# Research into Intelligent Tourism Architecture Mode Based on TRP

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**Abstract.** This paper proposes the concept of Tourism Resource Planning (TRP in short) and gives the definition and structure of TRP. Based on this, this paper analyzes the connotation characteristics and key technologies of intelligent tourism and designs the overall architecture mode of constructing intelligent tourism, which consists of perception layer, network layer, data layer, application layer and service layer. Then, it guarantees the regular construction, operation and maintenance of intelligent tourism through constructing information standard and standard system, operation maintenance and security system.

## Basic Concept of Intelligent Tourism

**Connotation of Intelligent Tourism.** Intelligent tourism, based on information communication technology (ICT), provides high-quality and satisfactory services in order to meet customers' personalized demands so as to share and effectively utilize tourism resources and social resources as well as reform systematic and integrated management. From the content point of view, the essence of the wisdom of tourism is meant to include the application of information and communication technology, intelligent technology in the tourism industry is to enhance tourism services, improve the tourism experience, tourism management innovation, optimize the tourism resource use as the goal, enhance the competitiveness of tourism enterprises, improve the tourism industry management level, expand the scale of industry modernization project. Intelligent tourism is a part of the wisdom of the earth and the wisdom of the city.

**Characteristics of Intelligent Tourism.** "Intelligent tourism" utilizes cloud computing, virtualize and the Internet of Things to convert "traditional tourism" into "digital tourism" and then "intelligent tourism", changes the mutual interaction way of tourism resources, integrates and utilizes tourism resources and application system so as to improve the definition, flexibility and response speed of application interaction, realizing the intelligent services and tourism mode of management. The three core characteristics of intelligent tourism are:

(1) Intelligent tourism pays attention to providing suitable personalized services, comprehensive intelligent perception environment and comprehensive information service platforms for different roles.

(2) Intelligent tourism combines the computer Internet and information services so as to realize the interconnection and coordination in the field of tourism services and make the entire tourism, service and management more convenient.

(3) It provides an interface of mutual communication and perception through the intelligent perception environment and comprehensive information service platform.

**The Key Technology of Wisdom Tourism.** (1) Cloud Computing: Cloud computing is a rapidly developing technology in recent years. It provides a virtual dynamic allocation of resources, through the continuous adjustment of resource allocation to achieve the best user needs. Cloud computing allows users to experience hundreds of thousands of times per second speed, can be used to simulate a variety of needs after a large number of calculations to draw the conclusion of the situation. Such as nuclear explosions, climate change and market trends. Cloud computing is usually performed on a number of computers, rather than the traditional native or traditional server.

 

In the construction process of intelligent tourism, due to the large amount of data, short response time and other characteristics, the use of cloud computing technology to provide a good user experience.

(2) The Internet of Things: IOT refers through RFID, infrared sensors, global positioning system, GPS, laser scanners and other information sensing device, the any objects connected to the Internet, the exchange of information and communication, in order to achieve the object of intelligent recognition, positioning, tracking and monitoring and management of a form of network. The Internet of things technology can be applied to the safety management of scenic spots, the instant determination of passenger flow, the research of tourist consumption behavior, etc.

(3) Big Data: With the development of the Internet, the amount of data showed a rapid growth. Especially in recent years, the arrival of the era of cloud computing, from the enterprise point of view, want to give users a better experience on the need to use intelligent computing. While intelligent computing needs to offer to a large amount of data. Big data is usually referred to as those that have not been processed, no obvious regularity of the data. And it cannot be collected and managed in a very short period of time, with conventional methods or tools. The significance of big data does not lie in the size of the amount of data, but from the mass of data, to extract meaningful data, that is, the processing of data. Building intelligent tourism process, the need to extract effective data from a large number of historical data, the establishment of a model for the school's decision-making to provide a good technical guarantee. Big data and cloud computing are inseparable. Because large data cannot be processed by a single computer or server, it is necessary to use cloud computing for distributed processing, distributed databases and cloud storage.

(4) Mobile Internet: In recent years, mobile communication technology develops rapidly. Nowadays, smart phones and other devices can complete most work of the traditional computer. In the construction of intelligent tourism, the mobile communication and tourism information management can be combined to obtain and manage the network information anytime, anywhere, to provide basic conditions for tourism activities.

(5) Geographic Information System (GIS): GIS is a collection, storage, management, analysis, display and application of geographic information of the computer system, is the analysis and processing of massive geographic data of the general technology. People make use of GIS in the management of tourism geography developed tourism geographic information management (TGIS), and the combination of GIS and network technology, the web publishing of spatial data, the user can through the network get tourism information, realize spatial data browsing, query, analysis of the combination of WebGIS, which integrates tourism electronic commerce system, become providing travel information for the new model. As well as the new 3DGIS technology, so that the two-dimensional expression into three-dimensional expression, so that visitors feel more intuitive to the tourist destination.

