

TORSTEN HOEFLER

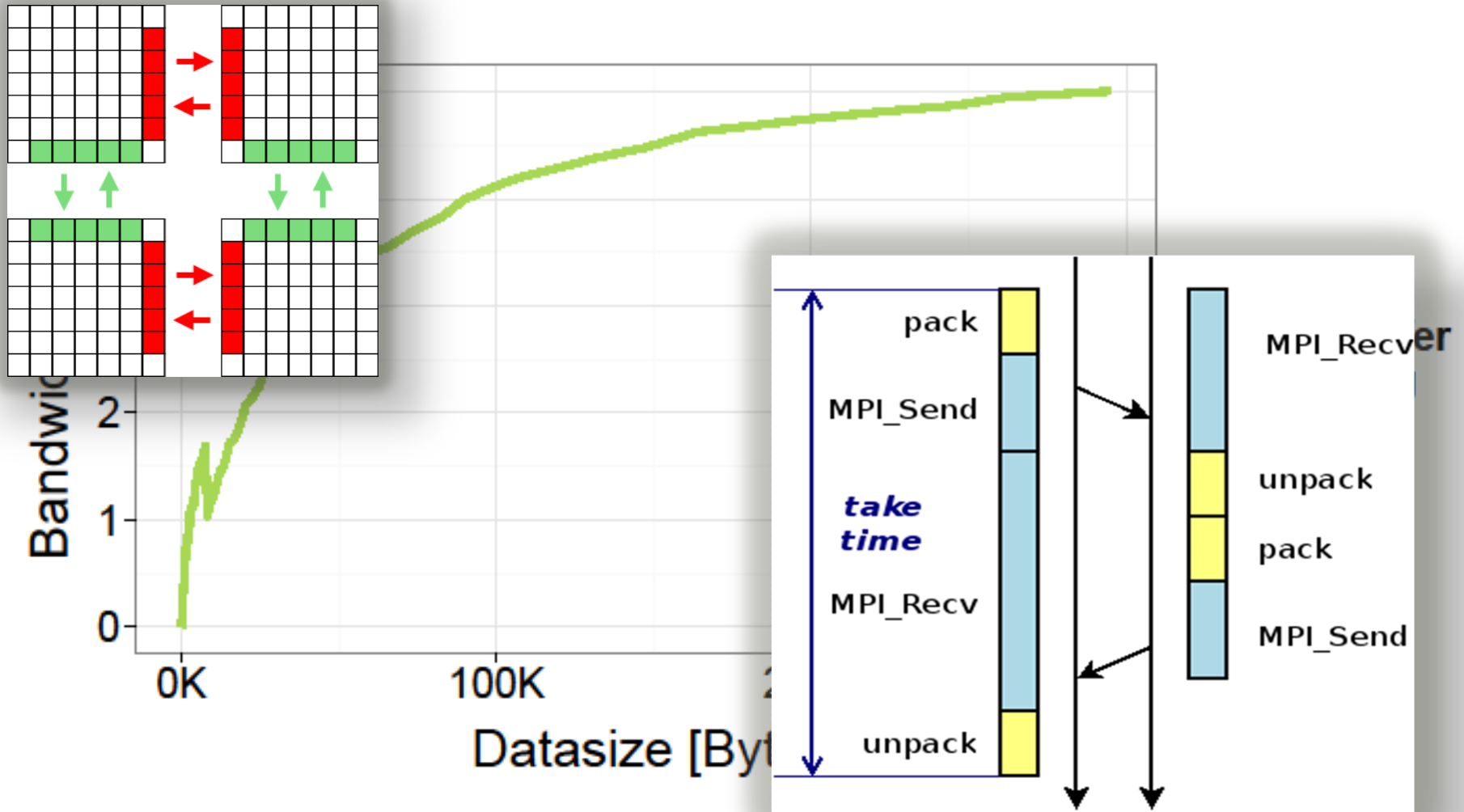
DEPARTMENT OF COMPUTER SCIENCE, ETH ZÜRICH

