Analysis on the Development of the Meta Universe to the Generation of Electronic Games from the Perspective of Media Convergence

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Abstract. With the continuous development of scientific and technological progress, the integration of media has long become the trend of media development in the new era. We will integrate the integration of media development with video games, and the definition of the metaverse is presented to people again. From the perspective of media integration, the metaverse is a new realm of the development of video games. Especially concerned about the development of the metaverse. Metaverse and blockchain are intrinsically natural, and people generally regard blockchain as a metaverse. This paper expounds the shortcomings of metaverse technology development in the media perspective and the solution strategy and innovation direction. Based on the Myrtle tree optimization algorithm in blockchain technology, it conducts security certification for the decentralized dynamic database of security cloud storage. To ensure the safe operation of video games in the meta-universe.

Keywords: media convergence; metaverse; Video game; blockchain technology;
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1 INTRODUCTION

At this stage, people from all walks of life will have different understandings of the "meta-universe". Broadly speaking, the "meta-universe" will become a new shape of Internet technology after the

mobile Internet. The integration of the meta-universe and media will build a new field for human work, learning and training, gaming and entertainment, and social interaction in the future. It will be an important medium for the future life style and a new world of data for everyone to participate in. Today, when the revenue of mobile Internet customers has already reached its peak, the occurrence of the "meta-universe" theory makes me see the development trend of big data technology. It's likely to lead to more total traffic, or it's likely to be a future interaction. At present, the specific content of big data is also presented through text, sound and video. Although e-commerce, social chat, online video viewing, hot news and other shapes can meet the needs of people using the Internet, the distance between people and things is still relatively long, and it is difficult to achieve the practical effect of communication in reality. With the development of The Times, people are likely to need more and more advanced feelings and interaction, which is the main reason for the hope of the metaverse[8].

The "Metauniverse" will combine blockchain technology, 5G technology, virtual reality technology, augmented reality technology, artificial intelligence technology, Internet of Things technology, big data technology, industrial Internet of Things and other cutting-edge electronic information technology, creating more ways of presentation in the new combined space. We're going to merge the collaborative development of media with digital technology, the metaverse is a higher form of video games. "Meta-universe" has enhanced the level of interaction between games and people's senses. Traditional video games have always pursued perfect and higher fidelity or sense of substitution. The huge industry and long-term strong consumer market have generated huge profits for game manufacturers. A lot of games are coming out of individual studios every day. The game market is booming day by day, and the game players are increasingly improving the game scale, the quality of the game picture, the difficulty of the game design scheme and other services. Driven by the market, the formation of the game module, a key dedicated tool for game development, has played a key role in the prosperity of the game industry[16]. Metaverse technical support is shown in Figure 1:
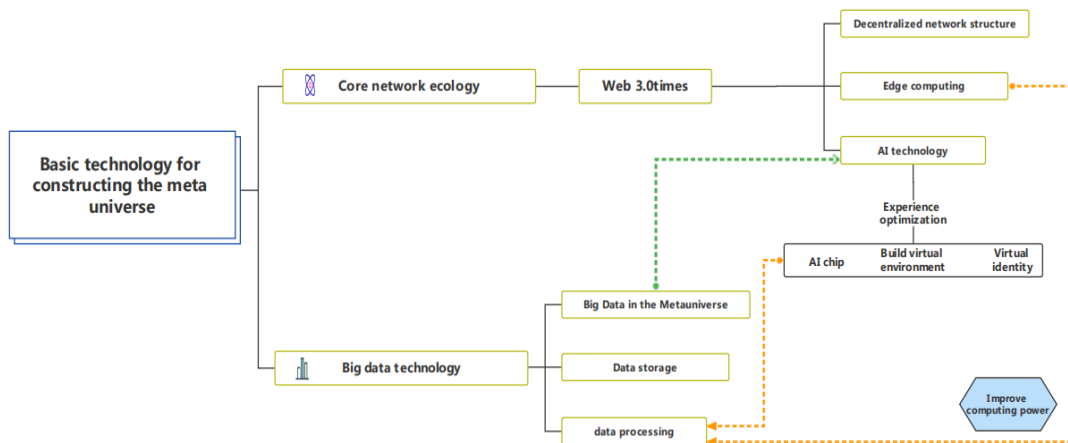

Figure 1: Meta Universe technical support.

2   METAVERSE UNDER MEDIA FUSION

The explicit proposal of media convergence theory originated from the United States in the 1980s. The simple idea is to bring together media that used to belong to different kinds. Media convergence

