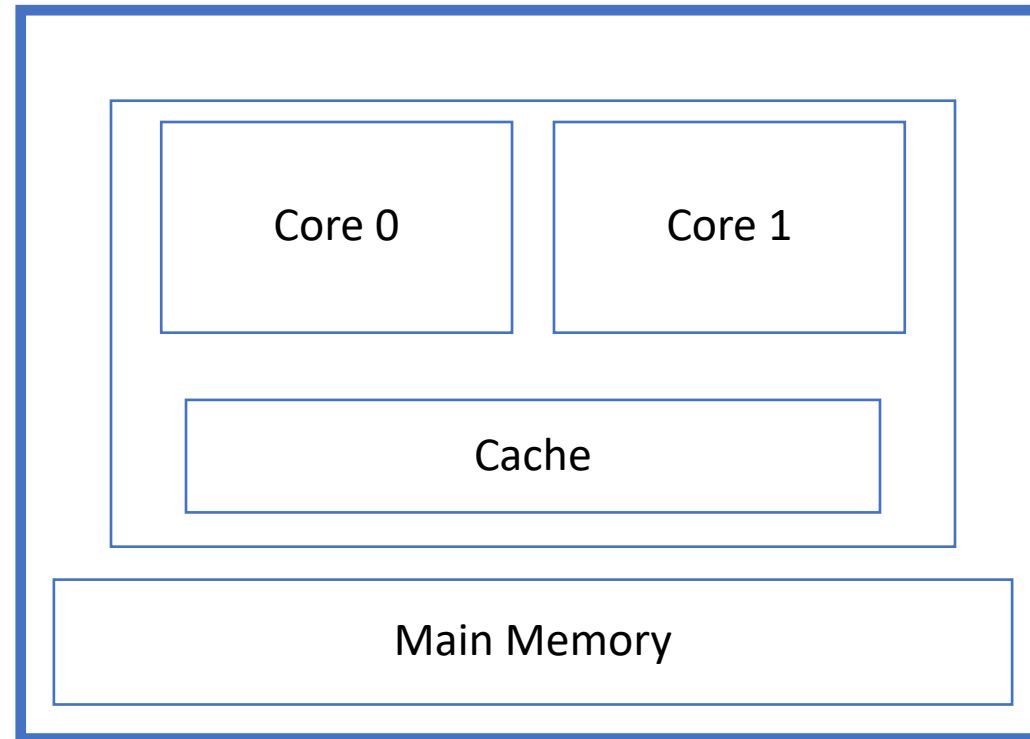


Benchmarking and Optimizing Data Movement on Emerging Heterogeneous Architectures

Amanda Bienz

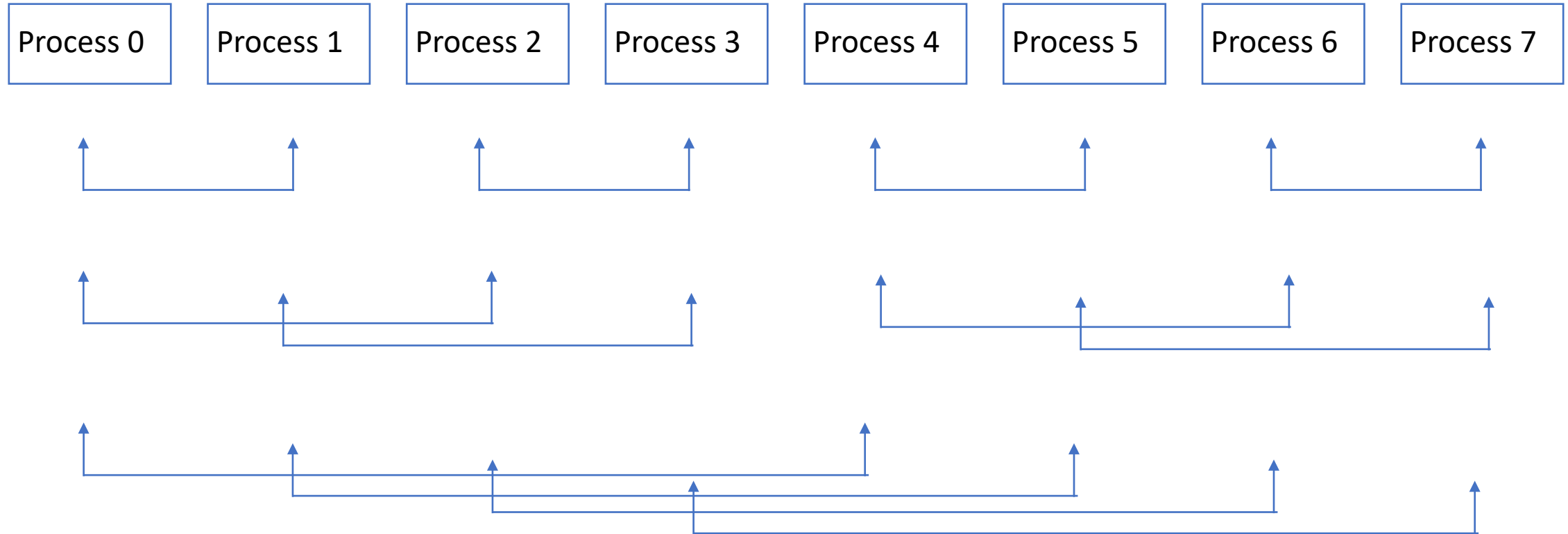
Assistant Professor
Department of Computer Science
University of New Mexico

