length with the threshold values. If the adding value of all the detected length of the pilot signal is larger than the threshold value, the frequency is detected.

Also, the 1st terminal(200) saves and updates digital and cable TV broadcasting channel and frequency band mentioned in Drawing 12 to 14. The 1st terminal(200) compares the digital and cable TV broadcasting channel and frequency band with the length of detected pilot signals and decides the relevant channel.

For example, if the length of the detected pilot signal, the relevant frequency is 54.31MHz for lower side band and 59.69 for upper side band, the 1st terminal(200) compares the frequency band of the digital and cable TV broadcasting channel, decides the band range of 54MHz ~ 60MHz and concludes the viewing channel is channel 2.

Also, to amend the decided channel, the 1st terminal(200) transmits the information of channel and location to the platform server (100), especially, to the EPG server(110) which consists of the platform server(100). The platform sever(100) compares the broadcasting and product information from the broadcasting system(500) based on the information of channel and location, decides the channel information.

The platform server(100) categorizes and saves the information about viewing channel and time of the user of the 1st terminal(200) based on the information of channel, location and broadcasting. The advertising information is transferred to the advertiser by manufacturer's server(410), which is described later.

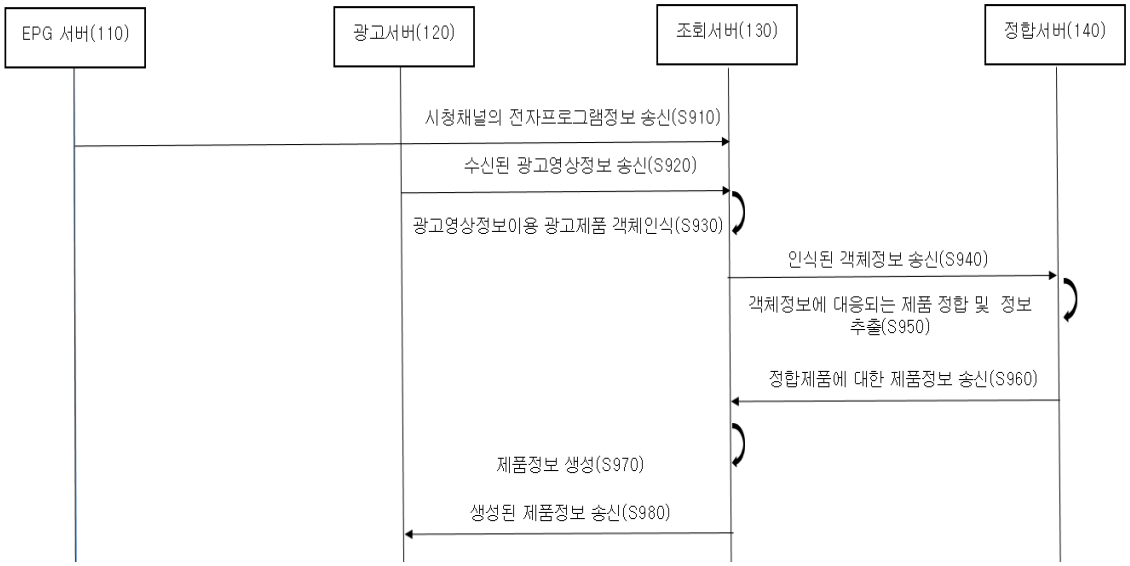
The 1st terminal(200) uses the detected frequency to detect the viewing channel of the TV(210).

After the 1st terminal(200) detects the viewing channel, the information on it is transmitted to the platform server(100).

The platform server(100) uses the viewing channel to access to the broadcasting system(500), obtains the broadcasting information and creates(S540) e-program information. The e-program information, the broadcasting information, includes viewing channel, time, location and the programs before and after the advertisement of the advertising broadcast.

The 1st terminal(200) obtains(S550) the advertising images of the viewing channel. The 1st terminal(200) uses the camera to film the screen displayed on TV(210) and obtain the image or QR code of the advertising product. The image or QR code is saved as the advertising image information by the loaded software in the 1st terminal(200).

The 1st terminal(200) transmits(S560) the advertising image information to the platform server(100). The platform server(100) verifies the advertising information and does mapping(S570) the product. The platform server(100) transmits(S580) the mapped information to the 1st terminal(200). Also, the platform serve(100) can transmit the mapped information to the 2nd terminal(300) and the 3rd terminal(400).



<Drawing 15. **the flowchart of information exchange between servers that comprise the platform server**>

Drawing 15 is the flowchart of information exchange between servers that comprise the platform server. In reference to Drawing 15, the platform server(100) describes the verification and mapping(S570) in details.

The platform server(100) constitutes EPG server(110), advertising server(120), inquiry function server(130), corresponding server(140), transaction server(150) and encoding server(160) and they be physically or logically composed.

The EPG server(110) transmits(S910) the broadcasting information of the viewing channel from the broadcasting system(500) to the inquiry function server(130). Also, the advertising server(120) transmits(S920) the advertising image information from the 1st terminal(200) to the inquiry function server(130). The broadcasting information is task information included in e-program information. Also, e-program information includes the general information on broadcasting channel, time-based broadcasting programs and etc.

The inquiry function server(120) uses the received advertising image information to recognize(S930) the object of the advertised product. The object of the advertised product here means the advertised product image information extracted from the advertising image information. Object recognition technology of advertised products uses semantic object division software. The inquiry function server selectively transmits the recognized object information to the corresponding server(140) or advertizing server(120).

On transmitting the object information to the advertising server(120), the advertising server(120) additionally transmits the object information to the corresponding server(120).

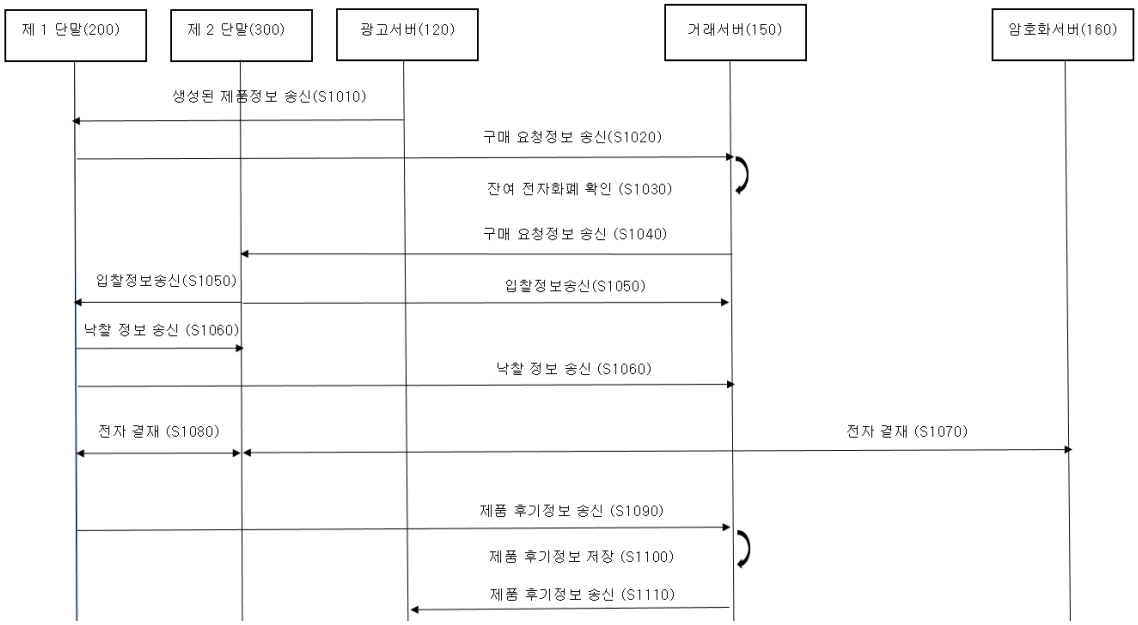
The corresponding server(140) uses the object information to extract the advertised product by using the photo matching software, extracts the product information and then transmits(S960) the information to the inquiry function server(130). For photo matching software, it is desirable to apply Vision API from Google Cloud.

The inquiry function server(130) receives(S960) the product information from the corresponding server(120). The inquiry function server(130) compares the product information with the broadcasting information of the viewing channel from the EPG server to compare and verify whether they are matched. Then the verified

product information is created and it is transmitted(S980) to the advertising server(120).

The product information here includes product image, manufacturer, product(model) name and price. Also, the product information is the one that combines the matching product, manufacturer's information and price information in augmented reality. So all the matching product, manufacturer's information and price information can be seen in three dimensions.

Also, the inquiry function server(130) constructs knowledge representation system at the level of computer's understanding – the system classifies logic connection, rule connection, structure connection and meaning connection and then finds compatibility - for ontology database. The inquiry function server(130) databases the information of the users, advertising broadcasting and e-program of the viewing channel, provides cross-search and relevant technologies, creates the category advertisement information and then transmits it to the advertising server(120). The advertising server(120) can transmit the category advertisement information to the 3rd terminal(400) or the manufacturer's server(410), which is described later.



<Drawing 16**. the flowchart of information exchange between the multiple terminals and platform server>**

Drawing 16 is the flowchart of information exchange between the multiple

terminals and platform server. In Drawing 16, the advertising server(120) transmits(S1010) the product information to the 1st terminal (200). Then the 1st terminal(200) transmits(S1020) the corresponding purchase request information to the transaction server(150). The transaction server(150) checks(S1030) the remaining e-cash of the 1st terminal(200).

The transaction server(150) can send a charge-request to the 1st terminal(200), if the remaining e-cash is under the fixed condition.

Also, the transaction server(150) can set the fixed condition optionally. For example, The case of the remaining e-cash under 80% of the product price can be set as the fixed condition for charging.

If the remaining e-cash is charged more than set-price, the transaction server(150) transmits(S1040) the purchase request information to the 2nd terminal(300). The conditions for the transaction server(200) to transmit the request information to the 2nd terminal(300) are the distance between the 1st terminal(200) and the 2nd terminal, the preference of the uses and so on. The transaction server(150) can set the transmitting conditions randomly. For example, the distance between the 1st terminal(200) and the 2nd terminal(300) is set to be within 2km, and later the distance can be set to increase by 2km.

The 2nd terminal(300) transmits(S1050) the bidding information related to the purchase request information to the 1st terminal(200) or the transaction server(150). The bidding information includes the product, product price and additional services. Various information can be added, if need. Here the 2nd terminal(300) receiving the information can be more than one. If the 2nd terminal(300) is plural, the 2nd terminals(300) can transmit(S1050) the bidding information to the 1st terminal(200) or the transaction server(150).

The 1st terminal(200) can choose one from the bidding information and transmit(S1060) the successful bidding information to the 2nd terminal(300) and the encoding server(160). e-payment is conducted(S1070) through the encoded channel among the 1st terminal(200), the 2nd terminal(300) and the encoding

server(160). The block-chain technology is applied to the encoded channel.

As mentioned, there is the encoded channel set between the 1st terminal(200) and the 2nd terminal(300), the encoded channel between the 1st terminal(200) and the encoding server(160) is set, the encoded channel between the 2nd terminal(300) and the encoding server(160) is set and for all of them, the block-chain based on the private and public keys is applied

There are preliminary understandings among the 1st terminal(200), the 2nd terminal(300) and the transaction server(150) before e-payment. The preliminary understanding means the agreed information among the user of he 1st terminal(200) and the 2nd terminal(300), the user (or consumer) of the transaction server(150), seller and the broker on payment and compensation.

If the product is delivered from the user of the 2nd terminal(300) to the 1st terminal(200), e-payment is conducted by the public key (the identifier), the e-payment information is transmitted to the 2nd terminal(300) and the encoding server(160) and then the e-payment is completed.

If the product delivery from the user of the 2nd terminal(300) to the user of the 1st terminal(200) is done incompletely, the user of the 1st terminal can force to conduct e-payment by the 2nd terminal(300) which uses some of the cryptocurrency from the 1st terminal(200) under the preliminary understandings. The preliminary understandings can be randomly set by the transaction server(150).

```
{
 구매자 : "0xEA674fdDe714fd979de3EdF0F56AA9716B898ec8" ,
 판매자 : "0xac03bb73b6a9e108530aff4df5077c2b3d481e5a" ,
 최대수수료 : "21000" ,
 기본수수료 : "200" ,
 임시수수료 : "0" ,
 대금금액 : "10000000000" ,
}
```

<Drawing 17**. Example of electronic payment script btw platform servers>**

Drawing 17 is an example of the block-chain based 1st terminal on electronic

approval and the electronic approval script between the 2nd terminal and platform server.

```
{
  "id" : 2 ,
  "jsonrpc" : "2.0" ,
  "method" : "account_signTransaction" ,
  "params" : [
    {
      "구매자" : "0x1923f626bb8dc025849e00f99c25fe2b2f7fb0db" ,
      "수수료금액" : "0x55555" ,
      "수수료단가" : "0x1234" ,
       "input" : "0xabcd" ,
       "nonce" : "0x0" ,
       "판매자" : "0x07a565b7ed7d7a678680a4c162885bedbb695fe0" ,
       "결재금액" : "0x1234"
    }
  ]
}
```

<Drawing 18. **Example of a script for calling electronic approval btw platform servers**>

Drawing 18 is an example of the block-chain based 1st terminal on electronic approval and the electronic approval call script between the 2nd terminal and platform server.

```
{
  "jsonrpc": "2.0",
  "id": 2,
  "result": {
    "raw":
"0xf883800182033394 07a565b7ed7d7a678680a4c162885bedbb695fe080a44401a
6e400000000000000000000000000000000000000000000000000000000000122
6a0223a7c9bcf5531c99be5ea7082183816eb20cfe0bbc322e97cc5c7f71ab8b20ea
02aadee6b34b45bb15bc42d9c09de4a6754e7000908da72d48cc7704971491663",
    "tx": {
      "nonce": "0x0",
      "수수료단가": "0x1234",
      "수수료금액": "0x55555",
       "판매자": "0x07a565b7ed7d7a678680a4c162885bedbb695fe0",
       "결재금액": "0x1234",
       "input": "0xabcd",
       "v": "0x26",
       "r":
"0x223a7c9bcf5531c99be5ea7082183816eb20cfe0bbc322e97cc5c7f71ab8b20e"
,
       "s":
"0x2aadee6b34b45bb15bc42d9c09de4a6754e7000908da72d48cc7704971491663"
,
       "hash":
"0xeba2df809e7a612a0a0d444ccfa5c839624bdc00dd29e3340d46df3870f8a30e"
    }
  }
}
```

<Drawing 19. **Example of electronic payment response script between platform servers**>

Drawing 19 is an example of the block-chain based 1st terminal on electronic approval and the electronic approval answer script between the 2nd terminal and

platform server.

In reference to Drawing 17 to 19, to indicatively explain the e-payment based on block-chain, the e-payment scripts including the user of the 1st terminal(200) and the public key it has, the user of the 2nd terminal(300) and the public key it has and the information of the price and commission can be transmitted among the 1st terminal(200), the 2nd terminal(300) and the encoding server(160). The call scripts shows comparing and identifying procedures among the 1st terminal(200), the 2nd terminal(300) and the encoding server(160). They can be transmitted among the two terminals(200, 300) and the encoding server(160). The response scripts shows the completion of the private key authentication among the 1st terminal(200), the 2nd terminal(300) and the encoding server(160), and e-payment, refund/ commission pay. They can be transmitted among the two terminals(200, 300) and the encoding server(160).

Once the e-payment is completed, the user of the 1st terminal can request after-services to the 2nd terminal(300) by using the 1st terminal(200). The 2nd terminal(300) then displays the request information to the user of the 2nd terminal and the user of the 2nd terminal can visit and give after-services to the user of the 1st terminal.

Also, the 1st terminal(200) can transmit(S2090) the purchase postscripts by the users to the transaction server(150). The postscripts information includes the product name, product price, related postscripts information, delivered time, seller information, product design and product performance. It may also include the private information of the user of the 1st terminal, such as the occupation. income, residential type, etc.

The transaction server(150) saves(S1100) the postscripts information after it receives it. According to the compensation agreement under the transaction server(150), the compensation is paid with the e-cash information to the 1st terminal(200). The compensation agreement can be set or amended by the transaction server(150).

Also the transaction server(150) transmits(S1120) the postscripts information to the advertising server(120) and the inquiry function server(130). The inquiry function server(130) constructs knowledge representation system at the level of computer's understanding – the system classifies logic connection, rule connection, structure connection and meaning connection and then finds compatibility - for ontology database. The inquiry function server(130) databases the information of purchase postscript, users, advertising and broadcasting, creates the category advertisement information and then transmits it to the manufacturer 's server(410). Then the profit for the information is received by e-cash.

The category advertisement information is decided, on the basis of the channel and location information from the 1st terminal(200), by the broadcasting information obtained by the EPG server(110) of the platform server(100) from the broadcasting system(500). That means the information of the channel and location is constantly and repeatedly collected. With the information, the viewing channel program and viewing time/location can be analyzed and the user information is also saved. Also, the postscripts from the 1st terminal(200) is analyzed and the preferred product or manufacturer can be collected and saved. If the postscripts contains the information of the age, gender, occupation, income and residential type, it can be collected and saved too. Therefore, category information includes the user information and the postscripts information.

2.6 User Advantage

Based on the innovative Smart IP Cloud TV platform as mentioned earlier, we will provide 6 million university students across Thailand with strong consumption of multimedia content and a strong desire to purchase shopping and generate profits from June 2021, with additional VR/AR convergence on-screen and advertising services starting with **OASIS FARM Service**, including 50 Thai terrestrial broadcasting and Korean terrestrial broadcasting and Korean remote education broadcasting. With our innovative **Smart IP Cloud TV Interactivity Service**, **every customer is a prosumer**, not a consumer, in a business that extends its services

to neighboring countries and around the world.

The University in Thailand, a **remote educational institution**, is enhancing the efficiency of education and the value of schools by receiving free support for Smart IP Cloud TV Platform and VR/AR Convergence Education Broadcasting Studio, which can provide real-time remote education broadcasting with digital TV-level quality and service to each campus and classroom even on the public Internet where speed and quality are not guaranteed. In particular, open universities (with 1 million students) with education centers in each province, including Lamkamhaeng University, have solved the costs and inconveniences that professors paid to visit education centers in each province over the weekend.

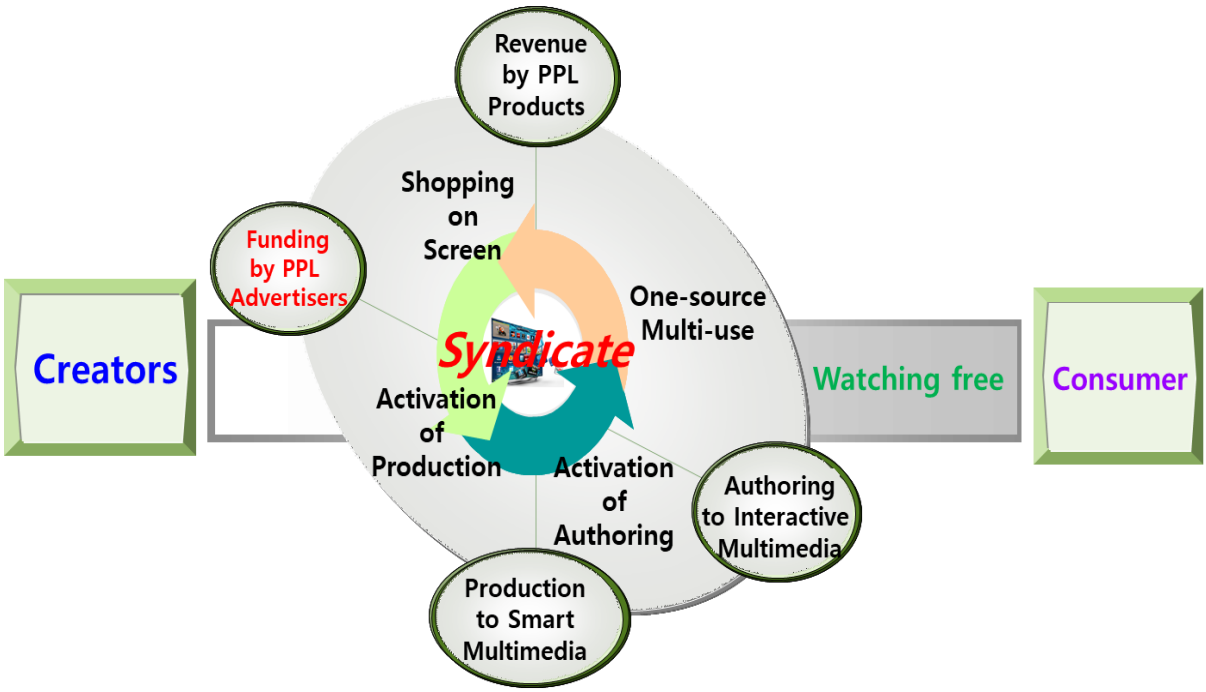
The **remote education professors** can provide students with education with digital TV-quality services even on the public Internet, where speed and quality are not guaranteed through Smart IP Cloud TV Platform, which enables the production of full HD quality educational content at the level of digital TV even on laptops and the powerful function of VR/AR Convergence Education Studio. In addition, professors will automatically archive these real-time remote educational broadcasts on our Smart IP Cloud TV Platform to compensate 30 percent of the service fees paid by students when they watch them on video on demand, and secure a funding base for better content production.