refers to the development direction of multipurpose integration of various media. Andrew Nachison, director of the Center for the Study of Media in American Journalism, defines "convergence media" as "the strategic, manipulative and traditional cultural alliance between print, audio, video content and interactive digital media technology organizations". What he talks about "media convergence" more refers to the collaboration and alliance between each medium. In the perspective of media convergence, the boundary between the meta-universe and video games has long been broken, and the meta-universe is called the higher realm of video games [2]. The development of media technology promotes the public's perception to be extended upward, continuously stimulating and actively reaching the "five senses" of human, namely visual effect, auditory system, taste buds, touch and olfactory nerves, prompting many people to generate a sense of substitution when collecting information, thus effectively completing information transmission. Nowadays, the development trend of media is in a highly integrated state, the renewal of media technology continues to accelerate, and the word "broadening" is increasingly colorful. Merging current practice and research, the shape of highly integrated media is increasingly focused on reshaping or recreating a "global" according to technology. "But when computing power took off and started to benefit the masses, virtual reality became a form of choice for the new medium." Compared with traditional media, VR /AR has created an unreal world, but its expression of virtual reality technology still has shortcomings and limitations in terms of sensory stimulation. Therefore, VR has been more included in the scope of technical discussion. However, with the continuous improvement of scientific research on electronic information technology such as blockchain technology, the scale of application and operation in the Chinese market is also getting larger and larger, and the completion of a more forward-looking metaverse can be realized [10]. The forecast trend of China's VR/AR market size from 2016 to 2022 is shown in Figure 2.
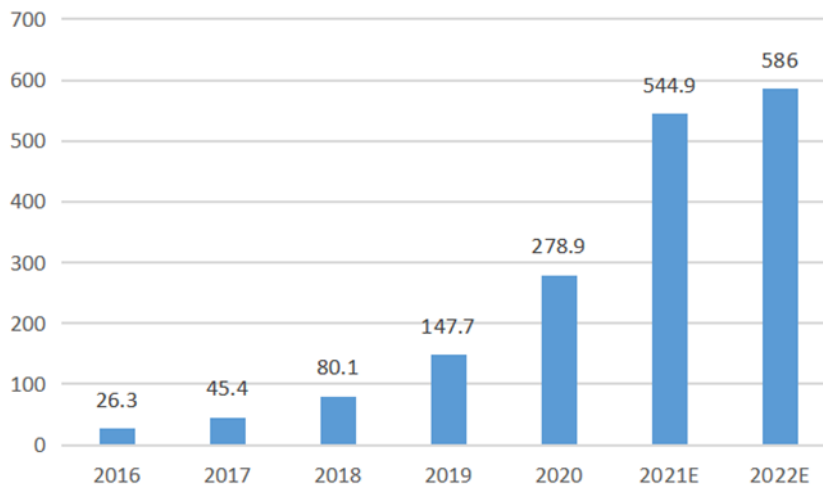
Figure 2: Forecast trend of VR/AR market size in China from 2016 to 2022.

From the perspective of media combination, compared with traditional media, metaverse integrates more diversified media shapes and technologies, focusing on instant randomness and a more vivid social unreal world. When people receive information in the high level of human senses, it can bring a more real and immersive way of media interaction. The facilities and hardware of media fusion platform are shown in Figure 3.

Figure 3: Media fusion platform facilities and hardware.

3   PROBLEMS AND SOLUTIONS IN THE DEVELOPMENT OF THE METAVERSE

3.1   Science and Technology
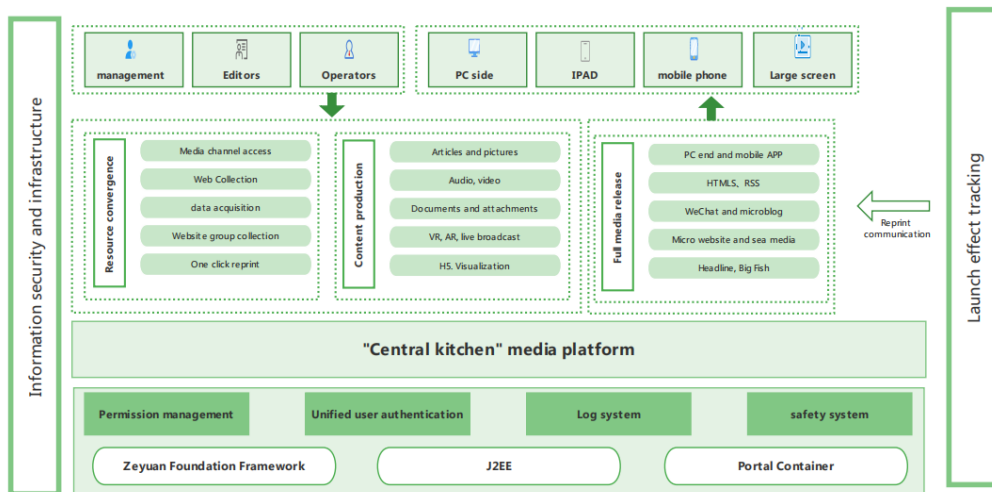
The metauniverse is developing slowly. Its scale of customers continues to be online. It has advantages such as high immersion, high efficiency content creation and blockchain technology information storage and verification, which must be supported by various technologies, including Internet and computing technology, interactive simulation technology, artificial intelligence technology, Internet of Things technology and blockchain technology. Only with the significant improvement of this technology can the all-round development of the meta-universe be achieved [4].

