NoC Benchmark Standards Panel

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NoC Benchmarking Challenges

- Many NoC applications are embedded/real-time
  - Completion time is not a sufficient metric
  - Need to measure vs. deadlines, etc.
    - Less likely that benchmark suite is “black box”
- NoC’s target complex systems
  - Representative benchmarks are quite large!
    - Difficult to resource benchmark creation
  - Commercial (MP)SoC examples cost $$$ to create
    - Tough to get industrial donation of flagship products
- NoC benchmarking metrics not (yet) agreed
    - Need consensus on what to measure – and how

NoC Benchmarking Opportunities

- NoC's never/rarely process data
  - Don't need function, only communication
    - Industry shouldn't be so worried about donation (i.e. IPR)
- Convergence applications drive the future
  - Combining almost anything makes sense!
    - Synthetic benchmarks could combine smaller/real examples
- OCP-IP offers good start on metrics
  - "Clean" definitions of semantics and measurements
    - More complex metrics should be built on OCP foundation
- Active NoC benchmarking WG exists
    - These issues (and more) being worked today!

My Benchmarking Wish List

- Synthetic benchmarks to expose mechanisms and efficiencies (# Initiators/# Targets)
  - Best case/loaded latencies and bandwidths (1 Init./1 Targ.)
  - Impact of transaction mix (1 Init./1 Targ.)
  - Impact of cross traffic (*1+N* Init./*1+N* Targ.)
  - QoS testing (Single Init. fighting rest of system for shared Targ.)
- MPSoC examples
  - Smart phone
  - HD set-top box (with home media server/gateway)
  - Heterogeneous network switching chip

Pervasive NoC Benchmarking?

- *The problem with benchmarks is that there are so many to choose from…*
- To be successful, the benchmarks should be:
  - Freely available
    - No NDA, no fees, etc.
  - Easy to use
    - Need full simulation testbench (SystemC TLM)
    - Need automated measurement
  - Easy to understand & optimize
    - Need clear description of benchmark stimulus & deadlines
    - Need trace capture and analysis capabilities
- OCP-IP offers a good framework for simplifying this now!