UPC Applications

Parry Husbands

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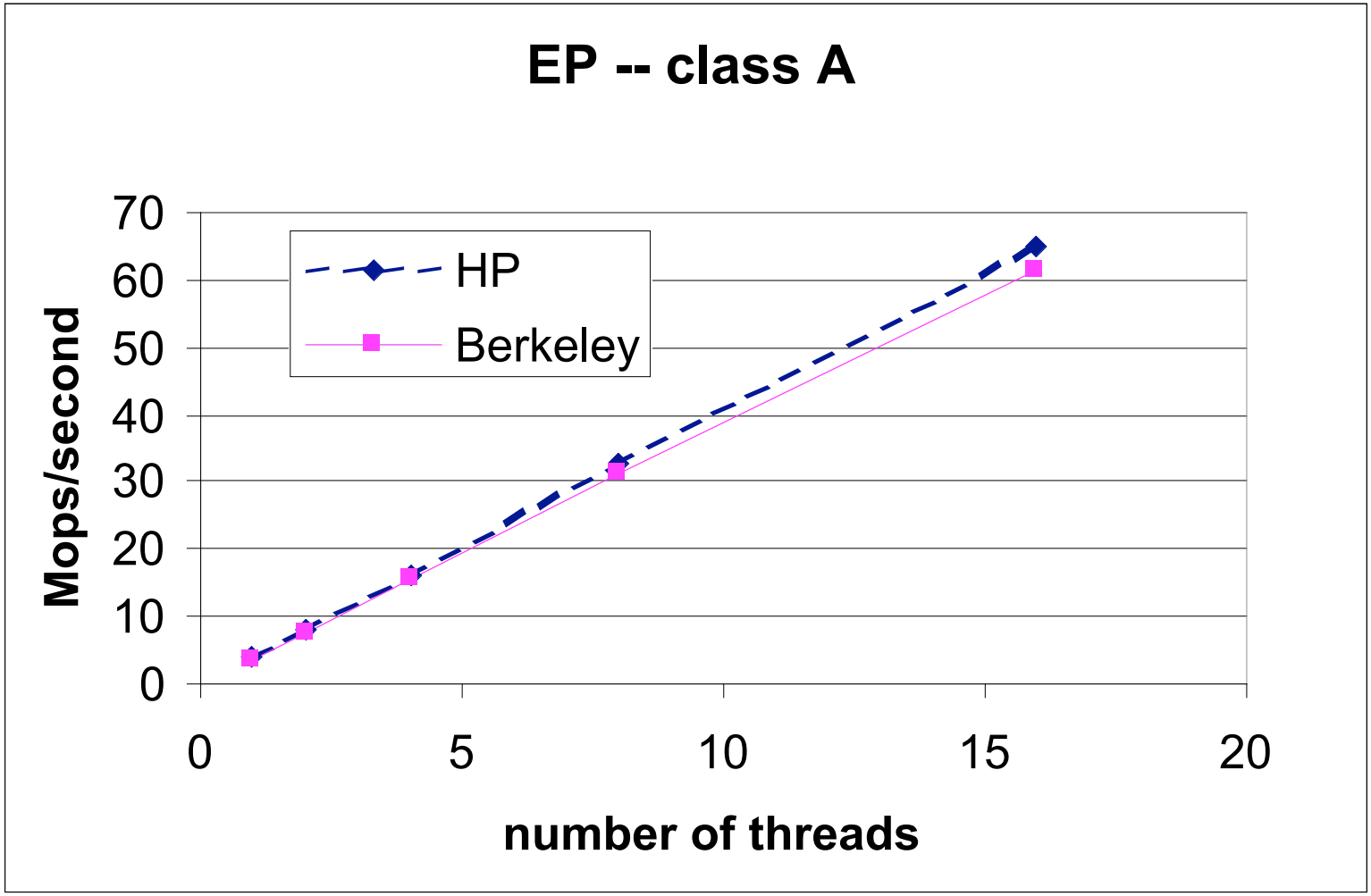
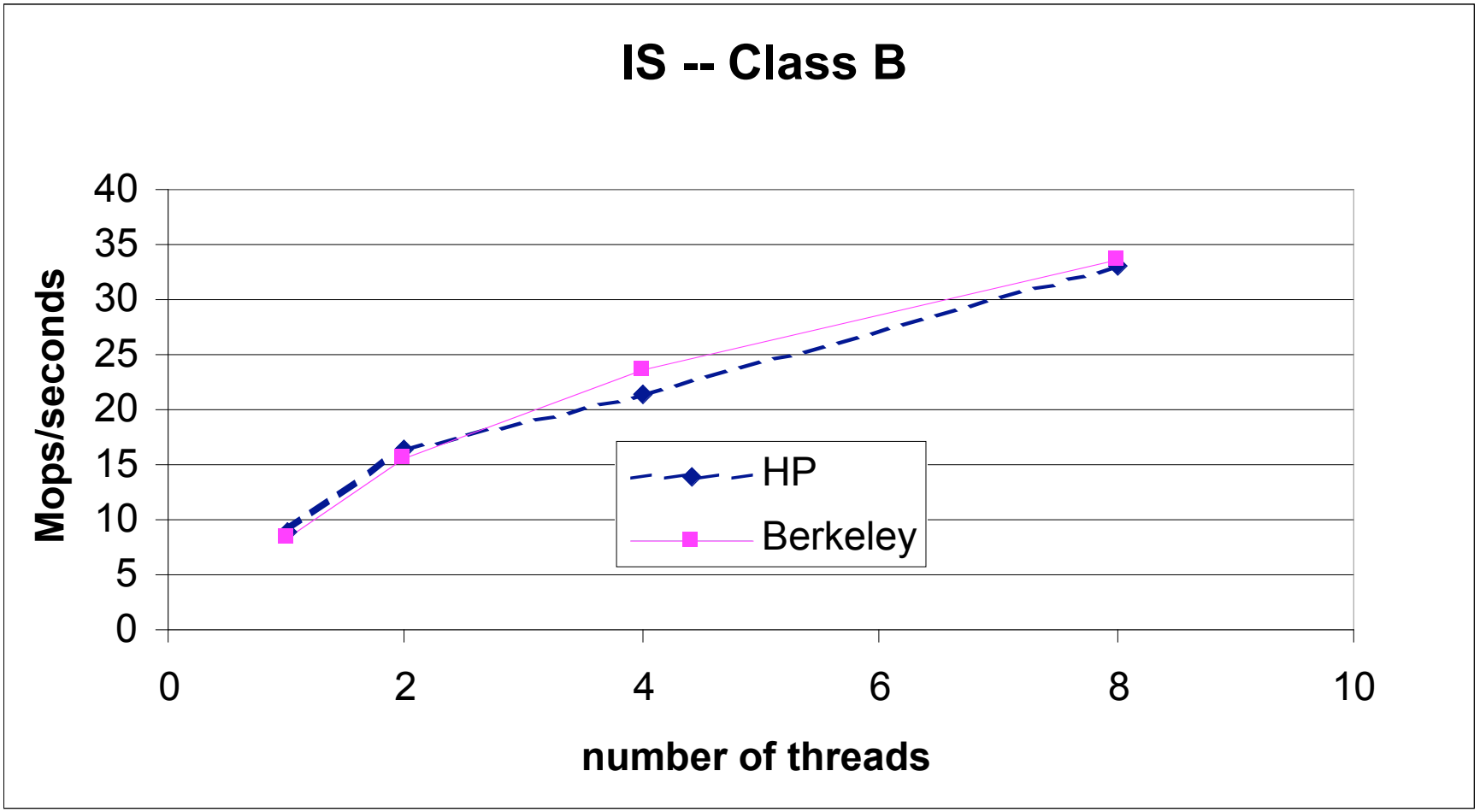
UPC Applications