(6) Virtual Reality (VR) Technology: Virtual reality technology is divided into based on the image of the virtual reality technology and virtual reality technology based on vector model of is a through the computer generated virtual environment can be natural interaction interface. With the help of multidimensional input and output devices, tourists can be roaming in tourism virtual reality among, travel through virtual reality experience tourism virtual scene and enhance the attractiveness of tourism.

## Tourism Resource Planning

Construction of informatization of our country tourism has generally experienced three stages: the first stage is the stage of specialization, the scenic spot and management departments to establish their own web site; the second stage is stage of the construction of digital tourism and digital scenic spot, at this stage has been achieved some distributed data integrated management function, and establishes a data sharing and service mechanism; the third stage is the wisdom of tourism, is the intelligent stage. In the process of promoting the wisdom of tourism, although it has made great achievements, but there are still a lot of problems: (1) Development lacks unified planning. Because the investment is not consistent, resulting in information construction is not continuous, lack of

system planning background support, and the particularity of industry, the relationship between the enterprise relative loose, resulting in in the construction of tourist information easy to the lack of unified planning, to the more high level information processing, such as data mining, decision support and so on. (2) There is a lack of effective sharing of information. The lack of unified planning information, will inevitably bring about the lack of consideration to the overall and system application are mostly from their own perspective to the development and implementation, performed by different research groups in different time periods, split between the organic connection; there is no unified information standard, data format is also each are not identical, systems unable to achieve effective data sharing, forming a of isolated information islands under the network environment. (3) There is a lack of effective integration of application. Application system uses different software platform, lack of unified application access interface. Lack of integration between the application system cannot directly access the data and function between each other, the need for human treatment. (4) Users do not have a unified interface. For different application systems, users need to log in for access respectively, so there is a lack of unified access resource and application interface.

In order to solve these problems, the tourism resources planning (TRP) system architecture is proposed.

**Concept of Enterprise Resource Planning.** In 1990, the famous American management consulting firm Gartner Group Inc. put forward the concept of enterprise resource planning, referred to as ERP (Resource Planning Enterprise). ERP is established on the basis of information technology, using advanced management ideas of modern enterprise, comprehensively integrates all the information resources of enterprise, and provides all-round and systematic decision-making, planning, and control and performance evaluation for the enterprise management platform. At that time, as application software, widely used by the world's commercial enterprises, has now developed into one of the modern enterprise management theory. Enterprise resource planning (ERP) as a kind of enterprise management software system, its core is the unified management of the production process of the product. The basic idea of ERP is based on the production process, and the effective planning and expansion of all the links. Through the planning of the work flow, the project completion cycle is shorter. By entering the product data, you can make data management more easily. By increasing the enterprise warehouse and network analysis functions, to facilitate business executives to understand the whole situation of the entire enterprise.

**Definition of Tourism Resource Planning.** Tourism Resource Planning is TRP in short. It is based on the necessary standard process as the center, through the external adaptation of the needs of the module, the module is based on the demand for change, and so TRP need to provide a large number of interfaces to docking module. In order to increase the stability and user experience, TRP must adopt a unified interface specification and the user interface, all of the tourism information and function integration, to achieve the purpose of information exchange and sharing. Tourism resources planning (TRP) is the evolution of enterprise resource planning (ERP), the two are inextricably linked. ERP mainly includes architecture, standards and applications. So the research on TRP is also based on these three levels to develop. We can understand the TRP as the development of a unified platform, using a wide variety of collaborative methods. To provide different users with targeted services, to achieve a unified management, in order to adapt to the diversity of tourism. To a certain extent, it is not only a set of information system, but also a kind of management thought and theory of the modern times.

**Structure of Tourism Resource Planning.** As can be seen from the definition of TRP, the structure of TRP can be abstracted as "1+N+1", that is, 1 basic platform, N application systems and 1 portal. TRP is open, it is different from ERP. Application system through the public platform, there can be some links between each other, can also be completely independent. It is both independent operation, but also can be connected with other applications through the interface system, so that the information resources of the application system is shared.

(1) TRP Gateway: 1in the "1+N+1" structure refers to the 1 portal, it is the user access to the application system of the portal. It provides a unified interface to the user, which is conducive to the

user's access to resources. At the same time, the portal should have the authority management function. Need to display personalized content to the user according to different permissions. Platform to support the application system, portal to ensure user experience.