What about MPI + LLVM

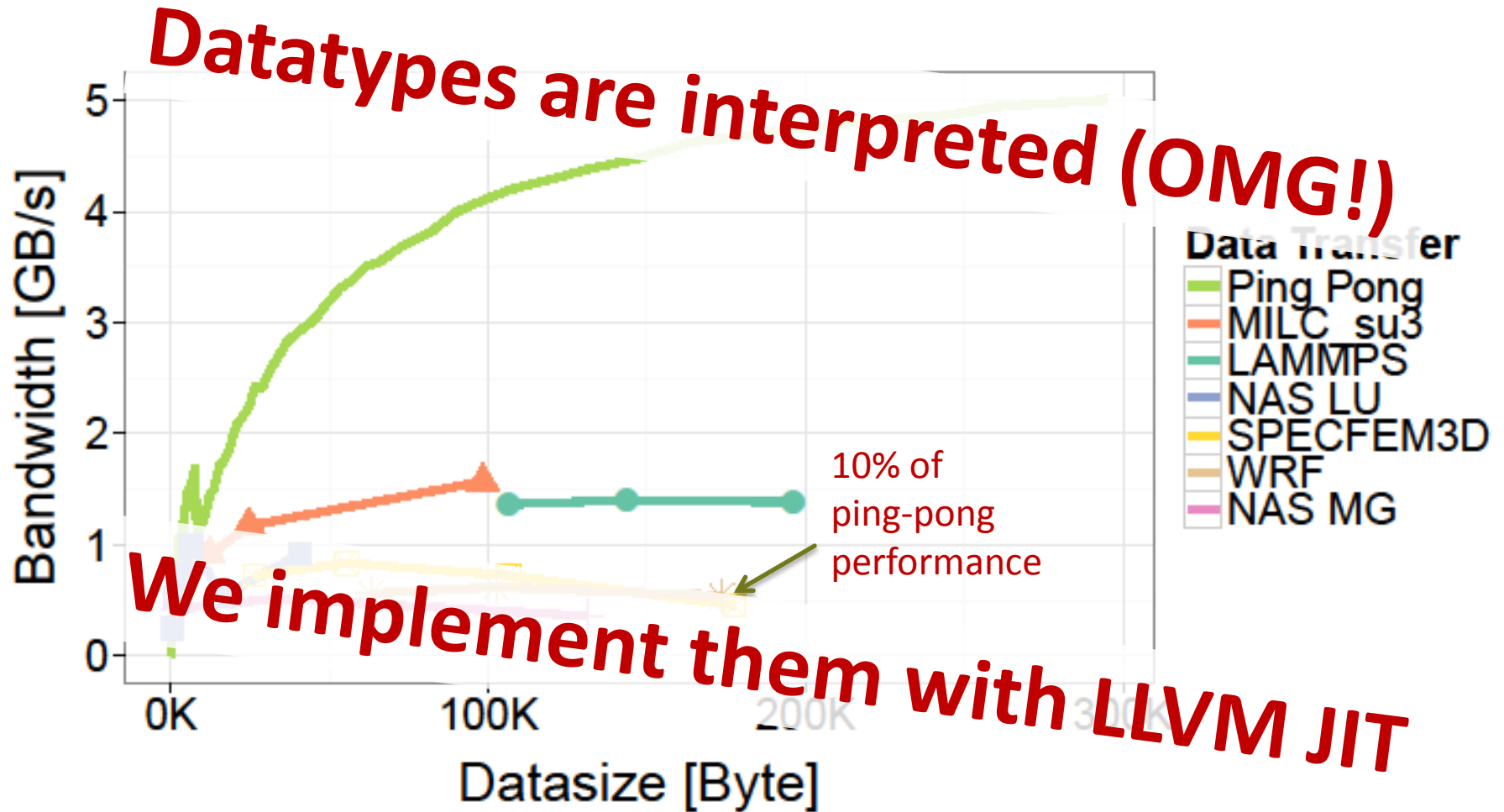
A case for dynamic recompilation and runtime specialization



