The CoSy Compiler Development System by ACE
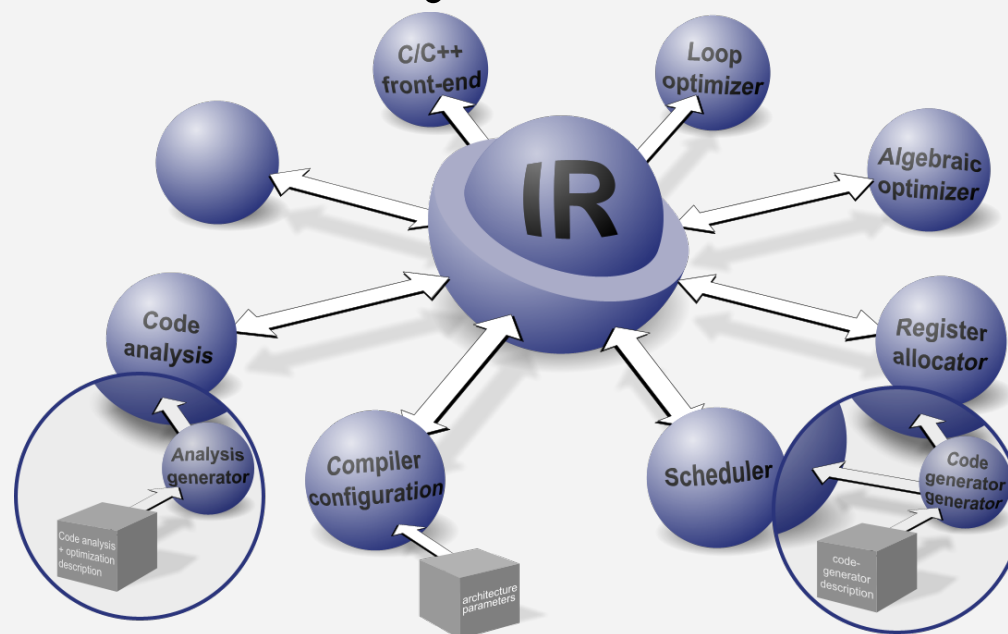

**Products and services
for professional compiler developers**

www.ace.nl

ACE Associated Compiler Experts

- **ACE founded in 1975**
  - Automation of a linear accelerator with Unix -> Unix porting business -> Retargetable compilers -> CoSy compiler development system

- **CoSy designed and implemented starting from 1989, as part of a European Project; Product ready in 1995**

- **ACE is an SME based in Amsterdam with about 15 compiler developers, of which 5 are PhDs**

- **One of the very few independent compiler companies left**

- **Serving a world-wide market (not yet in Brazil)**

CoSy Characteristics

- **For the C family of languages, aimed at the embedded market**

- **Single IR, control flow based**
  - **IR is generated from a distributed description: every 'engine' can extend the IR with data structures**

- **More modular than any other compiler framework**

- **Extensible and flexible**
  - **Fixed point, arbitrary primitive data types, multiple memories, processor specific extensions**

- **Generated code generator**
  - **Supports VLIW, non-interlocked architectures, predicated execution, software pipelining, hardware loops, …**

Compiler Business is Pretty Tough…

- **Worldwide compiler development costs are estimated about two Billion dollars…**

- **… but the revenues from compiler sales are about one Billion dollars**

- **ACE can only exist by delivering superior quality and performance**

- **Strong competition from open source alternatives**
  - **Free to start with, but requires more effort and does not deliver as quickly as CoSy; lacks features required in embedded**
  - **CoSy teams are initially two persons, then just one for maintenance, against 5 to 10 or more for open source alternatives**

… But We Like a Fight

- **Our benchmarks show that we are ahead of the LLVM-ARM9 compiler by some 15%**
  - Also ahead of GCC, but with smaller margin

- **We accept a challenge**
  - Recently developed a RISC compiler in 10 days with CoSy, outperformed in-house LLVM by 30%

- **Our customers:**
  - Like to have a professional place to get support from
  - Do not like the risk of open source (patents, IP-rights, backdoors)
  - Like to limit the effort of compiler development
  - Like our network of commercial and research partners
  - Like us ☺