(2) TRP Application System: N in the "1+N+1" structure refers to the N application system, N said the number of application system is uncertain, you can have any number of. These applications can be both the system of the official tour, and the application system of the third party to access the shared information resources on the platform. It is an important part of TRP. Whether the TRP is effective depends on whether the application system is rich and comprehensive, whether it can solve the needs of different users.

(3) Public TRP Platform: Another 1 in the “1+N+1” refers to 1 platform, which integrates information, resources and various application systems to achieve a variety of resources data sharing and exchange, for the user to provide a unified information and resource access to tools, it is key to TRP program as a whole. Its basic service module includes application management, user management and authentication, privilege management and data exchange. Application management has developed a specification for a variety of applications that must follow this specification, which will help to improve the efficiency of application integration. User management and authentication through the implementation of a unified public platform. Rights management in the formulation of the norms, the user and the application of a unified authority. Data exchange makes the data transmitted to the public platform have a unified exchange of norms, improve the efficiency and quality of data exchange.

## Overall Intelligent Tourism Architecture Mode

**Demands for Intelligent Tourism Functions and Application.** (1) Comprehensive and Unified Management Platform: Intelligent tourism projects have involved various subsystems with long period and large scale, according to the development trend of tourism informatization construction, the ultimate goal of the wisdom of tourism is to build a set of information collection, resource sharing, application integration and integrated operation is one of the unified management platform to provide integrated services, such as data integration, process integration and user interface integration, effectively changing information resources of the closed situation, so as to realize the sharing of data resources of tourism, to avoid duplication of investment, from the overall enhance the level of informatization construction of tourism.

(2) Demand for One-stop Services: The current digital tourism application focuses on management but attaches not much attention to service, which is very serious. The provided information and services are not comprehensive, and digital tourism adopts the “technology oriented” thinking mode, and during the process of implementation, it demonstrates the obvious preference of “focusing on construction while paying no attention to application”. The construction of intelligent tourism is in order to integrate business, and provide one-stop services through the information portal.

**Principle of Constructing Intelligent Tourism.** (1) Unified Standard and the Principle of Sharing Resourcing: The construction of intelligent tourism needs to take full consideration of relevant information system and the sharing of tourism information resources, establishes information resources sharing mechanism, fully utilize the network foundation, business system and information resources, enhance integration, promote interconnection and information sharing so as to give the maximum play to the limited resources’ benefits.

(2) Principle of Openness: The construction of intelligent tourism should consider the development platform, database and operation environment of the application system. The wisdom of tourism in the latter part of the application process, application and resource online travel will be more and more, if lack of effective organization and management of the application of technology to upgrade the existing risk, then business system maintenance costs will continue to increase. Therefore, the pre-construction must take into account the changes and expansion of the future needs of tourism, through the open platform for continuous improvement, and to achieve more convenient system maintenance.

(3) The principle of seamlessly integrating the existing and future new business application with the platform as the framework: In line with the under the guidance of the National Tourism Administration and the industry standard system, construction of the wisdom of travel data standard, to the wisdom of tourism platform framework, seamless integration has been built and the new business application system, promote to maximize the use of data. Maximum data fusion exchange integration, user management, unified identity authentication, business data integration, information resources display and its standards, data, applications, user as key elements as the main line of planning and construction.

(4) Principle of Advancement: System design uses advanced intelligent tourism concept, advanced technology and advanced systems engineering methods. Construction of a sustainable, advanced, open and Intelligent Tourism system.

(5) Principle of System Security: The design and construction of system software should take full consideration of data security, network security, transmission security, and management security.

**Overall Intelligent Tourism Architecture Mode.** A complete intelligent tourism contains at least 5 layers: service layer, application layer, data layer, network layer and perception layer, as shown in Fig. 1.

(1) The Network Layer: The network layer is mainly the interconnection of all kinds of network and the real-time transmission of all the sensing information. Network is the Internet, wireless network, private network, networking and other network, all network interconnected through, users convenient and efficient use of network, users and users, users and objects and between objects linked. Intelligent tourism should be based on the wired network, to achieve coverage and improve the wireless network. And on the basis of the wireless network, we can plan and dynamically manage all kinds of parameters of the wireless terminal. To ensure the quality of wireless network coverage, protection of wireless network attacks, to enhance the security of wireless network. And the use of the sensing layer is the function of uploading data through the network layer. Internet of things will be the projector, access control and Internet integration, to achieve unified management of all types of equipment. Network quality is good, high security will be the basis of the wisdom of tourism.

