

Adaptability of Embedded Operating Systems

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Abstract

Adaptability is one of the most important competitive factors in embedded systems. In a growing market, where each year new processors and/or new architectures are issued, only adaptable systems will survive. Especially embedded operating systems are vulnerable to architecture changes. Nowadays an operating system have to be easily portable to new processors and this portability will be more important in the future and we believe it will be as important as power efficiency or performance. With the introduction of an internet of things the embedded systems reach new dimension of evolution where adaptability and cooperation will be even more important.

Process of operating system adaptation to a new platform and architecture of operating system has to be revised. Operating system is a set of services, supported processor ports and modules for processing cores and devices. Parts of operating systems will be automatically generated and another will be designed in modern frameworks. But to allow this a processor datasheet have to be changed into computer-readable form.

In our work we designed a “Processor formal description” which describes processor in a form which is readable for computer and creates first step in operating system automated adaptation. This format describes communication interfaces of processor building blocks. Those blocks are processing cores and devices. The formal description can be easily processed by code generator into platform dependent code which acts as first layer of an embedded operating system. Generated code than can be used for implementation of operating system modules which manages processor devices.

As a result of this formalisation the operating system will be easily adapted to needed processor architecture that helps to developer to concentrate on other aspects of embedded system design.

Paper origin

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