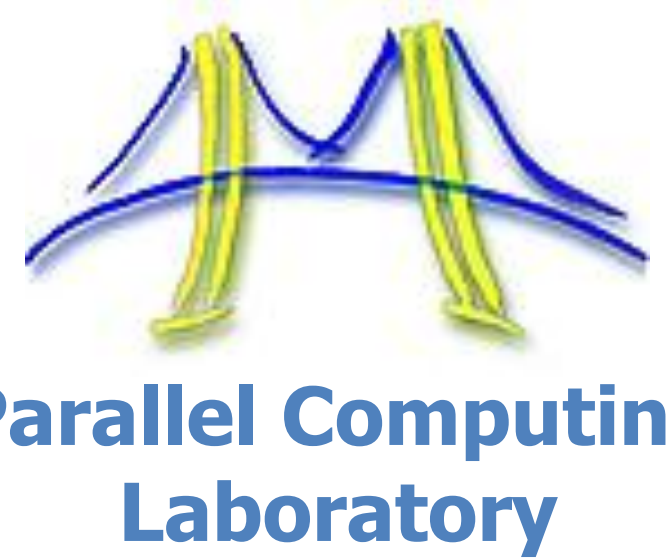




# Tessellation OS and a Music Application

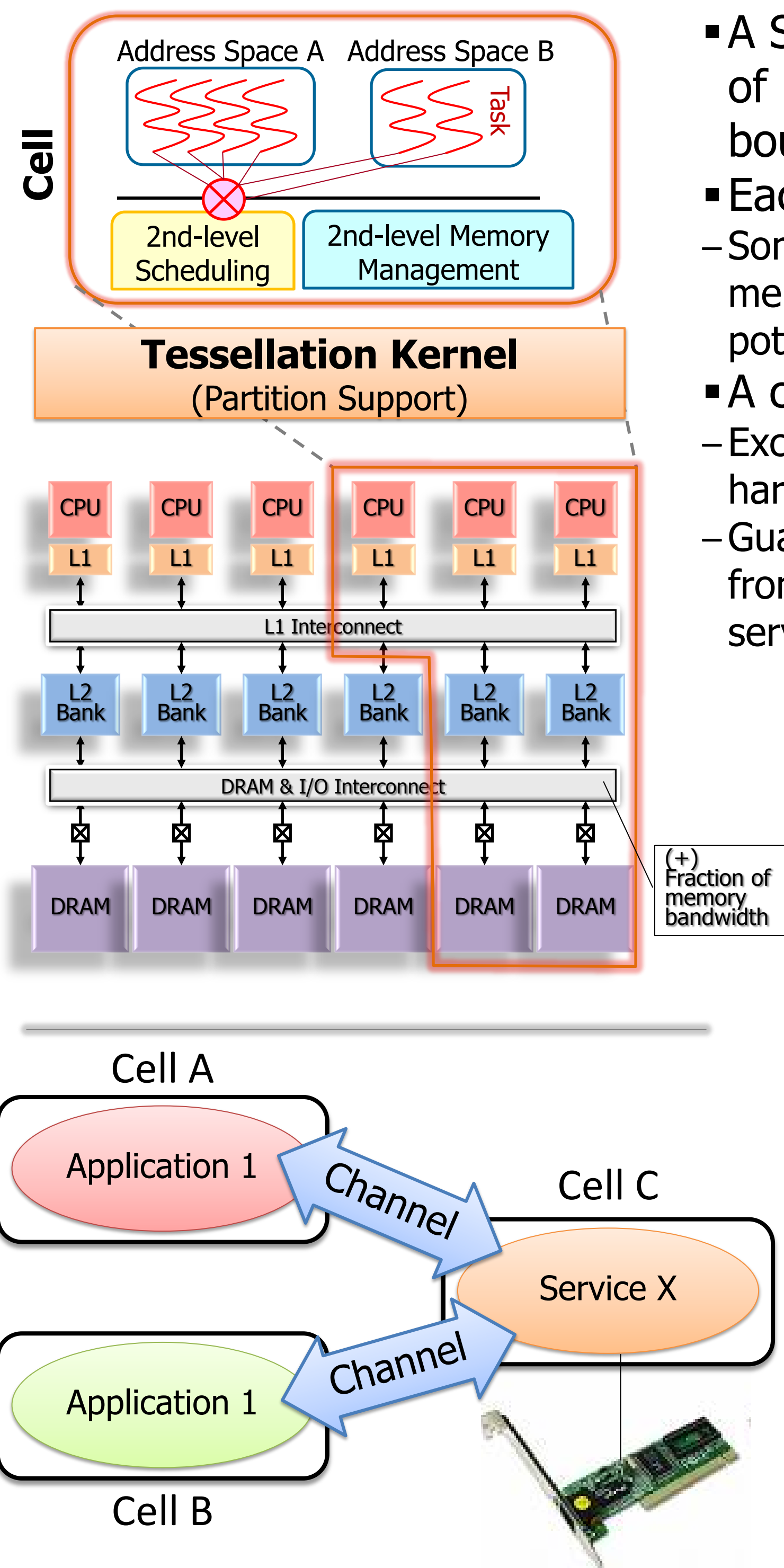