Parallel MPI Communication – Ping Pong

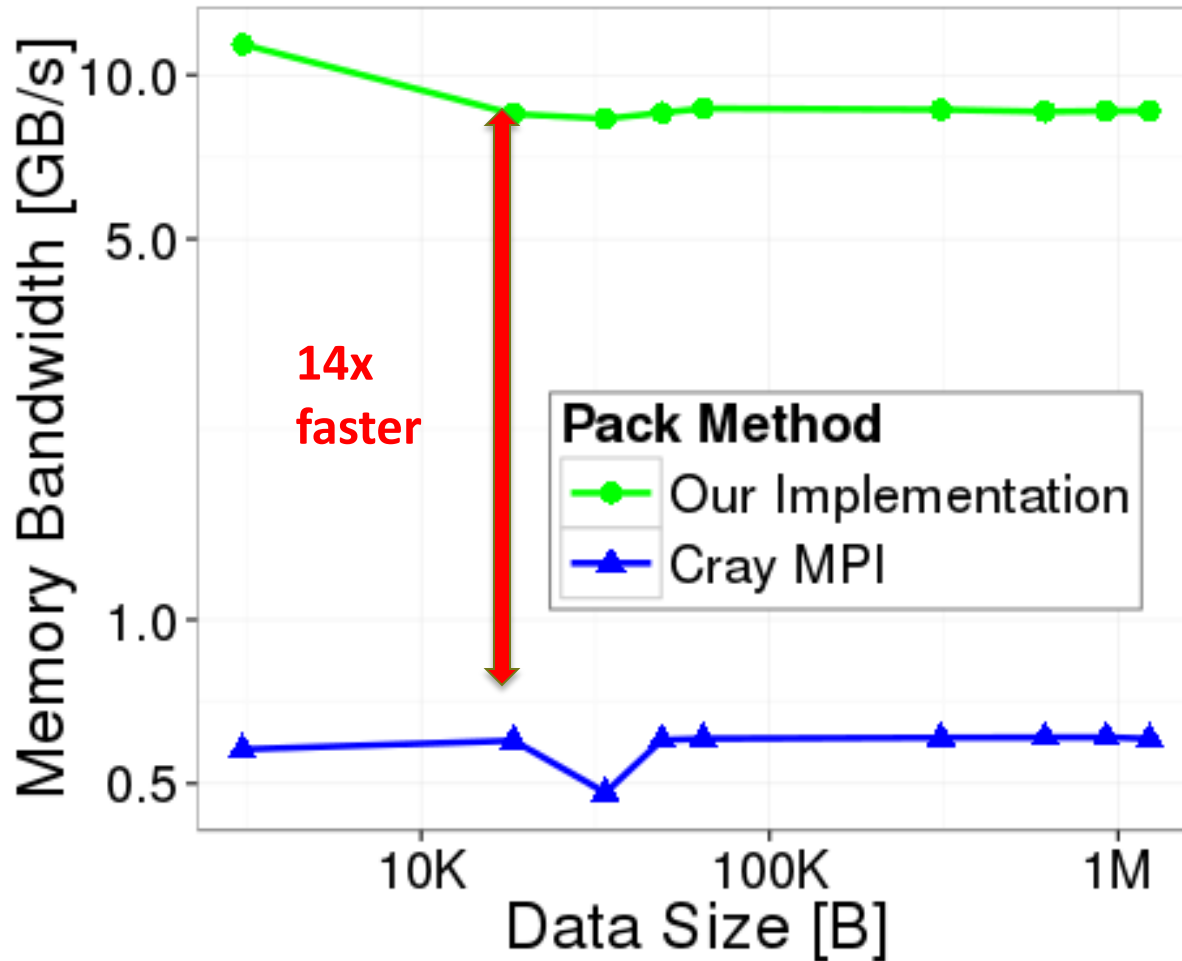


Parallel MPI Communication – Reality



Vector Packing Performance (LLVM 3.1 -O3)