Previous Generations (Blue Gene/L)

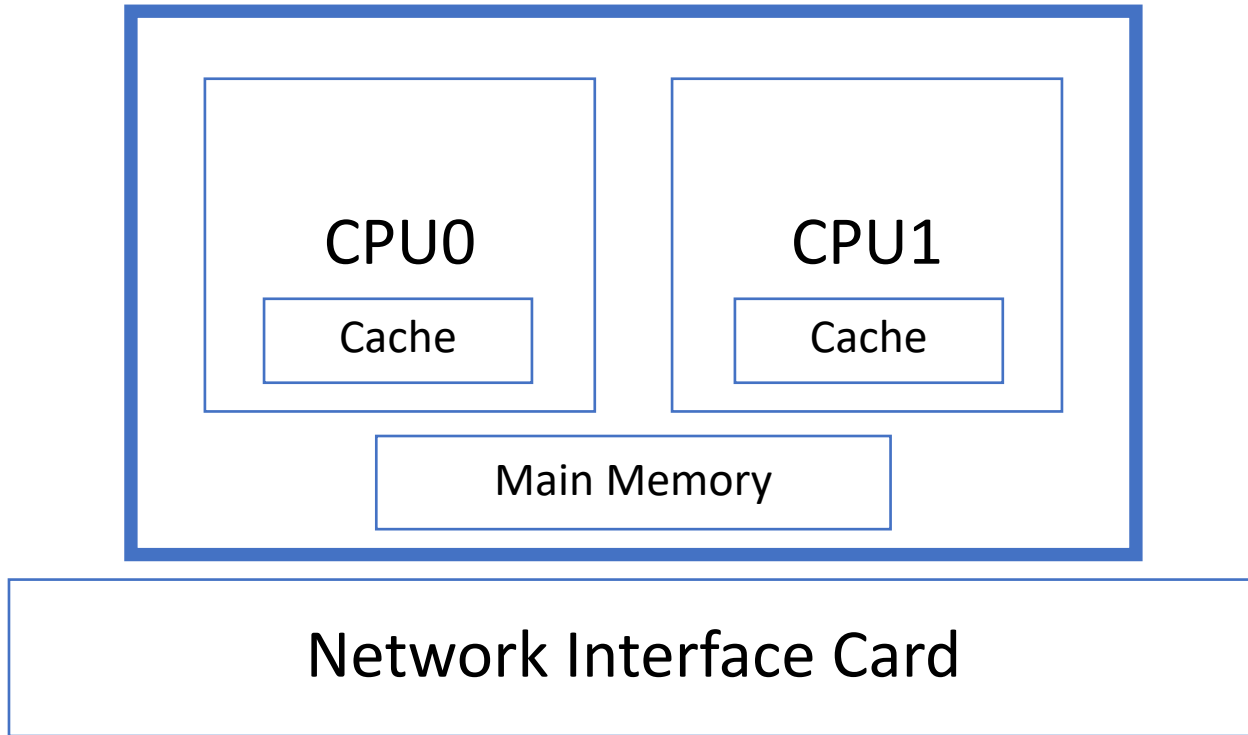


Node with single dual-core chip

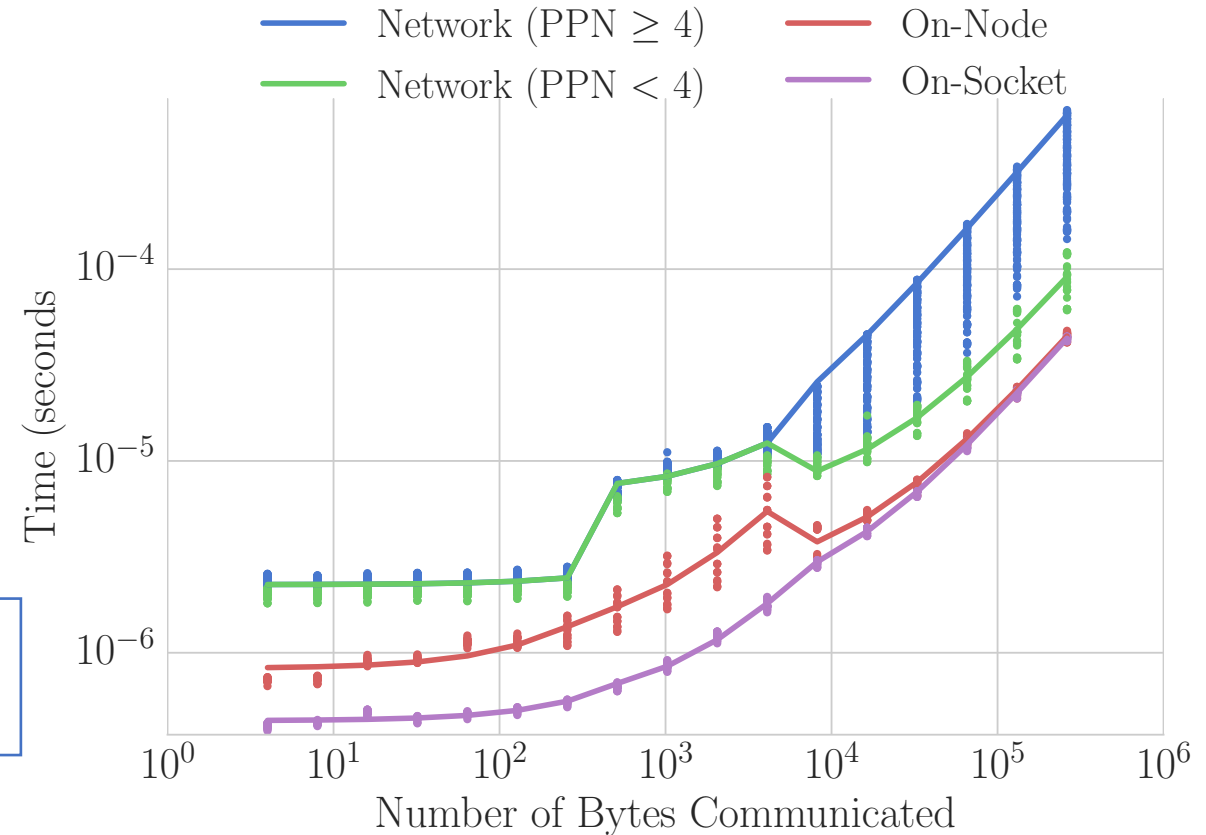
