Co-Design in Collaborative Projects

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Arm for HPC: Co-design Opportunities
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Collaborative Projects in the Arm Partnership

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FastForward-2 Project

- Excellent collaboration to accelerate research on technologies towards exascale
- DoE labs proxy-apps as target application driving requirements
- Key co-designed technologies:

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<th>Software</th>
<th>Architecture</th>
<th>Micro-Architecture</th>
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<td>Vectorizing compiler</td>
<td>Scalable Vector Extension</td>
<td>Next-gen SoC design</td>
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<td>Threading runtime system</td>
<td>Next-gen Arm Architecture</td>
<td>Data movement reduction</td>
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<td>Application refactoring</td>
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PathForward Project

• Continue collaboration to explore new advances in system and node technology
• ECP proxy-apps as driving applications
• Sustained performance, power efficiency, scalability and reliability

**Scalability**

• Improve resource utilization of parallel apps
• Scalable SoC design
• Synchronization, communication, coherence
• Dynamic scheduling (tasks), vectorization

**Architectural Extensions**

• Future Arm architecture features
• Data movement/addressing improvements
• Synchronization improvements
Arm Co-design Opportunities

• Arm Architecture research and development is a partnership effort

• Data-driven mindset: open to use cases for justification of architecture and microarchitecture enhancements

• Collaborative projects are effective to bring together IP, SiP, system and software

• We are here to help!
  • Enable software ecosystem, toolchains
  • Design Arm-based HW with SW requirements $\leftrightarrow$ Tune SW to best exploit Arm-based HW
  • Let’s talk