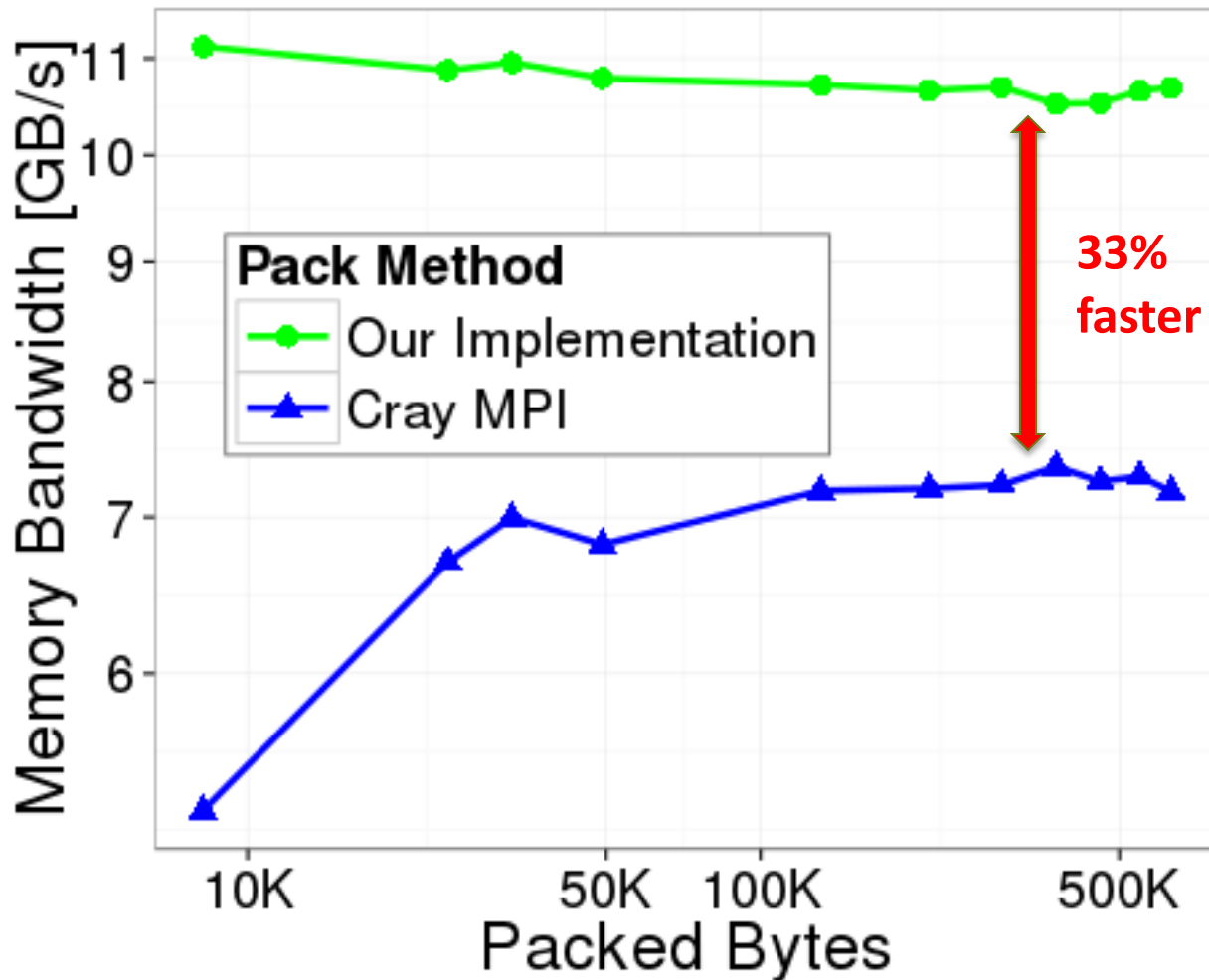
In-cache measurement on AMD Interlagos CPU (Blue Waters)



