

LeanOS - An Operating System for the SSDP

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The SSDP is a next-generation payload data processor developed in the frame of ESA programmes. For best efficiency this new processing platform requires a novel approach for management of system resources, DMA mechanics and DSP program design. Consequently, the flight software team of the University of Vienna developed an operating system to stably operate the SSDP at its performance limit.

LeanOS is designed with Symmetric Multiprocessing in mind and can support the SPARC Reference Memory Management Unit, including Paging and Virtual Memory. It comes with Loadable Kernel Module support, offering a means of dynamic reconfiguration and driver updates at run-time. An outstanding feature is the NoC/Xentium DSP data processing driver, which allows on-the-fly creation of arbitrary data processing chains for individual tasks. These based on meta-data descriptions of processing operations for a given data set. Operations on the data are done through Xentium processing program nodes that are capable of executing only a single type of operation. These nodes are loaded into the DSPs as needed. The modular approach supports well the creation of function libraries aiming at data processing, which in turn allows for rapid, system-independent development and testing.

While the operating system has been designed specifically for the SSDP, it can be reconfigured to run on most LEON-based platforms. LeanOS offers extensive support documentation and follows the ECSS standards. It is developed under an open source license.

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