Example Algorithm : Recursive Doubling



Previous Generations: SMP Architectures

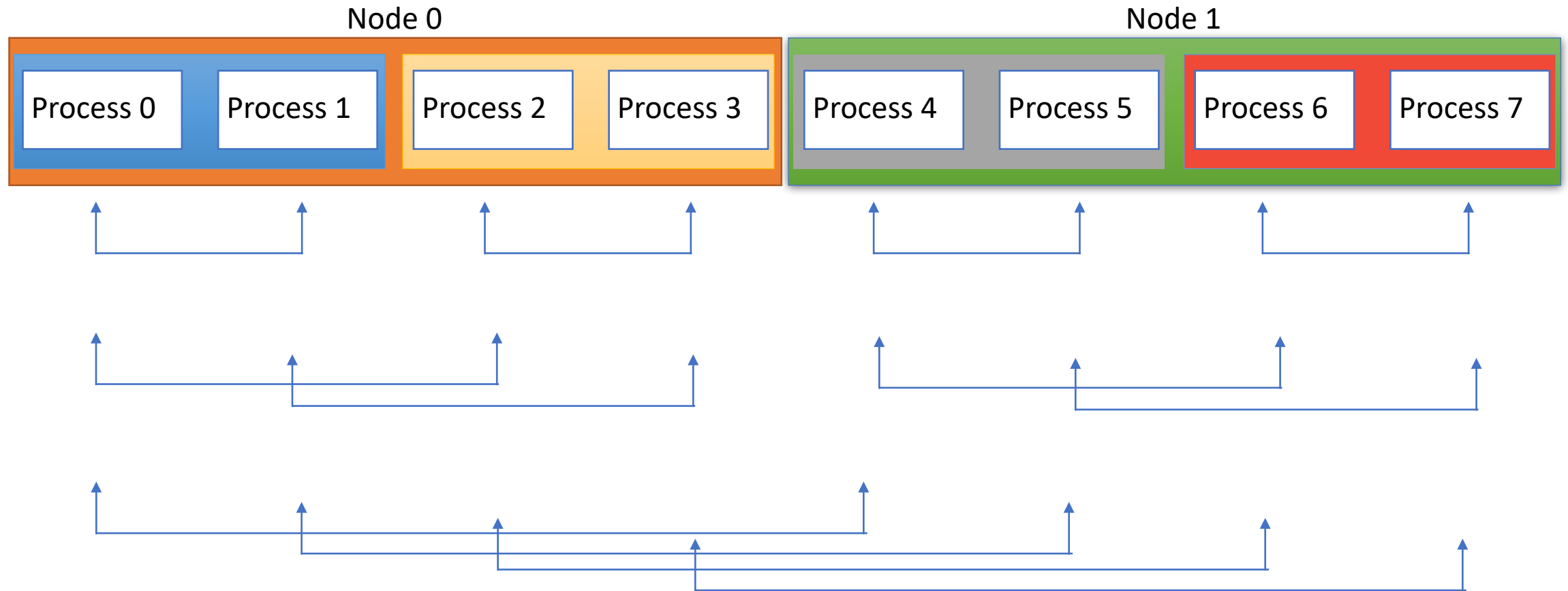


Symmetric Multiprocessing (SMP) Node