3.2   Capital Monopoly

At the early stage of the metauniverse industry, there are still many uncertainties. The market competition position of each giant depends on its relatively closed green ecology, and it is difficult to achieve true openness and decentralization. Decentralization is the main characteristic of idealized metaverse. The decentralization of metaverse ensures efficient content production and stable economic system, etc. It is still unclear whether it will lead to monopoly or decentralization in the end. The primordial metauniverse itself was created by people. It is still uncertain whether there is the possibility of decentralization due to profit trend or other reasons. The metauniverse industry and market are in urgent need of restoring objectivity.

3.3   Economic System

The meta-universe is to connect the virtual world in the game with China's real economy. Digital people need to create wealth in the virtual world and also need to form new data information. They must also connect with China's real economy and create wealth according to diversified scenarios. The key features of the metaverse are actually closely related to the digital economy platform traffic, data information, innovation and special needs, which is one of the important ways to promote the future of the digital economy. What are the differences between digital people's decision making in

the virtual world and the real world decision making in the current economic theory research, and how to better combine the decision making in the virtual world with the real world decision making, are all problems that must be discussed in the future [19].

3.4   Regulatory Issues

Maintaining personal information security and data security is a major necessary condition for the healthy development of the metacomverse industrial chain. In order to protect the private data, the meta-universe service platform should be able to fulfill three basic requirements: the project life cycle of the database is safe and reliable, the customer has the ability to control the parameters independently, and it is suitable for multiple parties to carry out collaborative governance of the distributed system. Therefore, the metaverse needs to be improved in terms of control [20].

3.5   Network Security

As an indispensable part of the meta-universe, network information security plays a very important role in the healthy development of the meta-universe. Massive information and infrastructure construction in the meta-universe are very vulnerable to hacker attacks, and existing security defense technologies may face important challenges. The problems of personal privacy security, data security and even capital security in the metaverse are all key factors restraining the development of the metaverse.

3.6   Address Ideas and Directions

In order to solve the scientific and technological problems in the development of the metaverse, poor compatibility mode of machines and equipment, cost and other conditions, in the field of hardware configuration, VR/AR and other facilities are widely used. In the future, brain-computer interface may become the excellent machine equipment for users to connect with the virtual world in the metaverse [18]. In terms of specific content, the entertainment and gamification of teaching is the key to the sustainable development of the meta-universe. The meta-universe will become the best medium for virtual games, and the close combination of other social needs and virtual mobile games will become the main form of expression of the meta-universe. With the production and manufacturing of increasingly strong intelligent terminals, the operation of bandwidth testing Internet, Internet computing rate and artificial intelligence and technical innovation, the metaverse industry will get the development trend.

The metaverse must be applied with blockchain to ensure the security of users' virtual assets. Blockchain is an important application part of the metaverse, which effectively solves the regulatory problems and network security problems in the development of the metaverse and provides standard media for the real identity, assets and economic system of users in the virtual world. Ensure that users can have their own assets in a fully transparent, open, efficient and reliable blockchain technology financial system, and freely complete the equivalent exchange. At the same time, it drives the development of the metacosmic economic system. The birth of the blockchain industry connects various assets in the real world with the digital space, and brings the on-chain land right confirmation to its productivity to avoid being forged, captured and destroyed [13].By addressing the problems that exist in the development of the meta-universe and providing solutions, the direction is conducive to the continued development of the video game industry. Lay a solid technical foundation for video game technology.The fields involved in the metaverse are shown in Figure 4.
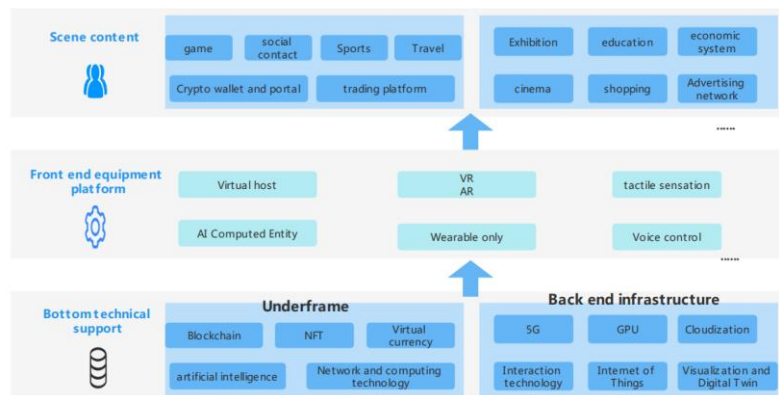
Figure 4: Domains involved in the metaverse.

4 THE DEVELOPMENT OF THE METAVERSE UNDER MEDIA FUSION TECHNOLOGY DRIVES THE DEVELOPMENT AND REALIZATION OF VIDEO GAMES

There is still a lot of variability in the metacomes, but through architectural efforts and attempts to build and continue to combine the application of core technologies, metacomes can be used to address specific challenges in the field of media convergence.

