Abstract

Real-time systems are systems which must produce a result within a given time frame. A result given outside of this time frame is as useless as not delivering any result at all. It is therefore essential to verify that real-time systems fulfill their timing requirements. A model of the system can facilitate the verification process. This thesis investigates two possible methods for modeling a real-time system with respect to CPU-utilization and latency of the different components in the system. The two methods are evaluated and one method is chosen for implementation.

The studied system is the decoder of a Wideband Code Division Multiple Access (WCDMA) system which utilizes a real-time operating called system Operating System Embedded compact kernel (OSEck). The methodology of analyzing the system and different ways of obtaining measurements to base the model upon will be described. The model was implemented using the simulation library VirtualTime, which contains a model of the previously mentioned operating system. Much work was spent acquiring input for the model, since the quality of the model depends largely on the quality of the analysis work. The model created contains two of the studied systems main components.

This thesis identifies thorough system knowledge and efficient profiling methods as the key success factors when creating models of real-time systems.