

Optimization of Vertical and Horizontal Beamforming Kernels on PowerPC with AltiVec

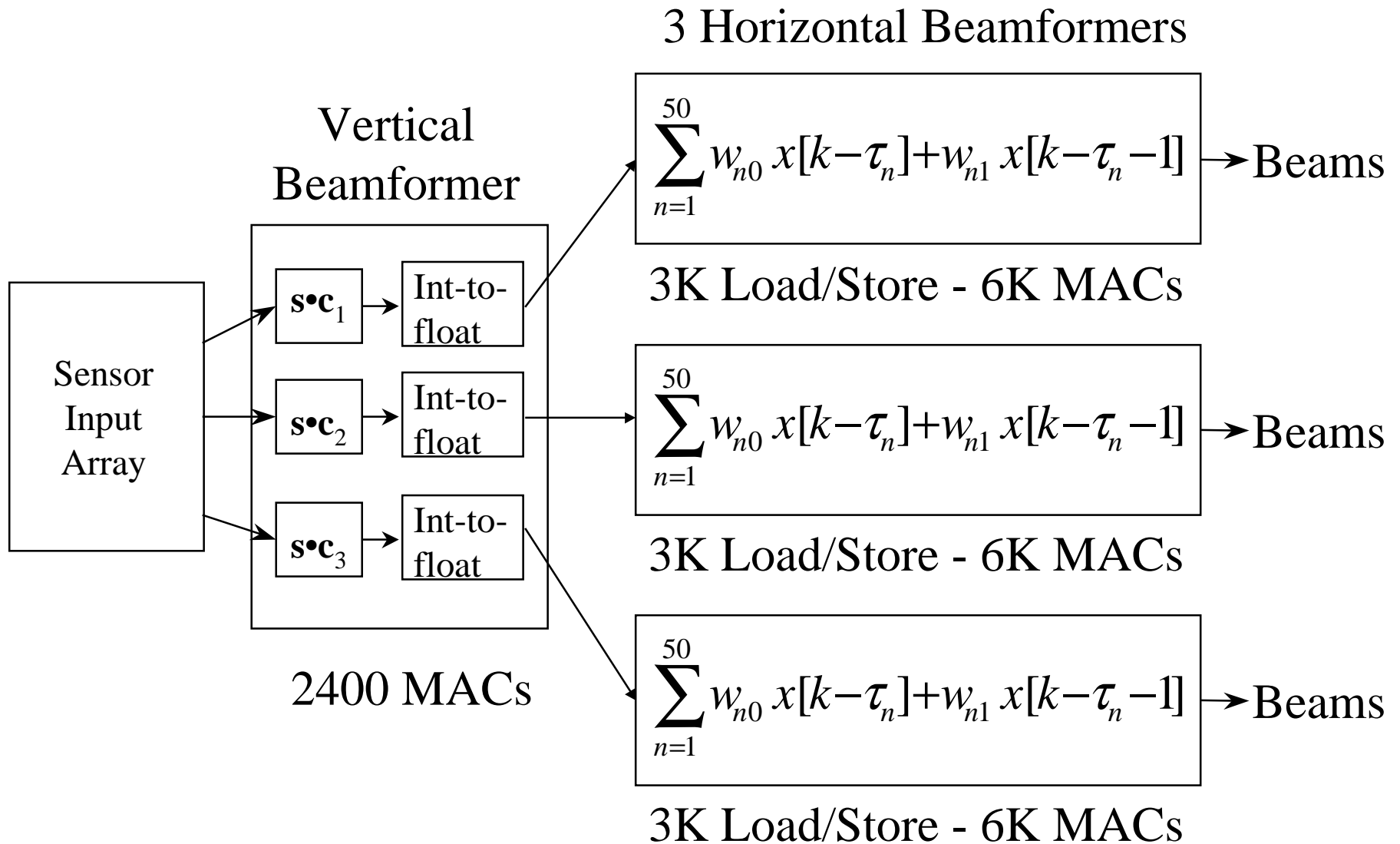
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Embedded Software Systems