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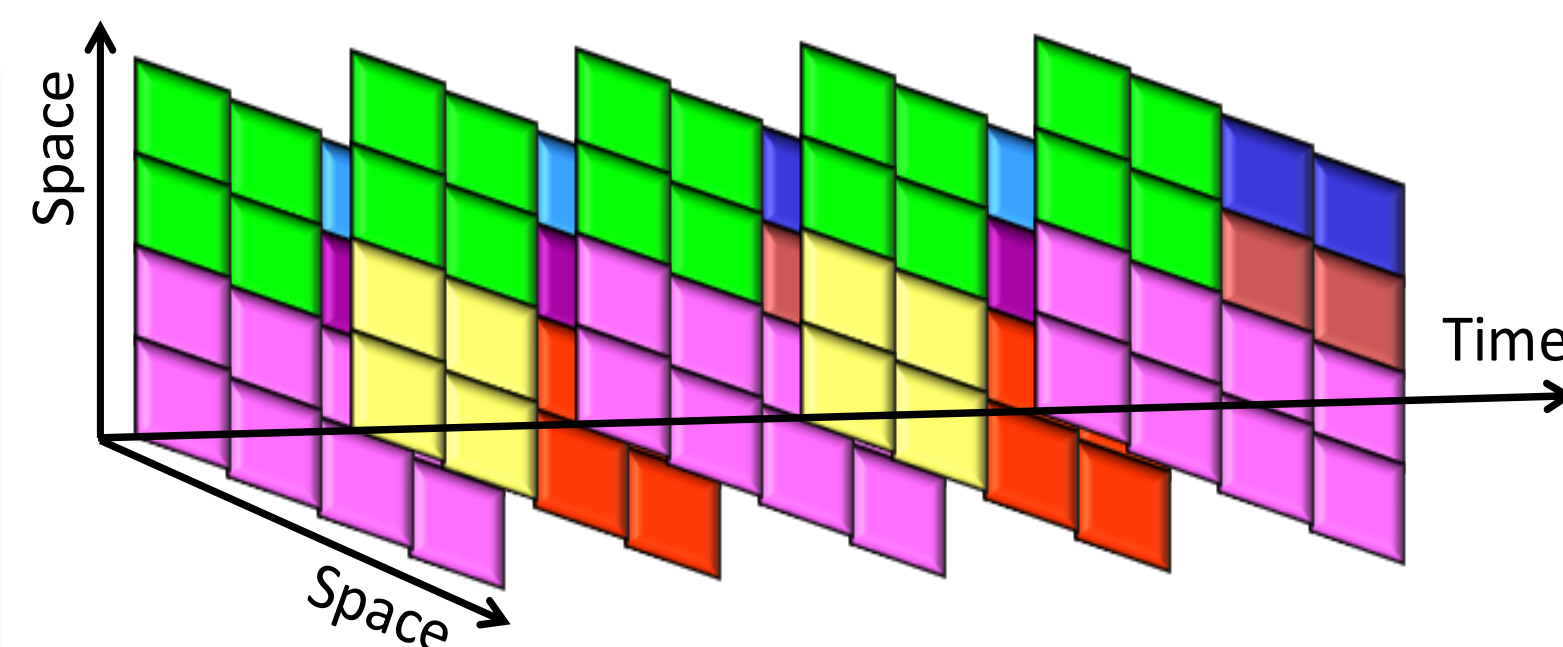
## 1. Basic Goals