- Recent focus on Berkeley UPC Compiler
  - Performance measurements
  - Identify areas for compiler “improvements”
- Applications tested
  - NAS Benchmarks
    - EP, IS, MG
    - CG working, performs well compared to Aztec implementation, but data set unrealistic
  - Delaunay Triangulation (HP compiler so far)

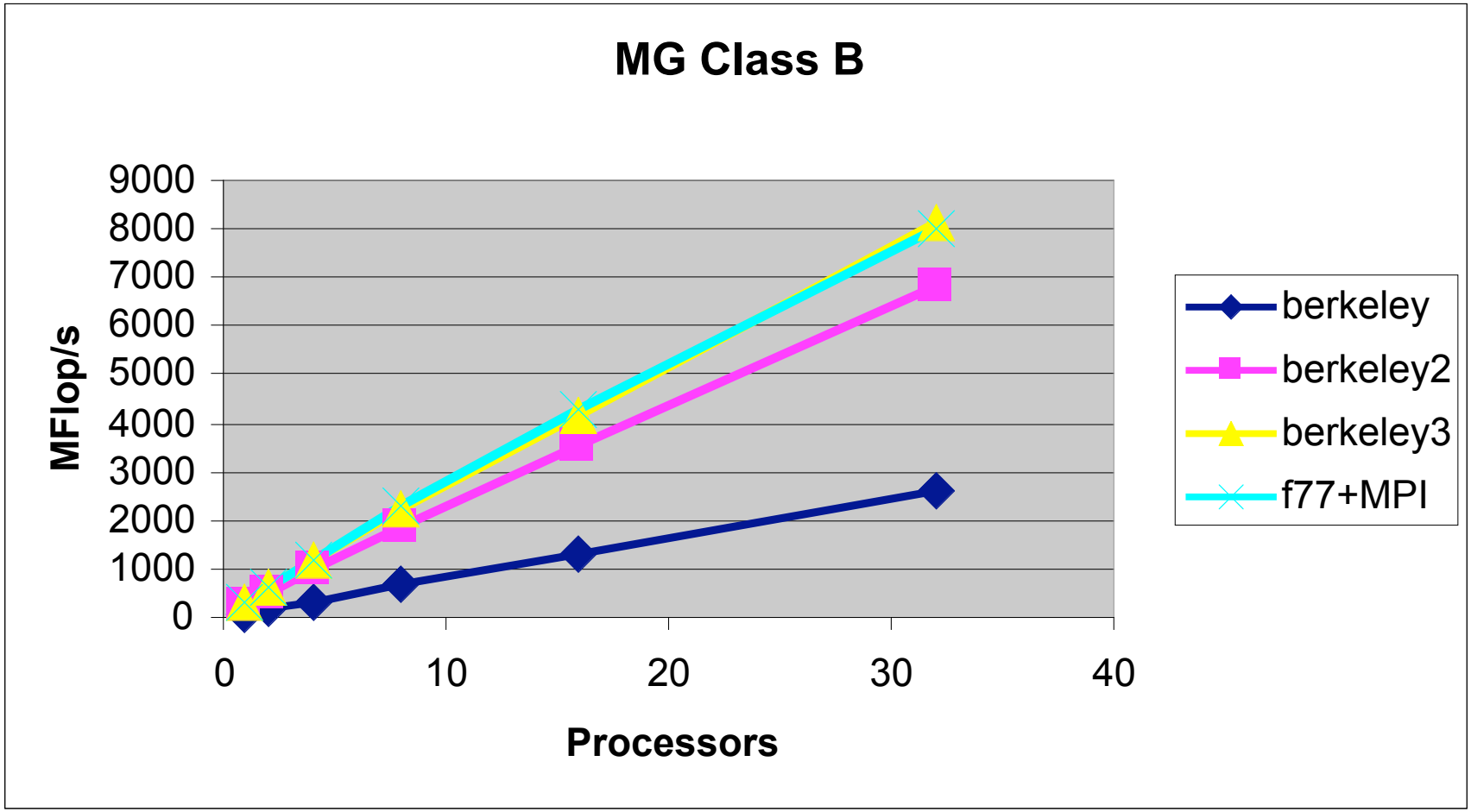
EP on Alpha/Quadrics (GWU)



