

# **Analysis of the Integration of Computer Networks and Urban Planning and Design**

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**Abstract:** "Urban planning", as the name suggests, is a comprehensive plan and deployment of the future development direction of a city, the overall layout of urban planning, and various projects within the city. It is the overall direction and development blueprint for a large and medium-sized city during a specific development period. The planning and design of large and medium-sized cities should take a scientific perspective on development, and make a scientific and reasonable summary of the current status of urban planning. The final investment decision should also be scientifically correct. The process of architectural design is complex, requiring massive data and technical resource support, and the introduction of computers has milestone significance in the development of urban planning and design. Starting from the importance of the application of computer networks in urban planning, this article briefly introduces and explores the integration of computer networks with urban planning and design.

## **1. Introduction**

With the vigorous development of China's economy, technology based computer networks have achieved rapid development, and computer network technology has rapidly penetrated into various fields, bringing tremendous changes to China's economic and social development. At the same time, computer network technology is gradually being introduced in areas such as urban overall planning and construction, and computer-aided mapping has laid a solid technical foundation for urban overall planning and design. The widespread application of remote sensing, geography and other information has laid a solid foundation for urban planning and construction through big data information systems, and improved the scientificity of urban planning and design. The widespread application of network technology has created opportunities for the approval of urban plans and also strengthened citizen participation. Urban planning is the goal, guidance, and overall direction of urban development. Therefore, planning and design must be accurate and fast, not only to keep up with the pace of social development, but also to stay ahead of urbanization. This also means that urban planning and design cannot be separated from fast and accurate computer and Internet information technology, nor from the development trend of powerful data sharing.

## **2. The Importance of Integrating Computer Network Technology in Modern Urban Planning**

The integration of computers and urban planning plays an important role and effect. The development achievements of urban planning directly affect the quality of life of the people. The application of computers in urban planning not only makes urban planning more reasonable and effective [1-2], but also creates a more harmonious living environment for the people.

### **2.1 Promoting the transformation of urban planning concepts**

With the continuous development of the socialist market economy, the number and scale of large and medium-sized cities are also increasing. Modern urban planning is no longer just about simple buildings, but also needs to reflect the close integration of society, economic environment, natural environment, and people's livelihood [3], in order to seek harmonious and sustainable development.

The widespread application of computer and network information technology in urban planning has also greatly promoted the transformation of modern urban planning concepts. Modern urban planning is not only a task that can be easily carried out by government agencies and departments, but also a scientific and orderly urban planning system engineering that involves the participation of the whole population. Modern urban planning must be approached with a scientific and rigorous mindset, and fully utilize the opportunities provided by computer networks to plan and build a scientifically harmonious city. The purpose of urban planning is no longer simply to build a city in a reasonable and orderly manner, but also to use urban planning to promote urban economic development, social ecological stability, and the improvement of people's quality of life. So, urban planners must magnify the overall planning and design goals of the city above the strategic high point.

## **2.2. Make urban planning more comprehensive**

It can be said that the application of computer information technology in urban planning has mainly promoted the technological progress in the field of urban planning and design in China. The urban planning work in China includes various aspects such as nature, society, economy, and culture, covering various aspects such as road traffic, housing, scenery, and landscaping. The number of information systems is abundant, and the data is complex. All data must be closely integrated together. If we simply use manual labor to complete the work, not only will the engineering quantity be large, but there will also be a lot of statistical information that cannot be mastered by manual labor. Due to the widespread use of computer information technology, massive amounts of data are stored in computers in a systematic and purposeful manner, providing strong statistical support and information technology support for urban planning work. In urban planning and design, computers also contribute to the public transparency of urban planning and facilitate citizen supervision, thereby improving the scientific, public, and effective nature of urban planning.

## **3. The Integration of Computer Network Technology and Urban Design Planning**

### **3.1. Integrated application in planning and design**

#### **3.1.1 Basic Application of Computer Aided Design**

The so-called computer-aided design refers to the use of the advantages of computer and its network technology to assist in the design of urban planning tasks. The architectural design management work of modern urban planning requires a large amount of design data to be statistically analyzed, classified, and compared, thus requiring a large amount of textual data, images, texts, etc. In the past, engineering design methods required engineering design technicians to collect and organize data, and then go through a large number of sketches and continuous improvement and adjustment. The actual workload was relatively complex, and work efficiency was greatly reduced. With the popularization of electronic computer-aided design, a large amount of data, text, and graphic information has been collected through network means. In order to achieve more efficient retrieval, it is necessary to convert design sketches into actual working drawings and have the electronic computer work independently, and then automatically produce the actual images after the design work. The operator only performs simple checks and adjustments, which makes the design program faster, significantly improve accuracy. At the same time, computer-aided systems can also complete a large number of drawing processing tasks, such as complex image arrangement, enlargement and compression. At present, computer-aided design technology has been widely applied in the planning and design of major cities across the country, significantly improving the quality of design, and the structure of drawing files is becoming more reasonable and accurate.

