Photo: necosky on Flickr

Collabora MULTIMEDIA

Or,

Vector Optimisation For SIMD Newbies

… by a SIMD newbie

What is SIMD?

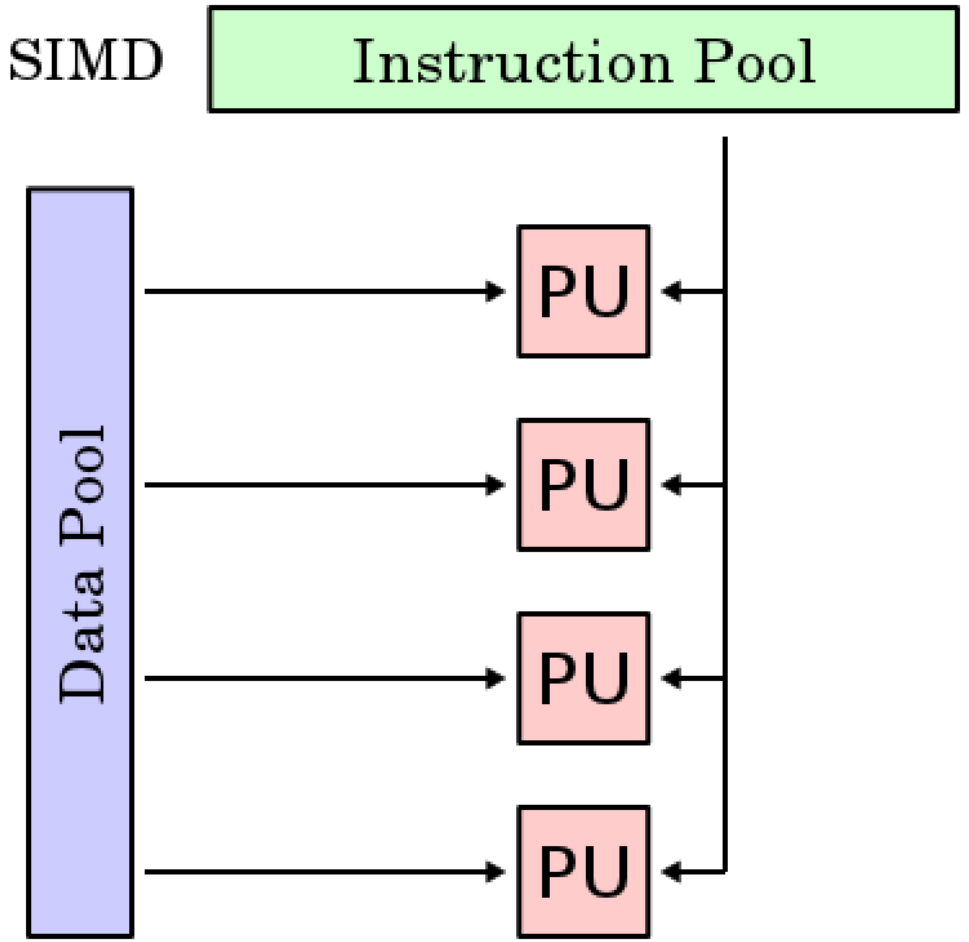


Image: Wikipedia

x86: MMX/3DNow/SSE*

ARM: NEON

GPGPU: CUDA/OpenCL

Works well for a very specific subset of apps

3D Graphics

Signal processing

Other (specific) forms of data crunching

But writing SIMD assembly is hard

Need to write once per architecture/processor

Enter: Orc

Project started by David Schleef

Write “programs” in simple ASM-like language

Runtime compiler: “programs” → native assembly

Library: extend Orc for your purposes

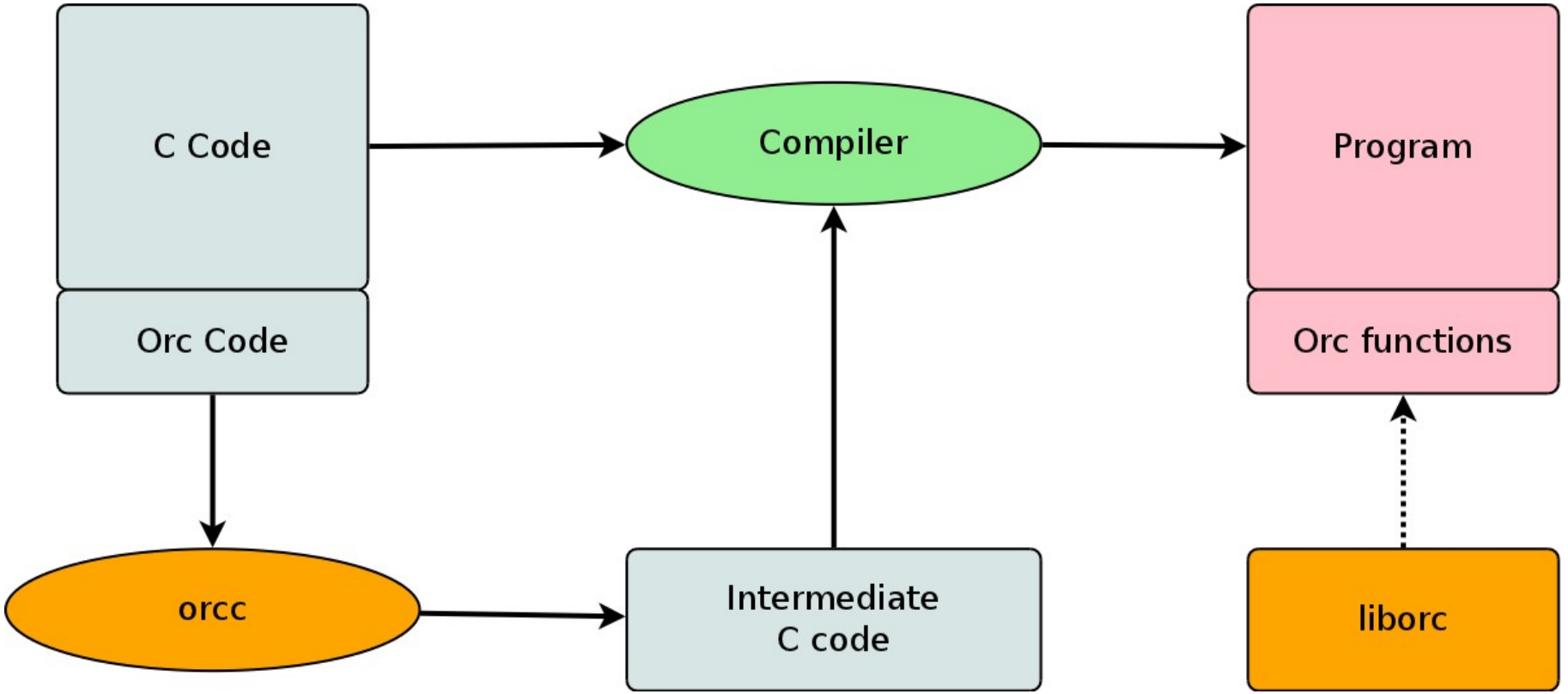
Supports:

MMX, SSE (1 to 4.2)

ARM, NEON

Altivec (PPC)

C64x (TI DSP)



Getting started

A simple example: PulseAudio echo canceller

That alone provided a >20% speedup

Another one: PulseAudio volume scaling

Sample **s**: 16-bit signed int (usually)

Volume **v**: 32-bit unsigned int

Operation: (**s** * **v**) >> 16

The C code

The SSE code

The Orc code

TBD: More AEC optimisation (dot product)

Limitations

Future work

Questions?

IRC: #orc on FreeNode