ATLAS
A NoC Generation and Evaluation Framework
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Abstract

What is it?
- ATLAS is a framework that automates various processes related to the design flow of Networks on Chip (NoCs).

To whom is it addressed?
- Academic: undergraduate or graduate advanced disciplines
- Industrial: applications requiring high performance and/or low power consumption

Why use it?
- To automate generation and evaluation of NoCs
- To establish a good trade-off between the NoC architecture characteristics and the requirements of performance and power consumption of a given application

Tools

1) The NoC Generation tool generates the network according to the configuration of following parameters: network dimension; communication channel width; buffer depth; flow control; number of virtual channels; scheduling and routing algorithms. The generated NoC is described in VHDL and its test benches are described in SystemC.

2) The Traffic Generation tool produces different traffic patterns, for different injection rates and source/target pairs (e.g. random and complement). The packet timestamp (i.e. the moment in which a packet should be inserted into the NoC by a producer) is calculated according different temporal traffic distribution (e.g. normal, uniform and exponential).

3) The Simulation tool involves an external VHDL/SystemC simulator: ModelSim. All generated traffic files are interpreted and injected to the NoC. During the simulation, consumers generate output files read by the traffic analysis module, when the simulation finishes, allowing to compute the latency and throughput for each packet.

4) The Performance Evaluation tool verifies if all packets were correctly received, and generates basic statistic data (e.g. a report file and charts) concerning time to deliver packets. The report file presents some traffic analysis results, such as: (i) total number of received packets; (ii) average time to deliver the packets; (iii) total time to deliver all packets and (iv) the average, minimal, maximal and standard deviation time to deliver a packet.

Some References