Asia Pacific
Academy of Science Pte. Ltd.

ORIGINAL RESEARCH ARTICLE

Research on BaaS-based tourism logistics cloud platform architecture in the perspective of territorial tourism

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ABSTRACT

On the basis of the analysis of the new tourism logistics mode in the perspective of the whole area tourism, it points out the change to the city The new requirements of the public operation and management service platform of tourism logistics in the city region are pointed out, and the necessity of building a cloud service architecture for urban tourism logistics is established. The necessity of constructing urban tourism logistics cloud service system architecture is established. The feasibility of applying blockchain technology to the construction of tourism logistics cloud service platform is also analyzed accordingly. At the same time, the framework model of hybrid cloud architecture of urban tourism logistics based on BaaS is proposed.

Keywords: comprehensive tourism; block chain; BaaS; tourism logistics; cloud logistics

1. Introduction

The proposal of global tourism is a fundamental change in the development concept and development mode of the tourism industry, and is the main direction of China's tourism development in the next step. Tourism logistics is an important part of the whole social tourism ecosystem. The supporting role of tourism logistics on tourism has been confirmed by a large number of literature researches. From the perspective of global tourism, the development strategy and service realization path of tourism logistics must also be improved accordingly, especially in the aspects of informatization, intelligence and security. It is necessary to continuously apply the research results of modern information technology to the industry, so as to adapt to the overall environment of vigorously developing global tourism and better achieve the mission of tourism logistics serving the development of tourism industry.

In the field of global tourism, relevant literature has carried out research from the aspects of theoretical analysis and operation mode. For example, Lin et al. used relevant data platforms to conduct quantitative analysis on domestic global tourism literature, and came to the conclusion that the development of China's global tourism has entered the stage of national demonstration and promotion[1]. Zhao et al. based on the coupling coordination degree model, explored the spatial data analysis method and geographically weighted

CITATION
Yu Z, Ye B, Liu K. Research on BaaS-based tourism logistics cloud platform architecture in the perspective of territorial tourism. Smart Tourism 2021; 2(2): 8 pages.

regression model, constructed the coupling coordination evaluation index system of tourism industry and regional development from the perspective of global tourism, and analyzed the main driving forces affecting the change of coupling coordination degree in China's provinces and regions[2]; Wang clarified the problems existing in the research and practice of global tourism development in academia and industry from the perspectives of the fundamental purpose of global tourism development, the current misunderstanding and the main path of development[3].

With the rapid development of tourism, the research on how to better provide services for modern logistics has been more into the operation mode and empirical research for specific areas because of the discussion of basic concepts and principles. In terms of operation mode research, Ge et al.[4] constructed the framework of tourism logistics system and discussed its system organization system and operation mode[4]; Liu[5] put forward the ldt-cer tourism logistics model based on the tourist center of scenic spots, and put forward new ideas for the architecture of tourism logistics system[5]. In terms of empirical research on specific regions, Yu et al. constructed a correlation analysis model based on the grey correlation theory for the tourism development samples in Chengdu. Through the empirical analysis of the historical data of the region for many years, they came to the conclusion that there is a close correlation between the tourism economy and the development of logistics industry in Chengdu, and put forward suggestions on promoting its next development[6]. In the field of application of information technology in tourism logistics operation and management, Yu et al.[6] took Qingcheng Mountain Dujiangyan scenic spot as a smart tourism area as a research sample, structured and analyzed the construction of tourism logistics information management platform based on hybrid cloud model, and described its basic functions[7]; Huang et al. put forward the development model of tourism logistics informatization, and put forward integration, standardization, informatization and collaborative

development strategies around the effective implementation of tourism logistics informatization management[8].