4.1 The Development of the Metaverse Under Media Fusion Technology has Led to the Development of Video Games

Create the update. Digital creation is the beginning of the metaverse. In the physical world, what you create is basically an entity or a service; In the meta-universe, what you do is digital creation, and what you create is digital goods, such as publishing pictures, taking photos and short videos, and building virtual cities. The flourishing of the metaverse requires many dynamic digital creators and a diverse and engaging array of digital goods, which in turn increases the ability of intelligent systems to create digital goods. AIGC, the creation of specific content by artificial intelligence technology, will become one of the key production forces in the future of the metaverse, and the formation of specific content of low code, zero code and automation technology is undoubtedly an inevitable trend. This will greatly reduce the barriers to creation and the cost of creation. In the future, everyone will be able to use authoring tools that used to be only for technical experts, and the authoring sales market will be in the cold. A decade ago, only TV programs or authorities could create short video content. Today, everyone can broadcast live video.

Measurement update. Computing power is a weather map that measures the growth of the digital economy, and the average computing power shows how many video game platforms are operating in a region. Internet innovation industries such as digital government departments, Internet finance, intelligent medical care and intelligent manufacturing systems need to count as support points, and the same applies to the metaverse. In the future, the experience of the meta-universe and its creation will produce a lot of needs for video game platforms. First, to make the specific content feel more real, the application of ar augmented reality and the application of large-scale customer online PK require a lot of computing power and network resources. The second is to create an illusory world and reality. Video games require Internet of Things products such as sensors and mobile intelligent terminals to collect and build models in real time, and a large amount of

computing power must be applied. In addition, the metaverse requires a lot of visual imaging and AI analysis. This practical need makes the traditional calculation structure with CPU as the center and its current computing level can not meet. Therefore, it is necessary to build intelligent data centers and cloud-side collaborative computing to integrate into the development needs of video games, which will be an inevitable trend of calculation and improvement.

Experience upgrade. An expert scholar once said: media is the broadening of human senses. In the meta-universe, the five senses of game users are digitized one by one, and the layers of information are gradually increasing, making the digital content closer to the emotional experience of real life and more truly immersive. For example, in June 2021, graduates from the School of Animation and Digital Art of Communication University of Beijing created a meta-universe with sandbox game technology, which can reproduce real game scenes through virtual environment design [9].

Management decision updating. A management decision is a command that specifically directs the next "action" in a digital medium. The key to electronic game management decisions depends on information system software. Most of people's activities are carried out in the physical world, and a little individual behavior will rely on information optimization to improve work efficiency. With the integration of meta-cosmic factors, the physical world is rebuilt into the digital world. The management decisions of electronic games largely rely on digital system software, and a little information of management decisions is returned to the physical world to guide the equipment and equipment to control. In addition, along with the increase in the size and level of information, and the increasingly intelligent system of information data analysis tools, the combination of the two will lead to more accurate and comprehensive management of video games.

Business service update. The metaverse, as a macro-economic dimension of the future delivery of development and patterns, can drive the "reintensification" of video game technology and create new business models. Take blockchain technology as an example. According to the development trend, the types of games and the development of in-game economy can directly create wealth in the meta-universe, and this kind of use value has high clarity and verifiability of trading, and the signing of contracts is also programmable, flexible and risk relative isolation. In other words, blockchain can realize tamper-proof and interoperability of the meta-universe. It effectively reduces the chances of fraud and inequality, and actually becomes a new set of business operation models, which can effectively guarantee the use of users' safety [7]. The combination of metaverse and blockchain is shown in Figure 5.
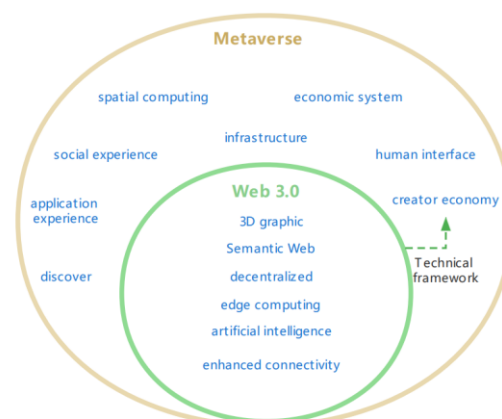

Figure 5: Combination of metaverse and blockchain.

4.2 The Development of the Metaverse Under Media Fusion Technology Drives the Development of Video Games

On the premise of the transformation of ideas, the reconstruction of organizational structure and the complete reconstruction and improvement of old news media steps, media convergence should timely track the new technological frontiers and dynamics and apply them to the meta-universe. Due to the large number of businesses in 5G, it is very important in media convergence, and closely combined with video game technology to promote the rapid deepening of media convergence; The application of blockchain is still in the early stage of the development trend and will become the main technical level to promote media convergence in the near future after 5 years [11].

First, we attach great importance to big data and artificial intelligence technology in a short time. The key to media convergence lies in the creation of game user information. It is necessary to build three platforms, namely cloud computing technology and resource sharing platform, intelligent manufacturing system and communication platform, and user precipitation service platform, among which big data and artificial intelligence technology are the key.

