CompCert is an optimizing C compiler which is formally verified, using machine-assisted mathematical proofs, to guarantee the absence of compiler bugs. The code it produces is proved to behave exactly as specified by the semantics of the source C program. This level of confidence in the correctness of the compilation process is unprecedented and contributes to meeting the highest software assurance levels.

Supported Targets
- PowerPC (32-bit and 32/64-bit hybrid)
- ARM
- IA32 (x86 32-bit)
- AMD64 (x86 64-bit)
- RISC-V (32- and 64-bit)

"The striking thing about our CompCert results is that the middle-end bugs we found in all other compilers are absent. As of early 2011, the under-development version of CompCert is the only compiler we have tested for which Csmith cannot find wrong-code errors. This is not for lack of trying: we have devoted about six CPU-years to the task. The apparent unbreakability of CompCert supports a strong argument that developing compiler optimizations within a proof framework, where safety checks are explicit and machine-checked, has tangible benefits for compiler users."

Study by Regehr, Yang et al. on a development version of CompCert in 2011