T-EMU: Machine Class Manual

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### 1. Introduction

The machine class is used to assemble and group related processors in machines. The machine class is intended to be used for SMP and multi-core systems. It provides the following capabilities:

1. A multi-CPU scheduler that executes all the CPUs in the machine in sequence (for a fixed time quanta).
2. A synchronised event queue. CPUs can post events in the next time quanta to be executed after all the processors have reached a specific time point.
3. A scheduling interface enabling the machine to be run for a time specified in seconds, not cycles.

Note that the machine class supports the scheduling of different CPUs with different clock frequencies.

Synchronised events are posted on a CPUs event queue by adding the flag TEMU_EVENT_SYNC to the posting function, this will bypass the CPU event queue and put it in the machine object's queue.

### 2. Configuration

<table>
<thead>
<tr>
<th>Property</th>
<th>Type</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>quanta</td>
<td>uint64_t</td>
<td>Length of time quanta in nanoseconds</td>
</tr>
<tr>
<td>syncMask</td>
<td>uint64_t</td>
<td>Considered when checking whether the CPUs are synced</td>
</tr>
<tr>
<td>cpus</td>
<td>CpuIface Object Array</td>
<td>For controlling CPUs</td>
</tr>
<tr>
<td>devices</td>
<td>EventIface Object Array</td>
<td>For distributing machine resets</td>
</tr>
</tbody>
</table>

### 3. Limitations

- The machine class cannot have more than 64 CPU cores connected.