

emtrion Debian Linux Real-time Packages

Rev	Date/Signature	Changes
01	02.02.2015/Bi	Initial revision

1 Introduction

The two most popular patchsets to enable the standard Linux kernel with real-time features are **Xenomai** and **PREEMPT_RT**. Emtrion wants to allow the users of our Debian BSP to try out these patchsets easily for their own purposes. Therefore we deliver pre-build kernel packages through our package repositories, which you can install on your emtrion Developer Kit.

Currently following kits and kernels are supported:

Kit	Kernel/Patchset Versions
DIMM-AM335x	PREEMPT_RT 3.14.29-rt26
	Xenomai 2.6.4 – Kernel 3.14.17

2 Packages

This section contains the package names. You can install them during runtime using the package management (e.g. apt-get). Please remember to **reboot** after installing a new kernel image.

2.1 Kernel

These are the Debian Packages deployed from the Kernel build. For runtime usage only the **linux-image[...]** packages are needed. **linux-headers[...]** and **libc-dev[...]** are only needed development.

Kit	Package names
DIMM-AM335x	linux-image-3.14.29-rt-emtrion
	linux-headers-3.14.29-rt-emtrion
	linux-libc-dev-3.14.29-rt-emtrion
	linux-image-3.14.17-xenomai-emtrion
	linux-headers-3.14.17-xenomai-emtrion
	linux-libc-dev-3.14.17-xenomai-emtrion

2.2 User Space

There exist additional user space packages for using/testing the realtime features of Xenomai or PREEMPT_RT. The package names are as follows. The **rt-tests** package pulls quite a lot of dependencies, so installing it on the flash of some devices can be problematic.

RT Patch	Package names
PREEMPT_RT	rt-tests
Xenomai	libxenomai1 xenomai-runtime

2.3 Additional Packages

For **GPU** support on **DIMM-AM335x** together with the real time kernels please use following packages. Be advised that using those kernel modules can impact your real-time performance.

RT Patch	Package names
PREEMPT_RT	am335x-gpu-driver-rt-emtrion
Xenomai	am335x-gpu-driver-xenomai-emtrion

3 Performance

We did some quick tests to measure worst case latencies while the systems are under stress. These are the results:

Board	RT Patch	Test scenario	wc latency
DIMM-AM335x	PREEMPT_RT	"cyclictst -p99 -m -n -i 200" while doing flooding on the device and running hackbench Having the GPU drive module loaded or not did not make a difference	90 us
	Xenomai	"klatency" – without GPU module while doing flooding on the device and running hackbench	12 us
		"klatency" – with GPU module while doing flooding on the device and running hackbench	20 us

The tests ran round 1h, so as already stated, the results are only from a rather quick test. Still they show the possibilities.

Also it has to be mentioned that the kernels are configured for full device support. Of course there are optimizations possible when knowing the exact specifications of a certain device. If you are interested in getting an optimized kernel for your system please contact us: support@emtrion.de

4 Creating Images with Real-Time Kernels

You can use the **elbe** tool to build images with the realtime kernel instead of the standard kernel. Therefore exchange the standard packages in the elbe XML with the realtime packages. We also have XMLs ready in our cloud. You will receive access, if you have bought one of our developer kits.

5 General documentation

<https://xenomai.org/>

<https://rt.wiki.kernel.org>