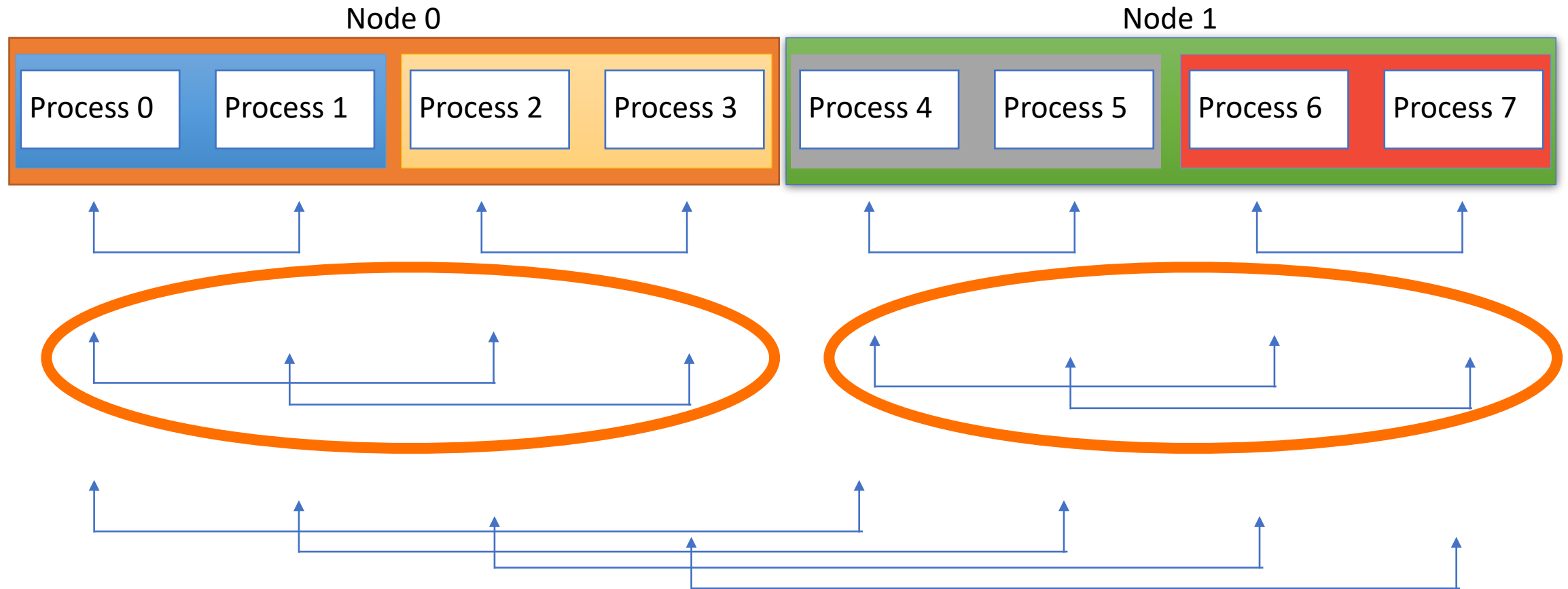


Profile of Blue Waters Communication

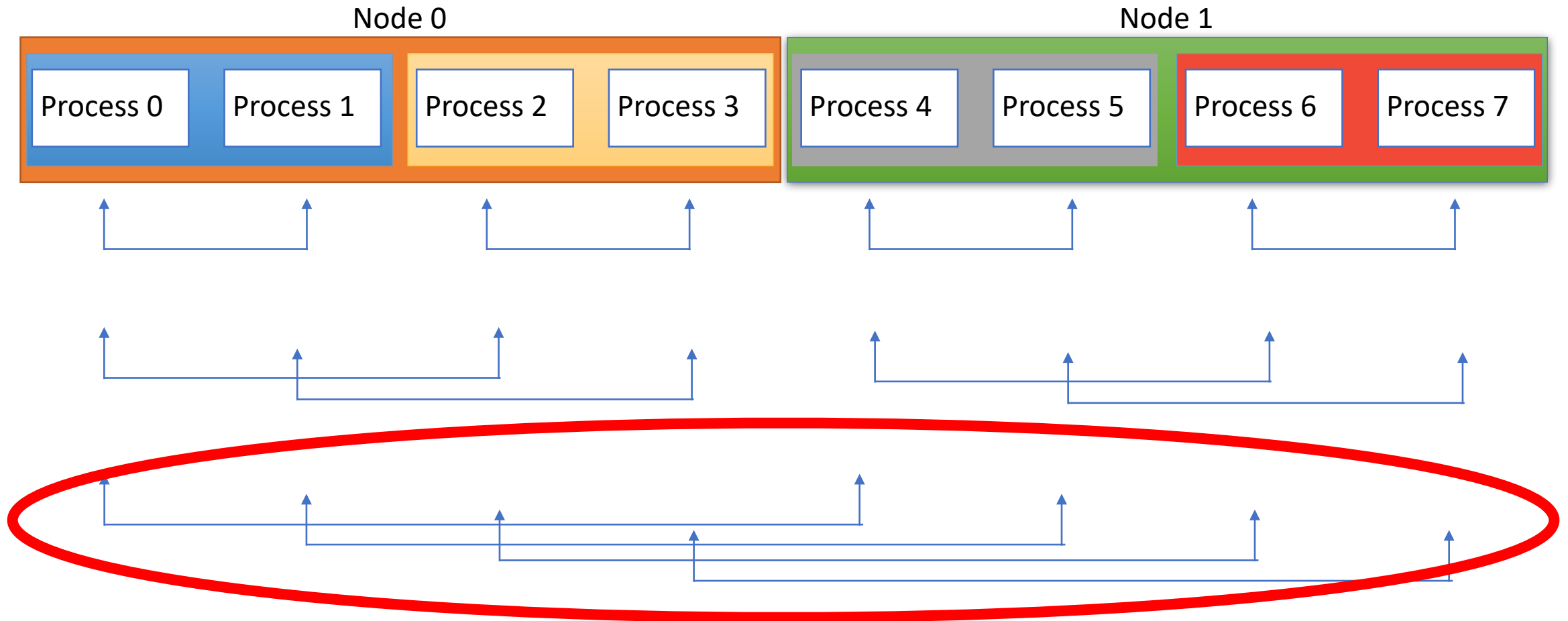