As a "decentralized" technology, block chain has attracted more and more attention in the construction of enterprise information platform. In recent two years, academia has also conducted more in-depth research on this from theory to application Zhang conducted literature review and Analysis on the current basic research status of blockchain[9]; Wang et al. analyzed the logistics information resource management of blockchain from the dimensions of object, attribute and function, and constructed the supply chain logistics information ecosystem model based on blockchain[10]; Yang et al. proposed to establish a supply chain information platform with blockchain technology as the core, discussed the application of blockchain smart contract in the supply chain, and analyzed the stochastic dynamic proof of equity (sdpos)consensus mechanism suitable for supply chain alliance[11]. On the combination of blockchain technology and cloud platform, based on the in-depth analysis of blockchain consensus mechanism, smart contract and programmable features, Wang proposed a cloud service integration architecture with blockchain as the underlying infrastructure with more prominent reliability and reliability[12].

Based on the above literature analysis, in the current research and practice of promoting the development of tourism logistics from the perspective of global tourism, the architecture and application of a fully functional, efficient, safe and reliable information management platform is a major key problem, and the integration of blockchain technology and cloud logistics platform can provide a beneficial solution, which is the starting point of this paper.

2. New business forms of tourism logistics from the perspective of global tourism

In 2016, Li Jinzao, director of the National Tourism Administration, proposed that China's tourism industry should focus on the transformation from the current "scenic spot tourism" to "global tourism", and pointed out that global tourism refers to a new regional development concept model in a certain region, which takes tourism as an advantageous industry and uses tourism to promote economic and social development. Therefore, compared with traditional scenic spot tourism, global tourism will more reflect the "five complete" characteristics of global optimization of tourism landscape, global matching of tourism services, global coverage of tourism governance, global linkage of tourism industry and national sharing of tourism achievements.

In essence, tourism logistics is a special form of logistics industry. Its goal is to serve the development of tourism industry. Its scale and format are continuously expanded and adjusted in the development of regional tourism economy. At the same time, it can effectively promote the sustainable and healthy development of regional tourism industry. Relevant research[6] shows that for a region, there is a significant positive correlation between the development of tourism economy and the development of local logistics industry. Therefore, when the development strategy of the tourism industry is adjusted, the format of tourism logistics will also change. Specifically, from the perspective of global tourism, the tourism logistics industry will present the following new characteristics:

2.1. The spatial scope of tourism logistics is highly overlapped with that of urban regional logistics

When the tourism market is dominated by scenic spot tourism, there are obvious differences between tourism logistics and urban logistics in spatial scope. When urban logistics strives to achieve full coverage of the region, the main body of tourism logistics pays more attention to the logistics services of scenic spots, along scenic spots and related hotels, restaurants and other institutions involved. In the context of global tourism, as pointed out in document[3], with the continuous expansion of the connotation of tourism products, "a new concept of tourism time and space with human life field as tourism time and space. 'Tourists' tourism demand is no longer the traditional sightseeing, catering and shopping, but the whole process experience or enjoy a tourism living space with beautiful environment, rich business forms, complete functions and high-quality service." Therefore, the scope of tourism activities has been expanded to the living field of human beings. Naturally, the tourism logistics serving it must expand the service space accordingly, which is no longer limited to the traditional scenic spots, scenic spots and along the line, and then the spatial scope of service presents a situation of high overlap with the urban material flow in the region.

2.2. The demand side of tourism logistics market can be expected to coexist with random demand

Like all market behaviors, tourism logistics market transactions also involve supply side and demand side. In the market dominated by scenic spot tourism, the service objects and regions of tourism logistics are basically determined. With the support of data and experience over the years, the market demand of tourism logistics can be predicted although it varies with seasons. In the context of global tourism, in addition to the above predictable needs, due to the expansion of the scope of tourism products and the different individual preferences of tourists, the demand side of tourism logistics is no longer mainly concentrated in traditional scenic spots, scenic spots, hotels, restaurants and other institutions along the line, but partially scattered in all possible areas of the city, such as decentralized experiential consumption and home stay. These logistics demands brought about by tourists' very scattered travel experience have great randomness in time point and volume, which poses new challenges to the supply side of tourism

logistics market in terms of service timeliness and high quality.

