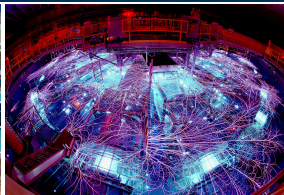


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Qthreads for Chapel

George Stelle

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What is qthreads?

C library for creating and scheduling userspace threads

How does Chapel use qthreads?

begin, cobegin
forall, coforall
sync variables, sync statements
reductions

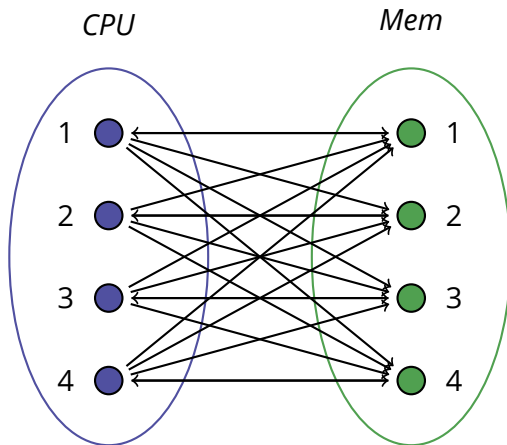
Features

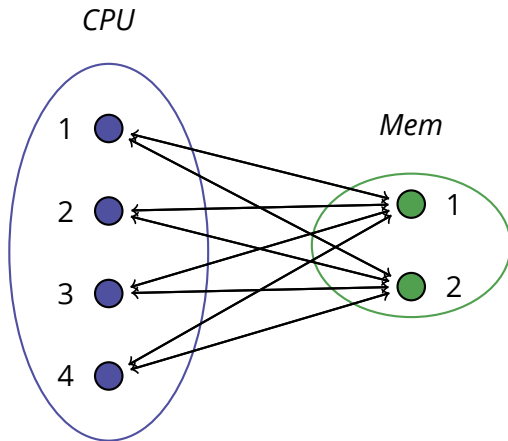
- Load balancing
- Hardware-aware
- full/empty-bit (FEB) semantics



- No preemption
- No guarantee of ordering (necessarily)
- Multiple options (nemesis, sherwood)

Nemesis





Advantages

- Nemesis
 - Low contention
 - `pthread_cond_wait`
- Sherwood
 - Load balancing
 - Locality aware

- Low/adjustable contention ✓
- `pthread_cond_wait` ✓
- Load balancing ✓
- Locality aware ✗
- Cost of features : $< \approx 20\%$

Conclusion

Managing thread pools is *tricky*