Blooming on c.mmp

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Quick Recap

- C.mmp has 16 PDP 11 processors.
- 32 MB of shared memory in 16 banks
- Crosspoint switch to link each processor to every memory bank.
- SAP
- Hydra quick-and-dirty OS which runs c.mmp.
IXP vs C.mmp

- **Similarities**
  - Multiprocessor
  - Shared Memory
  - Synchronization mechanisms

- **Differences**
  - No multithreading support
  - Switch interconnect
  - 16-bit address space
Bloom Requirements

- Memory for hash tables.
- Fast memory access time
- Computation /processing
- Means by which data can be accessed easily by each Bloom implementation
C.mmp Implementation

- Bloom filter can be implemented on each processor.
- Dedicate one processor to “receive” and one to “transmit”.
- Assuming a network I/O device on c.mmp, Receive process can implement a Ring type data structure that is shared among all the Bloom filters.
- Circumvent the “paging” limitation in c.mmp to improve performance.
- Deploy hash tables in two ways
  - Having multiple hash tables
  - Having one shared hash table among all processors (Bloom filters)
C.mmp Performance

- Contention for shared data structure on c.mmp. IXP scratch rings for hardware support for reducing it.

- Local memory on IXP significantly faster than accessing shared memory on c.mmp

- No dedicated process to fetch packets into memory. IXP MSF is capable of placing packets directly in memory

- Can use multithreading on IXP that can hide memory latencies, but not on c.mmp