MLIR Tutorial

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Context

End of Growth of Single Program Speed?

40 years of Processor Performance

- CISC: 2X/3.5 yrs (22%/yr)
- RISC: 2X/1.5 yrs (52%/yr)
- End of Dennard Scaling: 2X/3.5 yrs (23%/yr)
- Amdahl’s Law: 2X/8 yrs (12%/yr)
- End of the line?: 2X/20 yrs (3%/yr)

Technology & Power: Dennard Scaling

- Relative Power per nm^2

A New Golden Age for Computer Architecture

A New Golden Age for Compilers
MLIR: Multi-Level Intermediate Representation

Next generation open source compiler infrastructure
  • LLVM core project

Well positioned to support this new golden age!

Multiple open-source frontend languages (not just ML!)
  Exascale Fortran, Tensorflow, pytorch -> C, HIP/CUDA, SYCL

Multiple open-source backends
  LLVM, GPU, ACAP, Programmable Logic
<table>
<thead>
<tr>
<th>Agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MLIR Basics</strong></td>
</tr>
<tr>
<td><strong>CPU and GPU Code Generation</strong></td>
</tr>
<tr>
<td><strong>Break</strong></td>
</tr>
<tr>
<td><strong>ML Frontends and TOSA</strong></td>
</tr>
<tr>
<td><strong>Hardware Design and CIRCT</strong></td>
</tr>
</tbody>
</table>
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