2012-03-15 : Two New Diagnostic Features in the OpenCPI OCDP

There is the persistent need to benchmark both latency and throughput. We have made the following additions to provide more visibility and easier measurement of certain data movements with the OCDPs.

Active-Mode Doorbells with Time Info

Active-Mode Doorbells now contain a non-zero 32b value that is FPGA WTI time with the integer seconds radix point between bits and 26 and 27. In other words:

bits [31:27] : Integer Seconds (5b) wraps at 32 seconds

bits [26:1] : Fractional Seconds (26b)

bit[0] : Always '1'

Active-Mode doorbells are sent at the end of Active-Message Pull or Push, or as part of Active Flow Control. The time inserted on the doorbell is the FPGA WTI time at the clock cycle the doorbell TLP is generated in mkOCTLPServBC. It is not a buffered version of some other datum. In the sequence diagram, these doorbells are generated by the FPGA at points 8 and 15, and received by the GPP at points 9 and 16. They correspond to the DMA Done times described next.

Data Plane Active-Message Start and Done

For a DP that is in an Active Message mode (e.g. Pull/Consume or Push/Produce) the start and done times for the DMA are stored in readable configuration properties. The Start time is the cycle that the active DMA begins. The Done time is when the doorbell is sent to the host to indicate completion. The difference of PullDone minus PullStart reveals the duration of the FPGA Fabric Consumer DMA. The difference of PushDone minus PushStart reveals the duration of the FPGA Fabric Producer DMA. The overarching difference of PushDone minus PullStart the duration of FPGA occupancy, including an implicit indication of the time spent in the application.

The 64b Time is available with each OCDPs configuration property space at offsets

0xA0: dmaStart: Fractional Seconds 32b
0xA4 : dmaStart: Integer Seconds 32b
0xA8: dmaDone: Fractional Seconds 32b
0xAC : dmaDone: Integer Seconds 32b

Note that this is the full precision FPGA WTI time; coherent with all WTI time on the platform. The time stored in the registers represents the last dmaStart and dmaDone observed. These registers will only update if the DP is in an Active-Message mode. These values will not be present if hasDebugLogic==False.

For reference, WTI System Time may always be read from the admin space at admin base offset:

rplTime MS, LS 0x38, 0x3C (note big endian DWORD wise)

Sequence Diagram