### 3.1.2 Overall Integration Application in Urban Planning and Design

The overall planning is an extremely complex system, with a strong professional approach to design. Designers are required to conduct a comprehensive study of the system, understand and explore the interactions between various factors, and provide correct planning. At this time, the computer-aided creative part includes conducting evaluation research on land use, making judgments on planning, and so on. After processing and storing various information, it is necessary to study urban geology, roads, scenery and other elements, design land use, adjust land planning, make rough estimates of the city, and finally use computer evaluation programs to make evaluation judgments on the entire plan.

### 3.1.3 Use of land in detailed urban planning

In addition to the systematic classification and standardization of land use, population, road traffic, etc. introduced in the previous text, computer-aided design also plays a crucial role in more detailed urban engineering design. For example, in urban 3D modeling (as shown in Figure 1), landscape rendering (as shown in Figure 2) and other technical aspects, computer design software systems can be used and perfectly modified. It is also possible to perfectly present the planned city in the form of anime, presenting the overall image, basic supporting facilities, road traffic, housing, etc. of the planned city in a complete manner before the eyes of the world. By using dynamic visual representation, people can more conveniently find important issues in urban design, making the design more realistic.

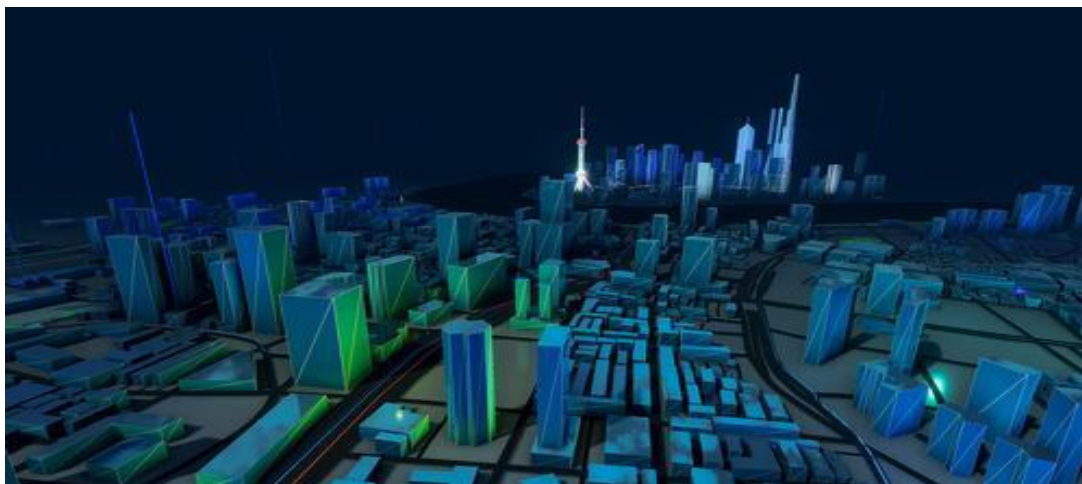


Figure 1: Smart 3D City



Figure 2: Environment rendering effect

### 3.2. Application in public participation

The main purpose of urban planning is to make urban construction more scientific and reasonable, and to improve people's living conditions. Therefore, in the design of urban plans, it is necessary to actively engage the masses and guide them to choose urban planning projects that interest them. In previous urban planning activities, due to the lack of planning information, design methods were known in practical implementation, and people often only passively understood the design and lacked opportunities to make proposals. The application of computers in the field of urban planning has also effectively solved this problem by presenting the planning scheme and planning method in urban planning through the Internet. Citizens can use the network to understand the urban planning and design scheme, and can also participate in the process of urban planning review. At the same time, computers also use multimedia to show the urban planning results to citizens. People can not only understand the planning and plan vividly, but also can carry out more direct exchanges and interactions with urban planning workers, put forward their own opinions, and turn urban planning decisions into the work of the whole people.

### 4. Summary

In summary, the widespread application of computer networks in urban planning has brought historic changes to urban planning and design. Through the application of computer-aided design, scientific management application systems, digital urban planning management networks, and intelligent approval systems, urban planning is more closely linked to the lives of residents. With the help of modern urban planning systems, people will be able to discover the future of urban planning and also discover what kind of urban environment future people will live in. And computer technology and urban planning system technology are also in the process of further development and improvement. It is expected that scientific workers and urban construction managers will continue to strengthen their research and improvement of urban planning, and strive to create a better and happier hometown for the people.

### References

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