In addition to the benefits of the aforementioned remote education, **students** can use the SNS provided by the OASIS FARM Service to efficiently obtain information needed for college life, enhance communication skills, and generate economic benefits by utilizing services such as used bookstores and job openings provided by the OASIS FARM Service, and receive 30% of the compensation for using the app and interactive TV on-screen advertising in Korean. One year's tuition and living expenses can be secured during the two-month vacation.

In addition, based on the expertise and capabilities of each individual, the powerful features of Trinity Studio, where we distribute our own knowledge and capabilities free of charge, and the production of personal broadcasting content

with full HD quality at the digital TV level and the Smart IP Cloud TV Platform, provide real-time personal broadcasting at the digital TV level, and at the same time, these personal broadcasting contents can be rewarded by viewers, and our own IP Cloud. They can also be compensated for 30 percent of the advertising fee when offering.

TV broadcasting companies in Thailand are currently in a vicious cycle of failing to secure high-quality broadcasting contents due to falling profitability as more than 50 terrestrial TV operators are unable to provide nationwide services due to the burden of transmission fees paid to cable TV operators, and real-time TV broadcasting with digital TV quality and quality guaranteed even on the public Internet, which is not guaranteed speed and quality using our Smart IP Cloud TV Platform. In addition to increasing advertising revenue by expanding the base of viewers, real-time TV broadcasting contents are automatically saved (archiving) in our Smart IP Cloud TV Platform and provided as Video On Demand, and 30% of the viewer's viewing fee or advertising fee due to watching advertisements are compensated, thereby securing high-quality content and achieving high profits by securing continuous growth engines for services.



<Achieved Syndicate of digital multimedia contents (digital multimedia ecosystem)>

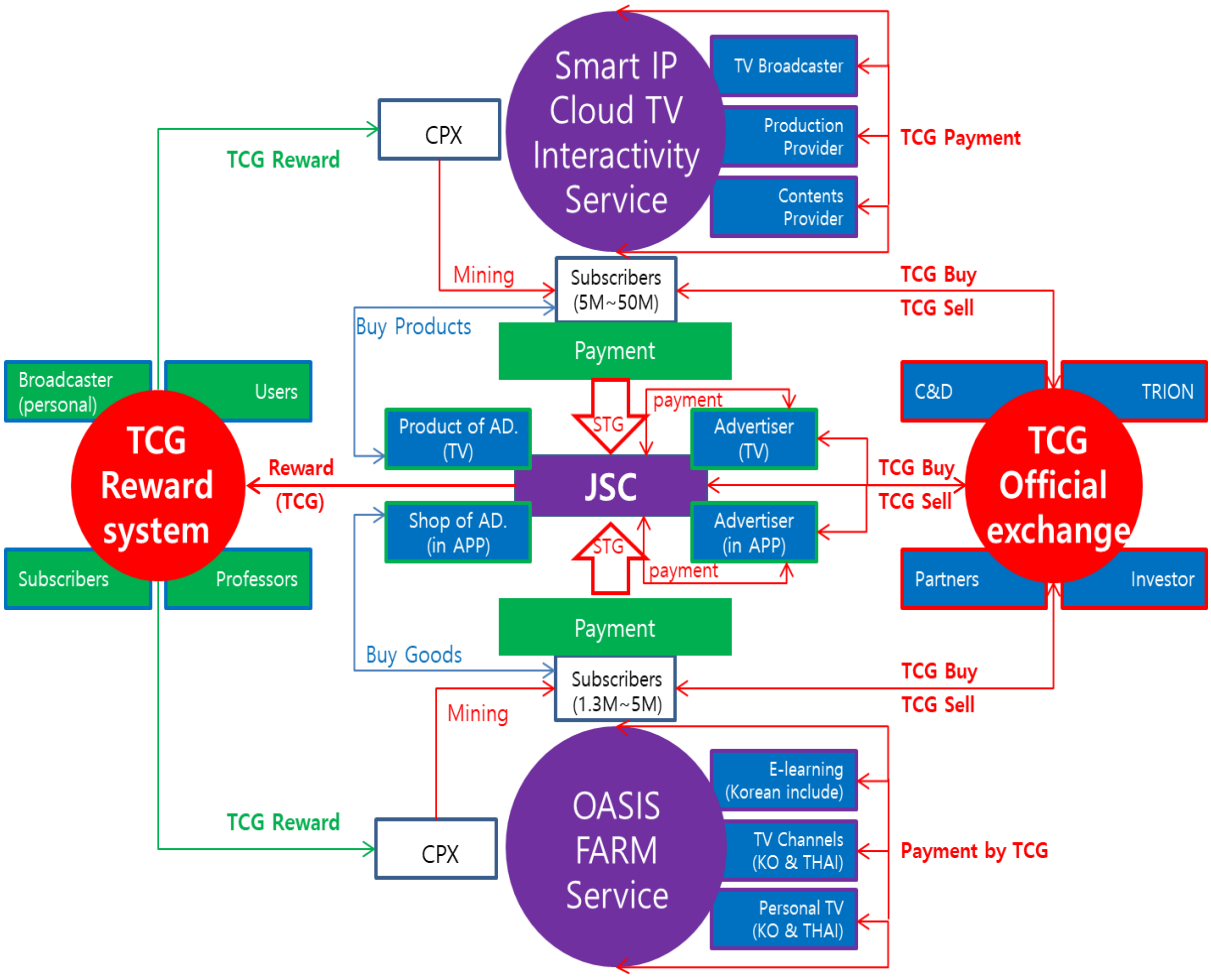
Because the current address of **content producers** is an abbreviation of the distribution structure that provides content to TV broadcasters and brings less than 30% of its revenue, our innovative Smart IP Cloud TV Interactivity Service supports interactive TV on-screen advertising, providing a variety of data, including viewer ratings and responses to products by indirect advertisers who have invested in content production, as well as generating additional revenue from sales of indirect advertising products through interactive TV on-screen shopping, and more on-demand on-demand (Vem Through this process, high profits are realized by securing continuous growth engines for quality content production and services.

As **production advertising customer** service providers, they were unable to obtain various information about the audience's age-specific response to the CPX (Cost Per X) type of advertising provided by Internet advertising, regardless of the high cost of TV advertising, services and services, but our innovative Smart IP Cloud TV Interoperability Service can enjoy all the benefits of TV advertising and Internet advertising directly through interactive TV-on-To realize high profits by expanding the sales network, increasing sales and securing continuous growth engines through the implementation of follow-up services.

With **retailers** facing the threat of their own existence due to Internet shopping, which has become commonplace in the busy daily lives of modern people, our innovative Smart IP Cloud TV Interactivity Service helps viewers buy products from direct and indirect advertisements while watching TV through interactive TV on-screen shopping. If a viewer chooses to purchase a product, the customer not only delivers the product on the same day from the viewer's neighborhood shopping mall, but also presents the various styles, colors, and sizes of related products to the buyer, thereby securing a continuous growth engine such as securing new customers through the complete pre-service and post-service of customer satisfaction that cannot be realized.

Service users are no longer just TV viewers. Our innovative Smart IP Cloud TV Interactivity Service is a pioneering service of the Fourth Industrial Revolution and upgrades TV viewers who have been consumers to Prosumers. Our service users

receive 30 percent of their advertising fees as compensation while watching interactive TV commercials, while enjoying all digital multimedia culture, and as a **private broadcaster**, compensation from viewers and advertising revenue exposed to their broadcasts will add to their lives' affluence and relaxation.



<Smart IP Cloud TV Interactivity Service & TCG ecosystem>

While **Internet operators** are investing heavily in upgrading the Internet, subscribers are not easily choosing an upgraded service with Korean subscribers. This is because the Internet services they are receiving are not too difficult to use SNS, and the quality of digital multimedia services such as YouTube and Netflix cannot be satisfied by waiting 10 to 15 seconds for buffering, even if they use the upgraded Internet service, even if they wait for 10 to 15 seconds for buffering at the digital TV level, or because transmission is repeatedly interrupted at intervals of tens of minutes during viewing. However, our innovative technology, Smart IP

Cloud TV Platform technology, meets the quality and service of digital TV levels even in the Internet environment as mentioned earlier, facilitating viewers' upgrade of Internet services and improving Internet operators' profits. By receiving 30% of the viewer fee through the installation and maintenance service of the domestic set-top box, we can not only provide full HD but also ultra-high-definition services such as 2K and 4K by creating a virtuous cycle ecosystem that can be invested to improve the level of the Internet and attracting investment from Internet service providers. In addition, it will provide a continuous investment environment for Internet operators and a high growth engine.

Based on these investments, we can ensure the future of **developing countries** and people, especially our own Smart IP Cloud TV Interactivity Service, a convergence service of broadcasting and information and communication that is not available in any developed country around the world, providing an opportunity to share the experience of the Fourth Industrial Revolution, thereby realizing the human life of the world through shared growth.

3. Market Analysis

3.1 Thailand

The broadcasting market started with 25 digital terrestrial channels in 2014, and is merged in 2019 into 15 channels, since there are various terrestrial channels, the TV market in Thailand is mainly watching terrestrial channels, and in August 2019, the current digital terrestrial channel viewing rate has risen to 59% (professional source, Thai broadcasting market trend, July 2019 issue, published by Korea Creative Content Agency). Also, the rapid growth of the OTT market is remarkable, the Thai OTT market increased by 24% year-on-year to 94 million dollars (120 billion won) in 2019, and is expected to double to **188 million dollars in 2024(220 billion won)**. (Professional source NBTC (Thailand Broadcasting and Communications Commission), announced on June 23, 2020) In addition, the market size of TV broadcasting in Thailand was 254 million dollars (300 billion won) in 2019, and is expected to reach **293 million dollars (350 billion won) in 2022**

(Professional Source, Thailand Broadcasting Market Trend 2019 July issue, published by Korea Creative Content Agency).

Unit: million USD

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
TV View fee	6	10	14	9	10	12	13	14	15	16
TV Another	377	439	549	413	208	224	241	257	267	276
	383	449	563	422	218	235	254	271	283	293

Source : PwC Global entertainment & media outlook 2018~2022 report

Source : report of the PwC Global entertainment & media outlook 2018~2022

<Thailand TV market size and forecast>

Unit: million dollars

구분	2010	2011	2012	2013	2014p	2015	2016	2017	2018	2019	2014-19 CAGR 247)
Publishing	2,412	2,488	2,559	2,660	2,654	2,672	2,708	2,749	2,802	2,861	1.5%
manga	20	23	23	20	20	19	19	19	18	18	-2.1%
music	304	304	302	287	279	273	269	268	269	268	-0.8%
Game	241	288	341	388	430	468	505	541	576	612	7.3%
movie	349	411	433	425	429	454	469	485	501	517	3.8%
animation	49	63	74	80	88	101	114	128	132	137	9.2%
broadcast	2,377	2,619	2,846	2,915	3,135	3,343	3,567	3,801	4,014	4,253	6.3%
Advertising	2,926	3,185	3,430	3,482	3,531	3,644	3,774	3,920	4,052	4,207	3.6%
Character license	21	19	20	21	22	23	23	24	25	26	3.2%
Knowledge information	1,245	1,440	1,678	1,962	2,155	2,411	2,687	2,985	3,316	3,701	11.4%
Arithmetic sum	9,944	10,840	11,706	12,240	12,743	13,408	14,135	14,920	15,705	16,600	5.4%
Sum	7,062	7,707	8,334	8,831	9,301	9,871	10,486	11,150	11,837	12,607	6.3%

<Thailand Contents Market Size, Source: PWC, KOCCA>

In the **advertising market**, the size of the TV advertising market in Thailand

was 2,088 billion dollars (2.5 trillion won) in 2019, and advertisements on terrestrial channels are overwhelmingly large compared to pay-per-views such as cable and satellite, accounting for more than 90% of the total TV advertisement cost, and expected to reach **$2.44 billion (2.85 trillion won) in 2022**.

Unit: million dollars

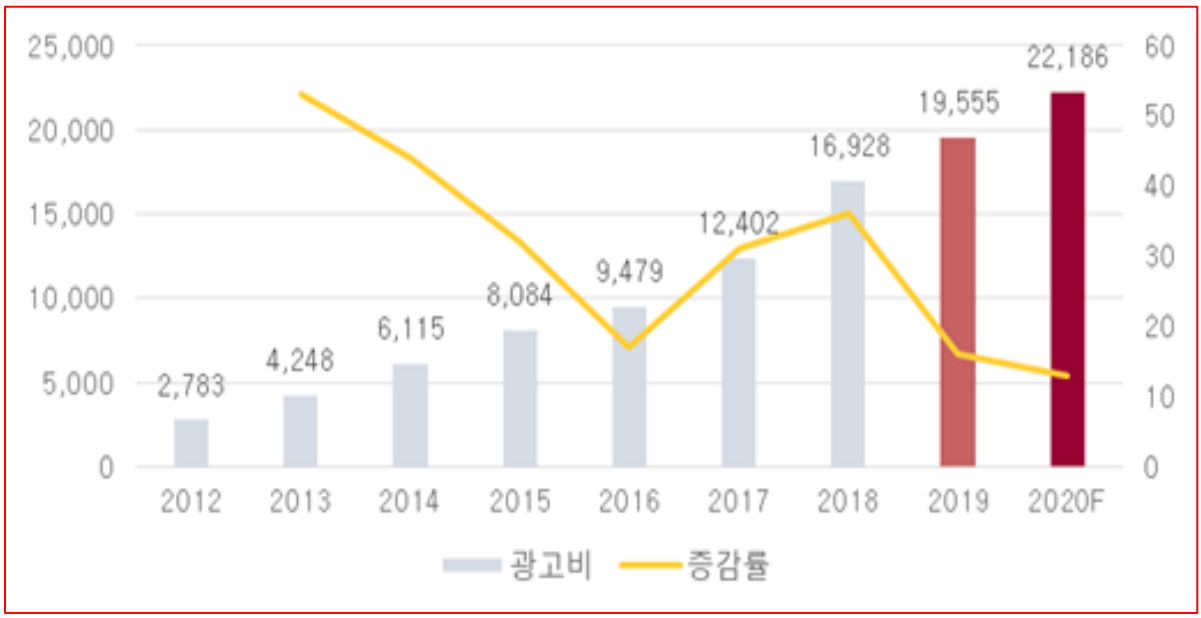
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Paid Channel	137	162	184	144	156	177	198	218	237	260
Terrestrial channel	1870	1937	2006	1712	1752	1830	1890	1982	2048	2143
	2007	2098	2190	1856	1908	2007	2088	2200	2285	2404

Source : PwC Global entertainment & media outlook 2018~2022 report

Source : PwC Global entertainment & media outlook 2018~2022 보고서

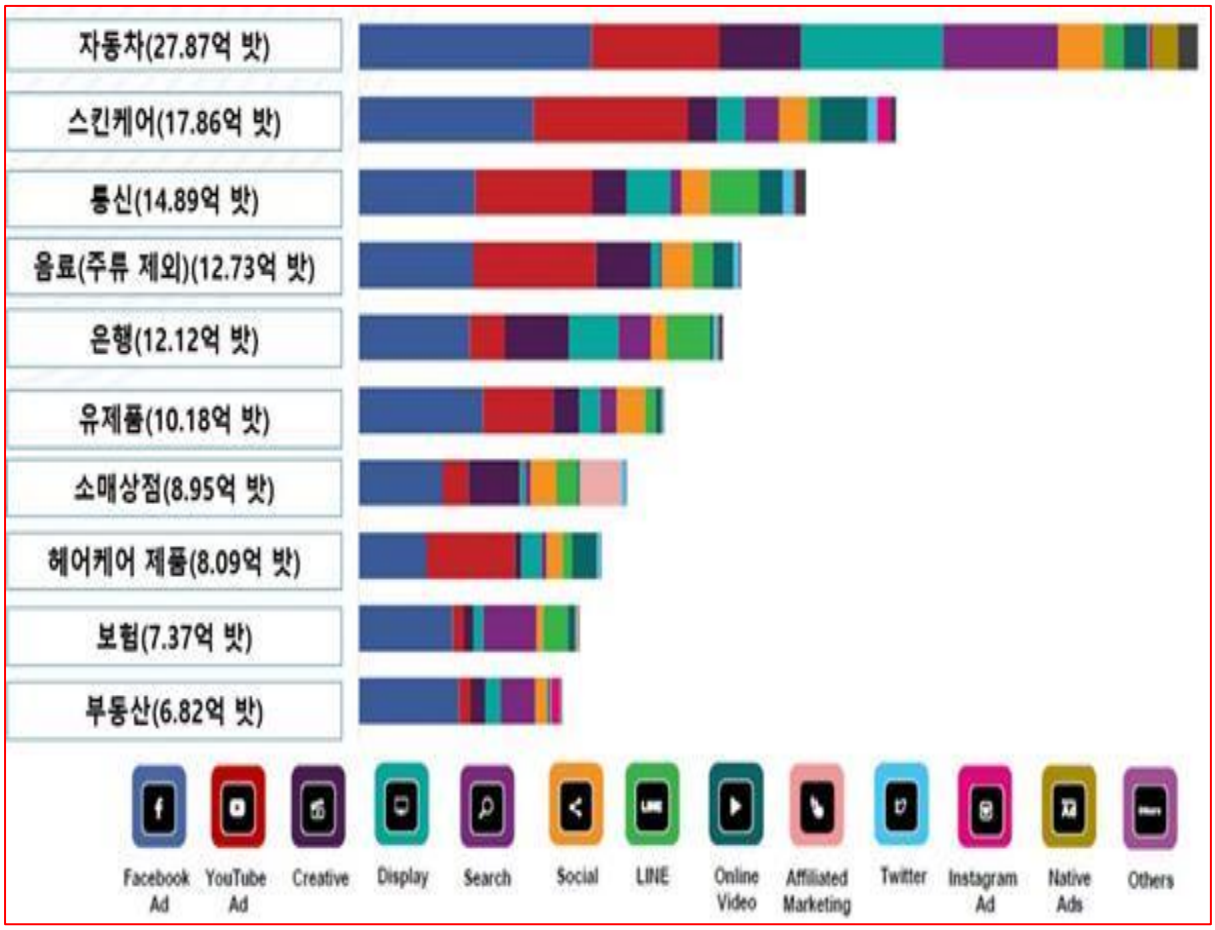
<Thai TV Advertising Market Size and forecast>

Unit million Baht



Source : Digital Advertising Association Thailand (DAAT), Kantar Insights Thailand

<Thailand Digital Advertising Market Size and forecast>



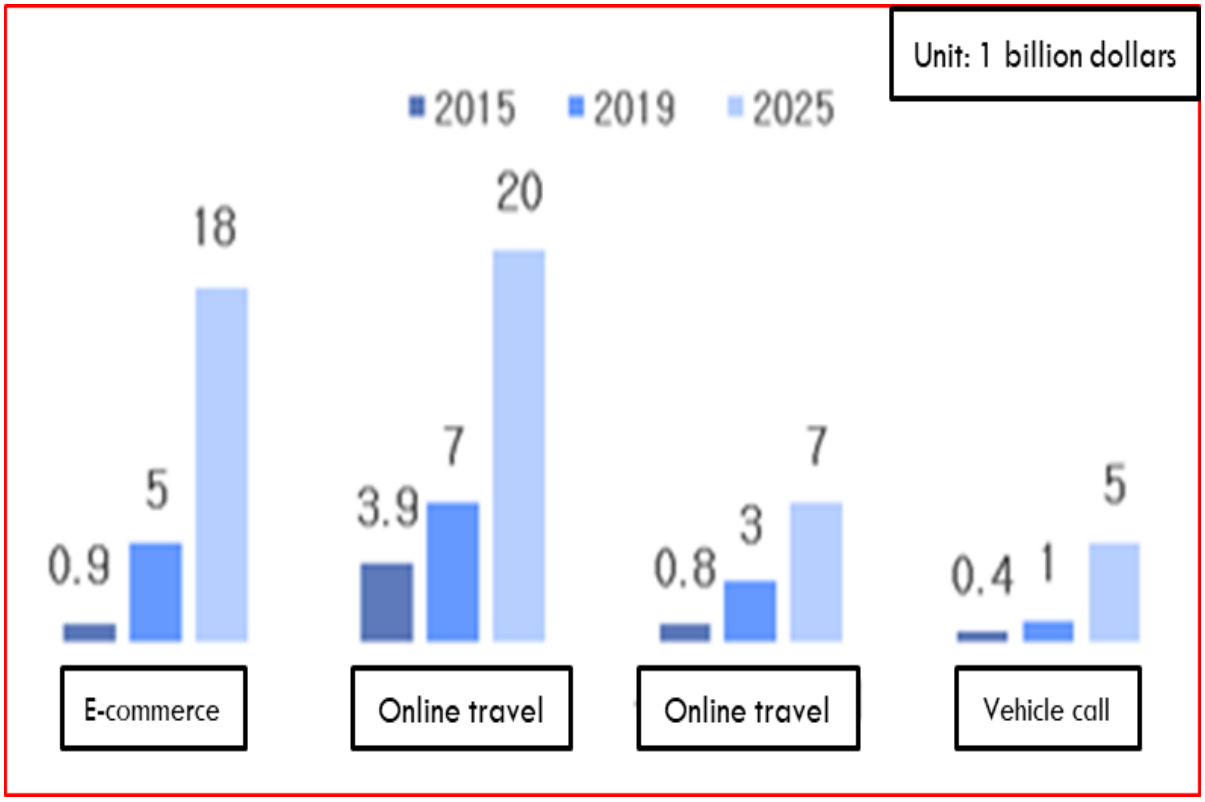
Source : DAAT, Kantar Insights Thailand

<Thailand's Top 10 Digital Advertising Expenses and Platforms (as of 2019)>

The scale of the digital advertising market in Thailand is expected to exceed 19.5 billion baht (650 million dollars, 720 billion won) in 2019 and **22.2 billion baht (734 million dollars, 820 billion won) in 2020**. The three major sectors in Thailand with the largest digital advertising expenditures are automobiles, skin care, and mobile communications, while Facebook and YouTube occupy half of the digital advertising platforms, as of **2020**, the total size of the advertising market is **$2,944 million (3.26 trillion)**.