Second, pay close attention to the innovative applications and new models brought by 5G technology, and immediately expand the demand scenarios for video game media convergence. As a new generation of modern communication technology, 5G, together with big data, artificial intelligence and technology, will create a super-large ecosystem of the Internet of Things and promote media convergence in terms of media shape, connection, production mode and market size. Specifically, one is at the level of media shape. Existing media shapes will be greatly enhanced and improved; VR makes video games more realistic; Independent innovation of new media shape. Second, at the connection level, the connection shows exponential growth and extreme experience. Game users also have a relatively large increase in the amount of indoor space; The Internet of Things technology could provide tens of billions of dollars of new connections; The combination of movement and movement with the development of the game page will make the user experience more perfect. Third, at the level of production mode. Professional production and manufacturing organizations, UGC production mode will also be more popular, MGC (equipment self-production and manufacturing specific content) may prevail. Fourth, at the level of market size, the market size will be greatly expanded. According to the market size of game users, the media industry also has a relatively large space [12]. 5G network technology popularization is shown in Figure 6.
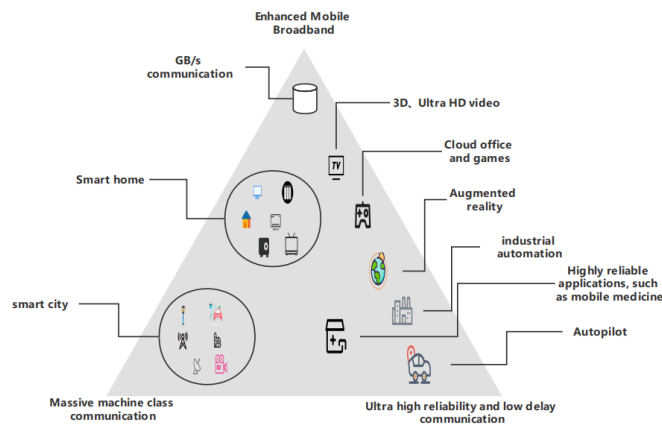

Figure. 6: Popularization of 5G network technology.

Third, in terms of blockchain innovation. Metaverse and blockchain are intrinsically natural. People usually regard blockchain as a metaverse, or as an extension of blockchain. It can not only carry out value transmission, but also enable consumers to control their own data information, attracting and stimulating a large number of participants more effectively. "Blockchain + media" will completely reconstruct the media industry, build an ecological system with a wide range, a large number of participants, more efficient incentives and constraints, and more open, fair and just values. In the long run, it will reconstruct the business operation mode and operation mode of the media industry, and in the short term, it will bring major opportunities to the news media of private enterprises by promoting the link of government departments [14]. The combination of blockchain and media has effectively promoted the publicity of video games, making people better understand video games and playing a certain role in publicity.The combination of blockchain and media is shown in Figure 7.
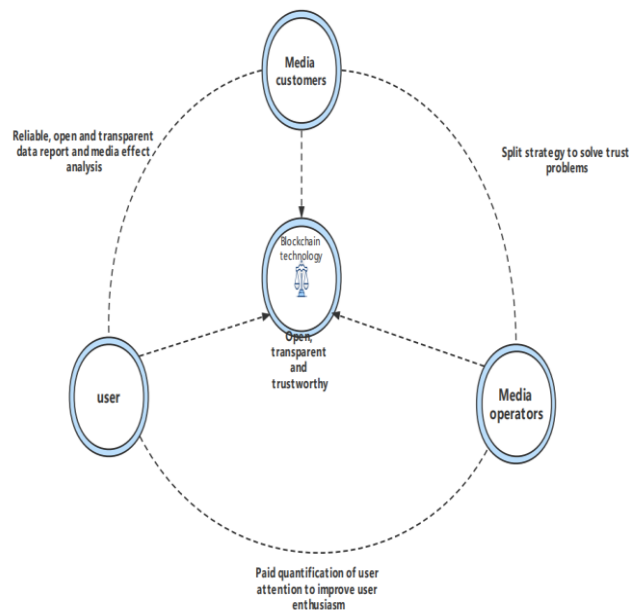

Figure 7: Combination of blockchain and media.

5   VIDEO GAMES WITH META-UNIVERSE SUPPORT TECHNOLOGY

5.1   Video Games

Video game technology generally refers to video games, which are interactive games where everything depends on the functioning of the electronic product service platform. News media can be divided into five categories: PC games, handheld games, classic arcade games, games and mobile games, which have become one of the cultural and artistic activities of most people nowadays [17]. The development of the video game industry is shown in Figure 8.
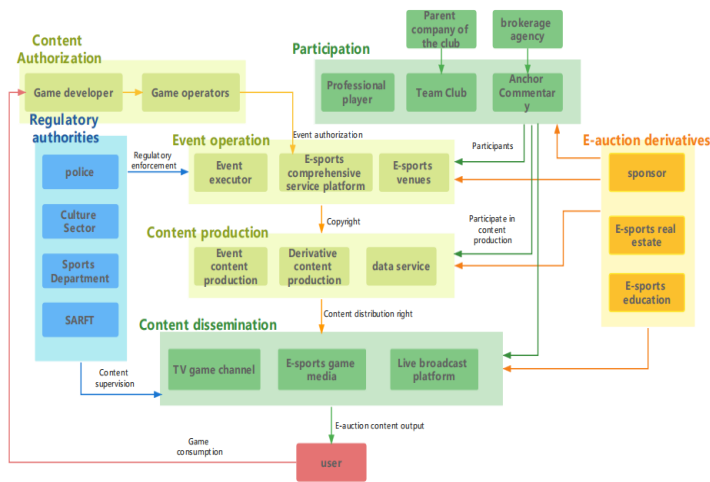
Figure 8: Video game industry development.