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Sonar Beamforming



Issues to Consider

■ Platform

- Operating System
- Compiler

■ Architecture

- Instruction Set
- Cache Organization

■ Kernel Implementation

- Data Structure
 - Corner turn
- Data Alignment

Our Implementation

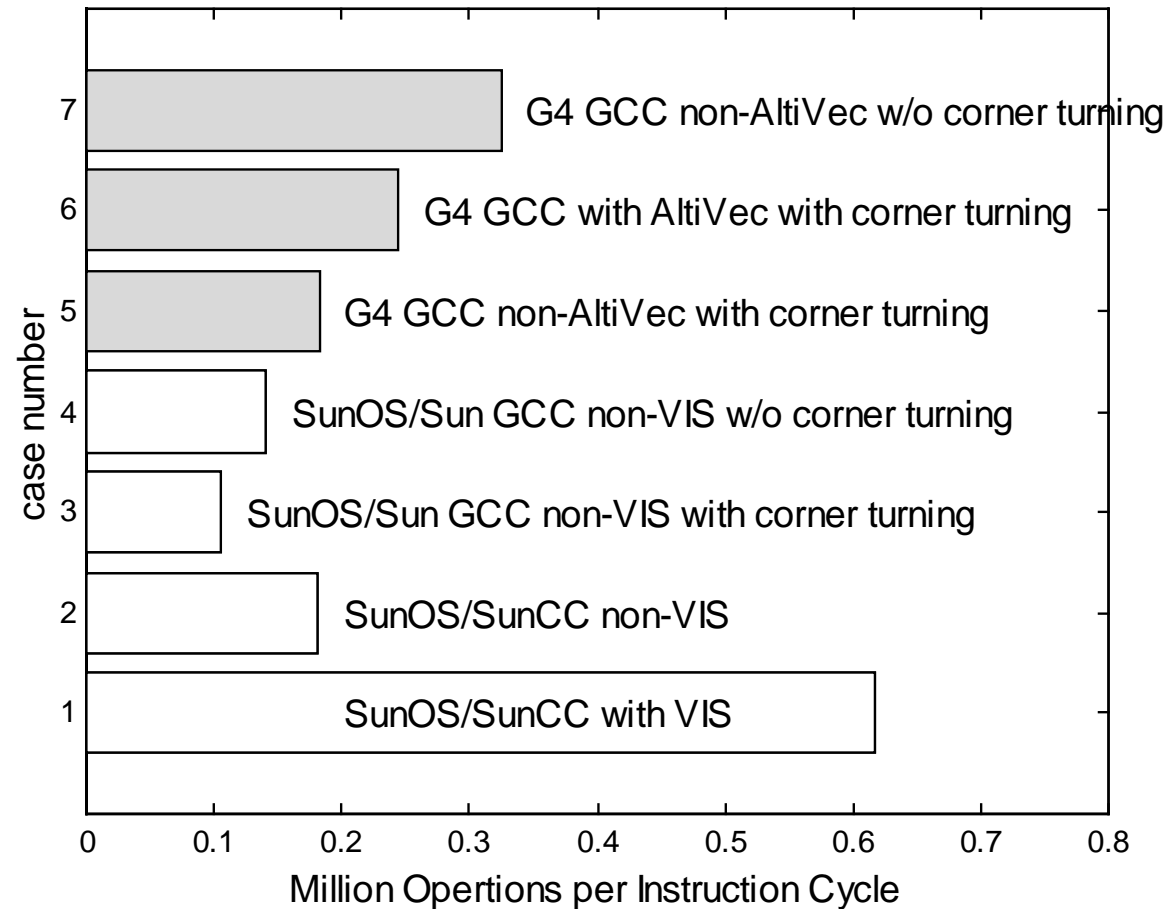
■ Kernels

- Corner turn for SIMD
- AltiVec in Horizontal Kernel
- Optimum Loop unrolling
- Data Prefetch

