



A Unified Sparse Matrix Storage Format for Heterogeneous Systems

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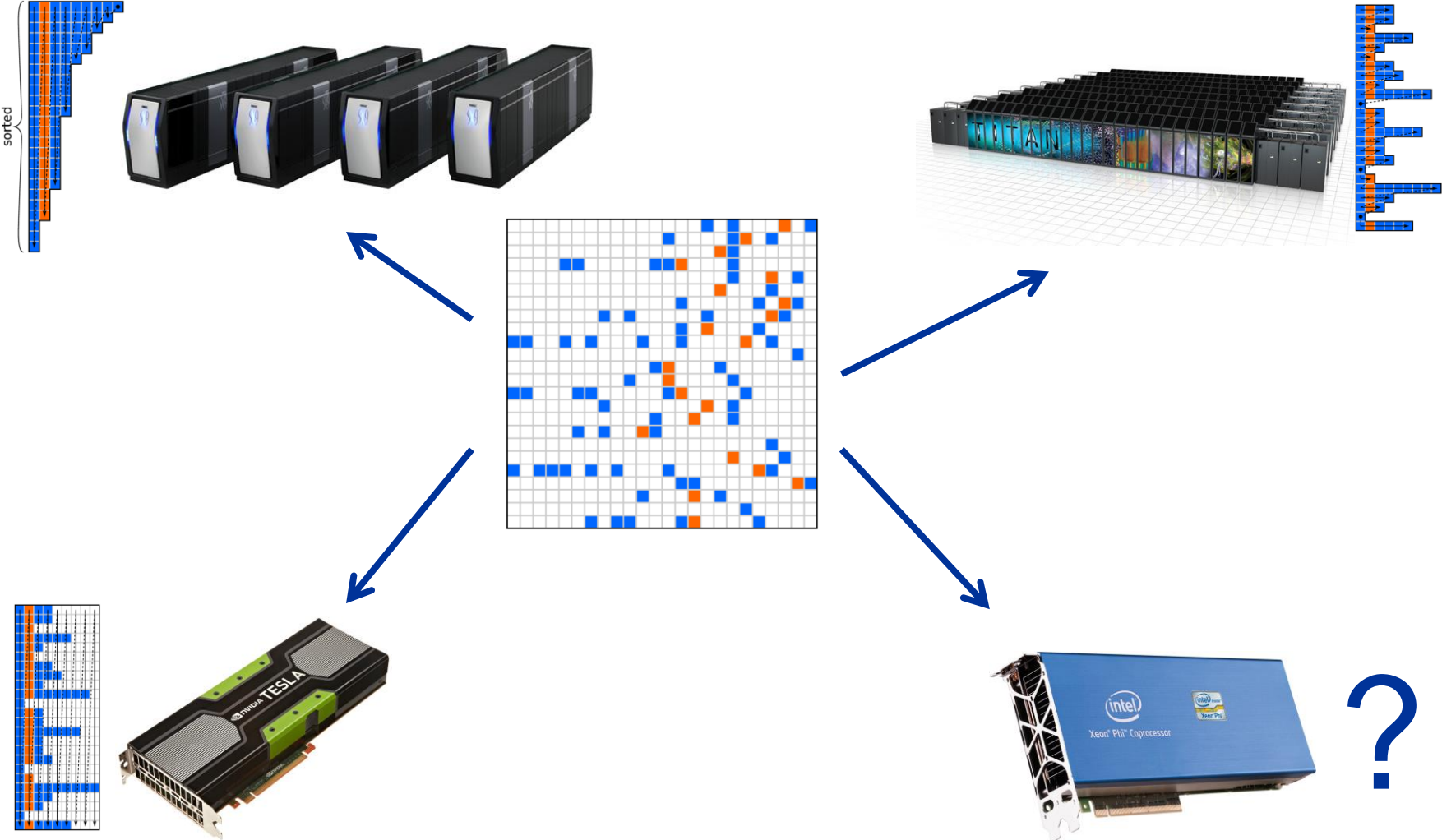
Early Research Showcase @ SC13, Denver, CO



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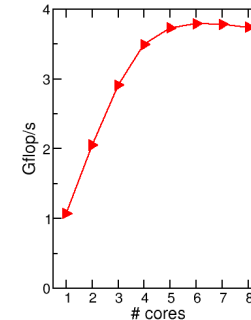
Variety of Sparse Matrix Storage Formats





Sparse Matrix Vector Multiplication (SpMVM):

- **Dominates runtime** in iterative solvers
- **Memory-bound**
- **Choice of matrix storage format is crucial for performance**
- **Optimal storage format is hardware-dependent**



Contribution:

