Programming Language

The kernel is written in the C programming language [c-language]. More precisely, the kernel is typically compiled with `gcc` [gcc] under `-std=gnu11` [gcc-c-dialect-options]: the GNU dialect of ISO C11. `clang` [clang] is also supported, see docs on :ref:`Building Linux with Clang/LLVM <kbuild_llvm>`.

> **System Message: ERROR/3 (`D:\onboarding-resources\sample-onboarding-resources\linux-master\Documentation\process\[linux-master][Documentation][process]programming-language.rst`, line 6); *backlink***
>
> Unknown interpreted text role "ref".

This dialect contains many extensions to the language [gnu-extensions], and many of them are used within the kernel as a matter of course.

There is some support for compiling the kernel with `icc` [icc] for several of the architectures, although at the time of writing it is not completed, requiring third-party patches.

Attributes

One of the common extensions used throughout the kernel are attributes [gcc-attribute-syntax]. Attributes allow to introduce implementation-defined semantics to language entities (like variables, functions or types) without having to make significant syntactic changes to the language (e.g. adding a new keyword) [n2049].

In some cases, attributes are optional (i.e. a compiler not supporting them should still produce proper code, even if it is slower or does not perform as many compile-time checks/diagnostics).

The kernel defines pseudo-keywords (e.g. `__pure`) instead of using directly the GNU attribute syntax (e.g. `__attribute__((__pure__))`) in order to feature detect which ones can be used and/or to shorten the code.

Please refer to `include/linux/compiler_attributes.h` for more information.

[c-language] http://www.open-std.org/jtc1/sc22/wg14/www/standards

[gcc] https://gcc.gnu.org

[clang] https://clang.llvm.org

[icc] https://software.intel.com/en-us/c-compilers

[gcc-c-dialect-options] https://gcc.gnu.org/onlinedocs/gcc/C-Dialect-Options.html

[gnu-extensions] https://gcc.gnu.org/onlinedocs/gcc/C-Extensions.html

[gcc-attribute-syntax] https://gcc.gnu.org/onlinedocs/gcc/Attribute-Syntax.html

[n2049] http://www.open-std.org/jtc1/sc22/wg14/www/docs/n2049.pdf