The **e-commerce market** is rapidly expanding, centering on B2C and B2B, and the size of the Thai e-commerce market from 900 million dollars as of 2015 has increased more than five times to 5 billion dollars (5.8 trillion won) in 2019 and is expected to reach **18 billion dollars (20.8 trillion won) in 2024**. The five major

trends in the Thai e-commerce market are revitalization of e-marketplaces, rapid increase in registration of reverse direct products, increase in sales due to Corona 19, activation of live commerce, and increase in official brand registration (Professional Source: Trade Economy News (http:/ /www.tradetimes.co.kr), July 8, 2020).



Source : Trade Economy Newspaper (http://www.tradetimes.co.kr), 7, AUG. 2020

<Thailand e-commerce market size and market size and forecast by sector>

3.2 ASEAN

The **broadcasting market (contents)** is focusing on fostering and expanding the digital, convergence content industry by selecting 'New Media and Content' as one of the 7 core strategies of the 'ASEAN ICT Master Plan 2020'. The content market in ASEAN countries is showing a high growth rate of over 8% per year from 2014 to 19, and the market size is forming in the order of publishing, broadcasting, and knowledge information. As a result, the size of the content market in the six major ASEAN countries (Indonesia, Thailand, Vietnam, Malaysia, Singapore, and the

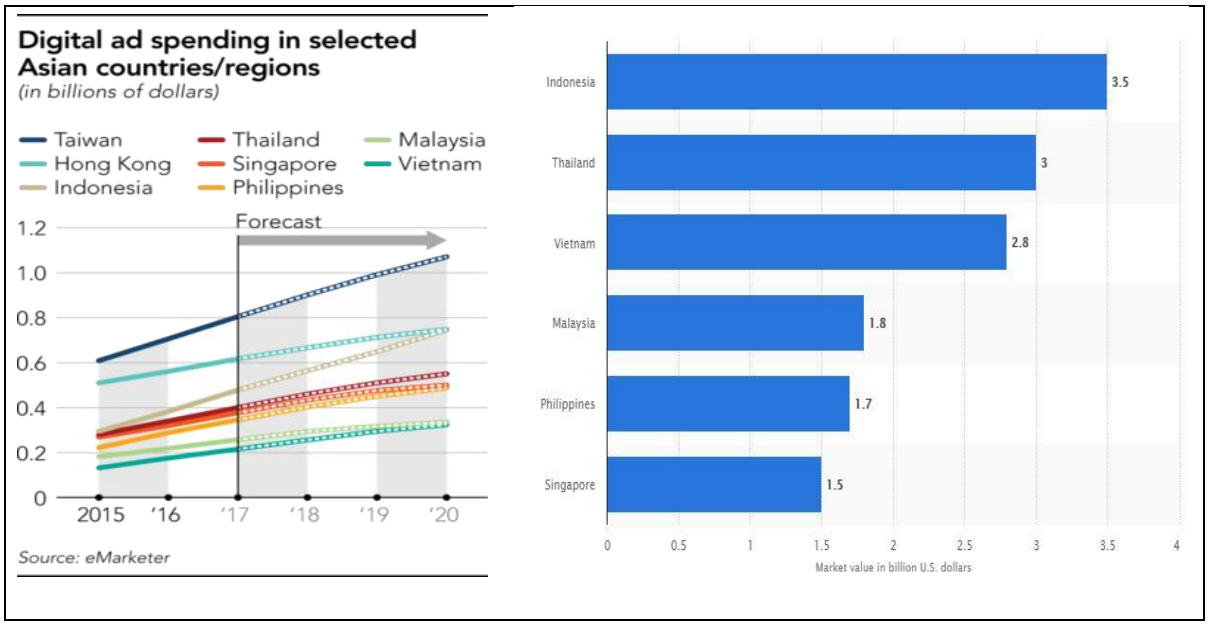
Philippines) was estimated at $49.5 billion (55.23 trillion won) in 2016, and is expected to grow by about 10% (**55.4 billion dollars, 60.8 trillion won**) by **2021**. (Professional Source: Contents Market Trends in ASEAN Countries and Content Partnership Business Introduction, April 12, 2019, Korea Creative Content Agency).

< 아세안 국가별 콘텐츠 시장 동향 ('14년~'19년) >

Source : Korea Creative Content Agency, KOTRA 2018

<Content market trends by ASEAN country (2014 ~ 2019 year)>

Globally renowned eMarketer in the **advertising market** predicted the size of ASEAN's advertising market in 2020 to be 40.5 billion dollars (4,4889 billion dollars) including Taiwan 1 billion dollars, Hong Kong 700 million dollars, Indonesia 500 million dollars, Thailand 500 million dollars, Singapore 470 million dollars, Philippines 450 million dollars, Vietnam 2.8 billion dollars, but STATISTA's **2019** ASEAN digital advertising market performance announced in 2020 was **$14.3 billion (15.85 trillion won)** including $3.5 billion in Indonesia, $3 billion in Thailand, $2.8 billion in Vietnam, $1.8 billion in Malaysia, $1.7 billion in the Philippines, and $1.5 billion in Singapore. It recorded more than 3.5 times growth than expected, which proves that ASEAN's advertising market continues to grow tremendously.



<ASEAN Digital Advertising Market Size by Country & Performance in 2019>

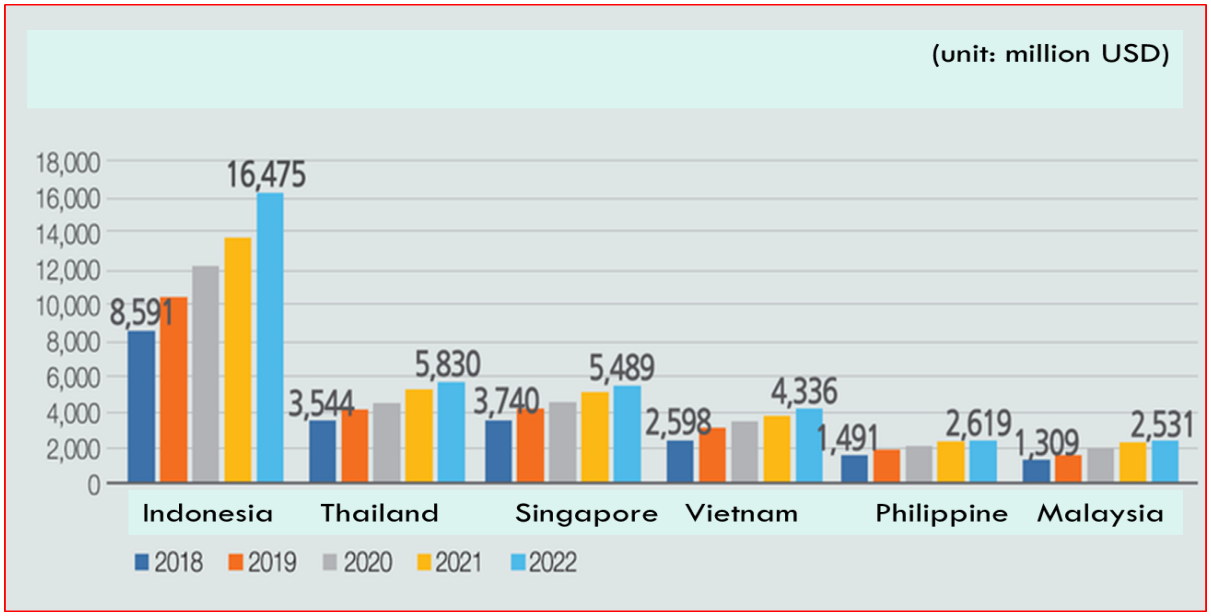
The **e-commerce market** is growing the fastest compared to other retail channels, and in the last 5 years, sales increased by 164.5% (2014 sales of $5.29 billion (6,1,255 won), 2018 sales of $14.15 billion (16) Trillion won) was recorded (professional source: Euro monitor). It continues to grow steadily every year and is expected to reach **$37.28 billion (41.35 trillion won) by 2022**.

Unit: Million USD, %)

National	2014	2015	2016	2017	2018	Increase 5 year decrease rate	2018 rate
Total	5,298	6,748	8,496	10,833	14,015	164.5	100.0
Indonesia	1,455	1,978	2,543	3,307	4,360	199.6	31.1
Thailand	1,380	1,566	1,801	2,107	2,479	79.6	17.7
Vietnam	586	863	1,282	1,703	2,127	262.9	15.2
Singapore	910	1,038	1,224	1,372	1,992	119	14.2
Malaysia	519	737	953	1,434	1,956	276.9	14.0
Philippine	448	566	693	910	1,101	145.8	7.9

* 주 1: 1IDR - 0.000071달러 기준(2019.07.01.)
* 주 2: 1THB - 0.033달러 기준(2019.07.01.)
* 주 3: 1VND - 0.000043달러 기준(2019.07.01.)
* 주 4: 1SGD - 0.74달러 기준(2019.07.01.)
* 주 5: 1MYR - 0.24달러 기준(2019.07.01.)
* 주 6: 1PHP - 0.02달러 기준(2019.07.01.)
* 주 7: 1달러 - 1156.20원 기준(2019.07.01.)
* 출처: 유로모니터

<ASEAN e-commerce market performance by country Source: Euro Monitor>



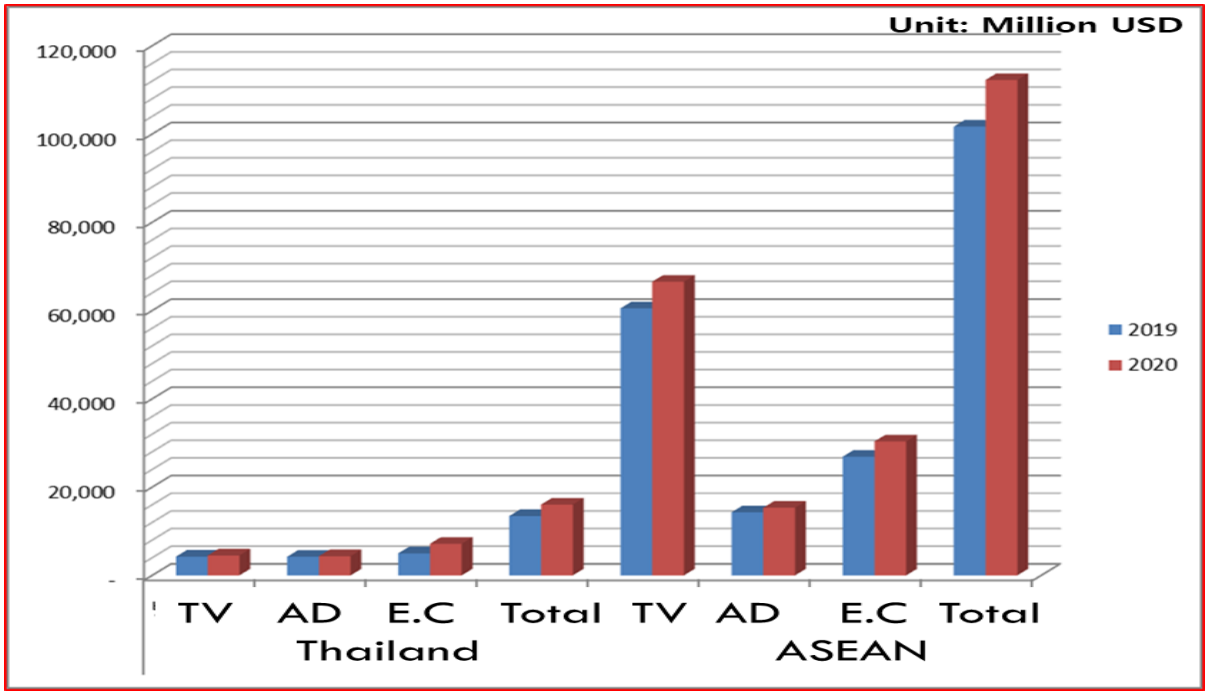
<ASEAN e-commerce market size and forecast by country Source: Statista>

3.3 Market Synthesis

In the aforementioned market analysis data, ASEAN member countries and three countries of the Indochina Peninsula, Myanmar, Laos, and Cambodia, are excluded, these countries are still in the beginning stage of the broadcasting, telecommunications and e-commerce markets, and the market size is due to the unsatisfactory economical scale, but in light of the high-speed growth characteristics of emerging countries, by the time our service started in 2021 and serviced all over Thailand through set-top boxes and smart TVs distributed to homes in 2023, these countries will also stand as our absolute customers.

When considering the aforementioned market analysis data, Thailand's broadcasting market in 2019 grew by 6.3% from $4.25 billion to **$4.521 billion(4.83 trillion won)** in 2020, and the advertising market grew in 2019 grew by 3.6% from $4.27 billion in 2019 to **$4.358 billion(4.83 trillion won)** in 2020. It is analyzed that the broadcasting and advertisement markets steadily grow together with the achievement of growth. On the other hand, the e-commerce market continues to grow tremendously by 43.4%, from $5 billion in 2019 to **$7.17 billion (7,946 billion won)** in 2020.

Analyzing the overall market situation of ASEAN countries, the broadcasting market in 2019 is growing 10% from $60.5 billion in 2019 to **$66.5 billion in 2020 (73.75 trillion won)**, and the advertising market is also growing at a high speed from $14.3 billion in 2019 to $14.3 billion in 2020. E-commerce market reached **$15.34 billion (17 trillion won)** with a high growth of 7.3%, and it can be seen that the e-commerce market is growing rapidly from $26.9 billion in 2019 to **$33.6 billion (33.6 trillion won) in 2020**.



<Analysis of broadcasting, advertising and e-commerce markets in Thai & ASEAN>

3.4 Competition Analysis

In 2014, Netflix began accelerating its global business after capturing the U.S. OTT market, and ASEAN's leading telecommunications companies began preparing their own OTT services to respond. And unfortunately, in 2015, HOOQ led by Singtel in Singapore, Viu led by PCCW in Hong Kong, and iflix, made by Catcha group in Malaysia, were launched simultaneously to compete in good faith to dominate the Southeast Asian market. Surprisingly, Hook, who seemed to have the strongest allies, was first eliminated from the competition, and then iFlix hurried to sell it under pressure to repay convertible bonds, and eventually fell into the

arms of Tencent in China.

Division	HOOQ 훅(HOOQ)	iflix 아이플릭스(iflix)	viu 뷰(Viu)
Overview	OTT Service of JVC with SingTel, Sony, W.B	OTT Service of Malaysia	OTT Service of PCCCW In Hong Kong
Viewer/Month	-	2,100 million users	41.40 million users
Price (Indonesia)	- HOOQ subscription: $5 USD per Month Don't service of the TV channels	$3 USD per Month Don't service of the TV channels	$2 USD per Month Don't service of the TV channels
Characteristic	Hollywood contents	A few kinds contents, Chipper	Korean contents provide earlier
Remark	Bought by Coopang in Korea July, 2020	Bought by Tintento in China Jun, 2020	-

<Comparison of OTT service competitors' services in ASEAN countries>

The biggest reason for this change is, of course, the entry of global operators (Netflix, HBO, Amazon Prime Video) into the ASEAN market and expanding their market share, but it cannot be ignored because each operator has not completed a stable profit model (BM) in the long term.

Hook was launched as a joint venture, invested by Sony Pictures and Warner Brothers, a large studio of Singtel's leading Lohan, and the first competitive advantage was Singtel's sales network shareholders' appreciation and movie TV series developed in ASEAN. Although customers browse wallets and expect to spend blockbusters, the situation continues to be unpredictable due to the **absence of local content** and a **flat monthly fee tailored to the income level of Singapore**, which has high GDP in ASEAN. Recognizing this situation, we started to provide regional-based original content creation and advertisement-based free services, but withdrew in time and failed to secure additional investment costs, we will liquidate the joint venture and provide services in March 2020.

In the early days of the business, **iflix** completed a revenue model of providing services to telecom operators at wholesale prices. Telecom companies pay attention to OTT because of the increase in mobile traffic use, the change is to change (upsell) products to high-priced plans, or to prevent (hold) churn of high-

priced plans, and iflix, an independent system that has no interest with other carriers, knows that they do so. Was the most partner you could ever have. iflix has grown in size by entering more than 20 Nulls over the years by copying and pasting the profit model for the following telecommunications companies, and from investors paying attention to this growth, $350 million (about 420 billion won). It has been dreaming of the birth of all media unicorns to be listed on the Australian stock market in 2019 by attracting more than KRW) investment. Demand for new growth engines is increasing as expansion into new countries is stagnant. Iflix launches 'iflix free', an ad-based free service in 2018. Iflix wanted to get a higher valuation at the time of public offering (IPO) based on expanding its free service more than a new revenue stream business through advertising. As much as the increasing profits, the investment has been exhausted at a rapid pace, but it is decided to postpone more listings after listing. In early 2020, the pandemic caused by Covid-19 wiped out all these expectations at once, and as the deadline for repayment of convertible bonds of $47.5 million (approximately 57 billion won) approaches, in the end the company is far lower than originally expected. Selling to China's Tencent at the price is very unfortunate.

From the beginning, **Viu** has wisely overcome the barriers to low media consumption spending in Southeast Asia through a revenue model that provides services for free and then switches subscriptions to paid products. If you upgrade from an ad-based free 'Free Viu' to a paid product, 'Viu Premium', the service not only allows you to watch VOD for 8 hours after airing on TV (advertisement takes 3 hours after paying), internal download and full access to TV. You can receive support for listening in HD quality. The proportion of subscribers to paid products has gradually increased, and in recent years, the proportion of advertisements and subscription fees for paid products has reached almost 5:5. It is nagging to say how much the increase in paid products will help in the recent downturn in the global advertising market. Along with the revenue model, Viu's secret to success is wise content sourcing and production. Viu recognized Hallyu content at its core from the beginning of its launch and signed a Southeast Asian copyright contract

with three terrestrial broadcasters to take the monopoly. Particularly noteworthy is that it did not increase the cost burden as it brought the content monopoly and shortened the validity period of the contract. Based on Hallyu content, which is welcomed in the Asian market, advertisement-based free is collected, and the line expansion cycle has created a cycle of increasing advertising inventory and subscribers to paid products. This will prepare you for the competition with the only surviving global company through Viu's 2015 OTT Southeast Succeeded Viu, which succeeded in generating the resources to create original content.

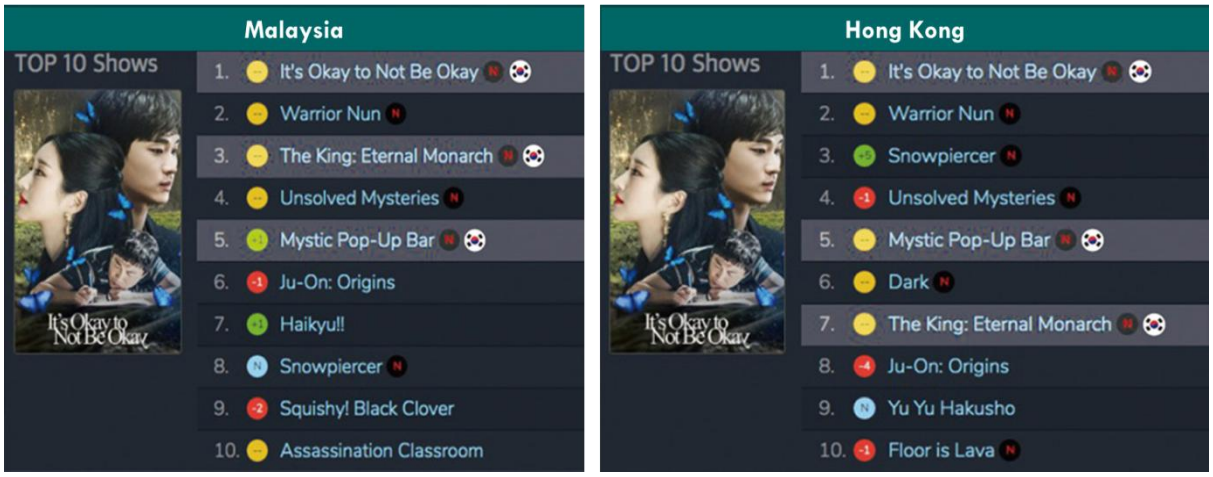
You can recognize two changes in the Southeast Asian OTT market in one slide contained in the 2019 Annual Report of Hong Kong PCCW.

