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Design and implementation of asynchronous LED display
centralized management system based on internet

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Abstract: For the current domestic market, most of multiple asynchronous LED display management system based on LAN or 485 bus technology have many problems such as screen limited distribution geographical scope, costly cabling, localized user operations, single project managed and so on. To solve these problems, an open multiple-project multiple-users multiple-screen cluster management system based on Internet technology is designed and implemented in this paper. In the system, a data relay server and a media are designed as a bridge of communication between user and asynchronous LED display on Internet, a relational database is built to maintain the information of client companies, users, LED screens and associated relationships between them on data relay server, and a set of

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scalable layered communication protocol is designed. This system provides a highly optimized implementation method for data relay server. Otherwise, a reusable architecture of client software and asynchronous terminal software are designed. After testing, system can operate stably and efficiently, achieve the ability that multiple-user can control the remote multiple-asynchronous LED display in real-time at any location that can access the Internet.

Key words: asynchronous LED display; cluster management; data relay sever; boost library

LED(Light Emitting Diode)

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LED ()
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RISC
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2.2

4

3.2.1

3

(1)

CPU

(2)

(3)

C++

Boost,SQLite,QT

Boost, Asio

Asio

IO

Asio io _ sevice

boost::thread

CPU

CPU 3

SQLite

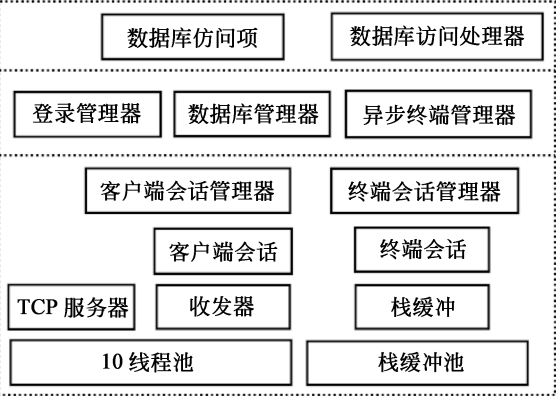
SQLite

[12]

3

2.3

0



4

Fig. 4 Schematic diagram of data transfer server class

```
class SkBuffer{//
    int buffer_pull(int n);// N
    int buffer_push(int n);// N
    int buffer_put(int n); // N
    int buffer_reserve (int n);// N

    char * data(unsigned int &. len);//

private:
    char * data_;//
    char * head_;//
    char * tail_//
```

... };

TCP TCP ,

,

TCP ,

()

...

protected:

shared_ptr<SkBuffer> recved_buf; //

,

,

int type_;

... };

3.2.3

“ ” ,

100 Mbps

ID ,

ID ,

ID map ,

O(1)

Linux

Ubuntu 10.04 ,

Intel i3-2120 CPU, 3.3 GHz, 4 G

PC , PC

3.2.2

:

10 , 100

TCP , 600

,200 ,10 ,

200 600 ,

1。

Tab.1 Testing results

	20(, 10)
	4
(DBCmdItem)	200
	600
	(s) 390
(/)(MB/s)	2.05/1.32
(h)	7×24

1 ,

class DBCmdItem { //

public:

DBCmdItem(int type); //

virtual int db_process()=0; //

/ *

*/

virtual int get_reply_buf(shared_ptr<Sk-

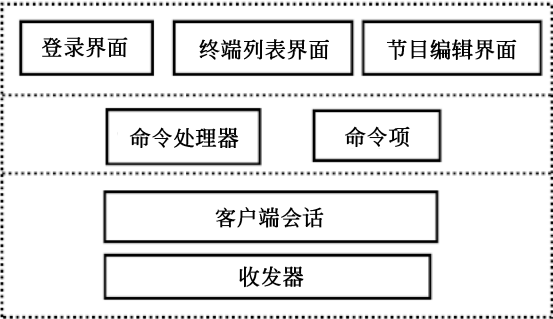


Fig. 5 Basic structure of the client software

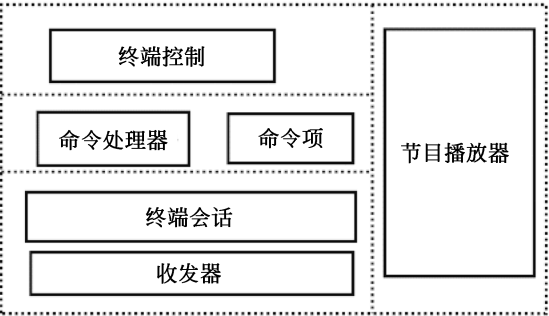
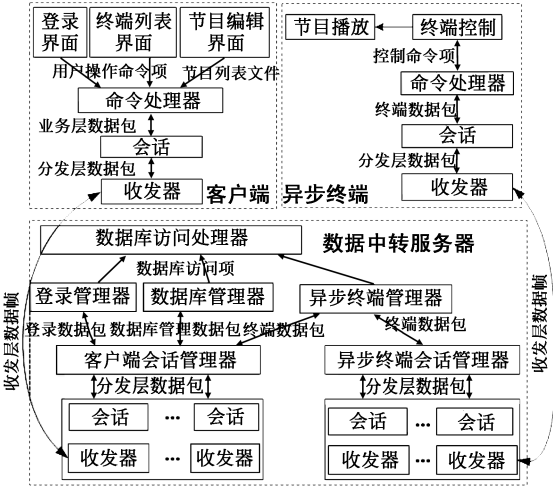


Fig. 6 Basic structure of asynchronous terminal software



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Fig. 7 Runtime data flow of the system

LED

LED

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