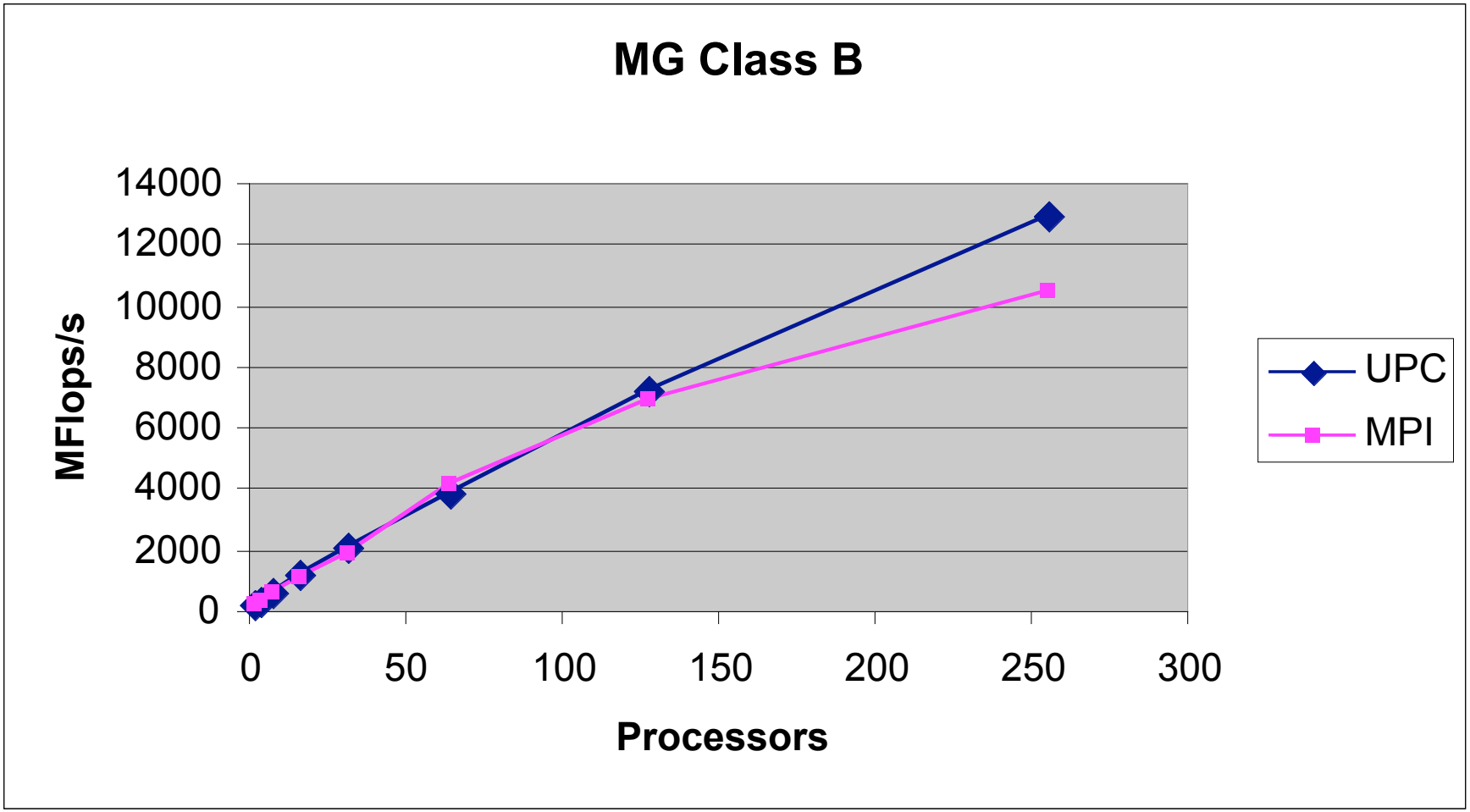
IS on Alpha/Quadrics (GWU)



MG on Alpha/Quadrics (B)



MG on T3E (last year)



2-d Delaunay Triangulation

- Mesh generation
  - First step in countless simulations
- Based on a divide-and-conquer algorithm of Blelloch, Miller, and Talmor (1996)
- No MPI version available
- Parallelism managed with UPC and base case solved using Triangle (Shewchuk)
- Interesting features:
  - Uses collective “teams” as algorithm divides both data and processes
  - Implements a simple caching scheme for points
- Demo in UPC booth at SC02

Other Applications Under Consideration

- Splash Benchmarks
  - Barnes Hut
  - FMM
  - Ocean
  - Radiosity
- Sparse Cholesky
  - Will be based on current OpenMP version
- Various Sorting Algorithms

If you build it, they will come…

- Library support missing in UPC
  - Current application writers are forced to re-invent the wheel
  - Collective spec. a step in the right direction
- Non-blocking bulk communications
- Mechanism for handling groups of processes
- UPC++?

- Debugging
- Interoperability with MPI
  - Can always use GASNet MPI conduit…