Resource Sharing and Remote Utilization in Communication Servers

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Abstract. The communication cluster servers require many key technologies in an information integration platform. In order to improve dependability, scalability, and other QoS features, we design a system structure to meet these requirements. The resource sharing and remote utilizing are applied to resolving the dynamical resource dispatch and the tasks distribution. The thread model and mechanism of the thread pool in the Non-blocking Input/Output (NIO) are created which include a case trigger mechanism. The system successfully resolves thousands of terminals connected to the information integrated platform. Messages, files, data, and other information can transport among the platform, the clients and the terminals.

Keywords: Cooperative server cluster, resource dispatch, concurrent processing, real time systems.

1 Introduction

Due to heavy use of web information systems, network transmission bandwidth and servers must meet the rapid increase of the internet traffic of large amount of clients and server nodes with dependability, scalability, and other QoS[5] features. So it is necessary and important to solve the problems of adaptive resource sharing and remote utilizing.

The communication servers must have strong CPU and I/O process capabilities because of the large amount of data transportation and the requirement of Qos character in network services. A cluster server system is a good solution which can meet the requirement of net parallel computing and increase of communication services. In this paper, resource sharing and remote utilizing for a cluster server system is studied. Thread and thread pool issues are also discussed in the paper.

2 The System Structure

2.1 The System Structure of the Information Integration Platform

The information integration platform consists of the intelligent mobile terminals, software systems, integrated GPS(Global Position System), GPRS (General Packet

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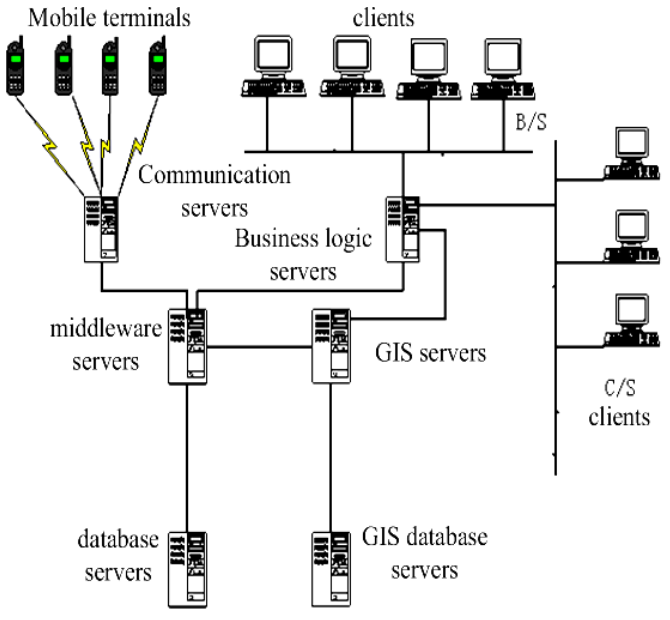

Fig. 1. Structure of the integration platform

Radio Service) or CDMA (Code Division Multiple Access), Internet (Intranet) and M-DMB(Mobile Digital Multimedia Broadcasting) networks.[1] more details can be seen in Fig. 1.

The communication server setup many imports and exports for messages, data, files and stream multimedia in the integration platform. Their functions are to receive the data packages from the mobile terminals and the middleware servers; and build a message sharing pool to hold up the data packages. At the same time, the communication servers transfer the bidirectional message packages between the middleware servers and the terminals in the message sharing pool.

2.2 Formulas

There are a message receive module, a message send module, a receive pool and a send pool in the communication servers. The received and sent messages are both in the message sharing pool. Our design is based on the principle of Non-blocking Input/Output(NIO), which utilizes a case trigger mechanism. The components structure can be seen in figure 2.

In the thread pool, there are read threads, working threads and write threads. The read threads deal with the read operation in thread pool. A read thread is in charge of read message packages from the message pool; a write thread is responsible for writing the message packages into the message pool; the working thread is in charge of the cooperative work between the read thread and the write thread, including import, export and holdup for the message packages in the message pool. Each selected operation only deal with one case by each case trigger, which is a switch and