Example Algorithm : Recursive Doubling



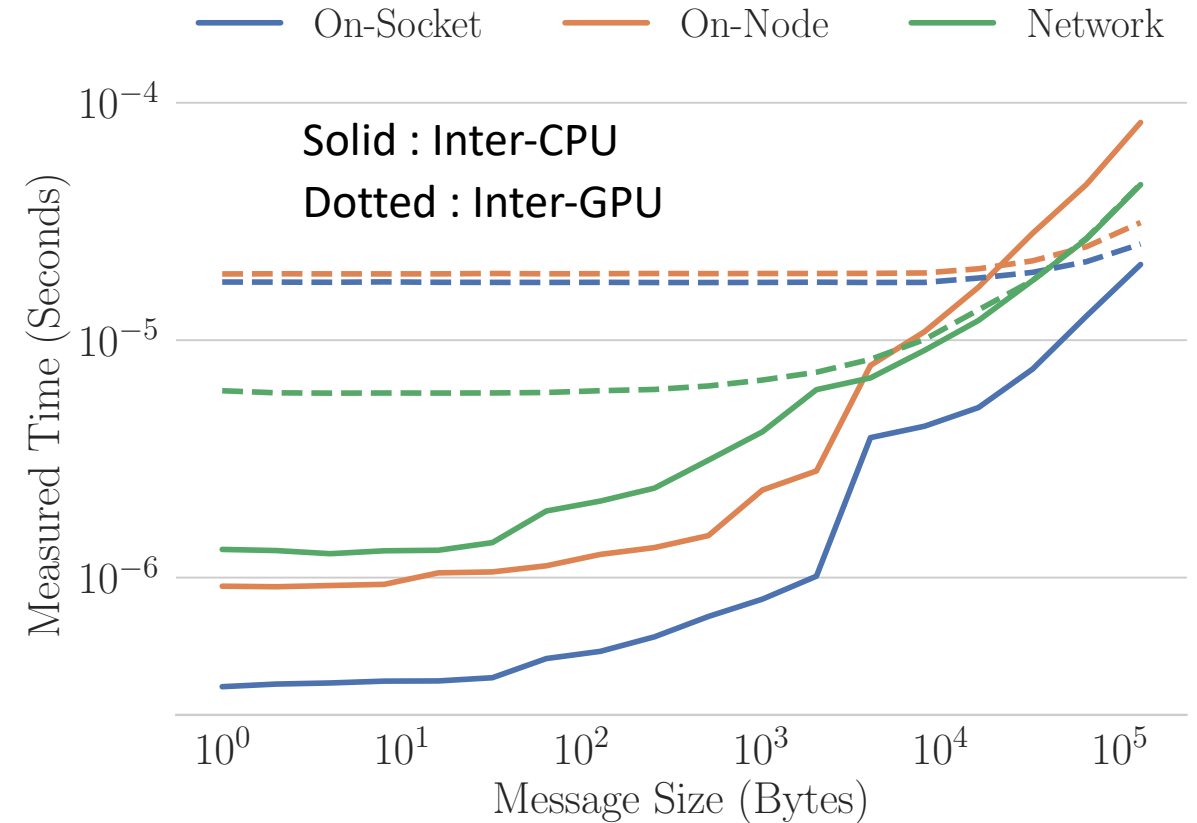
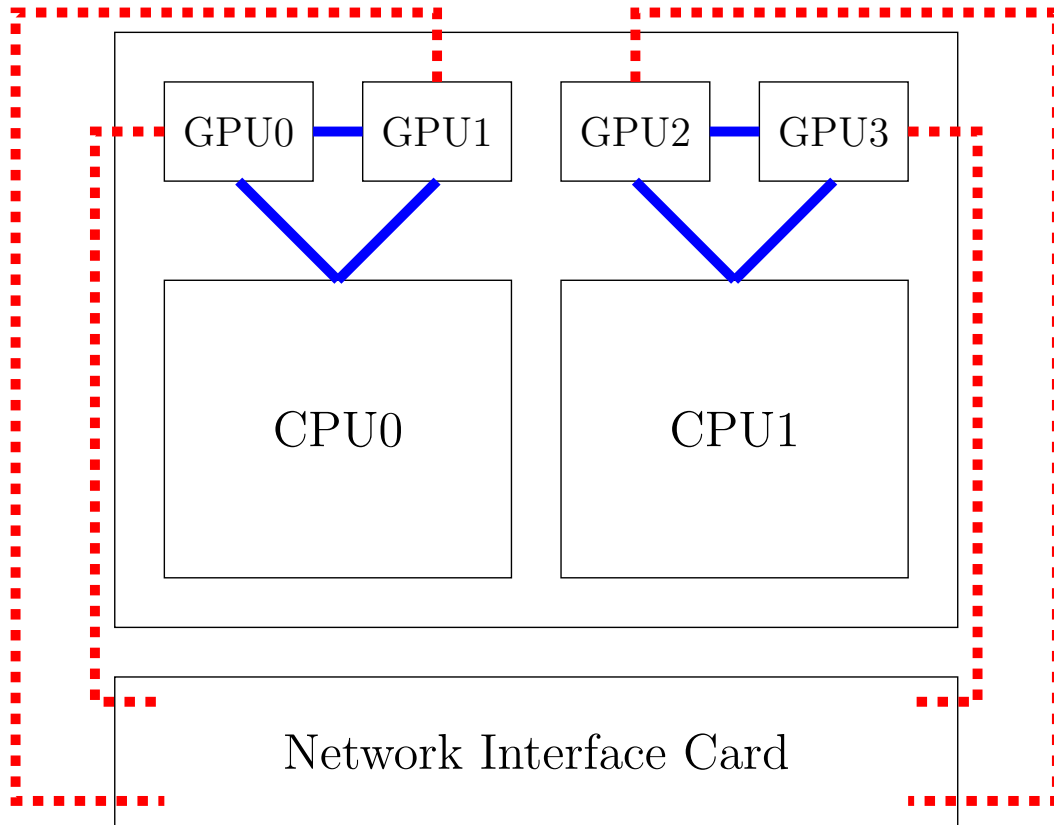
Example Algorithm : Recursive Doubling



