

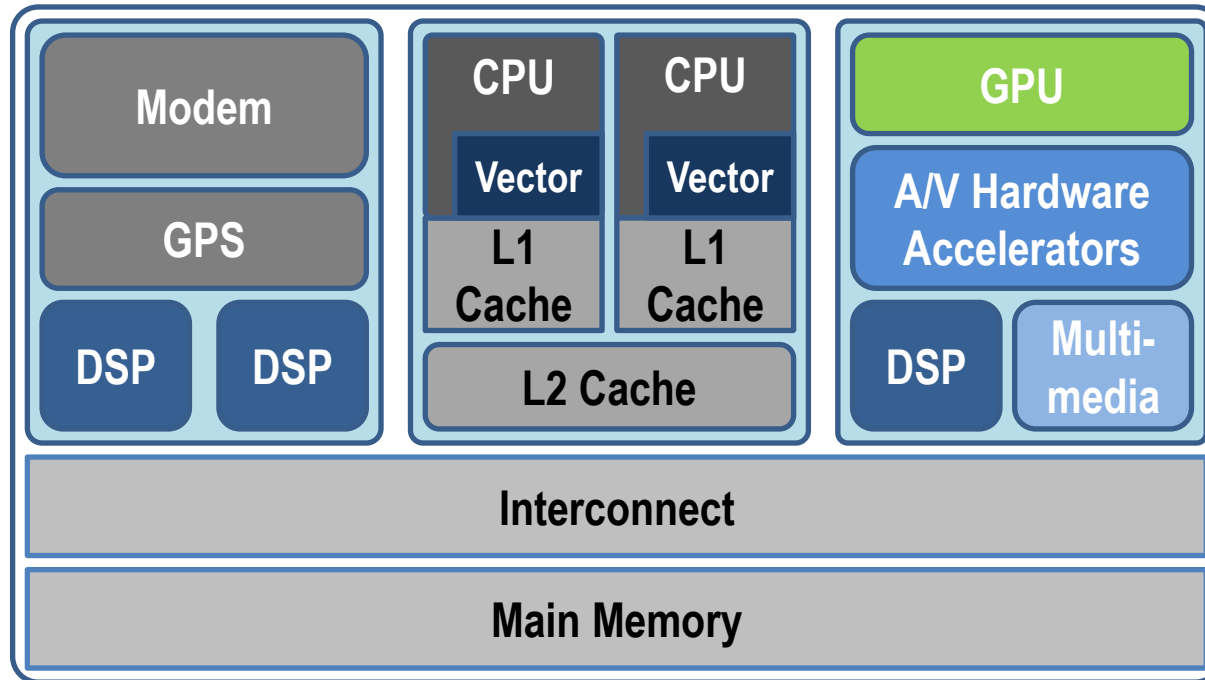


Virtual Instruction Set Computing for Heterogeneous Systems



Heterogeneous systems key to address power wall

Modern smartphone SoC



But it's difficult to program them due to diverse HW!

6 different ISAs, 7 different parallelism models, & Incompatible memory systems

- CPU, GPU, DSP, Vector Units, Multimedia, Audio-Video Hardware accelerators



Problem: Programming Heterogeneous Systems

- **Goal:** Solve major programmability challenges

- Simpler algorithm design
- Source- and object-level portability
- High performance without low-level tuning
- Uniform programming tools

- **Strategy:** Abstract away hardware differences

- Low-level, language neutral virtual ISA
- Wider range of hardware than previous systems
- Few parallelism models
- Uniform memory abstractions