HVector(2,1,6144) of
Vector(8,8,32) of
Contig(6) of
MPI_FLOAT

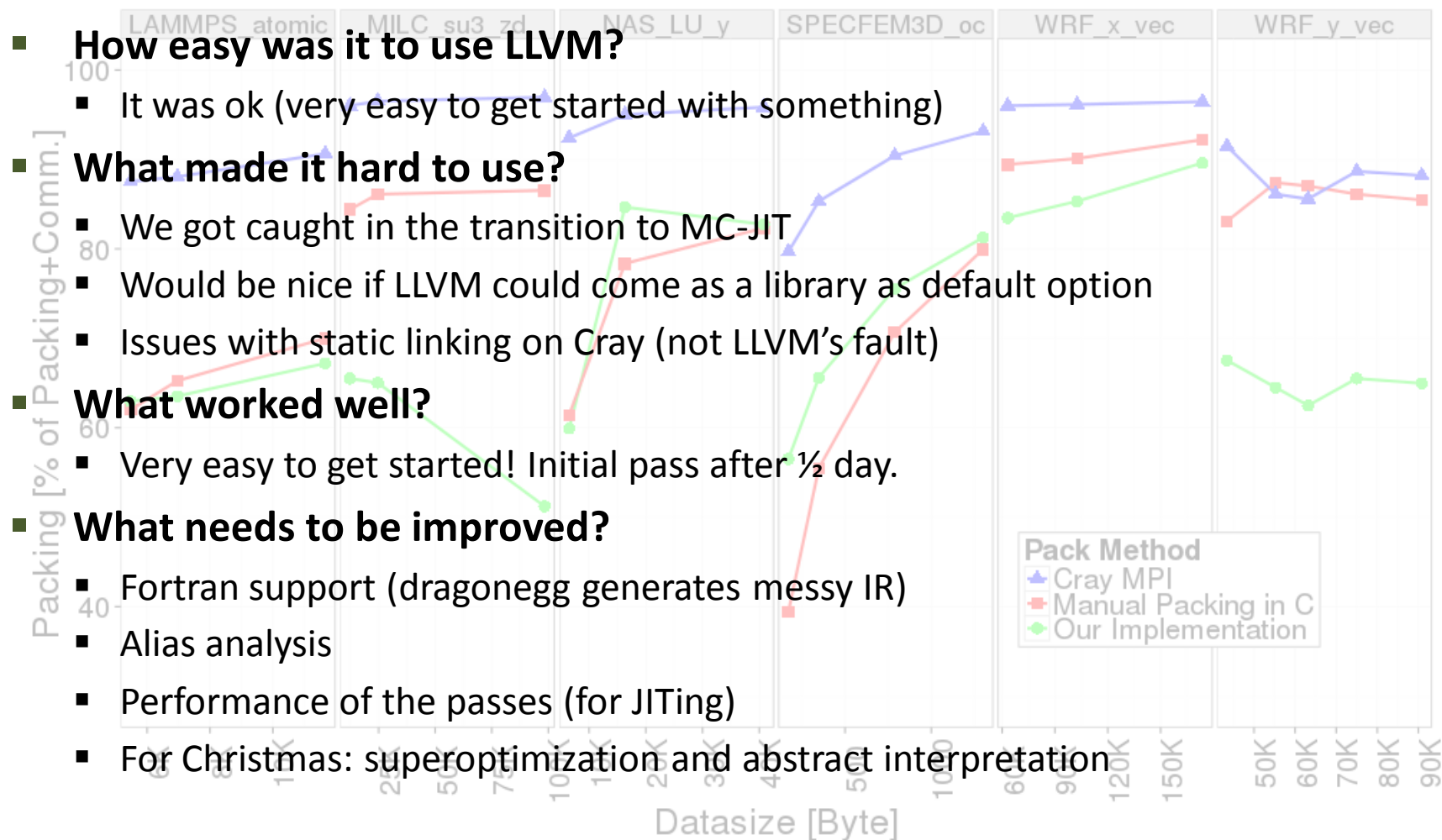
This datatype is used by the
Quantum-Chromodynamics
code MILC [1]

