

Ground-Based Preparatory Activities (11)
Ground-Based Preparatory Activities (1) (1)

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DESIGN AND IMPLEMENTATION OF EMBEDDED SIMULATION PLATFORM FOR IN-ORBIT
LARGE-SCALE SOFTWARE DEVELOPMENT

Abstract

Starting from the requirements and characteristics of in-orbit large-scale software development, aiming at the key and difficult point of virtual simulation during development of embedded software, this paper analyzes the gap between the functional performance of the current embedded simulation platform and the needs of developers. According to the idea of high performance, open, compatible, high cohesion and low coupling, an embedded high-performance simulation platform, which is based on QEMU hardware simulation system and Docker container virtualization technology, has been designed and implemented in the face of embedded simulation technologies in urgent need of improvement above mentioned. The platform supports mainstream core hardware devices, and has the characteristics of rapid simulation development, flexible interface customization, and self-controllable code. The embedded simulation platform can realize embedded Uboot startup, embedded Linux kernel loading, file system loading, interface communication (serial port, CAN, etc.), Docker container loading, and virtual testing. It is suitable for the development, transplantation and rapid verification of artificial intelligence algorithms. This paper presents the design idea and framework structure of the embedded simulation platform, and further verifies the feasibility, rapidity and effectiveness of the application of the platform in the rapid development of in-orbit large-scale software by summarizing the actual application, which embodies the engineering value of the embedded simulation platform.