Memory sharing for queues of media processing chains

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Abstract

The aim of this assignment is to develop a shared memory pool for the queues that are used for the communication of components with varying computation times of a media processing chain with time-driven boundaries.

Description

Within SAN, we performed research in the area of real-time analysis of media chains with time-driven boundaries and varying computation times [1]. A media processing chain consists of a sequence of software components, which communicate via queues and exhibit data-dependent variations in their computation times. Components behave in a data-driven manner, except for the head and tail components of the chain that behave time-driven. Because both head and tail components are time-driven, the total queue capacity must be roughly twice the number of packets in transit, because packets can accumulate at either side of the chain. The total queue capacity can be reduced by allowing the queues to share a common memory pool.

The aim of this assignment is to develop a shared memory pool for the queues of a media processing chain. The assignment involves the investigation, design, and realization of a shared memory pool and its integration with instantiations of a generic buffer [2]. Specific challenges to be addressed are:

- the behavior of the chain shall not change, i.e. neither the interfaces between components and queues nor the data-driven behavior of the components shall change;
- queues may have different packet-sizes;
- queues may change their mode [2], and dynamic memory re-allocations are therefore required as well.

This assignment provides a contribution to a prototype illustrating feasibility of novel concepts in the area of surveillance using a camera as platform with μC/OS-II [3].

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

References

[1] J.J. Lukkien, A. Weffers-Albu, R.J. Bril and P.D.V. van der Stok, *Real-time analysis of media chains with time-driven boundaries and varying computation times*, TU/e, WIN, SAN, TimeDrivenChainRTSS.pdf, May 2008.

[2] R.J. Bril and M. Holenderski, *Dynamic memory re-allocation for swift mode changes*, TU/e, WIN, SAN, Assignment description, Version 0.3, February 2009.

[3] Mike Holenderski, *Swift mode changes in memory constrained real-time systems*, TU/e, WIN, SAN, Working document, Version 2.3, February 2009.

Further information

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