Irregular Packing Performance (LLVM 3.1 -O3)



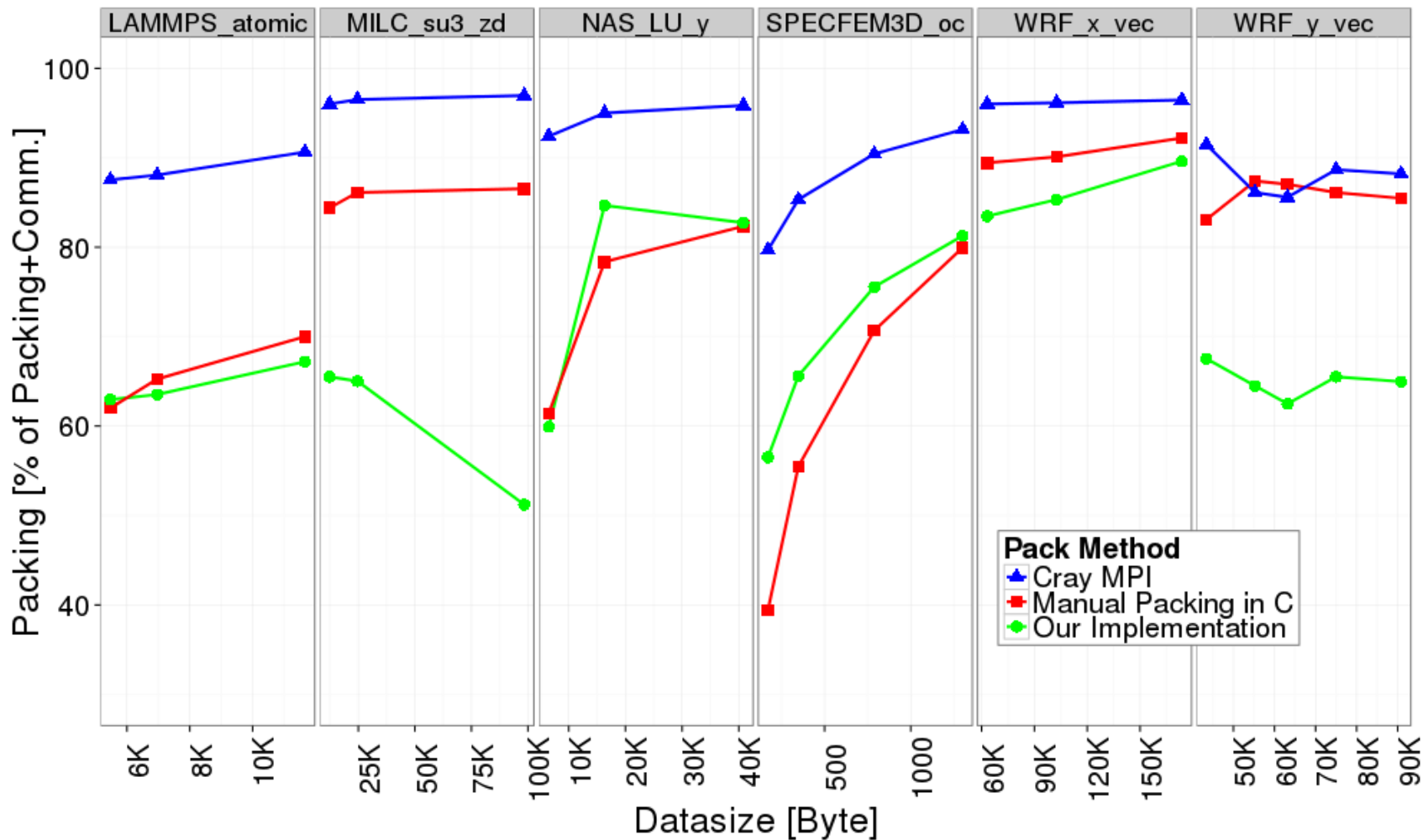
Hindexed DDT with
random displacements