2.3. The main body on the supply side of tourism logistics market intersects with urban regional logistics

The main body of the supply side of the logistics market is many logistics enterprises. These logistics enterprises may be large and medium-sized enterprises with the ability to undertake comprehensive logistics business, or small and micro enterprises mainly undertaking independent businesses such as warehousing, transportation and distribution. As far as tourism logistics is concerned, although its service object is a specific tourism industry field, it does not mean that there must be a special tourism logistics enterprise to undertake the corresponding business. There are two reasons for this: first, tourism logistics business has no fundamental difference from other social logistics forms in terms of operation and management. There is still no doubt that it must follow the basic laws and business operation processes of modern logistics, However, due to the different objects of logistics implementation, special operation links may be added on the basis of general rules and processes, such as food safety and cold chain transportation of fresh raw materials for tourism catering industry, special packaging for tourist souvenirs, which are within the business capacity of social logistics enterprises. Second, in the context of global tourism, tourism logistics objectively leads to a small volume of single business due to scattered demand and randomness. Except for a few cases, its daily business volume is generally insufficient to support the development needs of logistics enterprises. Therefore, there are few logistics enterprises with tourism logistics as the main business field. Therefore, for a specific urban area, there is only a single business object difference between tourism logistics and urban regional logistics, and there is no difference in the field of the whole enterprise.

3. From the perspective of global tourism, the new business form of tourism logistics chooses its public operation management service platform architecture

From the above analysis, many new changes have taken place in the business form of tourism logistics from the perspective of global tourism compared with traditional scenic spot tourism, which puts forward new requirements for the public operation management service platform of tourism logistics in urban areas. It mainly includes:

3.1. Have strong logistics integration ability

In view of the coexistence of predictable and random demand on the demand side of tourism logistics, the market puts forward high requirements for the ability of tourism logistics enterprises to respond to various real-time service needs. At the same time, due to the large number of logistics links, customers have different personalized needs, which requires the public operation management service platform to integrate different market needs in a very short time to form a personalized service scheme, reasonably decompose the scheme according to different operation links, and efficiently organize relevant logistics enterprises to complete it together, so as to give customers a perfect service experience To achieve this goal, strong logistics integration capability is essential.

3.2. An optimized and reasonable income distribution mechanism should be formed

From the perspective of global tourism, the operation of social tourism logistics shows obvious characteristics of "crowdsourcing", which is also the inevitable trend of further deepening social cooperation under the development of sharing economy. The important premise of effective cooperation is the clear decomposition of tasks and the correct distribution of benefits. Therefore, in the tourism logistics public operation management service platform, we must reasonably design and effectively realize the optimal operation of the

income distribution mechanism, so as to ensure that all logistics enterprises participating in the cooperation can accurately calculate according to different contributions and obtain due economic returns in time, so that the "crowdsourcing" cooperation can be carried out in a continuous and healthy way.

3.3. Ensure reliable security for partners

Security is the basis of all market cooperation behaviors. While participating in the real-time service response to the demand side of tourism logistics in the form of "crowdsourcing", logistics enterprises are very sensitive to the security of enterprise information, transactions, funds and other elements and activities. A highly secure tourism logistics public operation management service

platform is the guarantee for the effective organization and development of tourism logistics services in a region.

Considering the requirements of the above new tourism logistics formats on logistics service capacity, this paper believes that the cloud logistics service platform architecture shown in **Figure 1** is an effective choice that conforms to the development direction of the industry and fully draws on the research and practice achievements in relevant fields. The author has explained in detail the main function definition of each component module under the architecture in document[7], which will not be repeated in this paper, but put forward the basic ideas for the further improvement of the platform.
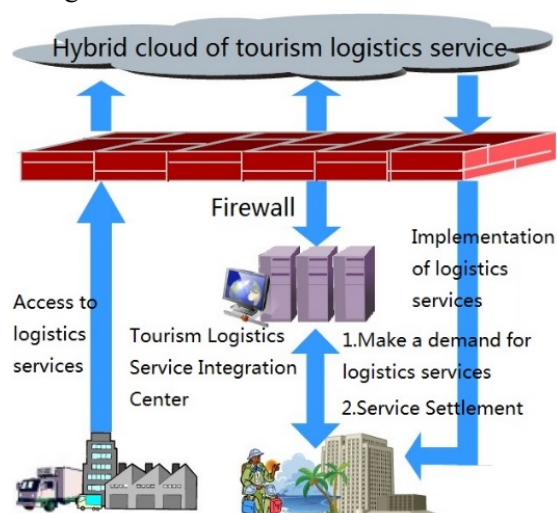

Figure 1. Tourism logistics information management service platform model based on hybrid cloud.