Rank	Income in APP.	MAU	Time	Watching time per user
1	Netflix	Netflix	Netflix	Netflix
2	Viu	Viu	Viu	Viu
3	WeTV	iflix	iWant TV	Youtube Kids
4	V-Live Broadcasting	TruelD	Youtube Kids	iWant TV
5	MONOMAXXX	iWant TV	WeTV	AIS PLAY
6	TruelD	LINE TV	iflix	HOOQ
7	HBO GO Singapore	Google Play Movies and TV	TruelD	iflix
8	iflix	YouTube Kids	Twitch	TruelD
9	HOOQ	HOOQ	HOOQ	LINE TV
10	iQIYI	AIS PLAY	LINE TV	Google Play Movies and TV

Source: PCCW 2019 Annual Results, 13, FEB. 2020.

<ASEAN countries' OTT service market share indicators>

First, Netflix ranked first in the ASEAN OTT market, and I think I will explain about the company. The content that was not yet powerful does not include Hallyu content from the second half of 2019, and the top 10 content of the current ASEAN event is definitely Hallyu content. Still, in the Asia Pacific market (APAC), Netflix estimates all rates at 10% and only offsets the price resistance (if monthly subscriptions are discounted or Southeast Asian income levels rise), it could take a far superior position than it is now.



Source: www.flixpatrol.com.

<Top 10 Netflix in Malaysia and Hong Kong (Korean content is popular)>

Second, Chinese services such as WeTV and iQIYI are expanding. WeTV (global version of Tencent Video) and Baidu's iQIYI, which had been operating only in China due to proposals and various regulations, leading the global OTT market together with the United States, aims to actively promote global business in ASEAN. In ASEAN, Chinese-speaking Chinese is widespread, and Chinese entry is actively progressing through trade strategies such as one-to-one (一帶一路) recently, and demand for OTT centered on Chinese content is expected to increase. In this context, Tencent acquired iFlix for the rapid expansion of Wi TV service.

In the future, competition between ASEAN OTT services will be seen in Netflix, which will be much more intense than it is now, and it seems clear that Hallyu content will act as a key element of the competition. As a result, it is likely that a time of agony will come to businesses that produce and distribute Hallyu contents. Various tours have been interested in the ASEAN OTT market and have made various attempts, but it was a repository that achieved various desired outcomes. Therefore, it is possible to consider the discussion on OTT integration, which has become a recent issue, from the perspective of global expansion. Still, in Korea, many OTT services are taking monthly flat rate as a profit model. There is no big issue in a time when various services grow together. Various global OTT companies will enter Korea as well. Already in the U.S., Hulu, Peacock, etc. have seen a profit

model that combines advertising and a monthly amount, and as the subscribers of OTT expand and the competition in Southeast Asia as seen earlier intensifies, the structure that is advantageous for the long-term survival of entrepreneurs with an advertisement-based profit model prepared can be seen.

It is suggested that from now on, a real-time plan to evolve from a free service that focuses on inducing OTT service experience to an advertisement-based service based on the current channel. (Professional Source: ASEAN OTT Market Changes and Implications, S.G IM)

On May 18, 2020, on the first day of online classes held in Thailand, satellite TV DLTV (channel 1 to 15) and two types of internet distance education application platforms were all down. All services including education and TV channels were unavailable.

Children waiting for online learning crashes every system

Source: https://www.komchadluek.net/

<All systems for distance education in Thailand collapse>

Thailand's NBTC has approved a set of training channels for 17 programs classified as channels 37-53, which air from 18 May 2020 to 30 June 2020. However, when the service was started as specified, all channels and applications below did not work properly.

ชั้น	KU-Band (จานทึบ)	ช่องสัญญาณ จานทึบ	ช่องสัญญาณ ดิจิตอลทีวี	C-Band (จานตะแกรง)	ช่องสัญญาณ AIS
อ.2	ช่อง 187	ช่อง 196	ช่อง 38	ช่อง 186	ช่อง 710
อ.3	ช่อง 188	ช่อง 197	ช่อง 39	ช่อง 187	ช่อง 711
ป.1	ช่อง 189	ช่อง 186	ช่อง 40	ช่อง 188	ช่อง 700
ป.2	ช่อง 190	ช่อง 187	ช่อง 41	ช่อง 189	ช่อง 701
ป.3	ช่อง 191	ช่อง 188	ช่อง 42	ช่อง 190	ช่อง 702
ป.4	ช่อง 192	ช่อง 189	ช่อง 43	ช่อง 191	ช่อง 703
ป.5	ช่อง 193	ช่อง 190	ช่อง 44	ช่อง 192	ช่อง 704
ป.6	ช่อง 194	ช่อง 191	ช่อง 45	ช่อง 193	ช่อง 705
ม.1	ช่อง 195	ช่อง 192	ช่อง 46	ช่อง 194	ช่อง 706
ม.2	ช่อง 196	ช่อง 193	ช่อง 47	ช่อง 195	ช่อง 707
ม.3	ช่อง 197	ช่อง 194	ช่อง 48	ช่อง 196	ช่อง 708

Source: https://www.komchadluek.net/

<Distance education channel approved by the NBTC of Thailand>

4. Business Plan

4.1 Service Provided

Starting from Thailand, ASEAN will expand OTT services to the world. Netflix, which ranked No. 1 in the ASEAN OTT market, cannot provide a real-time TV service with satisfactory service that supports instant viewing without the need for digital TV quality and quality satisfaction and buffering waiting time due to the poor Internet environment in Thailand.

However, our innovative technology can provide real-time TV service with service satisfaction that provides channel switching without buffering latency, as well as satisfaction of digital TV quality and even in Myanmar, Laos, Cambodia, etc., where the Internet environment is worse than Thailand. As in the case of Korea, it provides real-time TV viewing that satisfies the quality, quality and service of digital

TV even at a speed of 200 km/h even when using all means of transportation that do not provide internet access service inside public transportation.

<OTT service: real-time transmission of Thai terrestrial TV channels>

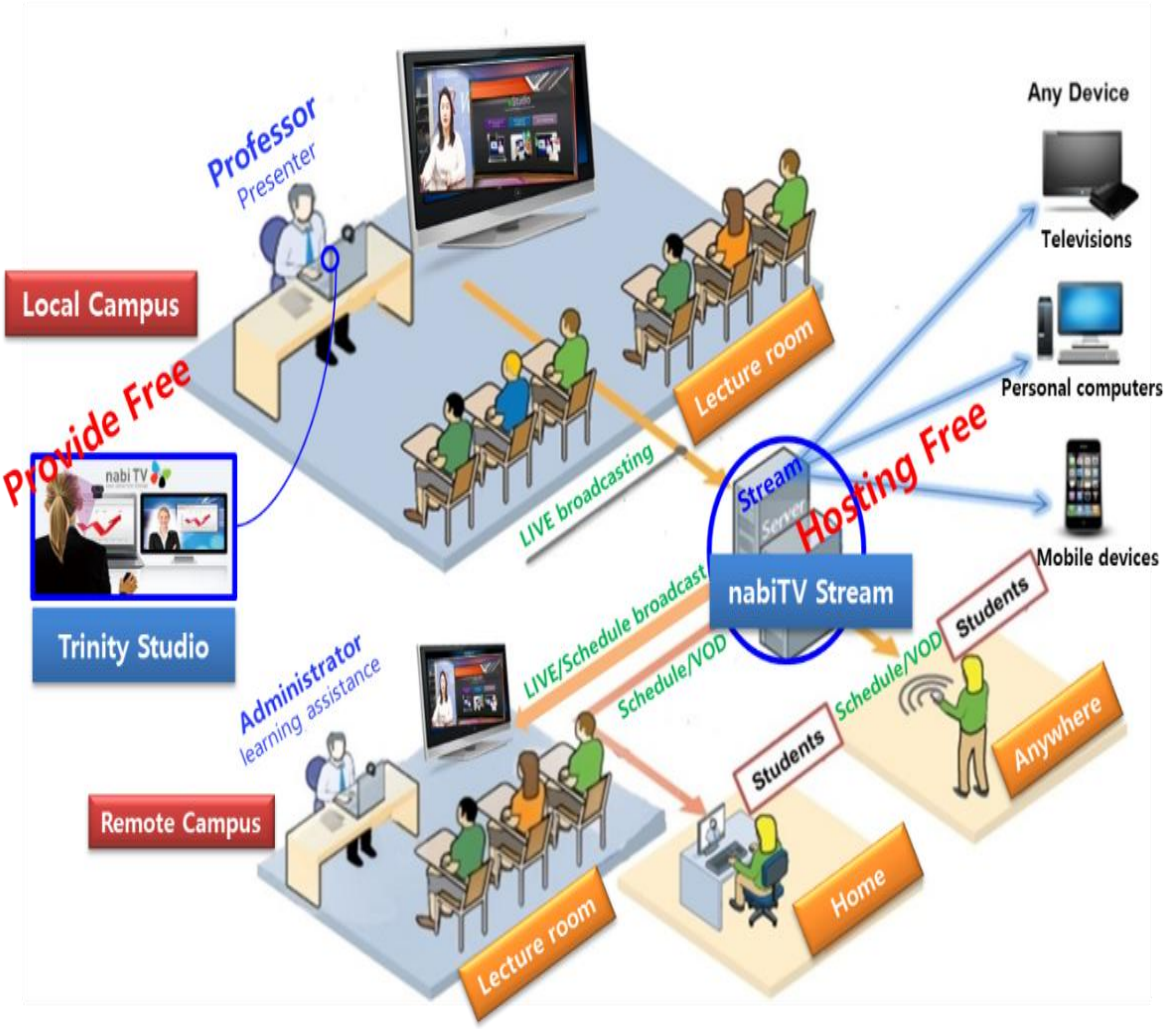
In the environment of terrestrial broadcasting in Thailand, we are not obligated to pay for content usage in retransmission of terrestrial broadcasting, but rather, we can charge a fee for transmission, and due to the various terrestrial broadcasting channels, Thai TV centered on terrestrial channel viewing. In the broadcasting market, no one can deny the fact that our service has secured great competitiveness.

Our innovative technology realizes real-time TV transmission that satisfies the quality and service of digital TV even on the public Internet network. Therefore, we realize real-time transmission of Korean terrestrial broadcasting at low cost with our service platform built in Thailand in Korea.

<OTT service: real-time transmission of Korean terrestrial TV channels>

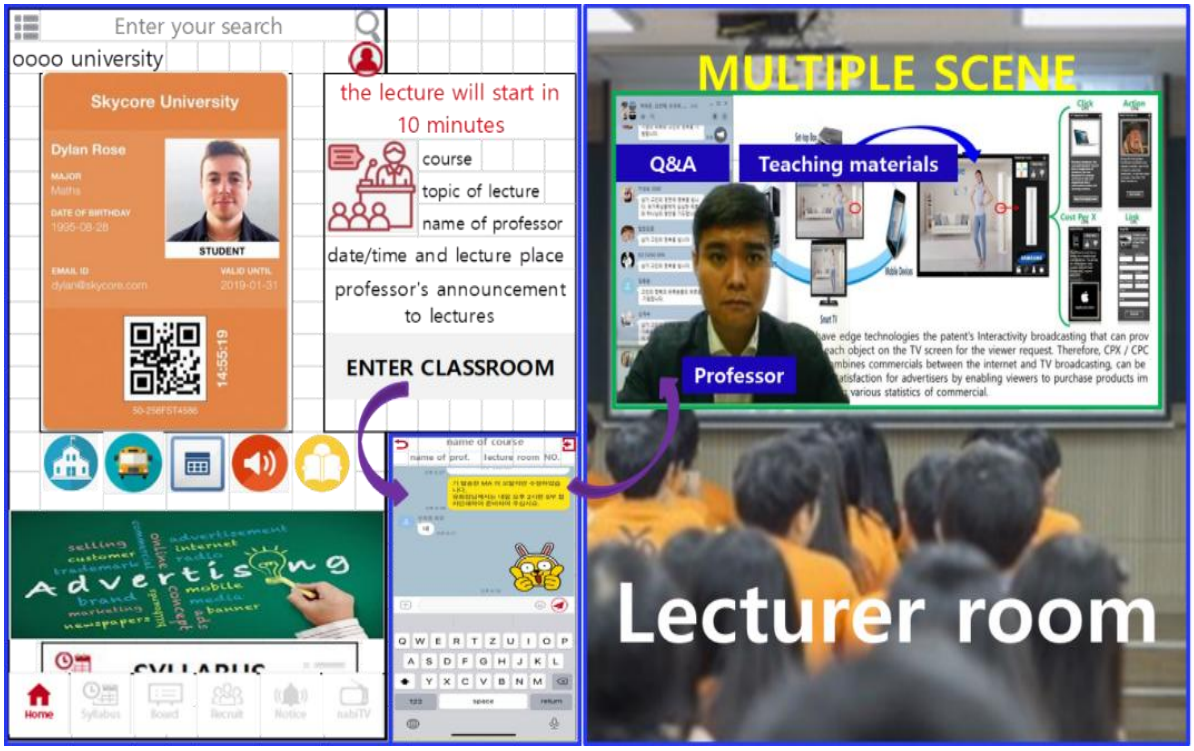
This transmission of terrestrial broadcasting does not require separate consultation with each broadcasting station, and there is no need to pay for content. The fact that the top 10 contents in the ASEAN OTT market is the Korean Wave means that our service has already secured great competitiveness.

In addition, in the face of the COVID-19 outbreak, the distance education platform established by the Thai education authorities, which desperately needed distance education, did not function properly in all services through the Internet and satellite, so our innovative technology Smart IP Cloud TV Platform As an opportunity to be recognized for the excellence in performance, quality, and service, Colalongkorn University, which is considered the best in Thailand, and the Assumption University belonging to the same foundation, wish to participate in this project. The presidents of the Royal University Foundation from all over the country enrolled in 5 million out of 6 million Thai college students were convened by Princess Maha Tsakri Sirinton of the Thai royal family, who is called the mother. It was held on the 30th, and 6 million Thai college students were attracted to our OTT service, and a green light was turned on.



<Remote education service: Real-time distance education broadcasting platform>

Our innovative technology transmits real-time distance education broadcasts that achieve digital TV-level picture quality, quality, and service satisfaction through the public Internet, which is not guaranteed in speed and quality, between universities and colleges, campuses and campuses, and classrooms and classrooms. In addition, Trinity Studio, a remote education authoring tool provided together, is a combination of virtual reality and augmented reality technologies, and is a high-quality, immersive and highly immersive educational aid material such as documents, videos, and Q&A functions. It supports the creation of contents, and our innovative digital multimedia compression technology supports real-time encoding of high-definition multimedia like digital TV even in general notebook computers.



<Real-time distance education broadcasting with various textbooks>

The application provided together provides a convenient lecture schedule creation and lecture management that maximizes the convenience of students, and at the same time, by sharing with friends, a meeting appointment that does not interfere with each other's lecture schedule is set, and through various types of anonymous public bulletin boards. Without worrying about the exposure of personal information, information on school life and experiences of seniors are shared, and textbooks are shared through mutual communication through direct messages and used bookstores. By providing self-reliance, we offer more and more students the opportunity to pursue higher education.

In addition, the real-time Korean language education broadcasting in Korea maximizes the educational effect by enhancing students' immersion in the class with a vivid sense of the realism of the education, as the enrolled students can inquire and receive responses from the instructor in real time. Provides students with a chance to learn not only to review students, but also to students who missed a lecture, and to learn vivid Korean conversation through real-time viewing of terrestrial broadcasts transmitted from Korea. Even if there is a bar to take the

Korean language proficiency test at the university, we do not even have a private academy that teaches Korean language, so not only students who had no choice but to study on their own, and to all those who wish to learn Korean language, we want to play a role as an oasis in the desert. Students who have passed the Korean Language Proficiency Test are provided with an opportunity to earn tuition by participating as short-term trainees in agricultural, fishing and industrial sites in Korea using the vacation period, and to resolve the labor shortage in industrial sites in Korea Through smooth communication with Korean employers, we contribute to strengthening friendly relations between countries through the formation of intimate relationships with each other based on mutual understanding, mutual benefit, and respect.

<Oasis farm service: learning efficiency, convenience, and income creation>

Most of the Oasis Farm services we provide for students are free, but there are services provided for a fee. However, students do not have to pay their own fees for paid services. When students use each service, they see the advertisement displayed between the service and the service and respond in the form of CPX, so

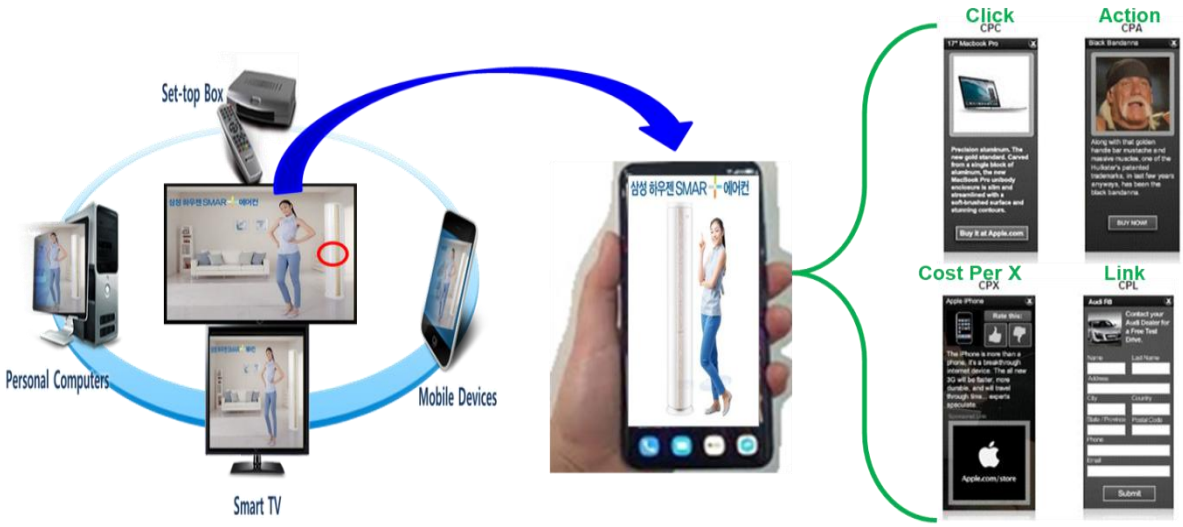
that 10% (CPM) or 20% (CPC/CPI/CPL) and % of the TCG Token that the advertiser pays to us as an advertisement fee. You will receive 30% (CPA /CPE) as a reward.

Trinity Studio, the aforementioned distance education authoring tool, is distributed free of charge to not only professors for distance education, but also students and all subscribers who use our service to provide their talents through real-time broadcast or on-demand broadcast to viewers with knowledge and wisdom. Not only does it give us joy, but it also gives us joy, and we donate TCG Tokens from viewers who are impressed by this, and it can be used not only to pay for our paid service, but also to pay for goods and service fees of advertisers of our service, and furthermore, Of course, it can also be exchanged for cash at the exchange.

<Personal broadcasting service: Talent broadcasting to generate income>

Trinity Studio, a personal broadcasting authoring tool, is fused with our innovative patented technology for digital multimedia, and supports high-definition and high-quality compression of digital TV level even on ordinary laptops, and even on the Internet for general users who do not guarantee speed and quality. It supports the provision of real-time broadcasting and on-demand broadcasting that satisfy the quality, quality, and service to viewers around the world through various terminals connected to the Internet.

All of our innovative services turn every user who uses it into a prosumer, not a consumer. As described above, the Oasis Farm application receives TCG Tokens through CPX-type advertisements. In addition to receiving TCG Tokens from viewers for individual talent broadcasting, the creative service business model based on our innovative virtual reality and augmented reality technology is the TV video that watches terrestrial broadcasting, cable broadcasting, satellite broadcasting and IPTV broadcasting. Direct advertising and indirect advertising products through the virtual reality and augmented reality technology cameras built into our Oasis Farm application, viewers respond in CPX format. It is shown to viewers and is provided with a variety of information on the effectiveness of advertisements (by time zone, region, gender, age, occupation, preferences and opinions through consumer participation, etc.), helping to establish various policies for marketing. Of course, it can be used for planning, and viewers will be rewarded with 10% (CPM) or 20% (CPC/CPI/CPL) and 30% (CPA/CPE) of TCG Tokens paid as advertising fees to us.