Our Observations



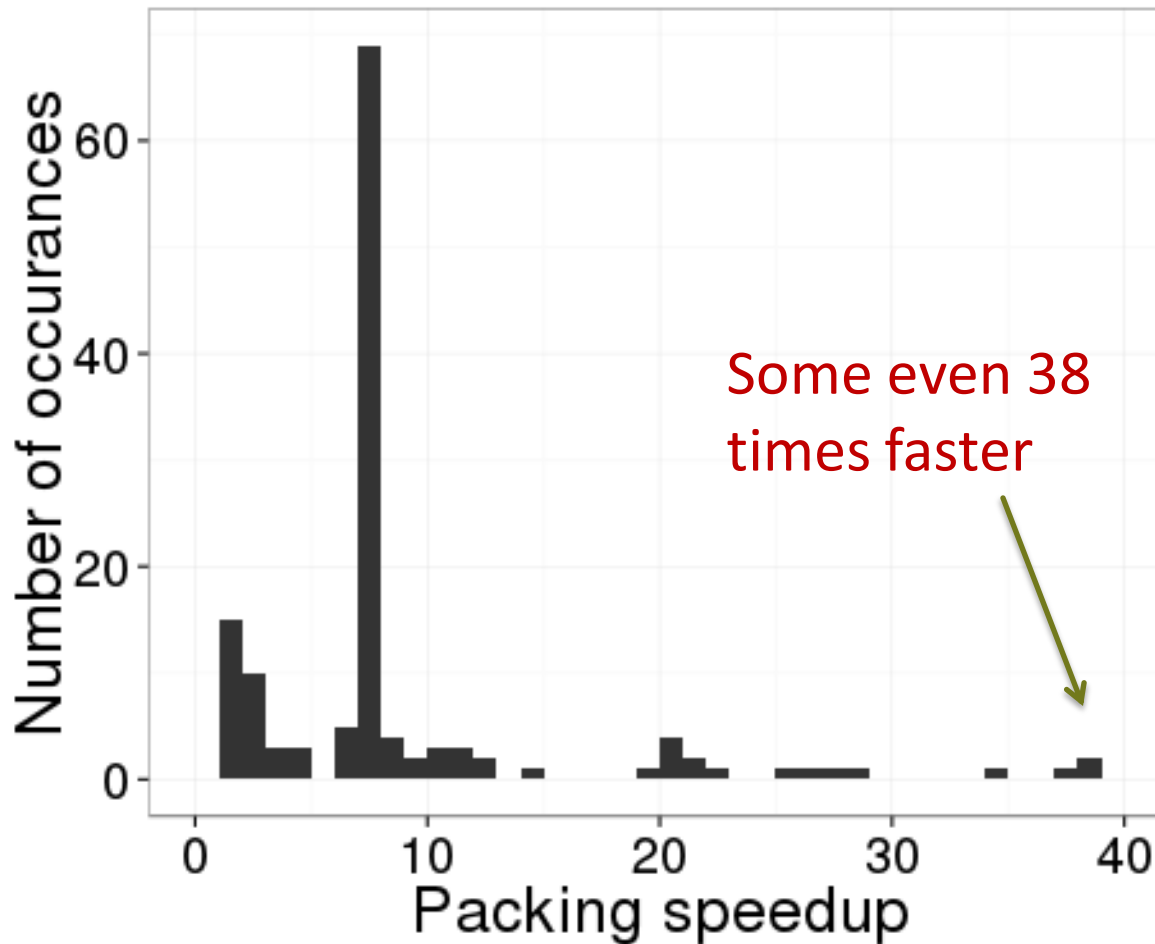
Backup Slides

LLVM-JIT DDTs vs. manual packing (and Cray)!