(2) Perception Layer: The perception layer consists of perception object and perception technology, and the perception object includes: personnel, equipment, resources; the perception technology includes one-card solution of tourism, real-time monitoring, dynamic tracking, radiation frequency recognition technology, etc. Through using perception technology, it connects personal life into intelligent tourism, so that users' latest status and relevant information can be clearly known.

(3) Data Layer: The data layer integrates and processes the existing data through comprehensive integration and intelligent analysis, greatly accelerating the pace of constructing intelligent tourism and providing better personalized services for users. Through integrating and analyzing these data, it summarizes users' daily habits and hobbies, playing a constructive role in improving the unified information gateway system and improving users' experience and service quality. The intelligent tourism application system is based on data and the core of supporting intelligent tourism "big data". If there is a lack of such huge amount of data, all the application systems are incomplete.

(4) Application Layer: The application layer mainly includes intelligent marketing, intelligent guiding, intelligent scenic spot, intelligent shopping guiding, intelligent management and some other personalized applications through application systems of different functions, facilitating users' work and life.

(5) Service Layer: Intelligent tourism blends different application services, so it is already an integral user-oriented system while it is delivered to users, and different systems of it are also interconnected and shared instead of being "isolated information islands". However, traditional software services are independent, seriously restricting the system application and construction level while causing great waste of resources. Applications and services in intelligent tourism provide various different intelligent services to different users, so users can log in the unified gateway to search information about hotels, scenic spots, travelling and business, location,

transportation and management, which improves the management efficiency and service quality. In the process of constructing intelligent tourism, all the systems are managed unified while they share data to maximize the usage of resources.

(6) Information Standard and Standardized System: Information standard and standardized system determine the standards and regulations of collecting information, processing information and exchanging information, etc., regulate the application system's data structure and satisfy the requirement of information construction, laying a foundation for data blending and service blending.

(7) Operation Maintenance and Security System: Operation maintenance and security system are important guarantees for the normal operation of intelligent tourism. Security in intelligent tourism involves physical security, network security, data security and content security. Physical security contains equipment security, environment security, disaster backup and media security, etc. Network security includes risk assessment, security test, data backup, tracking and auditing, and security prevention, etc. Data security mainly involves database security, digital signature, and authentication technology, etc. Content security mainly includes data mining, privacy protection and information filtering, etc.

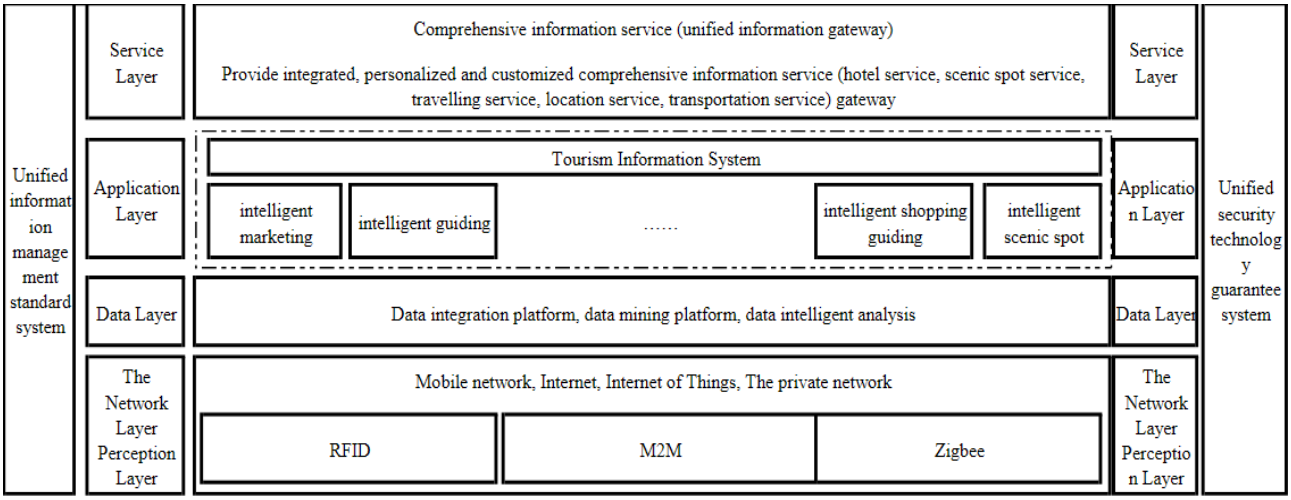


Figure 1. Diagram of Overall Intelligent Tourism Architecture


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