<VR/AR convergence technology smart phone interactive advertisement>

In Thailand, advertisements for terrestrial channels account for more than 90% of the total TV advertising expenditure and are expected to reach **$2.44 billion (2.85 trillion won) in 2022**. As a platform service for convergence of broadcasting and communication and advertisement that provides the best profit model that provides the world's one and only exclusive service that is unique and innovative,

it is expected that subscribers who use the service will also receive more TCG Tokens as compensation.

Our innovative service does not end with advertisements, but on-screen delivery of same-day delivery from neighboring stores that guarantees thorough pre- and post-services that viewers can purchase information about direct or indirect advertisement products in one month. Maximize the advertising effect to advertisers through shopping, expand the sales network, and secure loyalty to reorganize into a producer-centered industrial system, focusing on product development, supplying high-quality products at low and stable prices, and supplying high-quality products to buyers from neighborhood stores. Thailand's e-commerce market worth **11.1 billion dollars (12.300 billion won) in 2022** by providing the world's only and unique, and innovative service that provides thorough pre-service, packaging material reduction, and convenient and quick post-service by direct delivery. There is no doubt that it will be at the forefront of leading the 4th industrial revolution around the world as a broadcasting, communication and e-commerce convergence platform service that dominates the world.

<VR/AR convergence technology smart phone interactive shopping prosumer>

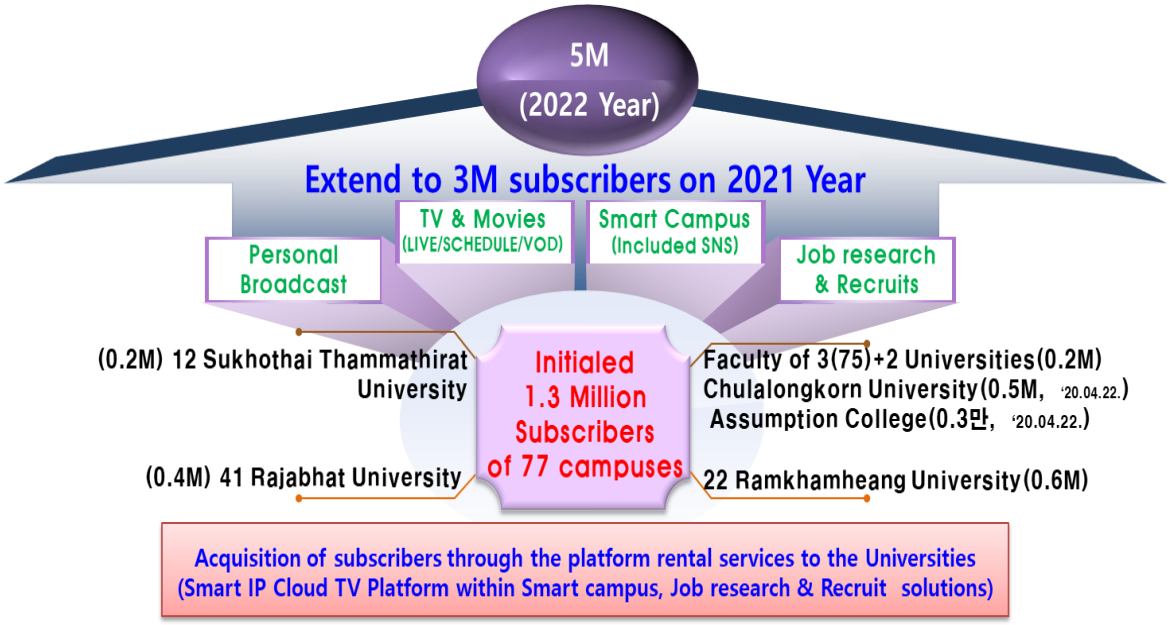
Above all, our TCG Token's effectiveness as a simple and secure payment tool will increase more and more, and no one will deny that it will become a reality for all who use TCG Tokens to experience increasing value day by day.

4.2 Attracting Subscribers

Since 2012, we have determined our target customers for our OTT service through in-depth consideration and experience on the broadcasting, telecommunications, and e-commerce markets of ASEAN countries. No matter how innovative technology and original service, if the user's terminal used to use this service cannot play digital multimedia, attracting subscribers using the service will be a difficult journey.

Therefore, we identified a group of college students who own smart phones that are not compatible with playing digital multimedia and considered a plan to attract them as subscribers.

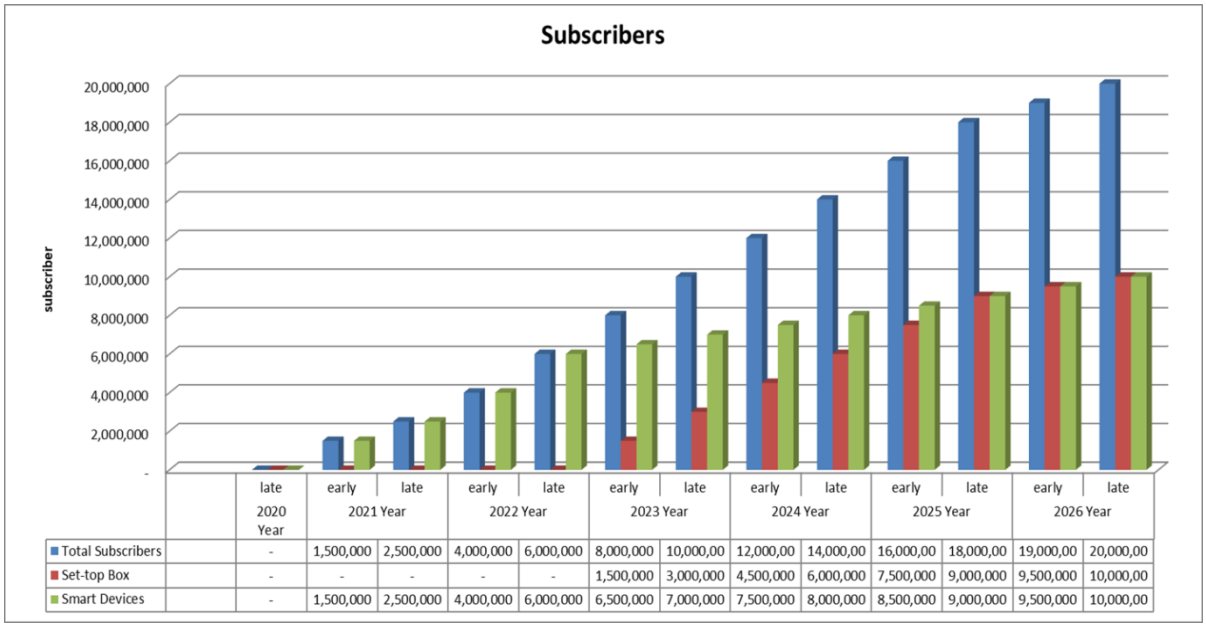
As a result, the focus was on distance education, which is a trend of the times and is the basis for national competitiveness. The participation of the three universities. Langkhamhaeng University, Thailand's largest open university with 600,000 students studying in 22 campuses nationwide, Rajabhat University with 400,000 students in 41 campuses nationwide, and Sukhothai Tamase University with 200,000 students in 12 campuses, was well brough up.



<Oasis farm service and OTT service: How to secure initial subscribers>

At the end of 2019, the need for non-face-to-face education was raised due to the COVID-19 situation, and as Thailand's top prestigious university, Chollarongkorn University, where 50,000 students attend, hoped to participate in the project, and 30,000 belonging to the same foundation as the university. Student's Assumption University participated, and due to the poor Internet environment in Thailand, all non-face-to-face education platforms were not functioning properly. As a result, the mother of education, the mother of the Internet, was called by Princess Maha Chakri Shirinton of the Thai royal family. The presidents of the Royal University Foundation from all over the country, of which 5 million university students are enrolled in Thailand, were convened and a forum for technology and services on our platform was held on June 30, 2020, and 6 million Thai university students were subscribers of our OTT service. The green light was turned on./.

Accordingly, we launched a pilot service from June to July 2021, attracting 1.3 million subscribers, and starting commercial services from August when the semester begins, securing 3 million subscribers including professors and students by the end of the year. At the end of the year, after securing 5 million subscribers, 5 million set-top boxes were distributed to each of these subscribers' homes. By 2023, the company's innovative technology Smart IP Cloud TV Interactivity Service was provided to 10 million subscribers, providing the service to Myanmar. Secure a bridgehead to expand to countries such as Cambodia and Laos.

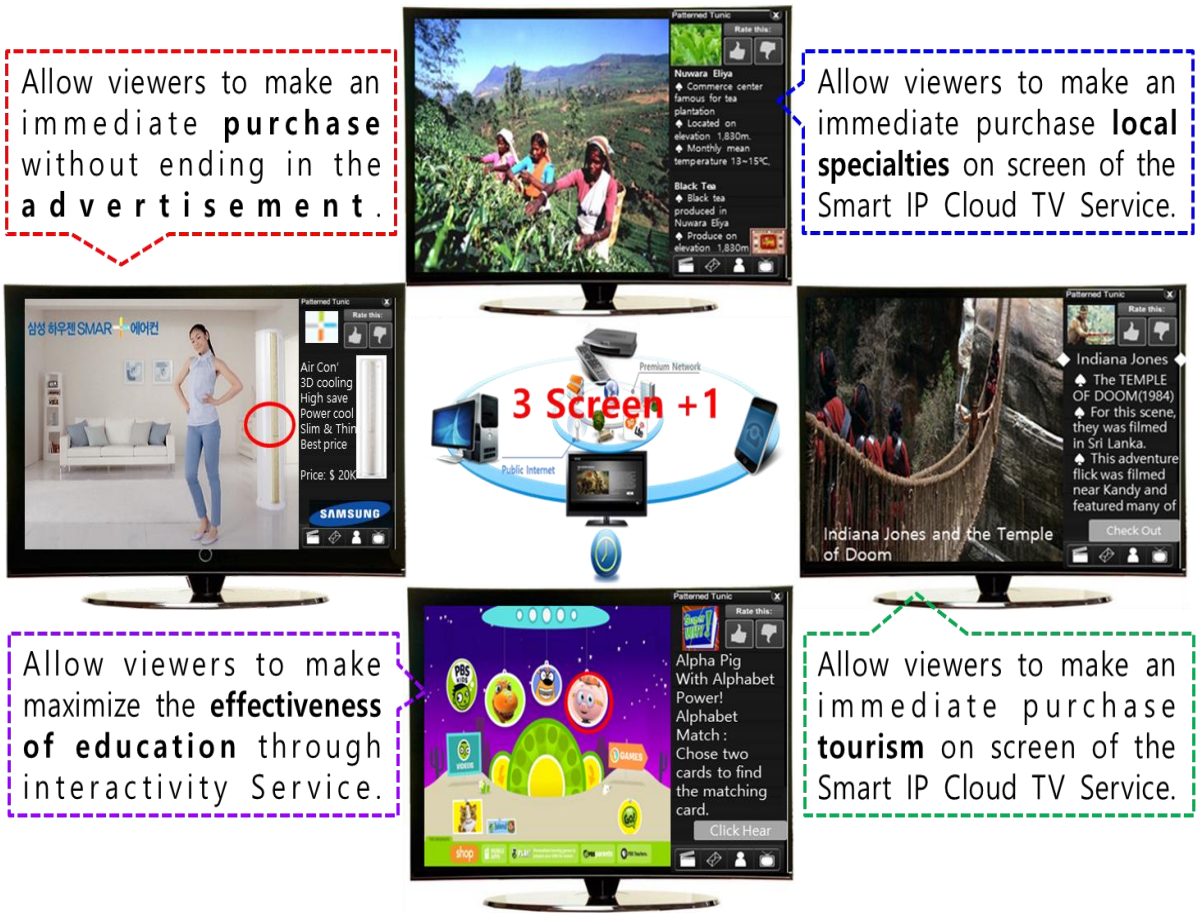


		late 2020 Year	early 2021 Year	late 2021 Year	early 2022 Year	late 2022 Year	early 2023 Year	late 2023 Year	early 2024 Year	late 2024 Year	early 2025 Year	late 2025 Year	early 2026 Year	late 2026 Year
Total Subscribers		-	1,500,000	2,500,000	4,000,000	6,000,000	8,000,000	10,000,00	12,000,00	14,000,00	16,000,00	18,000,00	19,000,00	20,000,00
Set-top Box		-	-	-	-	-	1,500,000	3,000,000	4,500,000	6,000,000	7,500,000	9,000,000	9,500,000	10,000,00
Smart Devices		-	1,500,000	2,500,000	4,000,000	6,000,000	6,500,000	7,000,000	7,500,000	8,000,000	8,500,000	9,000,000	9,500,000	10,000,00

<Smart IP Cloud TV Interactivity Service: Subscriber attraction plan>

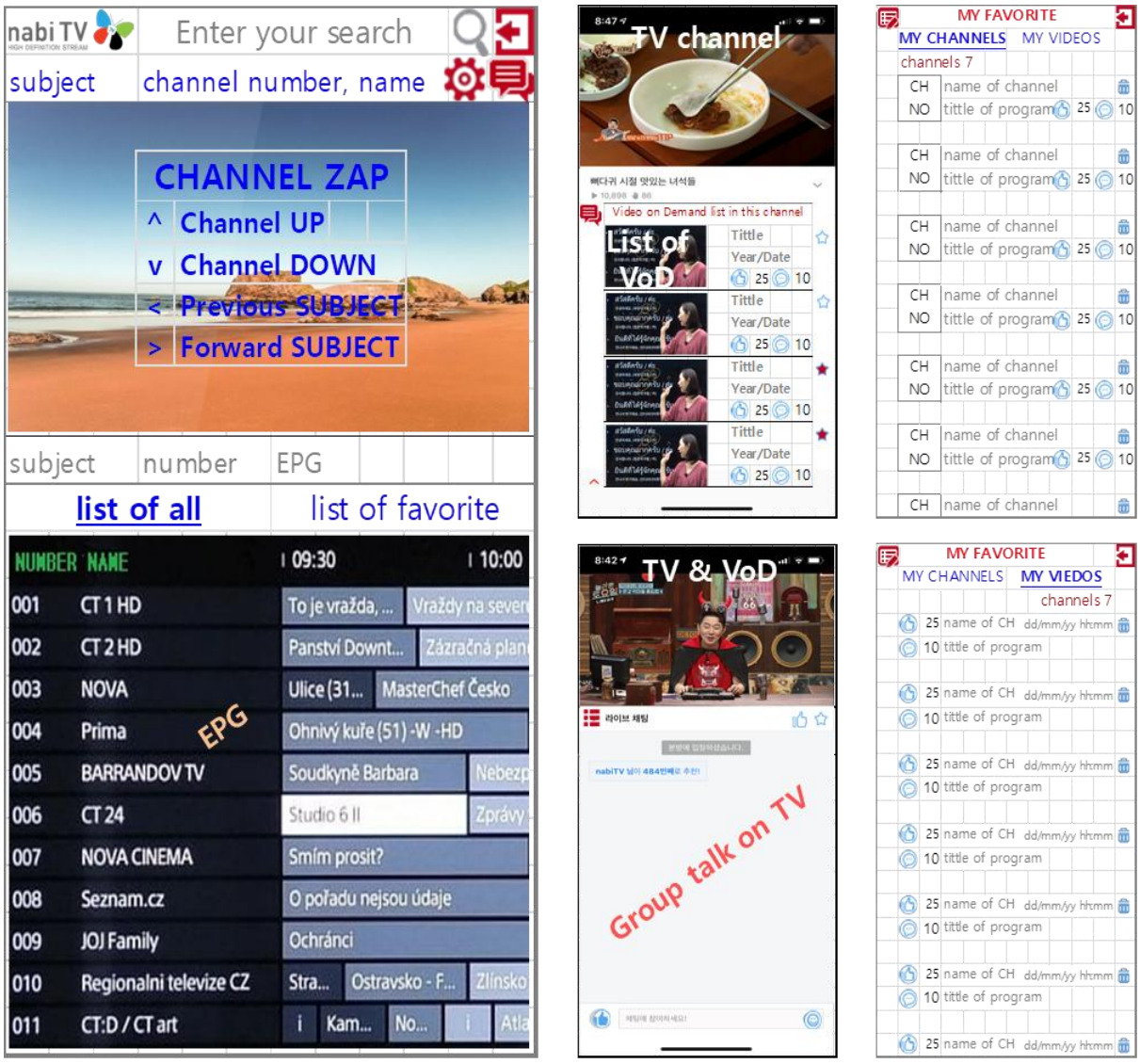
4.3 Service evolution

By distributing set-top boxes and dongles to TV connection devices in each home, we will strengthen real-time broadcasting and on-demand broadcasting services of not only Thai terrestrial TV channels, but also cable and satellite TV pay channels and Korean terrestrial TV channels, as well as the latest Korean contents. Providing all TV channels and expanding SVOD and TVOD services and realizing interactive TV services on TV screens by providing a true Smart IP Cloud TV Interactivity Service, such as interactive TV on-screen advertisement and interactive TV on-screen shopping. Of course, it completes the digital multimedia syndicate of One Source Multiuse through services that support shopping for educational broadcasting services, shopping for textbooks, and shopping for tourist products and indirect advertising products, including information on tourist destinations in contents such as dramas and movies.



<Smart TV Cloud TV Interactivity Service: Interactive TV services>

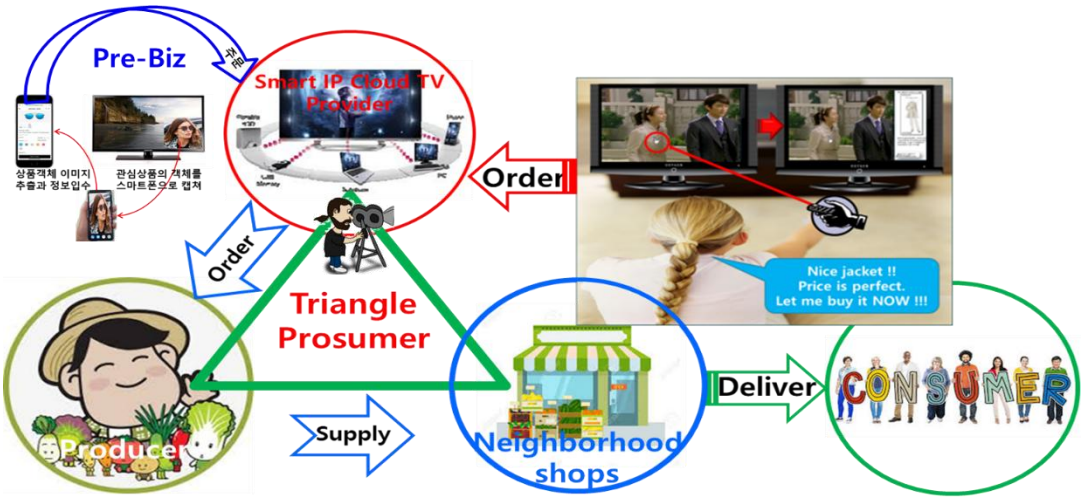
The completion of the interactive TV-based One Source Multiuse digital syndicate will establish a virtuous cycle structure of the ecosystem of digital multimedia contents, so that producers, product advertisers, and investors will establish a voluntary cooperative system in content production to create a large-scale fund. A large-scale fund drives the creation of high-quality contents, while a wider variety of products and products capture the attention of viewers, inducing interest and stimulating the desire to purchase. Therefore, by doubling satisfaction for consumers and profitability for business operators, the content market and advertisement and distribution of products and products must drive the growth of the industry more actively.



<Smart IP Cloud TV Interactivity Service: Viewer participation service>

<Smart IP Cloud TV Interactivity Service: Interactive TV on-screen advertising>

Furthermore, by breaking away from the fixed frame of unidirectional TV viewing so far, the viewers express their opinions and provide specialized real-time broadcasts and on-demand broadcasts that communicate with each other to further enhance the enjoyment of viewers through a TV forum where viewers participate In addition, information on each object displayed on the TV screen is provided only with the TV remote control, and revenue is generated by receiving TCG Tokens by participating in interactive TV on-screen advertisements, and intuitive information on these products and products is obtained. It provides a one-month service of interactive TV on-screen shopping that adds convenience by using TCG Token as a means of payment for quick purchase decisions and purchases.



<Smart IP Cloud TV Interactivity Service: Interactive TV on-screen shopping>

Our innovative service does not stop here, not only real-time transactions of the products and products of operators included in the video being broadcast, but also ICBM (IoT), Cloud Computing, Big Data, Mobile, which is called **LIVE T-Commerce**, which mutually trades products owned by viewers. Our customers will experience the innovative service of the 4th industry combined with artificial intelligence technology, and TCG Token is a convenient and investment currency as a popular payment method that can be used in all business areas that are fast, simple and secure. It is a fact that no one can doubt that it will establish itself as a cryptocurrency that everyone with the value of wants to hold.