4. Architecture of tourism logistics cloud service platform based on BaaS from the perspective of global tourism

4.1. BaaS and blockchain

Baas, which means "block as a service", is a new cloud service platform built by using blockchain technology in the field of cloud computing services, in addition to the more mature "software as a service (SaaS)", "platform as a service (PaaS)" and "infrastructure as a service

(IaaS)" The proposal of BaaS not only accelerates the application expansion of blockchain technology in many fields, but also brings profound changes to the service application based on cloud computing.

Based on the research of relevant literature [9–11], block chain was originally produced in bitcoin trading system. It is an Internet-based distributed ledger technology, which integrates a variety of existing technologies such as encryption algorithm and P2P file transmission, establishes a trust network between trading subjects through encrypted ledger distributed storage and collective maintenance, and combines all blocks in the form

of chain shown in **Figure 2.**

Blockchain involves hash function, Merkel tree, asymmetric encryption, data block, chain structure, timestamp, P2P network, propagation mechanism, pow, POS, dpos, blockchain finance, blocksupply chain and other key technologies. It has the characteristics of decentralization, security and transparency, smart contract and verifiability[10].
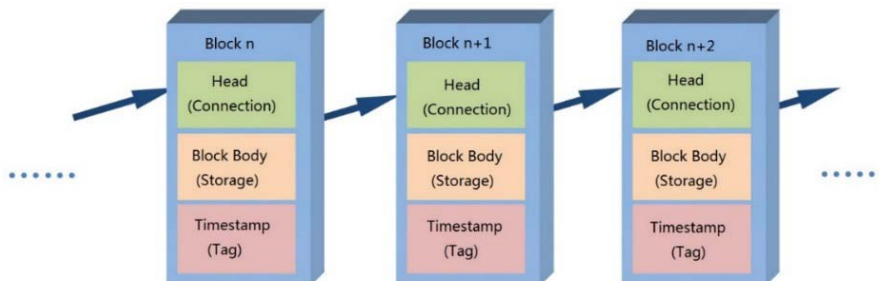

Figure 2. Basic structure of blockchain.

4.2. Choice of matching blockchain with tourism logistics cloud computing services: Alliance chain

Blockchain is not a single technology since the concept was put forward, but a collection of many existing information technologies. In essence, blockchain is a kind of cloud distributed infrastructure[12], in which consensus mechanism, distributed network, asymmetric encryption system and smart contract are the core of the system. This is similar to the fact that cloud computing essentially realizes the integration of traditional computers such as distributed computing, parallel computing, network storage and virtualization with the development of network technology.

At the same time, blockchain and cloud computing also have similarities in classification. Cloud Computing mainly includes three modes: public cloud, private cloud and hybrid cloud. At present, blockchain is also divided into three types, namely public chain, private chain and alliance chain. The classification of the two has the corresponding relationship shown in **Table 1.**

Table 1. Classification correspondence between cloud computing and blockchain

Three modes of cloud computing	Basic feature	There are three types of blockchain	Basic features[11]
Gong Youyun	Cloud services open to the public	Public chain	As an open system, anyone can freely become a node on the blockchain and enjoy the rights of obtaining all information on the chain, trading on the chain, participating in consensus, participating in bookkeeping, system maintenance and so on
Private cloud	Provide cloud services inside the enterprise, not open to the public	Private chain	It has a certain closeness and usually needs to rely on offline entity organization
Mixed cloud	The integration of public cloud and private cloud is a cloud service that flexibly combines the internal capabilities of the system with external service resources	Alliance chain	All nodes are not completely equal. Only some nodes screened according to the rules can obtain the right to verify new blocks and account, and participate in the consensus mechanism on the chain

Therefore, just as in the cloud computing service system, the hybrid cloud model better takes into account the security and resource integration capabilities and becomes the dominant cloud logistics architecture of society and enterprises, in the blockchain technology, the alliance chain can achieve partial decentralization of the network and ensure the immutability of data under the condition of ensuring the transaction speed because of its wider scope of application, easier control setting and better scalability, Therefore, it should become the main form of realizing BaaS in line with tourism logistics cloud computing services.

