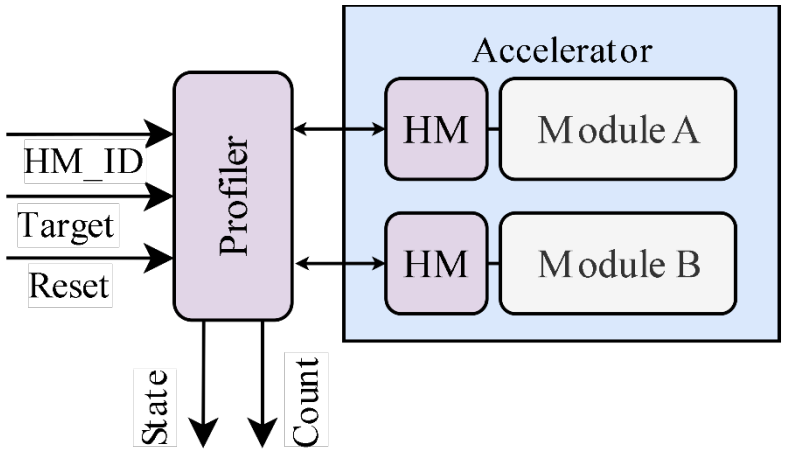
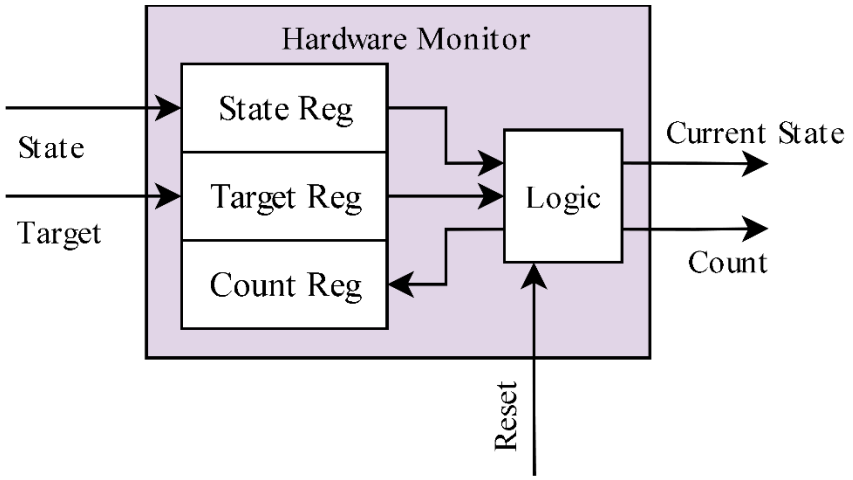
Hardware Profiling for SECDA on Edge Platforms

University of Glasgow

- **Introduction:** SECDA is a design methodology for AI accelerator development
- **Motivation**: designing specialized FPGA-based accelerators for AI is challenging, and fine-grained hardware profiling can enable better module-level performance and utilization
- **Solution:** per module Hardware Monitors will enable fine-grained performance enhancements
- **Hardware Monitor**: contains registers and logic to count cycles of target module state





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- **Case study:** monitored MatMul accelerator consisting of three modules - Load, Compute and Store modules
- **Profile:** tracked module performance across three designs with hardware unrolling of the core MAC Array
- **Overhead:** Only 0.17% FF and 0.29% LUTs @ 250MHz on AMD KV260 FPGA