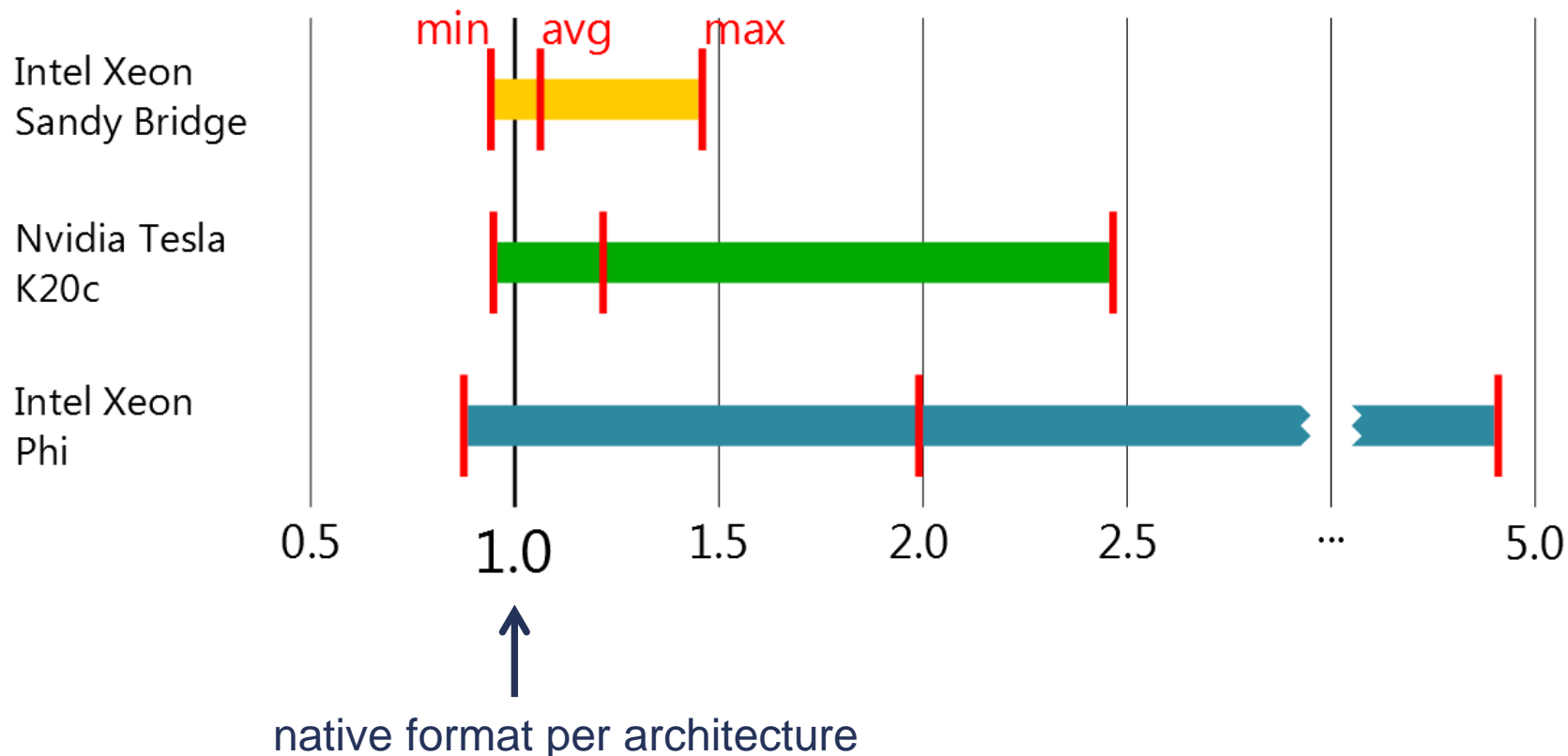
A single, high-performance format for all architectures

→ See poster for details!

SELL-C- σ : Relative Performance Benefit



16 square sparse matrices from UFL collection^[1]



[1]: <http://www.cise.ufl.edu/research/sparse/matrices/>

SpMVM Performance in a Heterogeneous System



2x Ivy 12 Gflops/s

K20m 22 Gflops/s

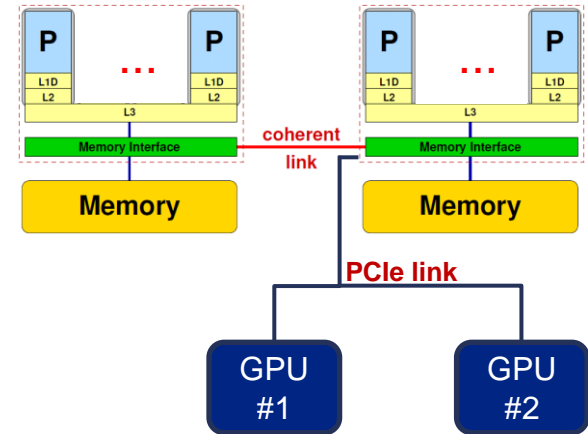
2x Ivy + K20m 33 Gflops/s

2x K20m 43 Gflops/s

2x Ivy + 2x K20m 53 Gflops/s

2x Ivy + 2x K20m (ideal) 56 Gflops/s

Two 10-core sockets of Intel Xeon Ivy Bridge and two Nvidia Tesla K20m GPUs



(SELL-32-1, ML_Geer matrix, 64-bit values, 32-bit indices, ECC=1)



Thanks for the attention!

Feel welcome to ask any questions at the poster session.

If you want, check out our paper on the topic: tiny.cc/sellcsigma

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