Casting an existing surveillance application in a framework supporting FPDS and reservations
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Summary
Within SAN, we are currently exploring the usage of fixed-priority scheduling with deferred pre-emption (FPDS) and reservations to exploit fluctuating network bandwidth for an application from the surveillance domain in the context of ITEA/CANTATA [1]. To that end, we are currently extending an existing platform based on RTAI/Linux with means for FPDS and reservations [2]. This assignment complements that work by casting an existing application, which is scheduled by means of fixed-priority non-pre-emptive scheduling (FPNS), in a framework supporting FPDS and reservations.

Description
To prevent arbitrary pre-emptions of an existing application from the surveillance domain, FPNS is currently used for scheduling. An immediate drawback of that approach is that the (fluctuating) network bandwidth can be exploited only partially, simply because the network task does not have the processor at its disposal when needed. To increase the frequency with which the network task can run, we aim at using FPDS rather than FPNS, requiring an existing video encoding task to be split-up in a sequence (or directed a-cyclic graph) of non-pre-emptive sub-tasks. During this assignment, an existing surveillance application must be cast in a framework supporting FPDS and reservations. Main issues to be addressed are

(i) finding appropriate (optional) pre-emption points in the existing application;
(ii) measuring the overhead of (optional) pre-emption points and context switches;
(iii) trading pre-emption overhead for pre-emption granularity;
(iv) illustrating the success (or failure) of the approach by means of a demonstrator.

The developer of the surveillance application will be available for consultation and be co-supervising the assignment. The work will be done in close cooperation with other MSc-students designing and implementing frameworks supporting FPDS and reservations and be done under the daily supervision of the PhD-student Mike Holenderski.

This assignment should also result in a white-paper, which may be submitted to a workshop (such as OSPERT) or a conference (such as RTAS).

References