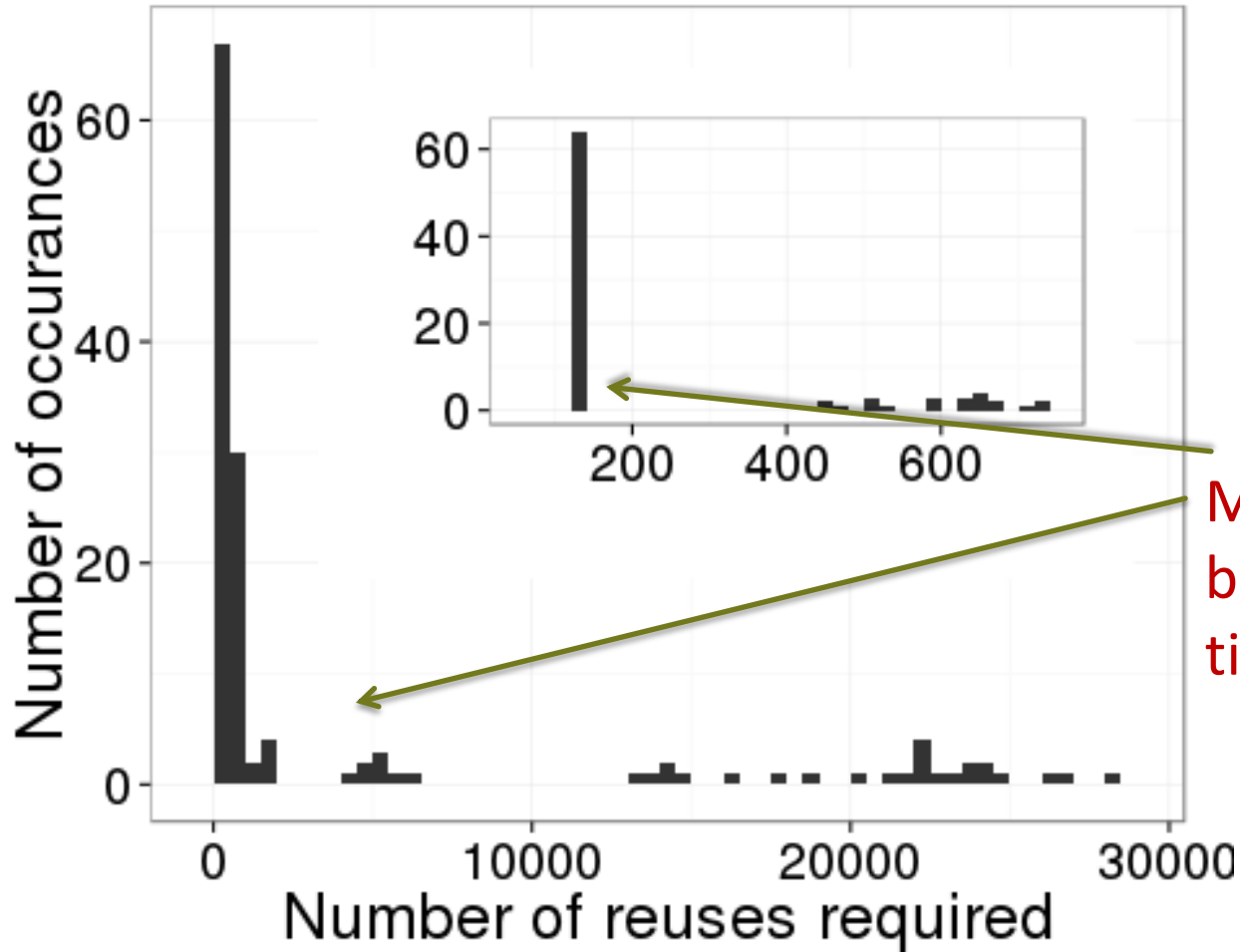


Performance Study: MILC

- Packing faster, but commit is now slower



Performance Study: MILC



Most datatypes have to be reused 180-5000 times