- Support a simultaneous mix of high-throughput parallel, interactive, and real-time applications
- Allow applications to consistently deliver performance
- Enable rapid adaptation
- Provide sufficient scalability

## 2. Space-time Partitioning and Two-level Scheduling



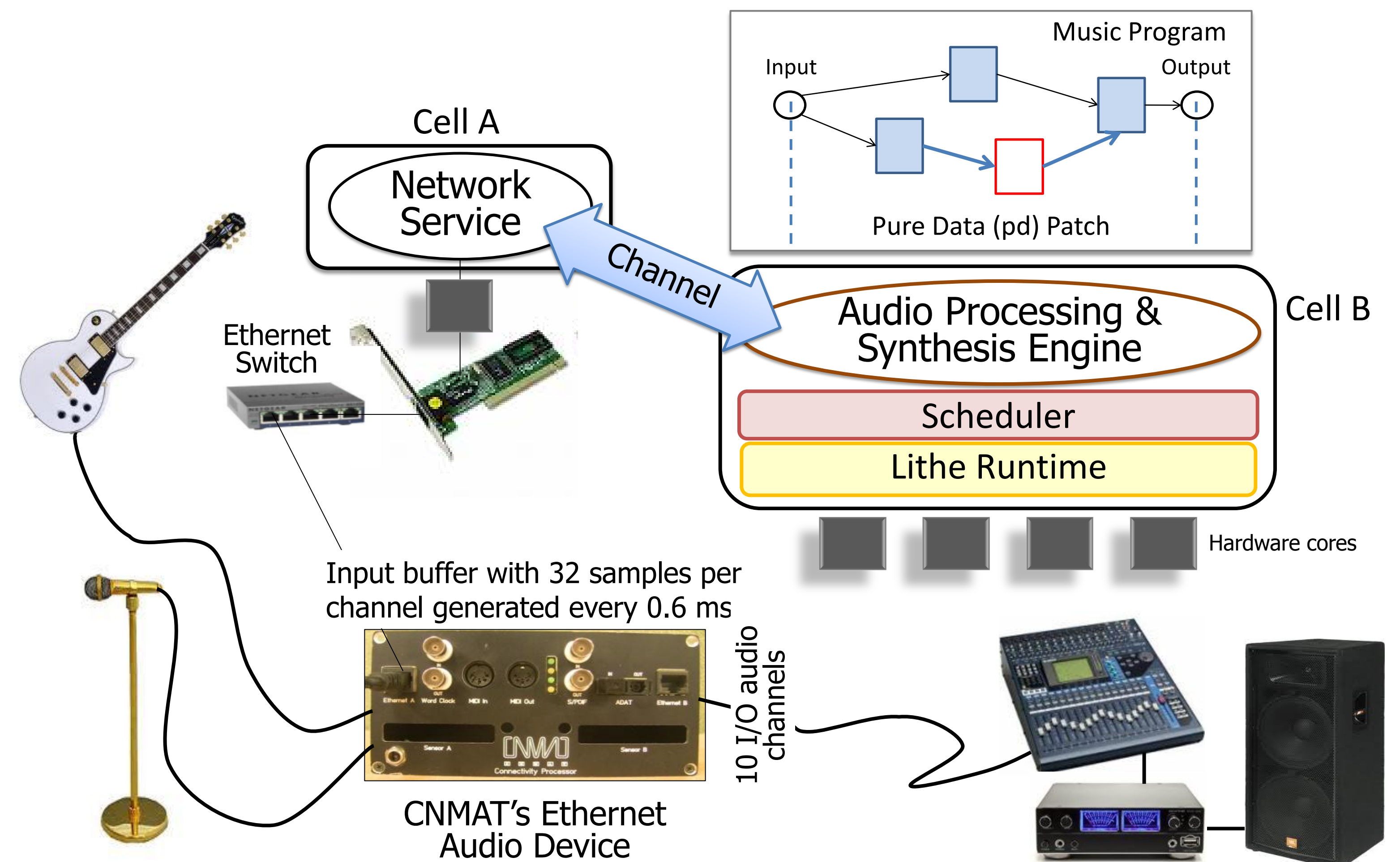
- A Spatial Partition (or **Cell**) comprises a group of processors acting within a hardware boundary
- Each cell receives a vector of basic resources
  - Some number of processors, a portion of physical memory, a portion of shared cache memory, and potentially a fraction of memory bandwidth
- A cell may also receive
  - Exclusive access to other resources (e.g., certain hardware devices and raw storage partition)
  - Guaranteed fractional services (i.e., QoS guarantees) from other partitions (e.g., network service and file service)