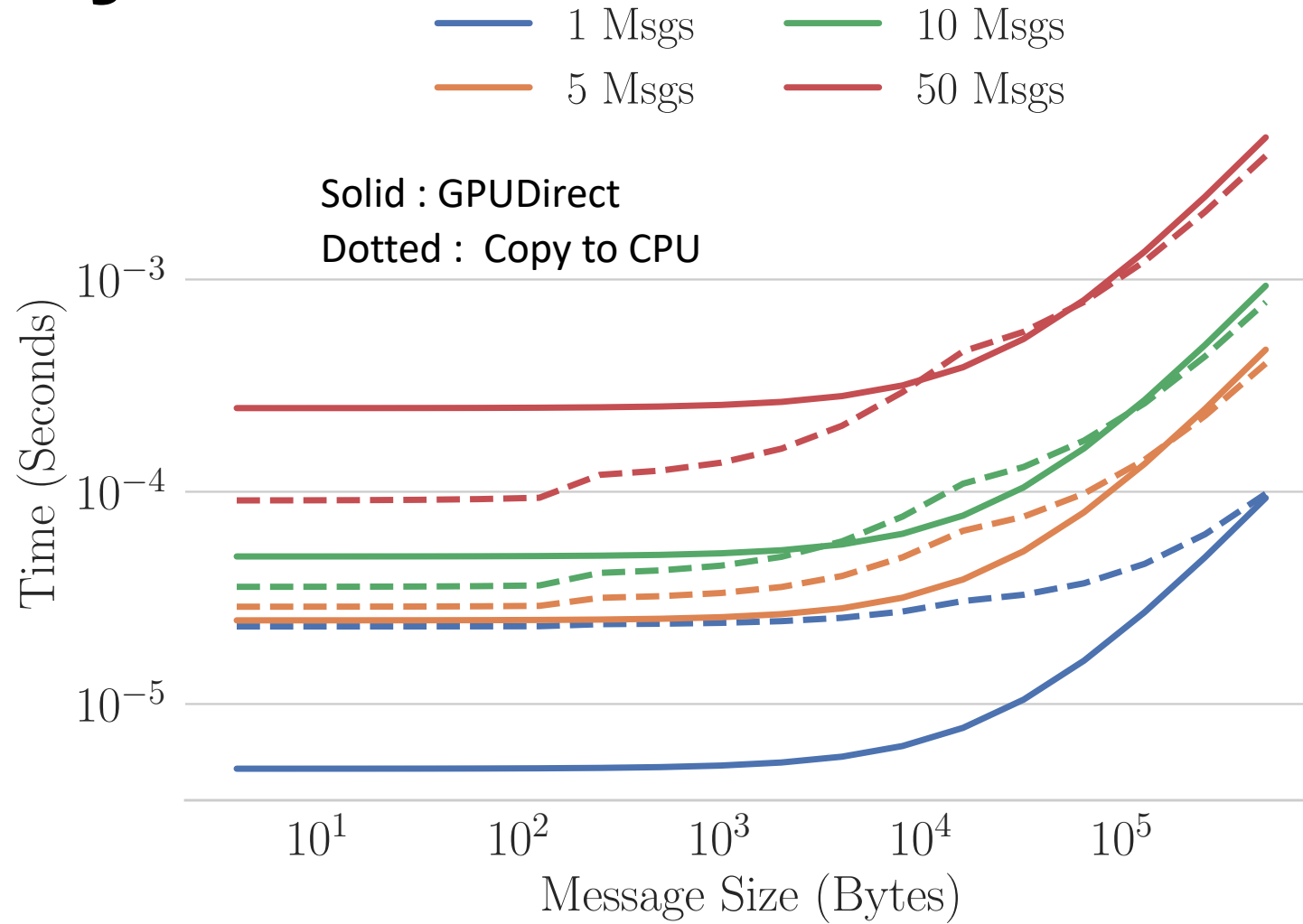
Example Algorithm : Recursive Doubling



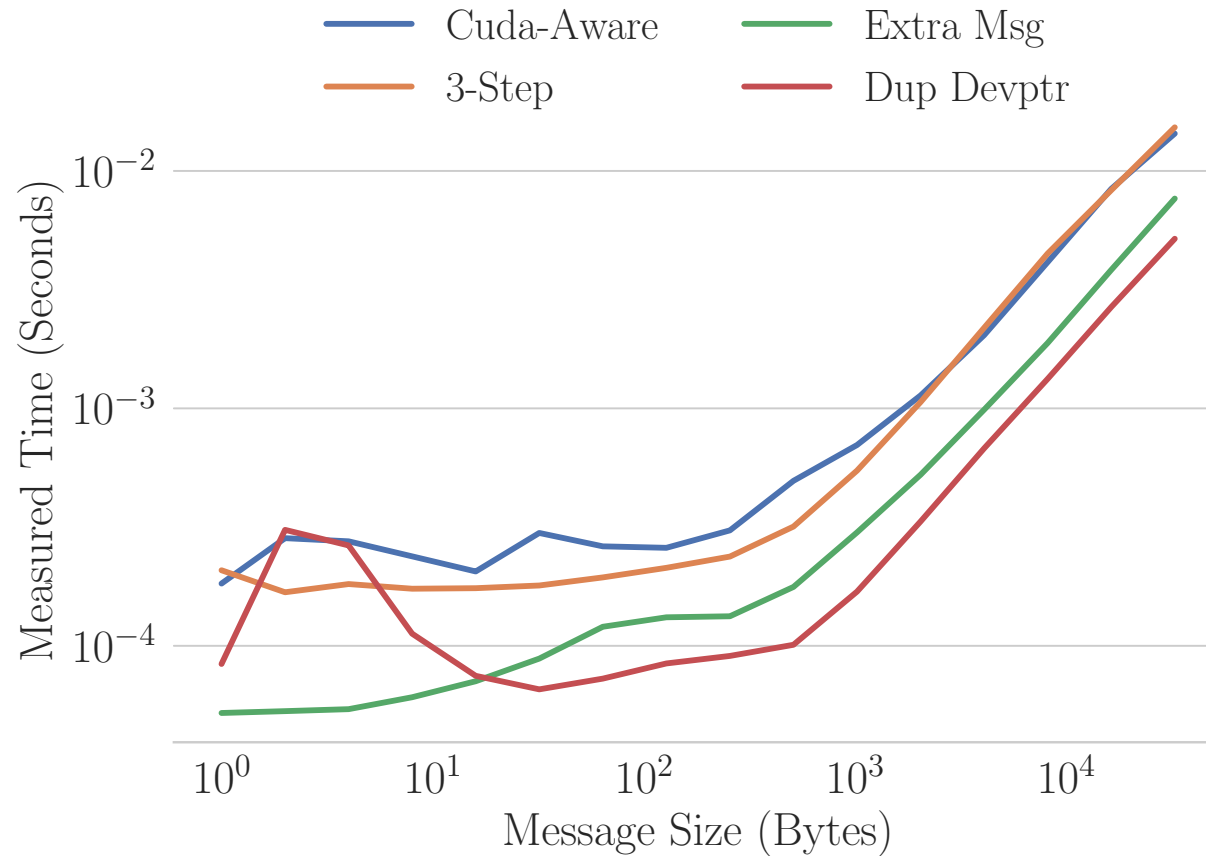
Current Systems : Summit/Sierra



Current Systems : Summit/Sierra

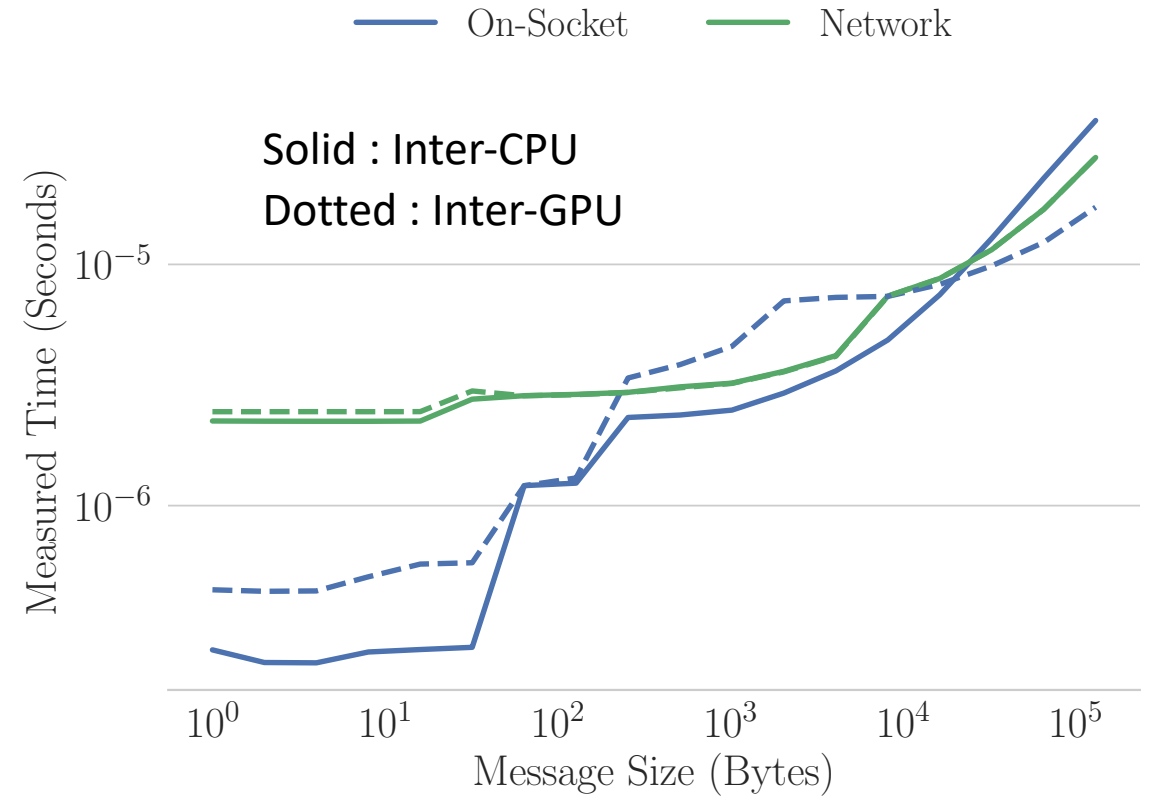
