FUNCTIONAL VERIFICATION AND PERFORMANCE EVALUATION OF THE xSTREAM ARCHITECTURE

xSTREAM ARCHITECTURE

NoC

PE

System Bus

Streaming Fabric

FIFO queues
PE — Processing Element
NoC — Network on Chip

SYSTEM MODEL

DATA FLOW

PROGRAMMING MODEL

FILTER 1 FILTER 2 FILTER 3

REFERENCE MODEL

FUNCTIONAL VERIFICATION

• Models in LOTOS using the CADP toolbox
http://www.inrialpes.fr/vasy/cadp/

• Formal verification supported by:
  - Minimization algorithms (*bcg_min*)
  - Equivalence checking between the reference model and the system model (*bisimulator*)
  - Model Checking (*evaluator*)

PERFORMANCE EVALUATION

• Based on the IMC (Interactive Markov Chains) formalism developed by Pr. H. Hermanns which is an orthogonal extension of :
  - Labeled Transition Systems (LTS)
  - Continuous-Time Markov Chains (CTMC)

• Performance evaluation supported by:
  - Minimization algorithms for IMC (*bcg_min*)
  - Markov Chains solver for transient and steady state probabilities (*bcg_steady, bcg_transient*)

IMC
one and the same model for

FUNCTIONAL VERIFICATION ← → **PERFORMANCE EVALUATION**

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