TASK SYNCHRONIZATION PROCESS BASED ON PETRI NET

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ABSTRACT—Task synchronization means that each redundant module has the same executing schedule in each task scheduling cycle of the operating system in the Triple Modular Redundancy (abbreviated TMR) fault-tolerant systems; it faces how to realize the coordination among the three modules. Therefore, it is necessary to investigate the task synchronization process of the TMR fault-tolerant system. In the paper, a task synchronization process of the TMR fault-tolerant system is given, the model is built up by Petri Nets, and the model is analyzed by reachable graphs. The correctness of the Petri Net model is analyzed by reachable graph from the reachability, activity, boundness, and integrity of the model. It shows that the merits of describing the task synchronization process model of Triple Modular Redundancy fault-tolerant system with Petri Net are intuitive, clear, and easy to understand the implementation mechanism of the task synchronization process, and the model is correct.

Key Words: Petri Net; TMR; Fault-tolerant System; Task Synchronization Process; Reachable Graph