

Design of Simulation System Based on Real Time Fiber Reflective Memory

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Introduction

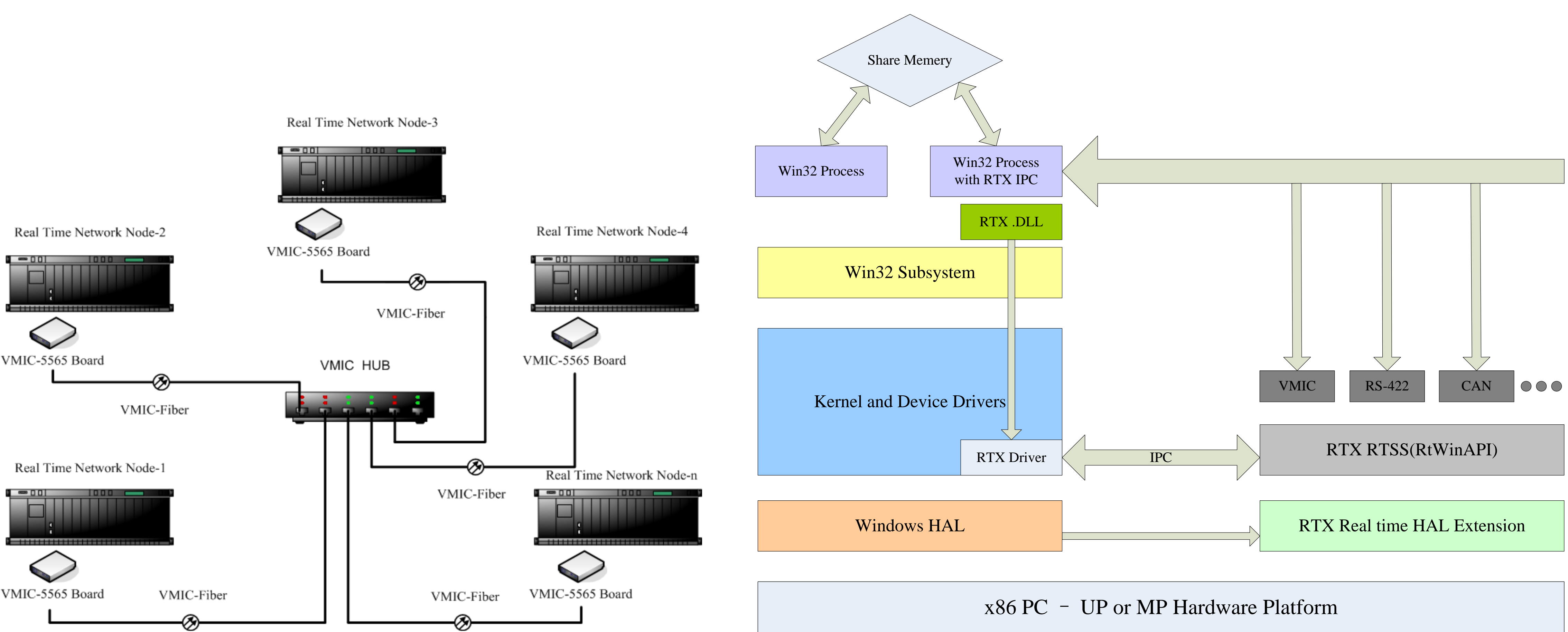
At present, the Windows operating platform is the most popular and efficient, but it does not have the required real-time performance. Based on the PC architecture design of the hard real-time product RTX, the American company Ardence has developed a real-time extension of the Windows platform, which includes the RTSS real-time subsystem. In order to achieve real-time scheduling and resource task management, the real-time expansion modules are added to the computer hardware abstraction layer. Good real-time performance and platform versatility can be obtained at the same time without any packaging or modification of the Windows (XP) system.

Taking a tactical missile as an example, it is necessary to establish a hardware-in-the-loop simulation test environment in order to reduce research cost, improve the development efficiency, and shorten the research and development cycle. In this simulation environment, functions of simulation calculation, simulated launch control, flight motion simulation and target simulation are needed, so as to realize multiple test schemes and real-time injection of process data. Among the functions, simulation calculation, as well as the data calculation and communication of simulated emission control need to meet certain real-time requirements. Therefore a simulation test environment with real-time performance must be established.

Research objectives

- Composition of simulation system structure and Structure of RTX system.
- Real-time optical fiber reflective memory communication.

Methods



Real-time main program design

By establishing the creation of programs based on RTX mode, it is possible to create real-time timers, link interrupt program simultaneously, start VMIC initialization and send and receive threads, thus realizing the functions of the main program.

A timer is that a fixed period per unit of time based on the reference time is calculated by a computer, and uses this as the time reference for real-time applications. The time of the timer inside the program can be set freely. In this program, the timer is set to execute every 2ms, and accumulate according to the setting. The timer code is as follows:

```
liPeriod.QuadPart = 20000; //The timer period is 2ms
RtGetClockTime(CLOCK_1,&Former);
RtCreateThread(0,0,Thread_VMIC,NULL,0,0); //Create VMIC thread
```

Results and Conclusions

The error between the simulation computer sending instructions to the analog transmission control computer is a timing cycle of 2ms. The transmission control computer receives the instructions, and then sends them to the real-time serial port. The delay of the real-time serial port receiving the instructions is 6ms, and the overall delay is 8ms, which is far lower than the basic delay of 50ms in Windows mode.