Since the meta-universe also needs AR, VR and other facilities to be introduced into the virtual environment, and most of the AR, VR and other facilities are used for games, the first development trend of the meta-universe at the present stage is games. The most important technology for electronic games is the game engine, a software architecture that is used to launch and upload video games, usually with a library and support plan. A game engine can also be an app designed and developed using this architecture, generally acting as a set of game development tools. Game developers can make games using game engines, such as electronic game consoles or other computers. The main functions provided by game engines are likely to include 2D or 3D graphics drawing module, game engine or path planning, sound, script production, animation, artificial intelligence technology, Internet, streaming media playback, code optimization, process, localization, scene pictures, cut scenes, etc. [6]. The completion of a game engine will always enable, modify, or facilitate the migration of the game to several software applications, thus saving development time for the game. The global market capacity of game engine is slowly expanding. The global market size of game engine from 2010 to 2021 is shown in Figure 9.
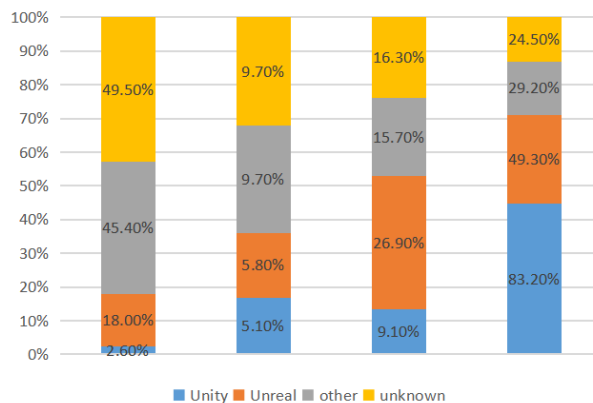

Figure 9: Global market engine market size, 2010-2021.

Game engine refers to some written better editable computer game system software, or some key components of interactive real-time image application software, for the development staff to efficiently, conveniently and quickly design and write the game program must be completed. Game engines put all the elements of a game together, allowing mobile game designers to quickly and efficiently create a game, rather than starting from scratch. Game engine consists of hardware configuration management method, natural environment development, scene construction and game production [1]. The game engine composition is shown in Figure 10.
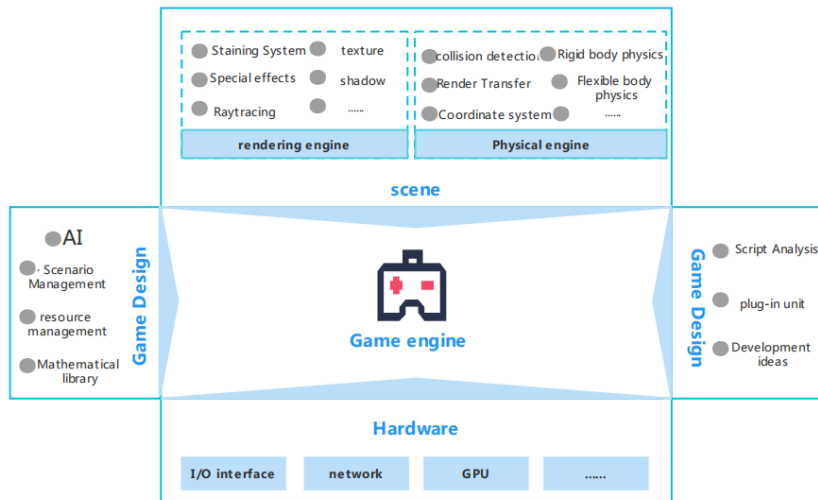

Figure 10: Game engine composition.

The obvious character of video games in a medium combination depends on the high level of immersive interaction and deep immersion. The concept of metacomes and video games are different in shape, but there is a certain correlation. Electronic games are entertainment industry media that use "multi-media mode" to carry out narration, aiming at integrating the advantages of multiple media with physical narration. That is to say, under the premise that electronic games themselves integrate a variety of media, "the systematic dissemination of stories depends on several service platforms, and each platform makes unique contributions in the field of their own expertise" [3]. In other words, video games, in combination with their actual media-combined nature, apply transmedia narrative structure to a global story. In Storyglobe, "customers or audience groups are called as' experts' and 'warriors', who actively grasp the world and try to express it or actively visit the world and feel different types of aesthetic feelings in the world". This kind of comprehensive narrative prompts people to temporarily get rid of the reality and become obsessed with the global story structured by the game, resulting in a sense of inclusion from the inside out.