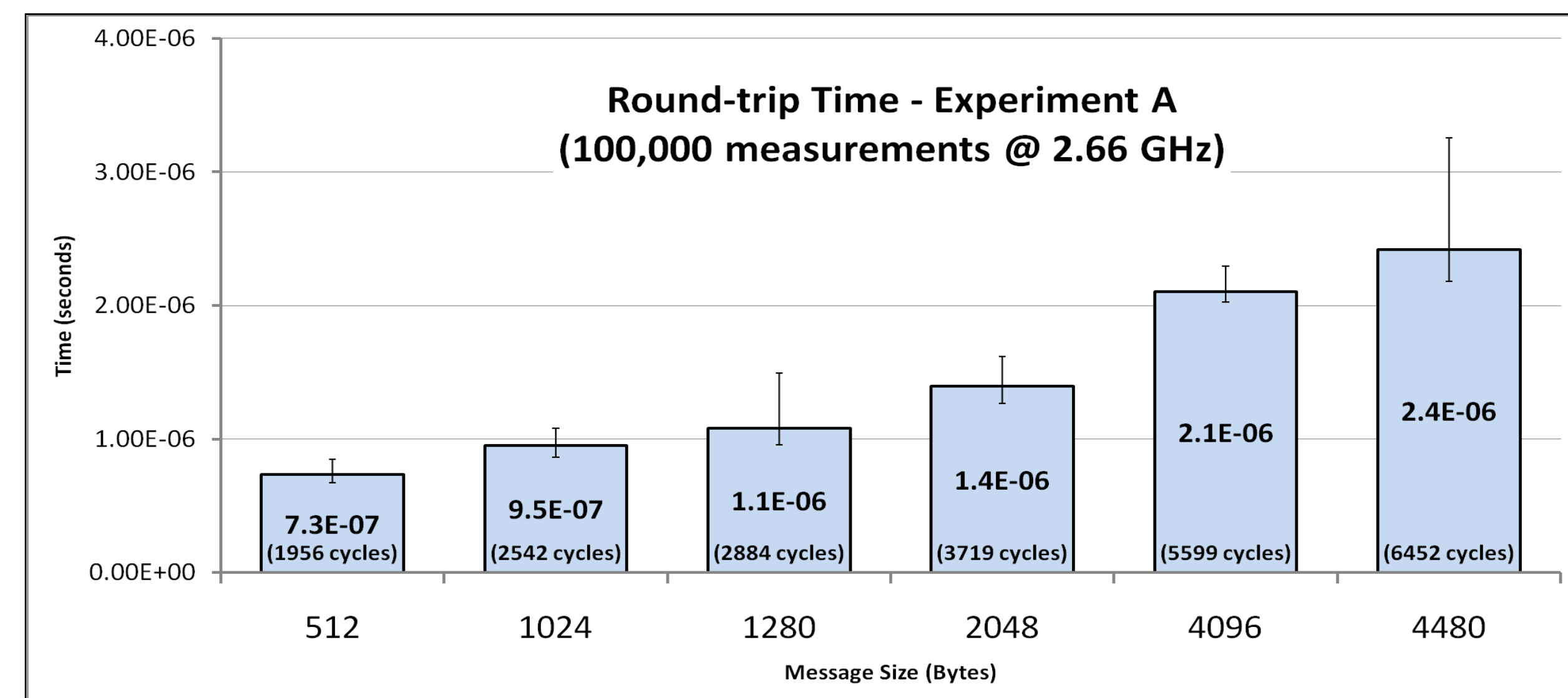
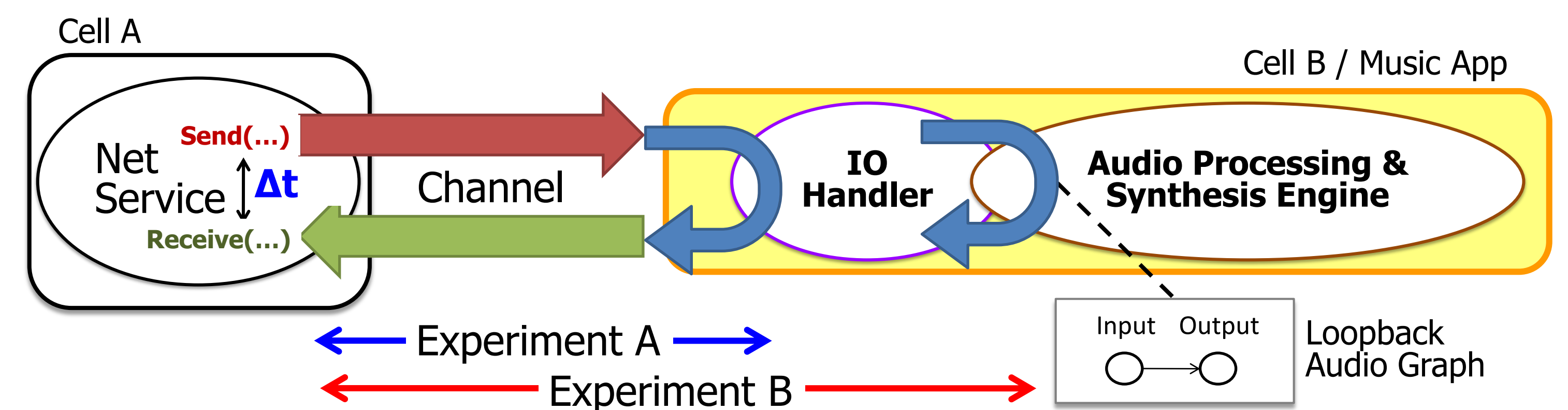
- Spatial partitioning may vary over time
  - Partitioning adapts to needs of the system
  - Cell can be time multiplexed
- Scheduling at Level 1:** Coarse-grained resource allocation and distribution at the cell level
- Scheduling at Level 2:** Fine-grained application-specific scheduling *within* a cell

- A cell contains channel endpoints to other cells
  - Channels allow an application in a cell to access services and to interact with other applications residing in other cells
  - Communication between cells is controlled for QoS enforcement
- Channels enable efficient and non-blocking message passing

## 3. Music Application



## 4. Experimental Results



**Round-trip Time - Experiment B**  
 100,000 measurements @ 2.66GHz, Message Size = 1280 bytes  
 21.08 μs (56,179 cycles)

**Test platform**  
 Intel Core i7 (quad-core processor)  
 Hyper threading  
 3GB RAM