OLTP On A Server-grade ARM

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### Transaction processing

- TPC-C on a modern server:
  - Busy
  - Stalled

![Throughput vs. Power](image)

**Stalls → wasted power**

### Xeon vs. Server-grade ARM

<table>
<thead>
<tr>
<th></th>
<th>Intel Ivy Bridge</th>
<th>ARM Cortex-A57</th>
</tr>
</thead>
<tbody>
<tr>
<td># Sockets</td>
<td>2 (one is active)</td>
<td>1</td>
</tr>
<tr>
<td># Cores/socket</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Issue width</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Clock speed</td>
<td>2.00GHz</td>
<td>2.00GHz</td>
</tr>
<tr>
<td>L1I / L1D</td>
<td>32KB / 32 KB</td>
<td>32KB / 32 KB</td>
</tr>
<tr>
<td>L2</td>
<td>256KB</td>
<td>256KB</td>
</tr>
<tr>
<td>L3</td>
<td>20 MB</td>
<td>8 MB</td>
</tr>
</tbody>
</table>

**Similar micro-architectures**

### Energy proportionality

- In-memory Silo, TPC-C, 5GB

![Energy efficiency](image)

**ARM achieves energy proportionality**
- Large power-saving at low utilization

### Server-grade ARM

- Fat
  - High performance
  - High power consumption

- Lean
  - Low performance
  - Low power consumption

### Power vs. Throughput

- In-memory Silo, TPC-C, 5GB

![Normalized throughput efficiency](image)

**ARM is a promising alternative**
- High performance & low power

### Tail latency

- In-memory Silo, TPC-C, 5GB

![Normalized latency](image)

**Xeon is more suitable for low latency**
- Renders Xeon the only alternative