Video games as a combination of media material, to a certain extent comprehensive to give everyone sensory stimulation. The connection between video games and the world of story is more like the game production engine or a certain medium method, the overall narrative made up of the story world, the real life unfolding. When game users participate in the game, they will be attracted and enter the story world, and they will be consciously brought into the identity of "learning soil" and "warrior", so as to immerse themselves in the game effect [5]. The concept of metacomes is technically related to video games, which are all materials combined by media. However, there will

be differences in practical application. We compare the characteristics of metacomes and video games in the context of media fusion vision, as shown in Figure 11.
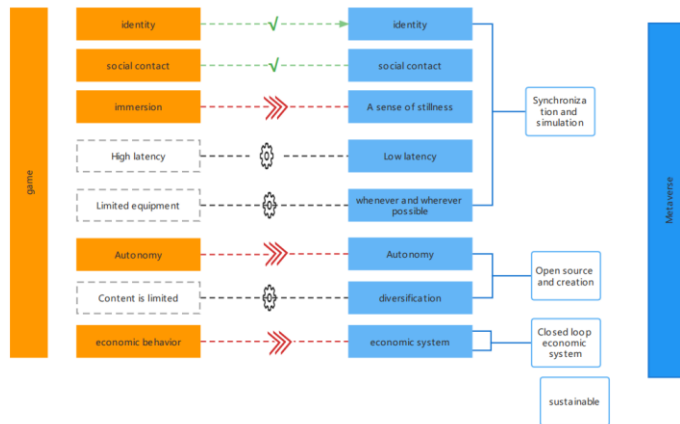

Figure 11: Comparison of game features.

5.2   Application of Blockchain Technology to Video Games

The collision of blockchain technology and gaming has added vast market prospects to the development of both markets. Innovation in the nascent field of blockchain gaming has pushed the limits of irreplaceable assets and is expected to again provide creative trends in other industries such as scalability. For objective reasons, blockchain provides a useful means for game players, including blockchain technology asset swap, verifiable virtual objects and collection of scarce resources, secure and efficient settlement of the Internet and its development staff can accurately use his works of monetization placement capacity. On the other hand, the search for sustainable and interesting game solutions based on blockchain has led to some exciting indigenous innovations at the scale and asset building level of blockchain. The combination of blockchain and video games is shown in Figure 12.
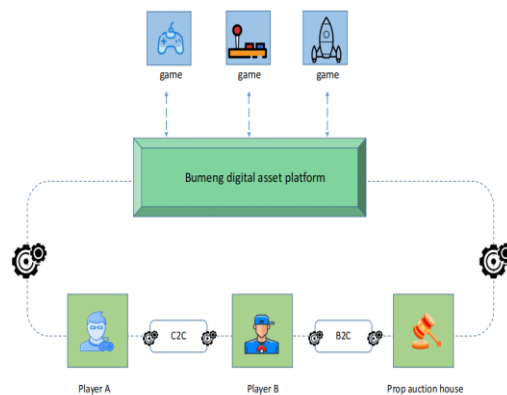

Figure 12: Blockchain and video games.

Based on the Merkle tree optimization algorithm in blockchain technology, this paper carries out security authentication on the decentralized dynamic database that completes security cloud storage of blockchain. Blocks are linked according to the use of data encryption to store data. The paper often chooses the blockchain theory to verify the improvement of video game technology by the concept of metaverse through optimization algorithm.

5.2.1 Blockchain

Blockchain is a chain of blocks. Each block holds a certain amount of information, which is linked in the order in which they are generated. This chain is stored in all the network servers, and only one server in the whole system needs to be working. A block chain is secure. Block chain is another benefit of our digital currency. Block chain can effectively ensure the operation of online games, improve the security of users and improve the efficiency in use. This paper carries out security authentication on the decentralized dynamic database of cloud storage of block chain based on the Merkle tree optimization algorithm of block chain technology. Blocks are linked according to the use of data encryption to store data. The paper often chooses the blockchain theory to verify the improvement of video game technology by the concept of metaverse through optimization algorithm. The composition of blockchain is shown in Figure 13.
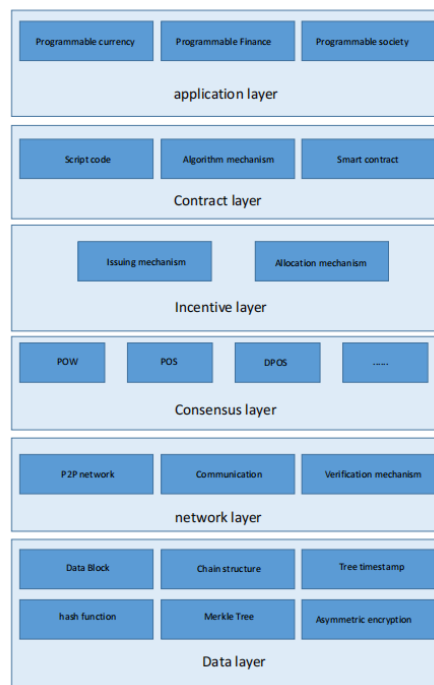

Figure 13: Blockchain structure.