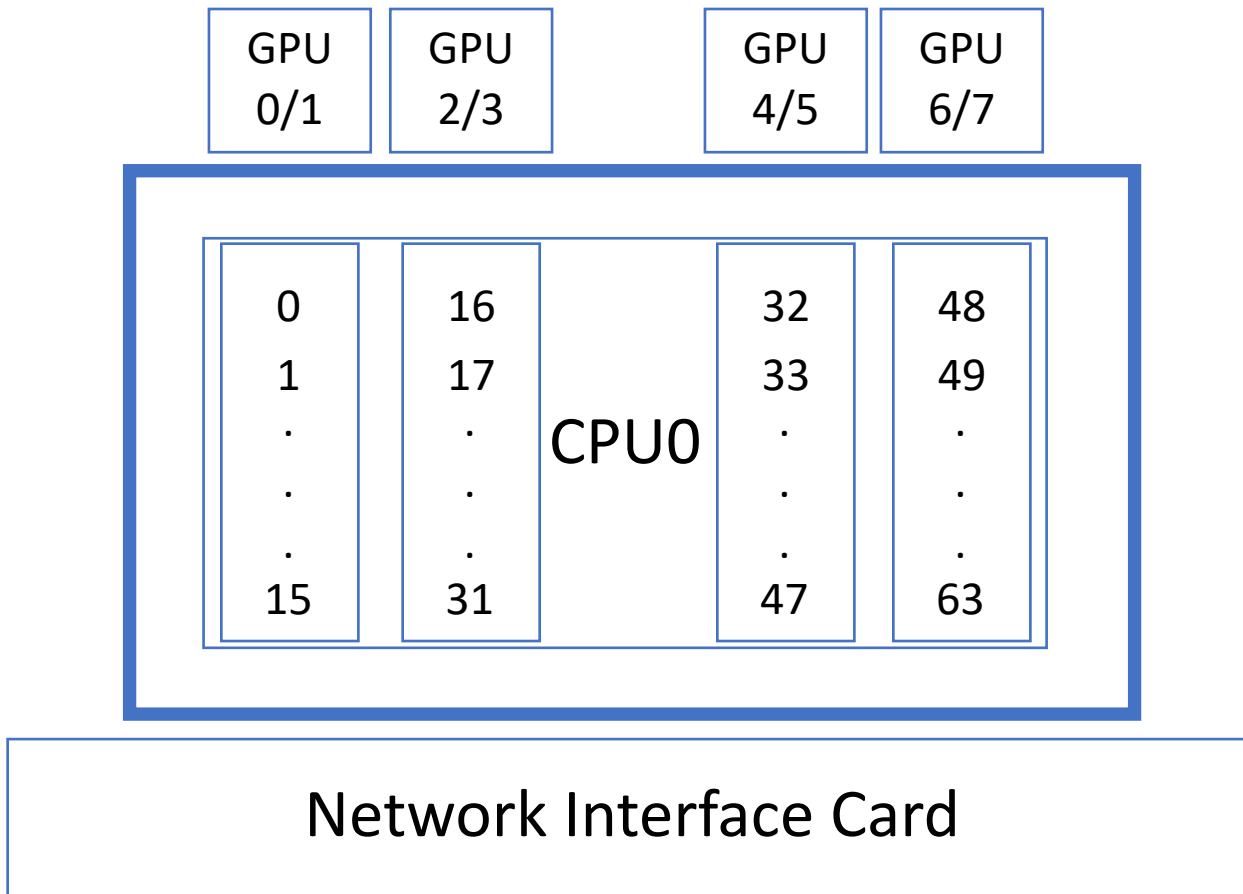


Current Systems : Summit/Sierra



Alltoallv Times

Emerging Systems : Frontier



Open Source Codebases

- BenchPress : benchmarking and modeling for emerging architectures
<https://github.com/bienz2/BenchPress>
- MPI Advance : lightweight communication optimization library, sits on top of MPI (can be used with any system install)
<https://github.com/mpl-advance>

Thanks!

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Questions?