



# **Starlight Linux: Linux Distribution for Embedded Systems**

White Paper



## Introduction

Starlight Linux, a joint project of Auriga and NICEVT (Science and Research Center on Computer Technology, Russia), is a technology based on the popular Linux operating system. Starlight Linux is a full-featured distribution of an embedded Linux targeting a number of microprocessor architectures widely used in the embedded products space. Microprocessor families supported by Starlight Linux include x86, PowerPC, ARM, and others.

Several factors have converged to make Linux an attractive offering in the embedded systems space. Linux, freely available from Internet for evaluation and use for everybody, runs on most of today's modern processors. Many developers have been successfully using it in their embedded products. Still, embedding Linux into a target system remains a non-trivial effort. Tasks a developer has to face include configuration of the development tools for the target processor, port of the Linux kernel onto the embedded system, finding or developing device drivers for the peripherals used in the application, fitting required Linux functionality into the limited resources of the target system, and many other small and not-so-small tasks and challenges that considerably increase the overall cost of the product and delay the moment it enters the market.

Starlight Linux fulfills the need for an off-the-shelf distribution of an embedded Linux directly supporting the needs of a modern embedded application.

## Supported Microprocessor

Starlight Linux supports the following wide range of the microprocessor architectures and families:

- x86, including embedded variants such as PC-104 form factor
- PowerPC
- PowerQUICC and PowerQUICCII
- ARM and StrongARM
- SuperH
- MIPS

## Key Features of Starlight Linux

Starlight Linux is a full-featured, state-of-art Linux development environment that comes with support for the following features and capabilities:



- Pre-built, pre-configured cross development tools supporting the microprocessor architecture of your choice. The development tools are composed of the standard GNU compilers toolchain and modern development tools for creating Linux images ready to run on the embedded target.
- Linux kernel and key userland components customized for small storage and memory. The minimum target size for Starlight Linux is 4 MB of RAM and 1 MB of ROM, Flash, or disk. Starlight Linux incorporates a number of special technologies for a small footprint. These technologies are a result of our innovative enhancements to the Linux kernel, components, and tools as well as many days and weeks spent reviewing and adapting many ideas developed by the Linux community.
- Comprehensive porting kit based on a step-wise procedure for bringing Linux up on your embedded system.
- A test suite for validation of the key Linux features and capabilities on the target system.
- Comprehensive set of the off-the-shelf Linux device drivers supporting key communication protocols, power management facilities, Flash file system, software watchdog timers, and many others.
- Full-featured Linux kernel debugger interfacing to the cross GDB and GDB based GUI debuggers residing on the development host.
- Advanced set of the configuration and development tools for creating a minimal Linux image customized for a particular set of peripheral features and Linux functionality and capabilities (for instance, IP routing, terminal server, and so on). The configuration tools based on the RPM packaging system enhanced to support metaformat configuration information, allow the user to carefully select only those features and capabilities that are required on the embedded target.
- A number of prebuilt, pre-configured Linux images, each showing a particular feature of the embedded Linux on the target, enabling the user to jump-start development of a custom embedded application.
- Reproducible build and quality control composed of full source of all the target components and the development tools that allow to manage the build process.
- Comprehensive user documentation.

## Consulting Services

Auriga and NICEVT have a joint consulting department dedicated to providing software development services in the area of embedded and real-time system design. The department focus is on Open Source Software, especially Linux.



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**Consulting services include:**

- integrating Linux into embedded systems and network appliances
- optimizing Linux for non-standard hardware and special-purpose devices
- troubleshooting, identifying and solving the problems by tuning the existing Starlight Linux implementation
- writing firmware
- writing device drivers
- porting Linux to new hardware
- porting or migrating existing applications/drivers from their native operating system to Linux
- developing applications to custom specific requirements.