4.4 Platform Investment

Price schedule for 100 live channels, 1.2M Subscribers

Unit ; USD

Div.	Description	2020 Year 100 CH, 1.2M Subscribers
0	Smart IP Cloud TV Solutions of C&D, 24.66%	5,321,510
	Add Value Solutions of 3rd parties, 8.04%	1,735,000
	Server Hardware & Equipments of 3rd Parties, 8.52%	1,839,361
	Professional Service of C&D Thailand, 7.77%	1,676,622
	Grand Total	10,572,492

I. Head-end System

Div.	Description	Phase 1 100 live channel
1	Head-end System	1,091,849
2	Professional service	163,777
2.1	Sub-materials, Installation, Testing and Commisioning	109,185
2.2	Training	54,592
Sub Total		1,255,627

Div.	Description	1.2M subscriber
3	Streaming System	2,081,491
3.1	Hardware	359,251
3.2	Software	1,722,240
4	Encrypt & Manager	235,312
4.1	Hardware	39,312
4.2	Software	196,000
5	Professional service	347,520
5.1	Sub-materials, Installation, Testing and Commisioning	231,680
5.2	Training	115,840
Sub Total		2,664,324

II. Middleware System

6	**Middleware System**	**1,572,927**
6.1	Hardware	200,927
6.2	Software	1,372,000
7	**DRM/CAS System**	**708,684**
7.1	Hardware	146,684
7.2	Software	562,000
8	**EMS System**	**662,476**
8.1	Hardware	74,476
8.2	Software	588,000
9	**Professional service**	**783,854**
9.1	Sub-materials, Installation, Testing and Commisioning	522,570
9.2	Training	261,285
Sub Total		**3,727,940**

III. Optional system

Div.	Description	NAS
10	**Storage system**	**100,000**
11	**Professional service**	**15,000**
11.1	Sub-materials, Installation, Testing and Commisioning	10,000
11.2	Training	5,000
Sub Total		**115,000**

IV. Additional system

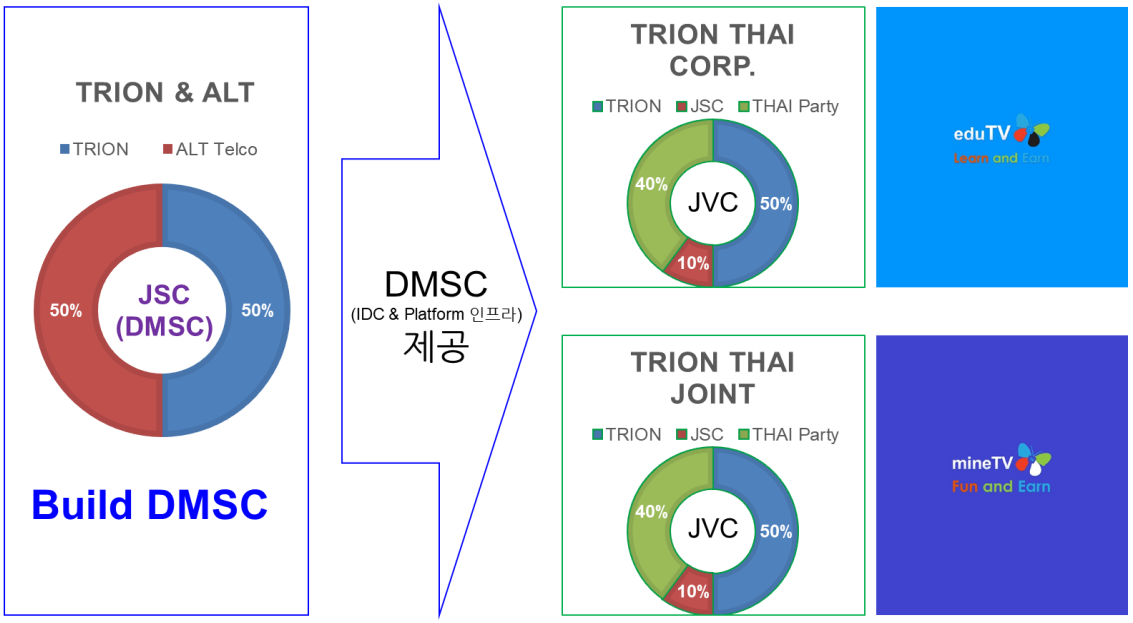
12	**Network Switch**	**100,000**
13	**Add value(Board/Talk/AD)**	**2,193,132**
14	**Control Center**	**150,000**
15	**Professional Service**	**366,470**
15.1	Sub-materials, Installation, Testing and Commisioning	244,313
15.2	Training	122,157
Sub Total		**2,809,602**

<Build Smart IP Cloud TV Platform : Details of construction cost by detailed item>

Smart IP Cloud TV Platform consists of Head-end Systems, Middleware (including DRM & EMS) System, and Oasis Farm System, with an investment of about 11.7 billion won. This is the amount when the solutions of the Smart IP Cloud TV Platform composed of our products are converted into market prices, and the goods actually procured from outside are Oasis Farms (Front-end & Back-end) developed outsourced, and other equipment admit.

4.5 Sales and Operation

The basic principle for our service is the paid payment service for the product. However, the viewer does not actually pay the amount, and the payment for our service is compensated by TCG Tokens through advertisements and on-screen advertisements of Oasis Farm application. By implementing the service, the viewer has no burden of paying for the service.



<Joint venture structure with local companies for eduTV/mineTV services>

Since our service is operated in Thailand, we establish a joint service company with a local person or a local company in accordance with local laws and do not require permission from the Thai government to implement this service project. The necessary resources for our service are platform investment, Internet infrastructure, and resources for sales and operation. Our service requires a large-

capacity backbone of IDC (Internet Data Center) and a service that charges hundreds of millions of won per month for the upper surface, so we have a large-capacity network (Backbone) all over Thailand, Malaysia, Myanmar, and Laos. In addition to providing international Internet access to countries such as Cambodia, Vietnam, etc., INTERLINK Telecom PCL, listed on the Thai Stock Exchange, was selected as a joint venture as an ISP operator connected to the Internet of a 300Gbps submarine cable between Korea and Thailand. In addition, the operation of the Smart IP Cloud TV Platform to provide 24-hour, 365-day, uninterrupted, zero-defect service requires a large number of highly skilled and skilled technical personnel, so we established a joint venture company for engineering in 2013. This joint venture (JVC) has already secured technical and operational experience for 8 years while supporting the establishment and operation training and maintenance of the Smart IP Cloud TV Platform for OTT service of broadcasting and telecommunications operators in Thailand and Myanmar. As it is in charge of operation, it reduces initial cost investment.

5. Economy

5.1 TCG Token

TCG Token is issued for investment for this business and reserved business, as well as circulation currency in this service and reserved service, and it is expected to have potential value to derive good areas of savings and investment.

Name	Symbol	Platform	Standard	Quantity
TCG Token	TCG	Ethereum-based	ERC-20	1,000,000,000 TCG

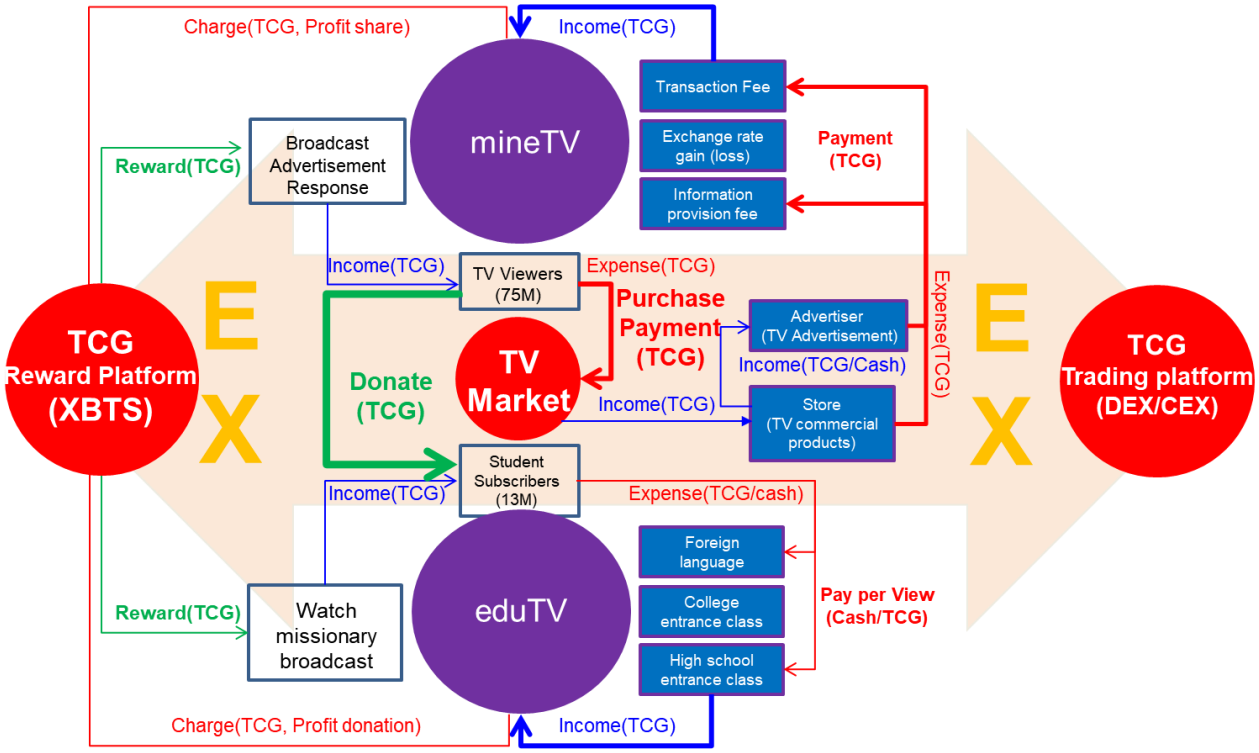
TCG Token is an ERC-20 token that anyone can freely trade on an authorized exchange and can be used freely as a payment currency for payment for using this Smart IP Cloud TV Interactivity Service and other reserved services. When the service is expanded to other countries including Thailand, there is a plan to issue tokens of constant value, and at this time, TCG of value volatility with potential value that will lead to good areas of saving and investment as the key currency to

purchase them. It is 1 billion tokens. Details on the use of the key currency are planned to be officially announced after being decided through a pilot project in the future.

The value-fixed token is a smart coin used as a currency for this service that cannot be traded on an authorized exchange. This token can be exchanged on the blockchain of this Smart IP Cloud TV Platform at a rate of 1 TCG Token per 50 bitTHB (=50 Baht) in the beginning (estimated in the first quarter of 2025), and after the TCG Token is listed on a Thai exchange, it will be exchanged at the exchange price. This token is used for payment for this service and is provided as a reward for watching EDUTV/MINETV and CPX advertisements.

5.2 Use of TCG

We guarantee that all TCG Tokens can be used at any time as a payment method for the use of this Smart IP Cloud TV Service and reserved services, regardless of type.



The 600M TCG Tokens given to C&D Co., Ltd. for investment in building the platform for this service can be freely traded between individuals as ERC-20 tokens and can be used for payment for the use of this Smart IP Cloud TV Interactivity

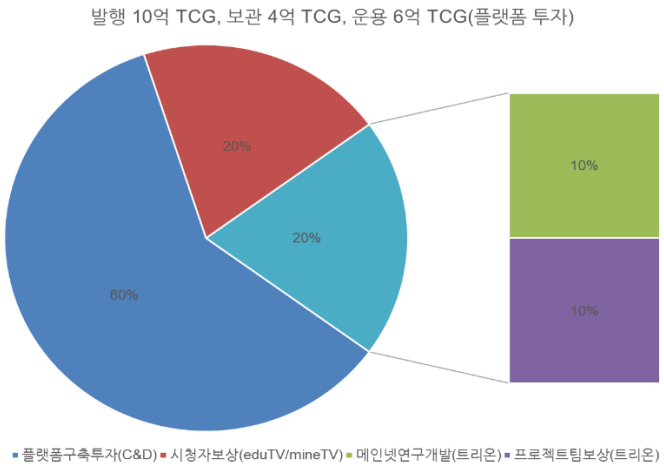
Service and other services. In addition, since the value-fixed token bitTHB, which is scheduled to be issued when the region of this service is expanded to Thailand and neighboring countries in the future, TCG Tokens have potential value for savings and investment as a base currency.

5.3 TCG Sales

Name	Initial token price	Minimum purchase quantity	Maximum supply quantity	Token sale period
TCG Token	10 won ($0.01 USD)	10 TCG	300,000,000	Until the consumption

5.4 TCG Allocation

Distribution information for each use of TCG Token is as follows. However, depending on the progress of the project, some ratios may be changed later within the required scope of purpose.



Classification	Ratio	Lockout Period	Remarks
Build Platform	60%	None	Refer to 4.4
Rewarding for users	20%	None	eduTV/mineTV
R&D cost	10%	After listing on EX in Korea	TCG key currency-development project
Team, torture compensation	10%	6 months after listing on EX in Korea	

5.5 TCG Compensation

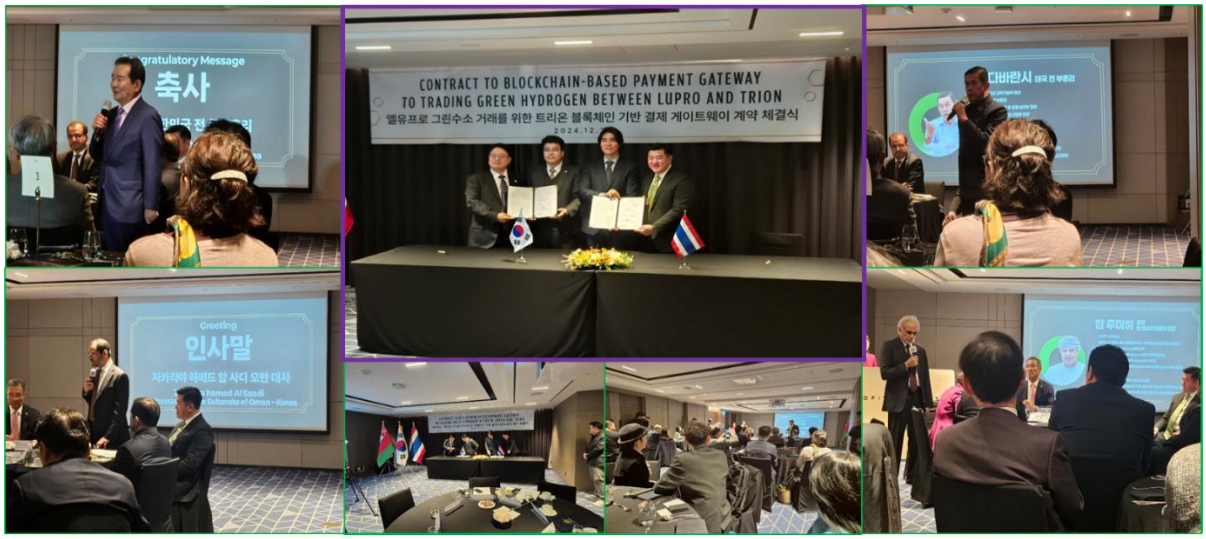
200M TCG Tokens will be given to relevant organizations/companies/individuals to attract and secure subscribers to the eduTV/mineTV service. First, eduTV/mineTV users in the Indochina Peninsula will be able to obtain rewards through service use, and this will also be applied to countries where the service will be provided in the future.

5.6 TCG Benefits

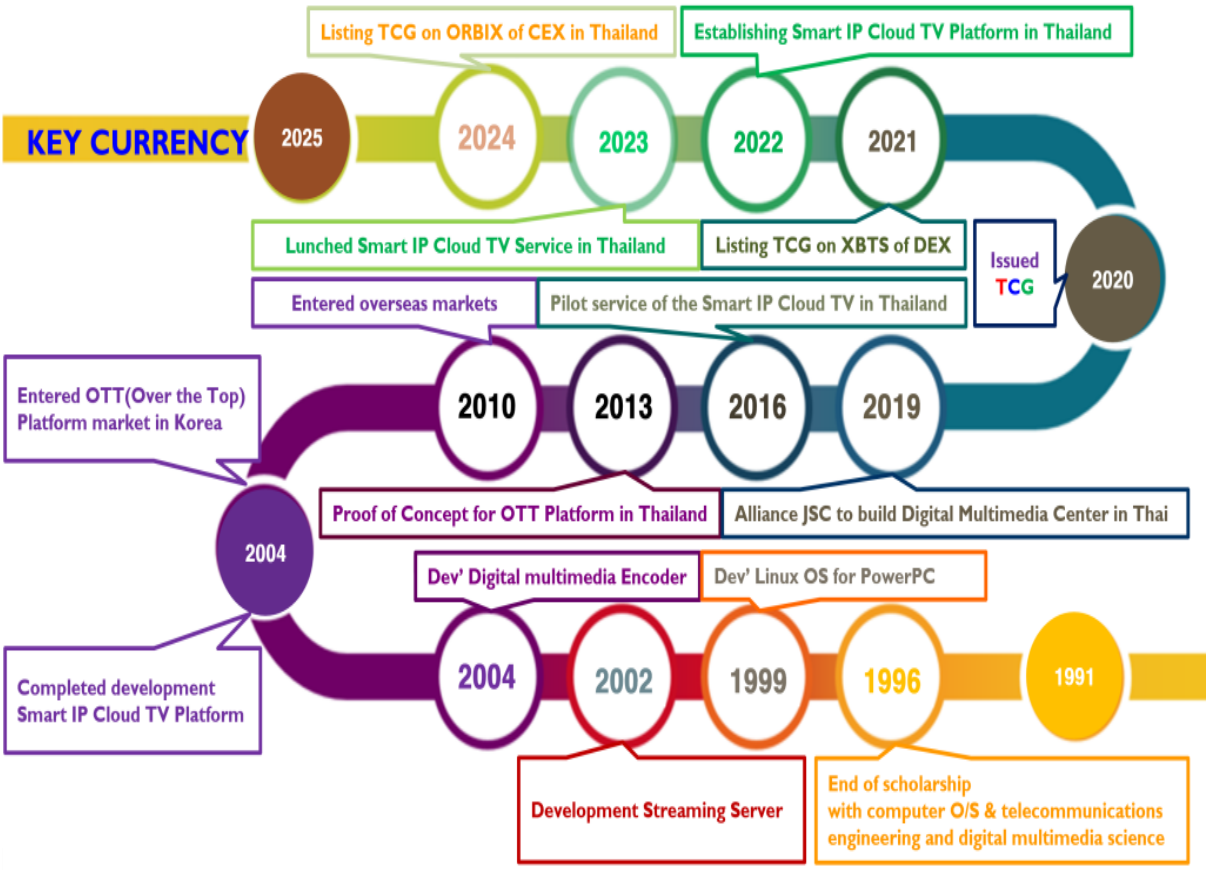
The value of TCG Token will increase as the number of users of eduTV/mineTV services increases and the service area expands, and it will function as an excellent investment destination in Thai, Korean, and global exchanges. In addition, the continuous discovery of additional ecosystems in addition to the basic ecosystem will further enhance the value of TCG Token.

