Better hardware and software knowledge allows to guarantee real-time constraints, even on a many-core platform.

Implementation of Real-Time Data-Flow Synchronous Programs on a Many-Core Architecture
Matheus Schuh¹,²,*
¹ Univ. Grenoble Alpes, CNRS, Grenoble INP, VERIMAG, 38000 Grenoble, France
² Kalray S.A., 38330 Montbonnot-Saint-Martin, France
* E-mail: matheus.schuh@univ-grenoble-alpes.fr

1 Basic Concepts
• Real-Time Systems
  – Valid outputs before deadline
  – Time is part of the specification
  – Worst-Case Execution Time (WCET) must be calculated
• Synchronous Data-Flow (SDF) languages
  – Network of computing nodes
  – Data dependencies and order
  – Formal semantics and determinism

2 Code Generation of SDF Programs

3 Model of Computation (MOC)
• Developed by previous thesis on MPPA2 architecture (A. Graillat³ and H. Rihani⁴)
• Time-triggered execution
  – Release dates statically calculated
  – Interference only on task communication
• Bare-metal implementation
  – External tool for mapping
  – Private memory bank for each core

4 Current and Future Work
• Find a good abstraction level for real-time applications implementation
• More versatile MOC
• Improved platform: MPPA3

References