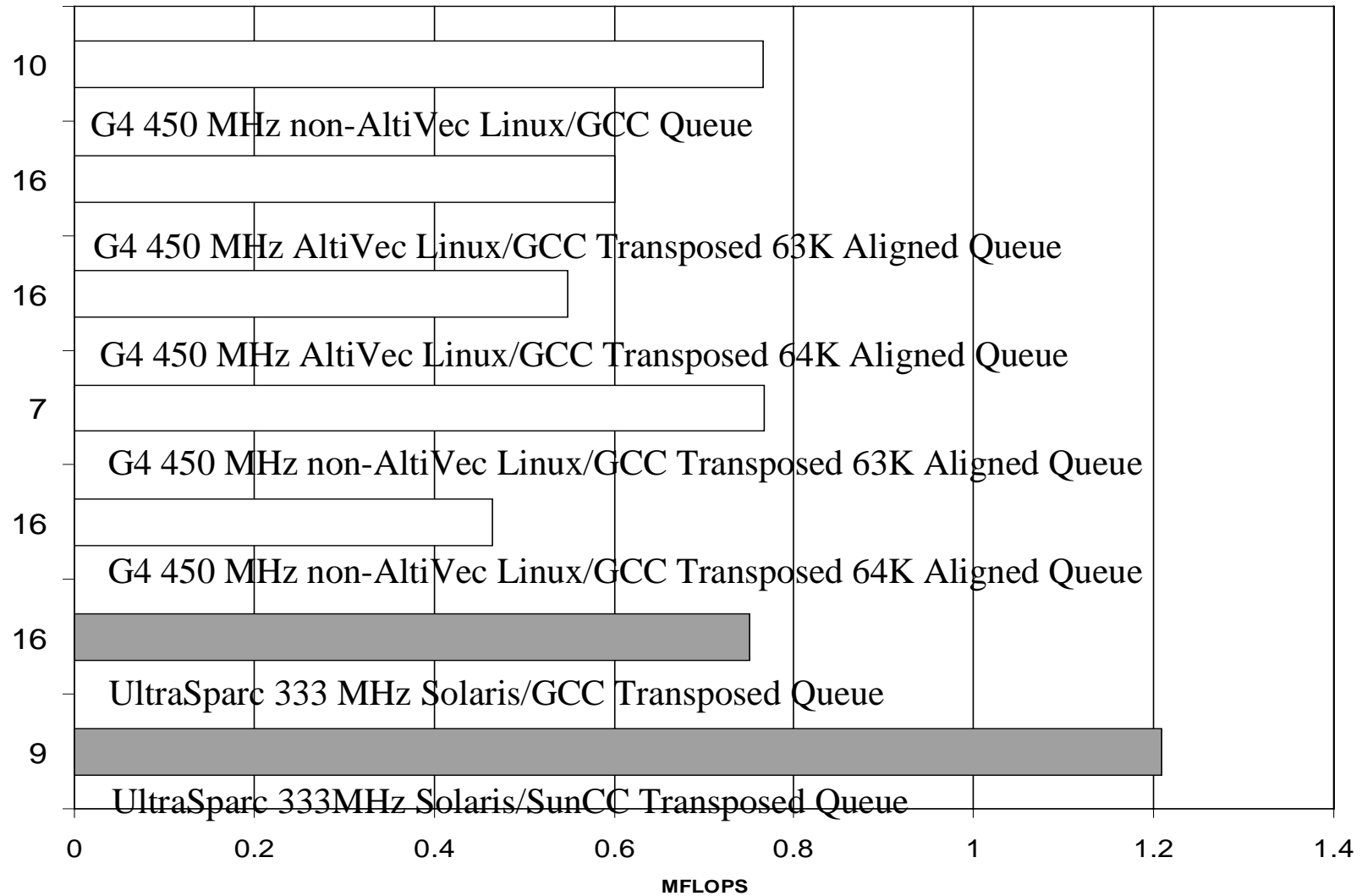
■ Comparison Platform

- Linux with GCC in PPC
- Solaris with GCC in UltraSPARC
- Solaris with SunCC in UltraSPARC

Vertical Kernel Performance



Horizontal Kernel Performance



Conclusion

- Similar issues as in DSP
 - Architecture Specific
 - Hand Optimization
- Performance comparison
 - Compiler Optimization
 - Cache Architecture
- Final Evaluation