4.3. Tourism logistics cloud platform based on BaaS from the perspective of global tourism

Literature[11] points out that the infrastructure of blockchain usually includes seven layers from top to bottom in terms of its functions, namely: application layer, contract layer, incentive layer, consensus layer, network layer, data layer and data infrastructure layer. According to the analysis of the fit between blockchain and cloud computing, the tourism logistics hybrid cloud platform architecture shown in fig 1 is further improved to form the BaaS based tourism logistics hybrid cloud architecture system shown in **Figure 3.**
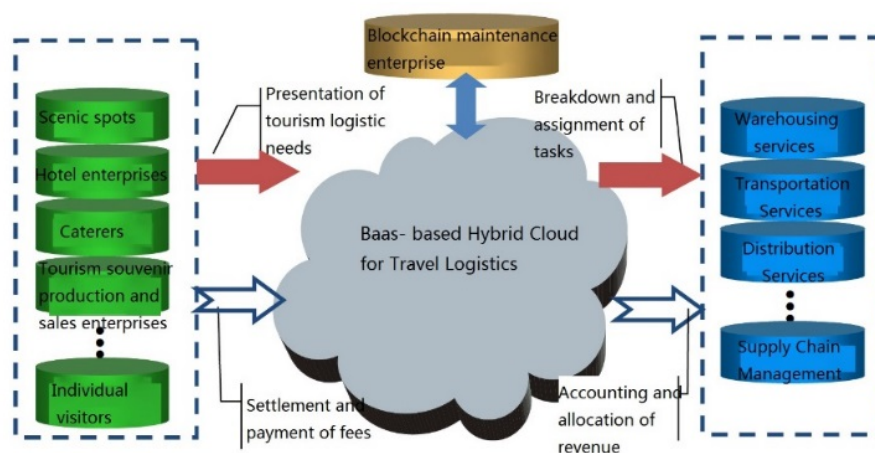

Figure 3. Hybrid Cloud Architecture of tourism logistics based on BaaS.

Compared with the architecture platform shown in fig 1, the architecture system better meets the new requirements of the new business form of tourism logistics from the perspective of global tourism in the following functions, and the functions of its cloud logistics platform have been further improved:

First, it meets the needs of real-time response to scattered and small-scale tourism logistics needs and relatively centralized and large-scale tourism logistics needs, and has strong ability of social logistics resource integration, service combination and realization.

Second, through the unique "smart contract" function of BaaS, it can complete the complex transaction process on the demand side and supply side of tourism logistics without manual control and intervention, realize the automation, intelligence and decentralization of the transaction, greatly simplify the transaction process, reduce the transaction cost and improve the security of the transaction.

Third, the "smart contract" function of the blockchain can also realize the automatic transfer of each transaction fund on the demand side and supply side of tourism logistics and the automatic execution of compensation contract. Compared with the traditional cloud platform, which requires capital settlement and transfer through the central server, it significantly improves the payment efficiency and simplifies the clearing process.

Fourth, the trust network between transaction subjects is established through the distributed storage and collective maintenance of blockchain encrypted ledger. While realizing the decentralization of the system, the traceability, collective maintenance and information tampering of all transactions are realized. All transactions can be traced accurately under the platform, which makes the rights and responsibilities of each link of the transaction clear, and ensures the high security of all participants in the transaction in terms of information, transaction and capital.

5. Conclusion

With the maturity of blockchain technology and more and more industry applications, it is necessary to combine this technology with cloud computing services to further improve the tourism logistics cloud service platform and form a tourism logistics cloud service architecture based on BaaS, to adapt to the changes of new business forms of tourism logistics from the perspective of global tourism and promote the sustainable and healthy development of tourism logistics.

Conflict of interest

The authors declare no conflict of interest.

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