

## Time-division multiplexing vs network calculus: A comparison - DTU Orbit (08/11/2017)

### Time-division multiplexing vs network calculus: A comparison

Networks-on-chip are increasingly common in modern multicore architectures. However, general-purpose networks-on-chip are not always well suited for real-time applications that require bandwidth and latency guarantees. Two approaches to provide real-time guarantees have emerged: time-division multiplexing, where traffic is scheduled according to a precalculated static schedule, and network calculus, a mathematical framework to reason about dynamically scheduled networks. This paper compares the two approaches to provide insight into their relative advantages and disadvantages. The results show that time-division multiplexing leads to better worst-case latencies, while network calculus supports higher bandwidths. Furthermore, time-division multiplexing leads to a simpler hardware implementation, while dynamically scheduled networks-on-chip allow the integration of best-effort traffic in the on-chip network in a more natural way.

### General information

State: Published

Organisations: Department of Applied Mathematics and Computer Science , Embedded Systems Engineering

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Pages: 289-296

Publication date: 2015

### Host publication information

Title of host publication: Proceedings of the 23rd International Conference on Real Time and Networks Systems (RTNS 2015)

Publisher: Association for Computing Machinery

ISBN (Print): 978-1-4503-3591-1

Main Research Area: Technical/natural sciences

Conference: 23rd International Conference on Real-Time Networks and Systems , Lille, France, 04/11/2015 - 04/11/2015

Networks, Network on chip, Network performance modeling, Computer systems organization, Real-time systems

DOIs:

10.1145/2834848.2834868

Source: PublicationPreSubmission

Source-ID: 118475530

Publication: Research - peer-review › Article in proceedings – Annual report year: 2015