

FSMLabs RTLinux PSDD: Hard real-time with memory protection

FSMLabs
Victor Yodaiken
yodaiken@fsmllabs.com
Michael Barabanov
baraban@fsmllabs.com
Cort Dougan
cort@fsmllabs.com
FSMLabs Inc.

ABSTRACT

This paper describes the process space (user mode) real-time facility on RTLinuxPro. The Process Space Development Domain (PSDD) is available on PowerPC and X86, supports SMP, and has extensive support for developing simulations including a secondary frame or slot scheduler. The API is a subset of the standard RTLinux POSIX Threads API and, in fact, process space threads can be recompiled to run as kernel space threads with no programming changes. The standard debuggers work with process space threads. One useful feature of PSDD is that process space threads share memory with the host UNIX process and are able to, for example, dynamically update variables shared between real-time I/O threads and a non-real-time simulation. PSDD supports use of Fortran and C++ as well as C.

The paper covers:

1. Real-time and memory protection
2. Overview of Process Space Real-Time and examples
3. The Frame Scheduler and examples
4. Technical Overview and API
5. Credits and History