Research on Capacity of Network of Different Cells

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Abstract: For the indicator system that affects user perception, voice services such as user traffic, average call duration, call drop rate, congestion rate, paging failure rate, call start failure rate, etc; For data services, such as user connection success rate, Internet access rate, etc. The following figure shows the system architecture of the web-based user awareness assessment system. Through the network infrastructure and signaling detection system, the original signaling monitoring data, policy data of each call, analysis data collection, core network traffic statistics and alarm information are collected on a platform, and then through the preprocessing of data, a report based on the user awareness evaluation system is generated to identify problems before users, solve problems in time and provide work efficiency, Provide user perceived satisfaction. The purpose of the research is to find out the influence of the add or decrease of the base station to the capacity of the whole network in order to deal with it when we build or rebuild some base stations in the network. The research takes use of the Gaussian white noise channel as the model of the channel. And every single cell is divided into two parts to calculate the interference and the capacity of the channel. The standard to divide the cells is the base station. As the number of cells increases, the capacity of the whole network increases.

Keywords: Apacity of the network, Gaussian white noise channel, Cells.

1. Introduction

With the development of the technology, the communications technology becomes increasingly advanced. And the technology involves in nearly every aspect of the daily life. For entertainment, laptops or smart phones will be used to play games, watch films or listen to music, which all needs the base station to send and receive data. For communication, phone calls or video calls also needs communication to the base station to collect the information to keep the call. For career, Internet is needed to collect information or raise the question which cannot be answered by oneself. In short , every aspect of daily cannot do without communications technology. As a result, the change of the capacity of the network when the base station changes matters a lot for the reason that it can have an impact on the quality of the communication.

2. Development status

2.1 Development of wireless communication

In 1832, Morse invented the telegraph, which was composed of dots and dashes to transmit information. This was the first time that human beings communicated by digital means. Later, Bell invented the telephone, which created the telecommunications industry. For more than a century, the basic telephone service of the telecommunications industry has made great progress towards success. However, with the development of human society, from the early telegraph, telephone and telecommunications services to the coexistence of multiple services today, the scale of communication has undergone earth shaking changes. With the development of science and technology, modern communication has entered the digital era. The wave of information revolution, the horn of information highway construction. As early as 1897, Marconi used 800kHz medium wave signal line to conduct the first transatlantic telegraph communication test in the world from Britain to Newfoundland in North America, creating a new era. Due to the limitation of technology, a large number of long wave and medium wave were used in early wireless communication. In the early

1920s, short wave communication was discovered. Until the rise of satellite communication in the 1960s, it had been an important means of international telecommunication, emergency communication and military communication.

Microwave communication with wider transmission band and more stable performance became an important method of long-distance and high-capacity terrestrial radio transmission from 1940s to 1950s From the 1980s to the 1990s, a set of high-speed multi-state adaptive coding modulation and demodulation technology and information processing and signal detection technology were developed, which have played an important role in today's satellite communications, mobile communications, full digital high-definition television transmission, GM signal design and signal processing, high-speed wired/wireless access, and even high-quality magnetic recording and many other fields and applications. With the economic and social development, people hope to open up new ways in construction, management, commerce, finance, culture, education, medical care, consumption and lifestyle through information technology.

2.2 Development of wireless communication in China

At present, operators and equipment manufacturers of world communication technology hope to occupy the development space and market share in the Chinese market. China's mobile communication has developed very rapidly, which has attracted the attention of the world. In November 1987, Guangdong, China officially launched the first TACS standard analog cellular mobile communication system, realizing the breakthrough of "zero" mobile phone users. By the end of 1994, Guangdong Province had opened the first GSM digital cellular mobile communication system. By 1995, the GSM mobile communication network had been opened in 15 provinces and cities across the country. So far, all provinces, autonomous regions, and municipalities have completed the construction of GSM networks, and realized the full automatic roaming at home and abroad.

Since 1987, the number of mobile phone users in China has grown rapidly, especially the unexpected rapid development of GSM network. This is mainly because GSM system has greater advantages in technology and economy than TACS system. More importantly, China adopts competition mechanism in GSM operation to promote development. At present, China's mobile communication users have exceeded 8 million, ranking second in the world.

In the past 10 years, China has made gratifying progress in research and equipment production in the field of mobile communications. The domestic mobile communication equipment switching system, base station and mobile phone have been put into production and put on the market. The development and research of the third generation mobile communication system are synchronized with the world. China's wireless communication has achieved success in the first stage.

2.3 Future development direction of wireless communication technology

In the 21st century, the telecommunications technology is entering a critical turning point, and the next decade will be the most active period for the development of science and technology. The advent of the information society and the rise of IP technology are profoundly changing the outlook and future development trend of telecommunications networks. The main development trend of wireless communication technology is broadband, grouping, integration and personalization.

3G and its evolution system support high-speed data service, which is much better than the second generation system, but still can not meet the explosive growth rate demand of users. While promoting the development of 3G technology and industrialization, countries have shifted their focus to the research of future mobile communication systems. The future mobile communication system is also called the third generation mobile communication system (B3G) or the fourth generation mobile communication system (4G). This is a network with IPv6 as the core network and multiple wireless access modes. It has an outdoor data transmission capacity of more than 1000Mbps and an indoor data transmission capacity of 1Gbps.

3. Military communication

Purpose and service object: According to the purpose and service object of wireless communication, wireless communication can be divided into private network wireless communication and public network wireless communication. The private network wireless communication service is used in specific departments or groups, mainly for public security, public utilities and some industrial and commercial customers. Public wireless communication mainly serves the personal communication of the public. Difference between frequency and wavelength: According to the difference of frequency and wavelength, wireless communication can be roughly divided into very long wave communication, long wave communication, medium wave communication, short wave communication, ultra short wave communication, microwave communication, etc

Parameter: Frequency selected for communication system. Output power of base station (or center station) transmitter. Impact of terrain and ground objects (radio wave propagation obstacles) within the communication service scope. The type of antenna used, as well as the position and height of the transmitting antenna. Sensitivity of receiver. Capacity is the capacity of the network; SINR is signal to noise ratio. As shown in Table 1

Table 1. Cell Center Frequency Channel

Number of cells	Number of frequency channels in the cell center	Number of frequency channels in the cell edge	Average number of users per cell	SNR (in dB)	capacity
10	5	5	6	10	29.96
20	5	5	6	10	33.28
30	5	5	6	10	44.45

4. Conclusion

With the rapid development of mobile data services, network capacity and user experience have become the key challenges for operators in network operations. Adding cells is a traditional way for operators to expand capacity, but with the increase of the number of cells, network interference also increases, which makes it difficult to further improve the capacity At the same time, with the popularity of high-definition video services, higher requirements are put forward for single user experience. How to break through the limitation of network capacity, improve user experience and build a user centered network has become the focus topic in the field of mobile communication. This paper finds that with the increase of the number of cells, the network capacity will also increase. Proposed solutions

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