5.6.1 Additional Ecosystem (1)

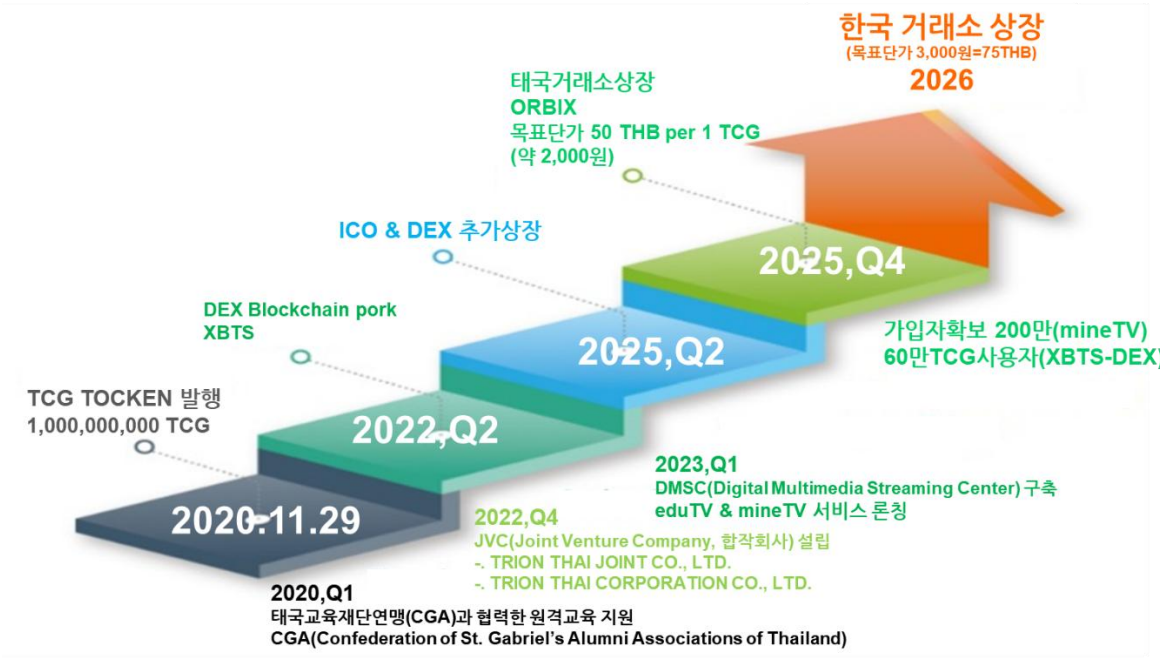
Contract for Payment Gateway for global distribution of green hydrogen ammonia produced by LUPRO OMAN LLC., a joint venture between LUPRO INC. of Korea and Muscat House Development and Invest LLC. of Oman (Dec. 21, 2024)



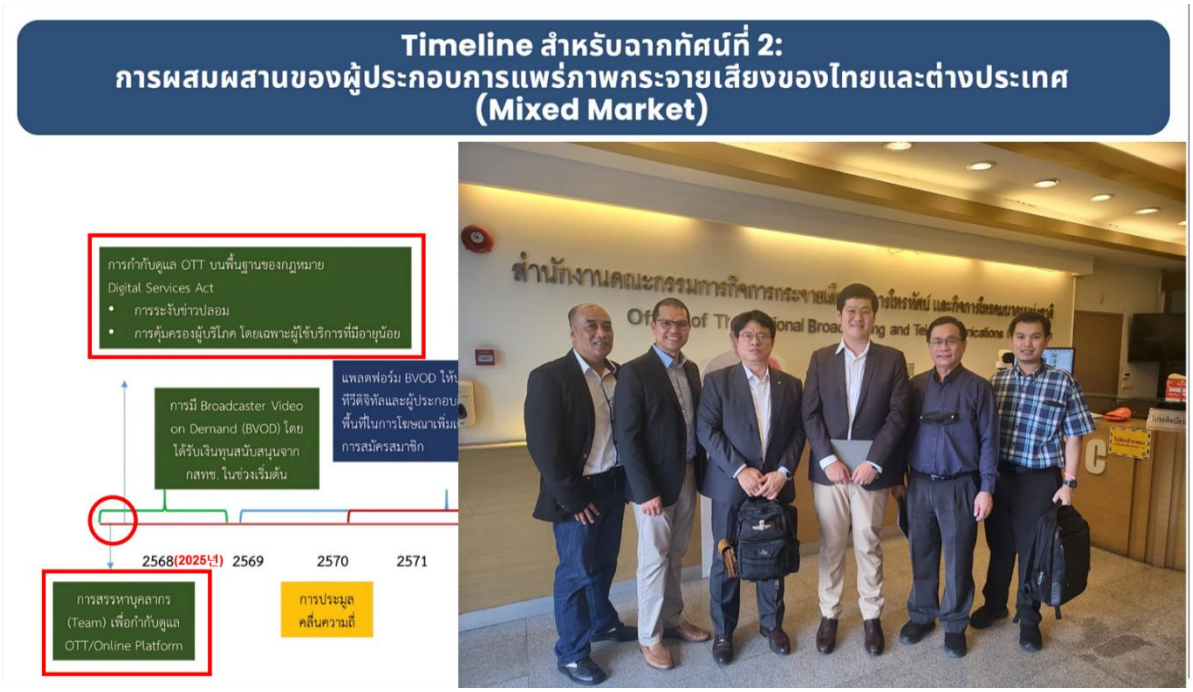
6. Roadmap



6.1 Milestones



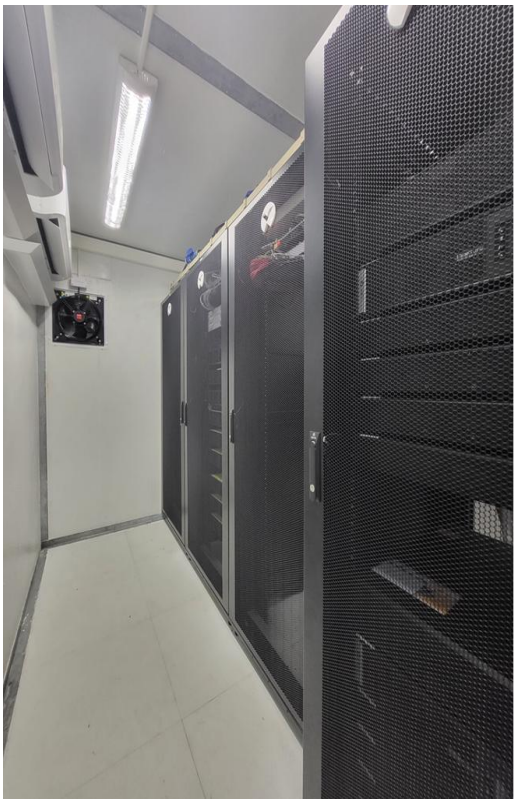
6.2 Footsteps



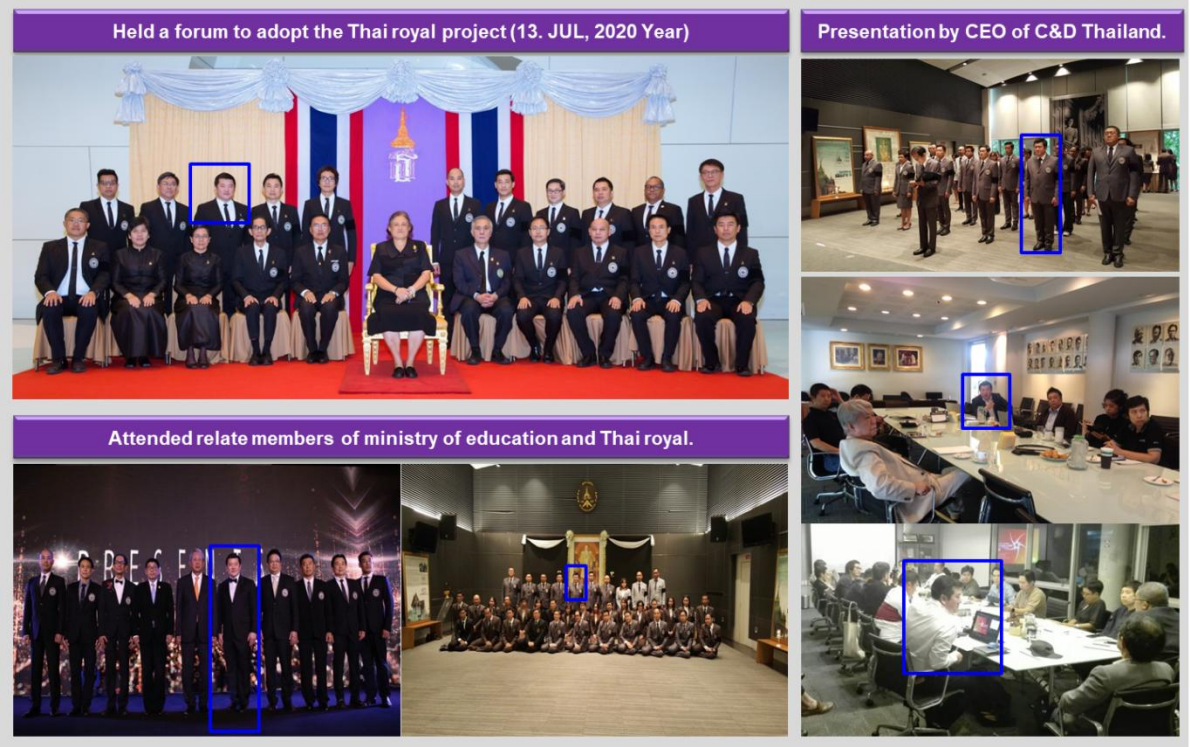
<Securing the foundation for attracting 75 million Thai subscribers for Thailand's terrestrial broadcasting OTT platform>

<Securing the foundation for attracting 14 million student subscribers in cooperation with the CGA Foundation>

<Securing the foundation for attracting 2 million Christian subscribers through cooperation with Thai Christian groups>

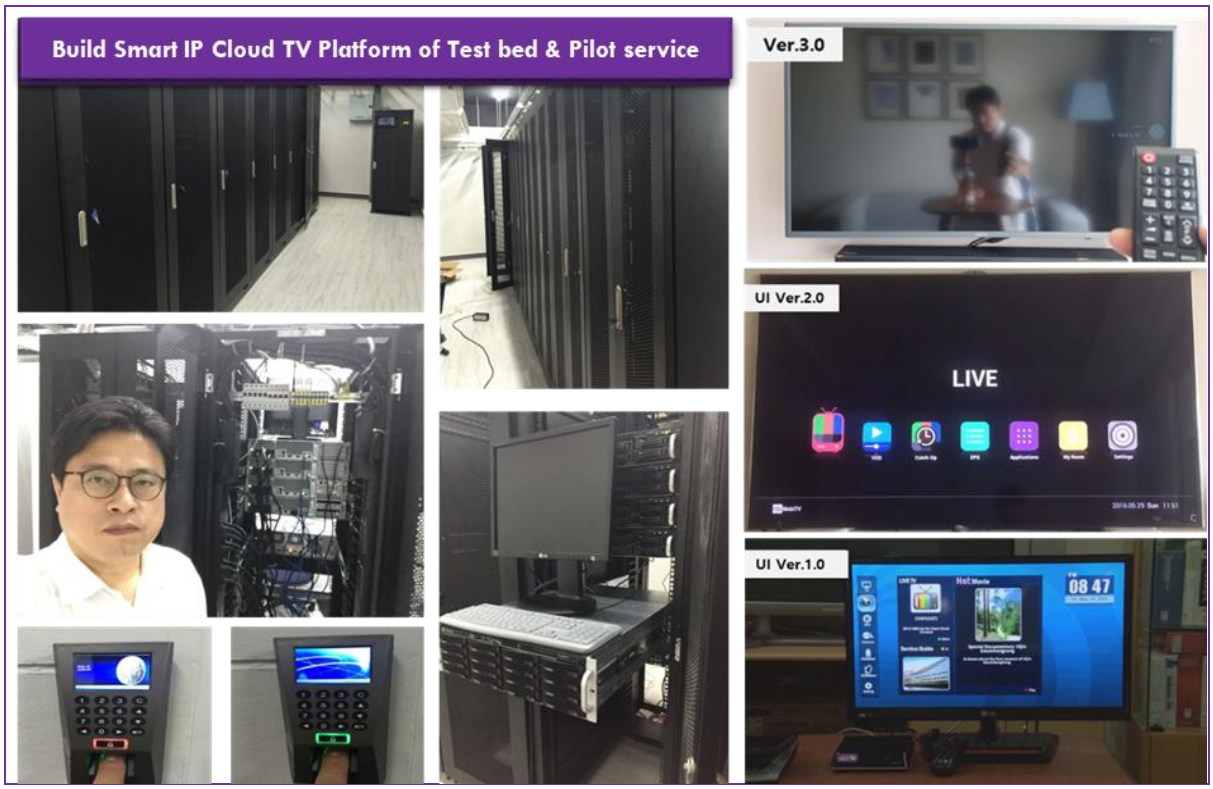


<DMSC (Digital Multimedia Streaming Center) Construction Site>

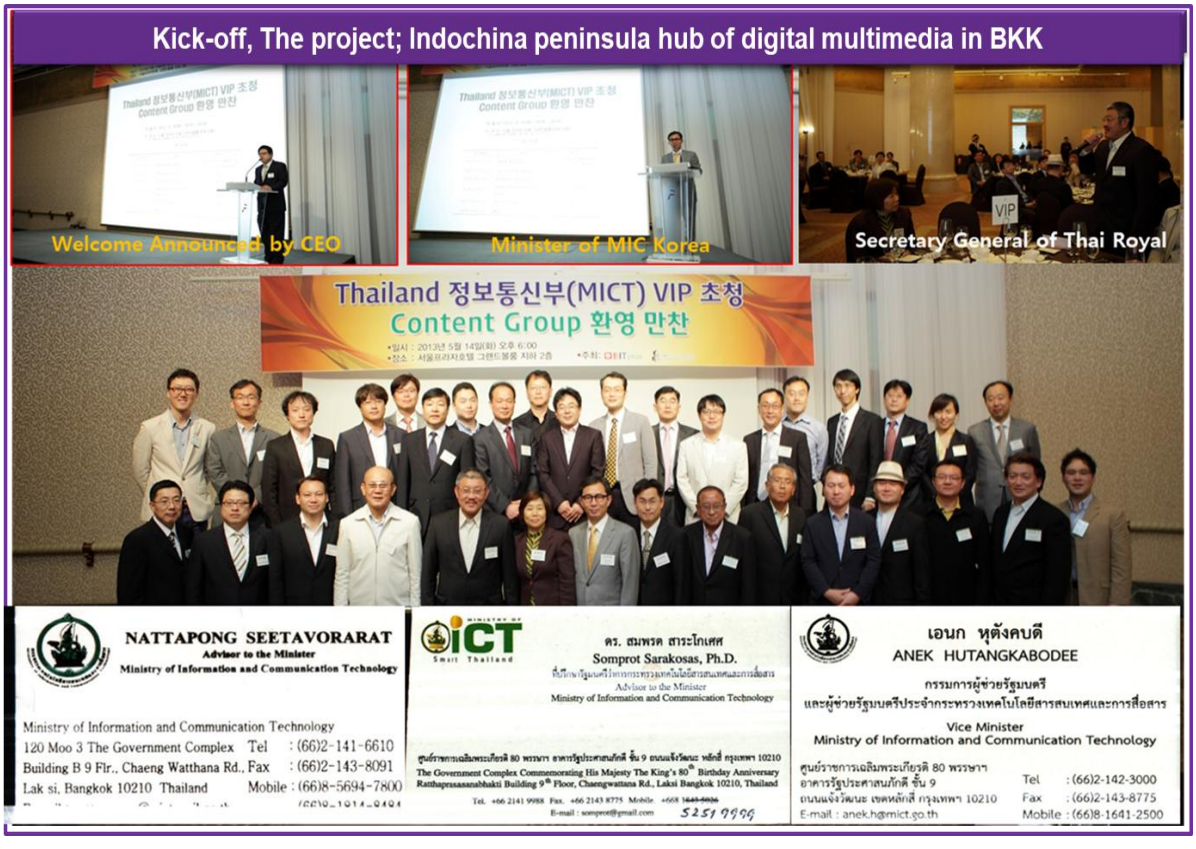


< June 13, 2020, the Royal Forum for Distance Education Broadcasting >

< January 22, 2020, signed a cooperation agreement with a Thai joint venture (JSC)>

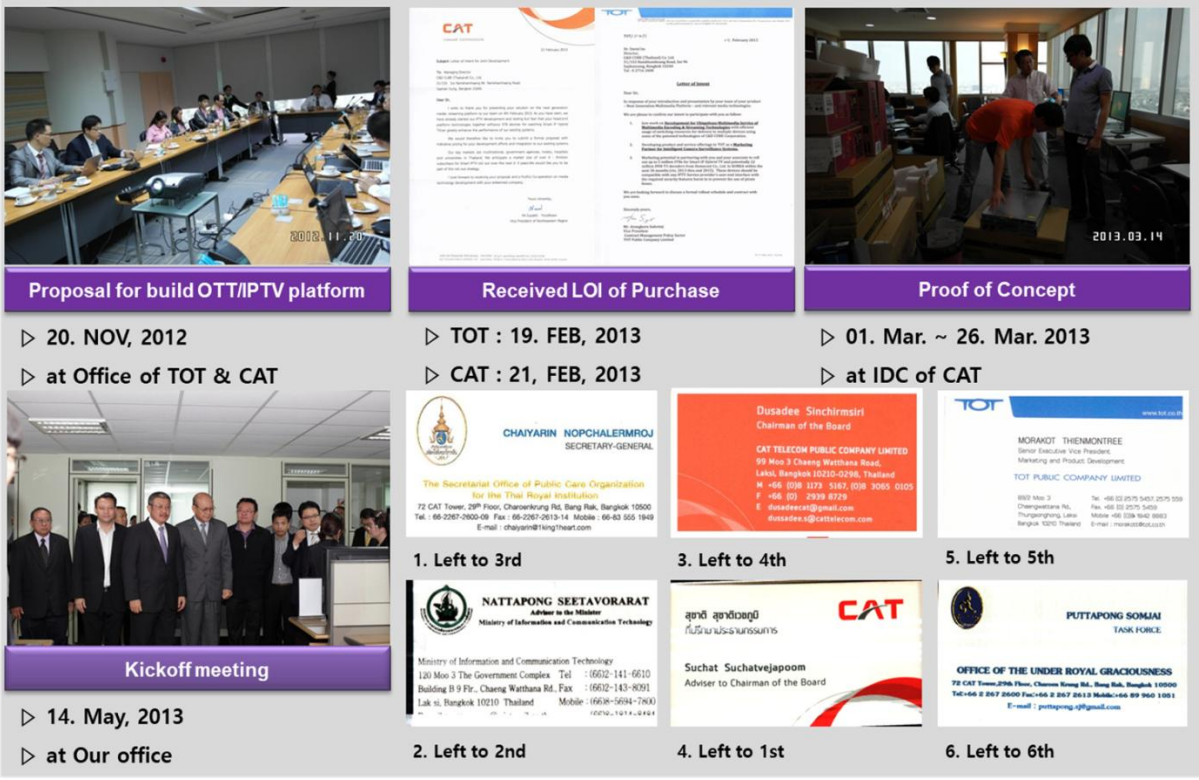


<2016~2013, pilot project: Build Smart IP Cloud TV Platform >



<2013, Kick-off: Build Smart IP Cloud TV Platform >

<2013, established a joint venture in Thailand>



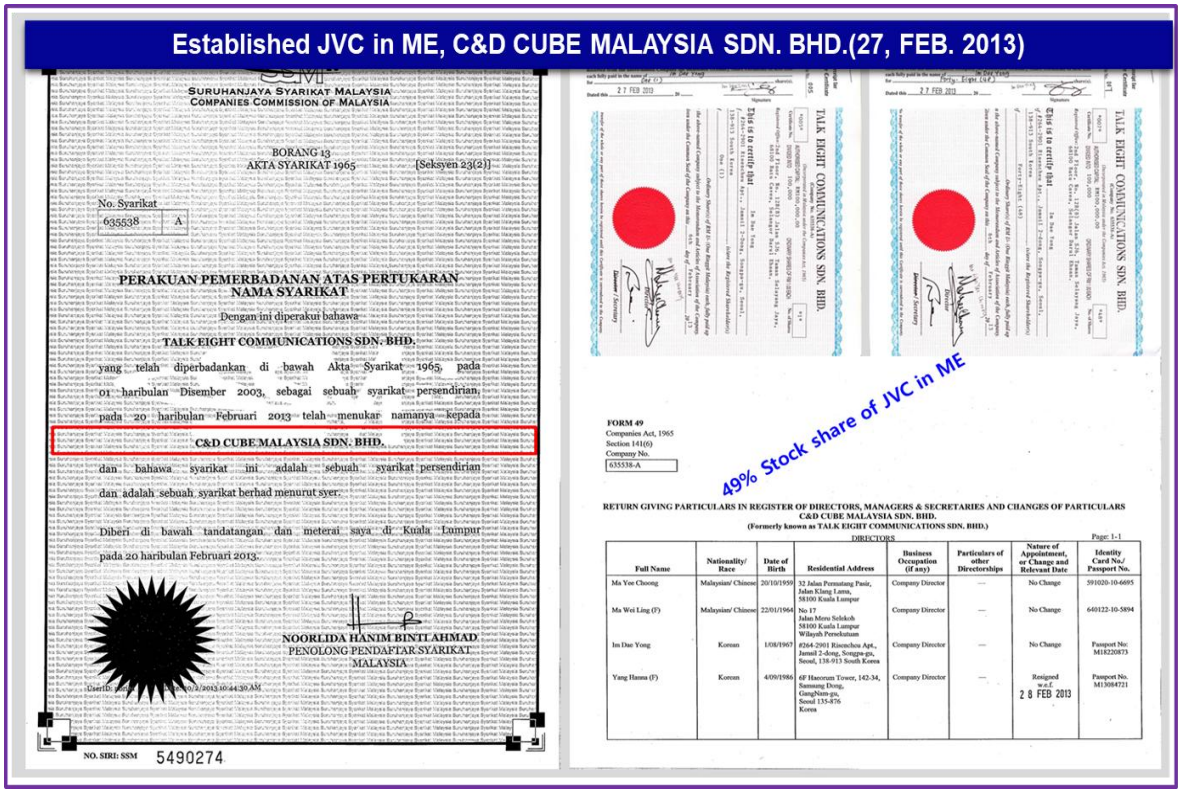
<2013~2012, verification of POC by CAT/TOT (state telecommunications company) >

