

PULSAR (Parallel Ultra Light Systolic Array Runtime) offers a simple programming model for large-scale distributed-memory machines with multicore processors and hardware accelerators. PULSAR automates multithreading, message-passing, and multi-stream multi-GPU programming.



PULSAR offers a simple programming model, where the user defines the computation in the form of a Virtual Systolic Array (VSA), which is a set of Virtual Data Processors (VDPs), connected with data channels. The VDP is assigned a



BENEFITS OF PULSAR

- Þ Simple Programming Model
- Lightweight Runtime System
- Multithreading & Message-passing 6
- Multi-stream Multi-GPU execution 6
- Minimum Overhead / Maximum Scalability •

RUNTIME SYSTEM

This programming model is accessible to the user through a very small and simple Application Programming Interface (API). All the complexity of executing the workload on a large-scale system is hidden in the runtime implementation. While the user invokes simple push and pull channel operations, the runtime takes appropriate actions, depending on the boundaries crossed by the channel, i.e., uses shared memory for VDPs residing in the same node, uses message-passing for VDPs residing in different nodes, uses Direct Memory Access (DMA) transfers between CPU VDPs and GPU VDPs.

INVEVATIVE COMPUTING LABORATORY

MPI MULTICORE

PROCESS

MPI

THREAD

THREAD

VDP VDP

