



ferrous systems

Ferrous Systems UK Ltd
201a Victoria Street, Office G
London, SW1E 5NE
United Kingdom

ABSTRACT: Using Rust for Mission Critical Systems

Peeling away the layers of any software stack will ultimately end up with a layer of “systems software”. This is software that is compiled to machine-code and executes directly on the processor (or perhaps a simulation or virtualisation thereof). For the past 40 years, the standard for such software has been the C Programming Language, with some systems making good use of C++ or Ada. However, all such languages place a heavy burden upon the developers in that it is necessary to manually ensure the program is free of *undefined behaviour*. Any mistakes can be catastrophic and so the verification and validation must be extensive. Some tools are available to support this process, but the C language doesn't lend itself to the kinds of extensive analysis required.

The Rust Programming Language is rapidly gaining favour as a productive tool for producing safe and performant systems software on a wide range of platforms. It supports everything from cloud/server systems, to mobile and web, to very small embedded systems. This talk will introduce the language and the latest successes (and some challenges) people have had with it, in particular around producing real-time embedded systems where the system is mission critical. The goal is to help people answer the question “Does it make sense to look at Rust for my next embedded project? And if so, where do I go next?”. We will also discuss Rust's applicability for systems that must meet standards such as DO-178C and ISO 26262 using the Ferrocene qualified toolchain.

About the Presenter

Jonathan Pallant has been working with Embedded Rust since 2017. He is a founder member of the Rust Embedded Working Group and has developed a number of demonstration projects and support libraries in Embedded Rust, on a variety of microcontroller platforms. Jonathan currently teaches Rust as a trainer at Ferrous Systems and is a member of the Rust Project Leadership Team. Prior to working full-time with Rust, Jonathan helped design and maintain the firmware for a variety of Iridium satellite modems and telephones, including several based on the Gaisler LEON3.