6.3 Possibility

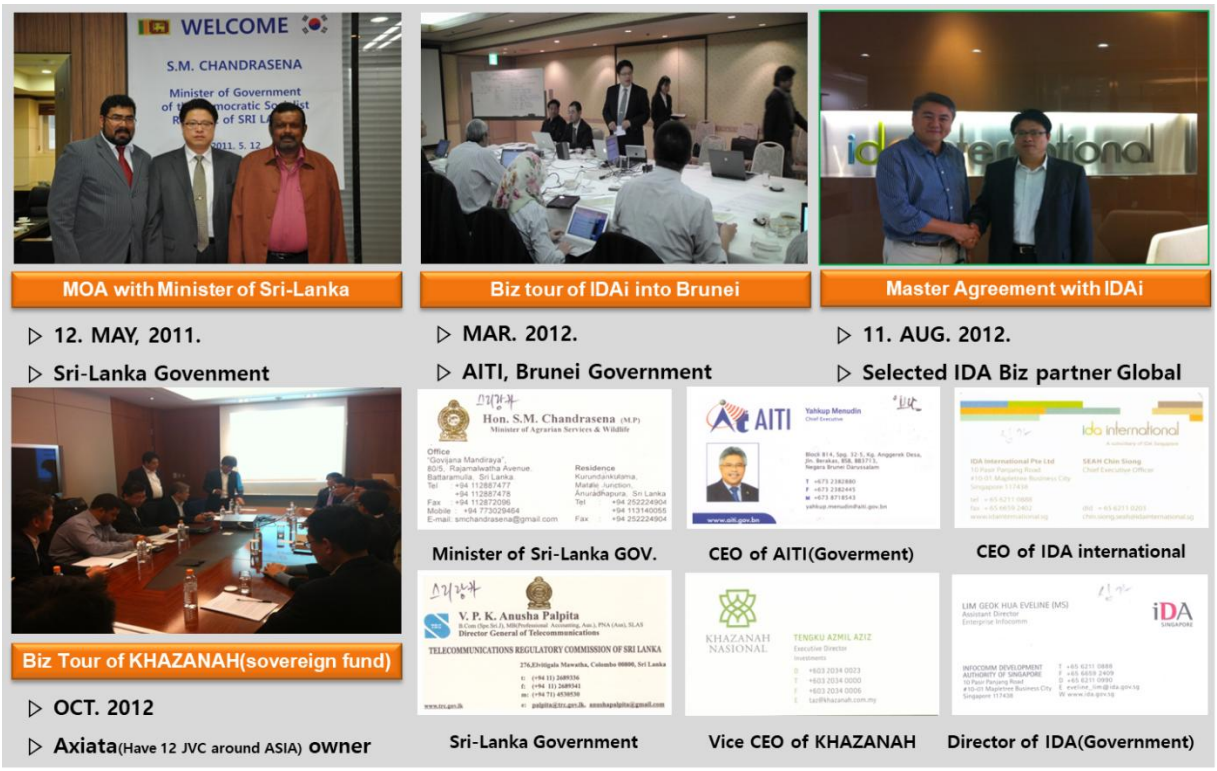
< Securing global cooperation, Asia, Pacific Rim, Middle East, and America >

<2016, securing application cases, building Smart IP Cloud TV Platform, Myanmar >

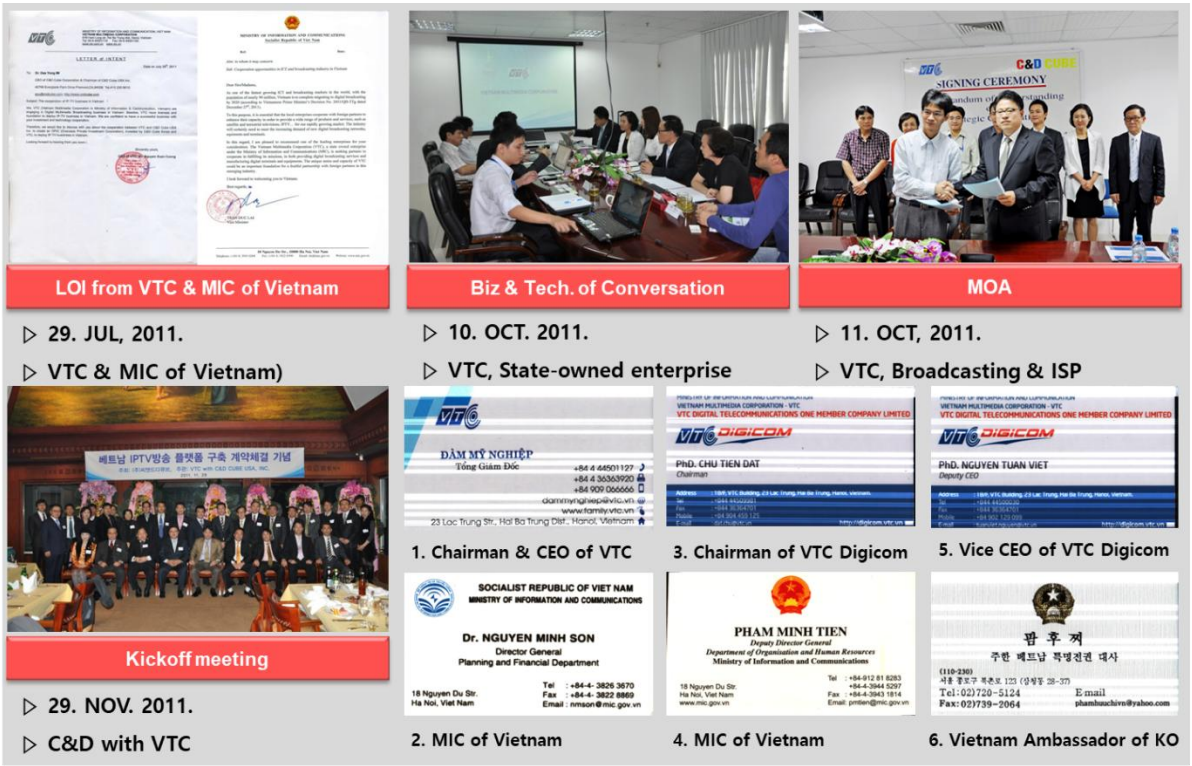
<2013, securing cooperative relations, Cambodian & Laos state run company >



<2013, established a Malaysian joint venture, C&D CUBE MALAYSIA SDN. BHD.>



<2012, securing cooperation, Sri Lanka/Brunei/Singapore/12 Asian countries >



< Securing cooperative relationship: Vietnam VTC state-run broadcasting company >

7. Members

Chairman Daud Bin Chong Alharthy, C&D Corporation Co., Ltd. President/CEO

Dr. David D.Y IM, AUG. 1st, 1967 was born

EDUCATION

- **1996** St. Cross College, University of Oxford in UK, MSc/Ph.D
  . Computer Operating System & Communications Engineering
  . Digital Media Science (Data processing & Communications)
- **2010** Green International University in US, MBA

CAREER

- **1997** LinuxPPC KOREA, INC. CEO/President (~2003)
  . Biz for Linux O/S & Solution for PowerPC Processor
  . Biz for PSTN/ISDN/xDSL base Digital Multimedia Network
- **2004** Established C&D Corporation Co., LTD.
- **2008** Grateful Award from the president, M.B Lee
- **2009** Ubiquitous Media Contents Association, IP media chairman
- **2010** Director/IPTV Chairman of Korea Communication Society
  . Presented QoS, QoE and Interactive IPTV Platform over public network
  . Presented Digital multimedia encoding acceleration technology based on SIMD
  . Presented 3 Screen Plus 1 Smart IP Cloud TV Head-end Platform
  . Presented Global Multimedia Platform based on CINE GRID Network
- **2010** Grateful Award from the province governor, M.S. Kim
- **2010** Selected as one of 33 Korea Leaders
- **2011** People's Movement alliance for Korea Clean Contents , Chairman of IP Media
- **2011** Policy consultant for Korea Communication Commission
- **2011** Selected as 33 Leaders among 363 Korea Leaders 2000-2010
- **2012** Appointment "Chairman of Cyber Committee" and Chairman of Broadcasting & Communications Committee" from Ms. Park of Elected President
- **2012** Appointment "Member of Presidential Transition Commission" From Ms. Park of Elected President
- **2014** Selected as 33 Leaders among 495 Korea Leaders 2000-2014

Deputy Chairman R.H KANG, C&D Corporation Co., Ltd. Vice President/COO

Age: 70 Years Old

Education: YeonSei University Bachelor

-UBIX SYSTEM Co., Ltd. President/CEO

-Hyosung Information Systems Co., Ltd. CMO

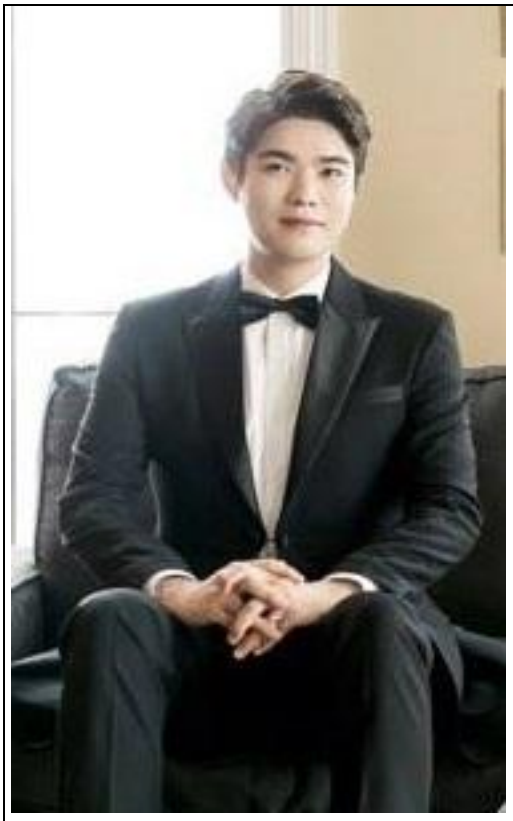
Experience

깨진 유리창의 법칙

강래훈 효성인포메이션시스템 전략사업본부 상무이 국.. 입력 2006-08-22 14:49

He joined Hyosung Group as an employee and worked on projects such as large Unix systems and storage CD Network Clusters, experienced large-scale projects such as data emergency recovery and WDS WAN acceleration, and retired as executive director.

President/CEO S.P CHOI TRION Corporation INC. President/CEO

	Age: 38 Years Old Education: Indiana state University, Ba. Experience -CWO, C&D Corporation Co., Ltd. -Manager, KCIA (Korea Consultancy Industry Association) Certificate -Korea Foundation Quality (ISO9000 & 14000 Global standardization) Co Author(Korea B & C Association) -Ontology triangle prosumer T-commerce. -Public benefit of Shopping and U-commerce Patents -Interactivity TV On-screen advertisement -Interactivity TV On-screen commerce Development: Trinity Studio APP.

Board/CSO H.P KIM, tFarm Co., Ltd. President/CEO

	Age: 57 Years Old Education -Hanyang University in Seoul, Bachelor -State University of New York, Master Experience -tfam Co., Ltd. President/CEO -Daelim Corporation Vice President -Daelim Industrial Co., Ltd. VP & CIO/CISO -LG U+, Head of the IT Department Technologies: -Smart Factory & Construction platform -Wire Tap Solutions -Robotic Process Automation -Block chain End to End Service

Board/CMO NATHASITH ITTHITHAVORN, TRION THAI CORPORATION(JVC) President/CEO

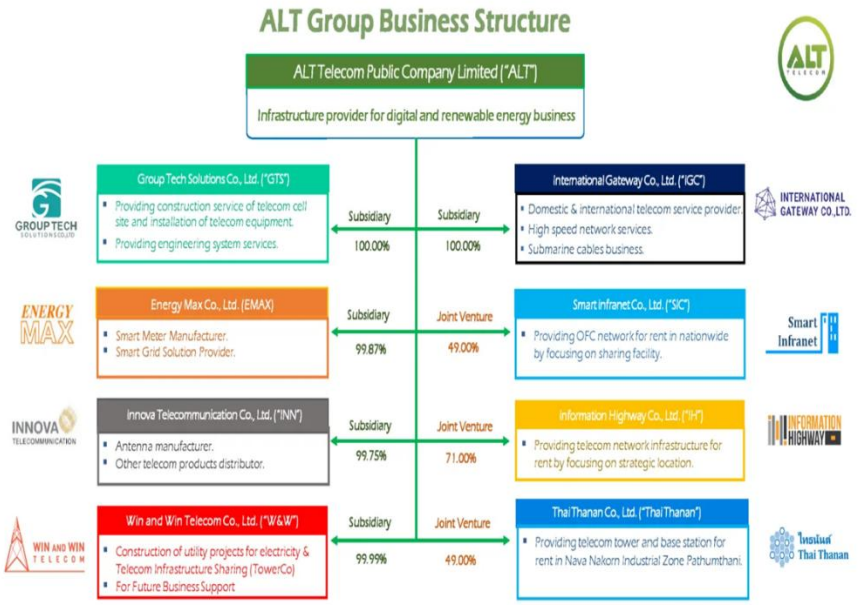
	Experience: 32 Years in Business Age: 59 Years Old Education -Chulalongkorn University in BKK, Bachelor -Columbia University in NEW YORK, Master President/CEO -MA Corporation Co., Ltd. I.T & Construction -ASIA Expert Ltd.(홍콩), Oil/Gas Trading -ULTIMATE Property Co., Ltd. Real estate biz. -POWER I.Q Co., Ltd. Green energy fund -DESIGN I.Q Co., Ltd. Architect & Planner -DEVELOPMENT I.Q Co., Ltd. Consultant R.E Honors & Awards -BANGKOK in The Future as Design Competition -Vacation House as a Experimental Design Com. License: Registered Architect.

Advisor H.E. KORN DABBARANSI, TRION THAI CORPORATION(JVC)

	**Chairman of Foundation Rajabhat University** Age: 79 Years old Education -University of Massachusetts Experience -Vice Prime Minister ('02~'03) -Vice Prime Minister ('98~'00) -Vice Prime Minister ('96~'97) -Minister of Science & Technology ('04~'05) -Minister of Public Health ('98~'00) -Minister of Industry ('96~'97) -Minister of the office of the P.M ('89~'90)

President ALT Telco. Mrs. Preeyaporn Tangpaosak, Joint Venture (JSC) Partner

Mrs. Preeyaporn Tangpaosak
President



President P5 Group. Mr. Parwat Tokakung, Joint Venture (JVC) Partner

8. Legal Notice

This whitepaper is intended to provide information about business models, technologies and teams to those interested in the TCG Token platform and [Listing Tokens and Reward points (collectively, "TCG Tokens")]. This whitepaper is based on the status at the time of the writing (As-is), and whether that the TCG Token team is correct or appropriate for any content, including the conclusion, schedule and performance of the project as its appears in the roadmap for the future is not guaranteed. This whitepaper may change in accordance with the policies and decisions of the TCG Token team, and the final version shall take precedence over any changes.

The information or analysis contained in this whitepaper does not contain any recommendations to encourage you to participate in this project. This whitepaper is not an investment advisory, nor a document to recommend an investment in securities or financial products and in addition to the information contained in this whitepaper, we recommend that you seek the advice of a specialist to ascertain any risk assessment, application of applicable laws or taxation.

You are solely responsible for any damages, losses, and expenses resulting from the decisions you make in references to or use of this whitepaper and the TCG Token team does not bear any responsibilities other than those caused by intentional false information.

This whitepaper contains information about third parties and publications. The TCG Token team makes no warranty as to the accuracy or completeness of such information and assumes no obligation to update, modify, or alter this whitepaper, even if such information changes.

This whitepaper is not reviewed or approved by regulatory authorities, nor does the publication, distribution, or dissemination of this whitepaper signify that this whitepaper complies with all applicable laws and regulations. In some cases, the publication, distribution, and dissemination of this whitepaper may be prohibited or restricted by applicable laws and regulations. Moreover, regulatory authorities may restrict the sale, possession, use, and retention of TCG Tokens and these regulatory actions may affect the sale and use of TCG Tokens.

TCG Tokens have no other purposes other than their use in the TCG Token platform set forth in this whitepaper, and their value and functionality are not guaranteed. TCG tokens are not securities or investment products, and the ownership of TCG tokens is not to be constructed as a right to claim any

distribution or repayment of profits, etc., to the TCG Token team, nor shall it be constructed as having any intellectual property rights.

Purchasing tokens involves significant risk. You may lose all or a substantial portion of the funds used to purchase the tokens, and the TCG Token team makes no warranties regarding the purchase price or the value of the TCG tokens. When you refer to this whitepaper to purchase TCG tokens, be sure to understand and accept these risks.

Exclusion of Liability

The information contained in this whitepaper may be translated into other languages from time to time or used in the communication process with multiple participants. We acknowledge that there may be changes or misinterpretations in the course of such translation or communication, and since the Korean whitepaper on the homepage has the highest overriding effect, it is your responsibility to verify the whitepaper with the highest priority.

The TCG Token team notices and explains the risks as follows. The TCG Token team does not make any representations or warranties with respect to any of the following risks described by the TCG Token team, and the risks below are entirely bone by TCG Token buyers and participants in the TCG Token platform.

Warnings about Future-forecasting Statements.

This whitepaper contains information about plans and practices (“Future Plans”) at this time. These plans are expressed with words and phrases such as “can”, “will do”, “expect”, “anticipate”, “goal”, “predictions”, “intend”, “plan”, “look for”, “believe”, “potential”, “continue”, “it will be there”, and these words were used based on the assumptions and analysis that are considered reasonable in light of the [TCG Token] team’s experience, current situation, anticipation of future developments and other factors. However, there are risks and uncertainties in the contest, and the actual results and outcomes of the [TCG Token] project may be different from plans.

Potential Risks

Before deciding to purchase and participate in TCG tokens, we strongly encourage you to read and understand the elements and risks involved carefully. Risks include, but are not limited to: Tokens or coins are closely scrutinized by various regulatory agencies around the world, including the SEC, and TCG tokens

may be considered as securities in many countries, including the United States. In this case, the terms of the securities law may limit the possession of more than a certain amount of TCG tokens, transfer of TCG tokens may be restricted, certain conditions may be added for selling TCG tokens and other related business that facilitates exchange or transfer may be restricted.

You may lose your TCG tokens due to the loss of your private key to your digital wallet. If access to the private key is not possible due to loss, destruction or damage of the private key, the holder, may not have access to the block chain-based digital assets, such as the TCG token, and the TCG Token team cannot restore it.

Smart contract technology is still in its early stages of development, and its application involves significant risks associated with operational, technical, regulatory, and financial factors. A smart contract may not be suitable for the original purpose, and deficiencies, vulnerabilities, or other issues that may be inherent in the smart contract may cause technical problems or loss of TCG tokens.

Potential participants, such as individuals and companies, may choose not to participate in TCG Tokens or use TCG tokens after launch, and their awareness of such coins/tokens and their potential use may not be high. In addition, TCG Tokens may not be operational. In such cases, the value of TCG tokens, etc. can be significantly reduced or lost.

The function of the TCG Token includes the storage and transmission of personal information of participants, and it is exposed to the risk of leakage of personal information due to security problems caused by various methods, such as cyber terrorism. Although the TCG Token team will take various security measures, like preventing unauthorized access to the database, privacy violations could still occur for a number of reasons. This can result in legal and financial loss, loss of confidence, such as a decline in the reputation of TCG Token and TCG Tokens, and may have a negative impact on the TCG Token project.

The risk of government regulation on block chain-related industries is increasing. Depending on whether or not the government is regulating the block chain industry and the level of government regulation, the business of these companies may be significantly affected, directly or indirectly. The TCG Token team strives to comply with relevant laws and regulations and ensure stable operation within the limits permitted by law in order to ensure the sound development of block chain technology.

However, due to future legal regulations, the TCG Token project may be

negatively affected; moreover, if government regulatory measures are taken against TCG tokens, a considerable amount of time and resources may be spent to respond.

9. Value-oriented Direction

The direction to go forward is that TCG(To promote practicality and economic value Oriented TCG) is a Cryptocurrency that aims for practical aspects and takes the normal value increase and the protection of investors and consumers' assets as the first value. After the advent of bitcoin, numerous coins and tokens flooded, but only the goal of implementing a vague technology and deception against investors was rampant. Therefore, most of the investors, except those who made profits through some initial cryptocurrency investments, have repeatedly failed in numerous investments. As a result, distrust in cryptocurrency has become full and the industry-wide bubble has extinguished and has been regarded as a minor business group.

TCG is a cryptocurrency designed with a great emphasis on guaranteeing the actual usage and currency, which are the basis of Cryptocurrency. Most of the other cryptocurrencies have the risk of bombing after listing on the exchange, but TCG is focusing on expanding its infrastructure to become a cryptocurrency that can be used in real life. We firmly believe that all of this will be reflected in TCG's market price, and we aim for a long and stable value increase, not a fluctuating coin. "End"