5.2.2 Merkle tree algorithm

In fact, Merkle Tree itself is a hash directory, but on the basis of the introduction of the tree structure, so that to get a higher coordination ability. In order to reduce the memory space and improve the viewing efficiency, we can expand the Merkle hash tree from three aspects: (1) Store data labels on each node instead of only on the leaf nodes; Each node stores several data label items from small

to large. (2) Index keys are added to each data label for efficient label viewing; (3) The index category field name indicates the lowest and largest index value of the node at this stage to be placed on the top of each bulk [15]. First, the structure of the hash tree is constructed:

$$H(v_i) = \begin{cases} hv_i, & lesfnode \\ h(h(v_i)||\ （rchild）), & \exists right\ child, \\ h(h(v_i)||\ （lchild）), & \exists left\ child, \\ h(h(v_i)||\ （lchild）||H(lchild)), & \exists two\ children, \end{cases} \quad (1)$$

Then, we implement the algorithm through the initialization and validation steps.

(1) Initialization link

$sk \in Zp$, the Client generates a random value as its private tag key and computes the public key. $pk = skP$ Under the lnv-CDHP assumption, the private key cannot be extracted from the public key.

$$Tag_i = \frac{1}{\mathcal{g}(m_i) + sk} p \quad (2)$$
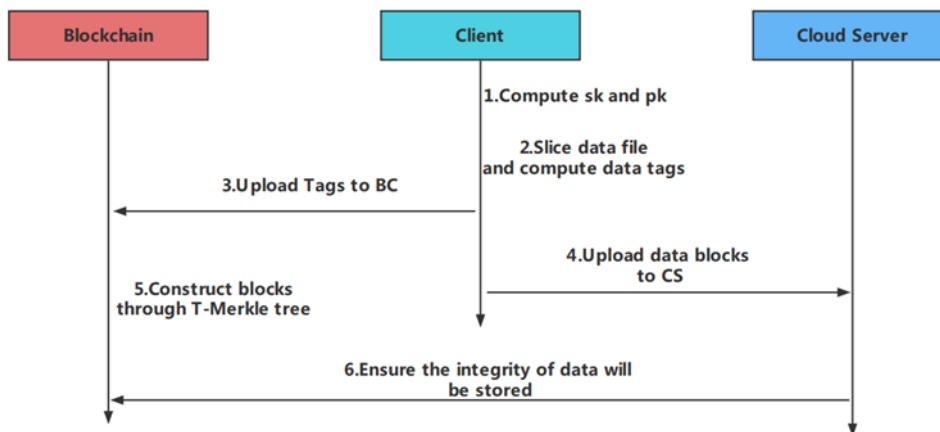
The initialization process is shown in Figure 14.

Figure 14: The process of initialization.

(2) Verification

We take a set of random numbers, I=, of which z is a subset, [1,x], and generate pseudo-random values for each set. It is divided into two parts: receiving data and label proof.

When receiving data:

$$DP = e(\sum_{i \in I} u_i\, \mathcal{g}(m_i)P, P) \quad (3)$$

Label proof：

$$TP = e(\sum_{i \in I} \frac{u_i}{Tag_i} P^2, P) \quad (4)$$

After receiving the data and label proof, the client also needs to use the public key that has been issued for calculation and verification through the verification formula:

$$TP=DP \cdot e(R,P) \tag{5}$$

The process of the verification phase is shown in Table 1:

Tache	*Process*
Blockchain	1. *Generate challenge chall* 2. *Send chall to CS/BC*
Client	3. *Computer data proof DP/TP* 4. *Send TP to client*
Cloud server	5. *Computer R and check the proofs by eq*

Table 1: Verification phase process.

The participating nodes of the decentralized dynamic database security authentication application that completes the security cloud storage of blockchain get rid of the dependence on the central server and directly establish trust through the TPM chip on the user machine, which makes it possible to create a secure distributed application with better scalability, higher reliability and stronger availability. Thus, it solves the problems of supervision and network security in the use process of video game users, and better obtains people's trust in the application of the meta-universe to video games. At the same time, the meta-universe is the development of a higher level of video games, so the two are interdependent and mutually promoting.

6 CONCLUSION

The establishment of the meta-universe can bring many profound changes to the real world and the unreal world in which they live. To some extent, it can change the familiar way of being, which is bound to have an impact on people and all fields of the whole society. In this process, there will be many unpredictable risks and challenges. The key lies in the adverse effects of the endless extension of human sensory faculties. In the context of media combination, the meta-universe is a new realm of the existence of online games. As a relatively highly integrated new medium, the meta-universe is bound to impact the traditional media and their inherent ideas. This paper analyzes the development and realization of video games driven by the development of metacomes under the media fusion technology. Metacomes are a higher level extension of video games. We can show diversified ways of video games to people through VR, AR, blockchain technology and 5G technology. To improve the daily lives of the public through the application of new technologies. The Merkle tree algorithm under the blockchain technology is also used to verify the metaverse's technical support for the development of video games, gaining people's trust in the technical security. Scientific and technological progress is the primary productive force. For the birth of the metaverse, we must think about the future development of video games with an open and optimistic attitude.

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